

of the Terns, of which ten species are introduced belonging to our native list. The most interesting species to the British ornithologist is the *Sterna Leucopreia*, for species of which, killed in the end of August at Lyme on the Dorsetshire coast, Mr. Yarrell is indebted to T. C. Heythem, Esq. of Carlisle.

Transactions of the Royal Society of Edinburgh. Vol. xv. Part 2. Session 1841-42, Dec. 1842. 4to. Grant and Son.

An unusually thin number, containing only sixty-nine pages; but we have among the contents two papers relating to zoology and botany, both of them illustrated with plates, of the first we have given an abstract at page 126 of the present Number. The second paper alluded to, is on the ultimate secreting structure, and on the laws of its function, by John Goodsir. The conclusions arrived at by the author are: "That all the true secretions are formed by a vital action of the nucleolated cell, and that they are first contained in the cavity of that cell; that growth and secretion are identical,—the same vital process under different circumstances.

Preparing for Publication.

Supplement to Dr. Parnell's Grasses of Scotland, including the Cereal Grain, making the British Grasses complete.

We have much satisfaction in learning that the results of Captain Belcher's Voyage in H.M.S. Sulphur are to be made available to science in the most advantageous manner, Government having advanced a sum of money to provide the requisite illustrations. Richard Brinsley Hinds, Esq. has been appointed by the Admiralty to edit and superintend the publication, and the co-operation of Mr. J. E. Gray, Dr. Richardson, Mr. Gould, &c., has been obtained by that gentleman, to describe respectively the mammalia, fish, birds, &c., the shells being undertaken by himself.

The work is to be published in parts, and at a moderate price.

Part XI. of Taylor's Scientific Memoirs, just published, contains Ehrenberg's important memoir on the Animals of the Chalk Formation.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Feb. 8, 1842.—William Yarrell, Esq., Vice-President, in the Chair.

Some notes on the habits of the Horned Screamer (*Palamedea cornuta*, Linn.), by William Martin, Esq., Secretary to the Clifton Zoological Gardens, were read.

These notes were communicated by the President, the Earl of Derby, and are drawn up from observations made upon a specimen of the *Palamedea* living in the Clifton menagerie.

"The Horned Screamer was presented to the Society early in June 1839, by Capt. Rees of Bristol. On its arrival in this country it was exceedingly thin and weak. It had been fed during the voy-

age principally upon Indian corn, but had a little chopped boiled meat occasionally. The weather being very mild, it was placed in a turfed aviary, used generally for pheasants, some water-cresses and other aquatic plants being procured; but it was soon evident that we had not discovered a proper substitute for its natural food. Thinking one day that it manifested a desire to get at some roses which were trained upon the aviary, I gave it one of the flowers, which it ate eagerly. It was then thought, that, as it was so domesticated and familiar, the feathers of one wing should be cut, and the bird turned loose into the garden and watched, to see what plants it would prefer. The rose-trees were the favourite plants, the flowers, young shoots and leaves being eagerly eaten. Since this time it has always been turned out every morning in mild weather to roam about the garden, and it is very fond of creeping up close to the gardeners, and watching them at work, although it does not appear to be from any desire to obtain worms or insects. It seldom wanders very far from its aviary, and in the afternoon is always found waiting to be let in. In winter it is allowed its liberty in the parrot aviary, which is heated by one of the Arnott stoves, and close to which it may generally be found. Even in moderately sharp weather, if it be dry, we find it better to let it go out for a short time; but then, instead of creeping leisurely about, it bustles off to its favourite plants, and very soon returns; but it will not bear confinement in a cage. At the present time *lettuce* is its principal food, but it has also Indian corn, hemp-seed, sopped bread, and a little boiled sheep's head. Small stones seem also necessary, and it is very fond of swallowing small pieces of the coal used in the stove, which is anthracite. Owing to the difficulty and expense of procuring a sufficient quantity of lettuce during the frost of last winter and that of the year before, the poor bird became very thin and weak, but quickly rallied upon again getting this food. In the summer, when on the lawns, it will eat grass, which it chips off with its beak in a very singular manner. I have tried it several times with a frog, but it has always been refused. When we first had it the horn upon the head was about four inches long; but as it used to stand so close to the stove, it became burnt down to about an inch, and is now grown again considerably.

“The spurs upon the elbows of the wings are nearly two inches long, and of amazing strength and hardness; they are truly formidable weapons. We have several varieties of dogs, which are kept in single kennels, in different parts of the garden, but they always retreat upon the approach of the Screamer; and whilst the bird continues close, nothing will induce them to come out, at least those that have once felt the spur. I have several times seen it standing close to a door of a kennel, with its head erect and looking very proud, making a sound which one could only look upon as a challenge to the dog to come forth. As the mode of attack is so sly and unexpected, none are at first prepared for it. Throwing its neck and head backwards and forwards, and uttering at the same time a low note, it advances sideways up to the dog, and when close enough turns half-way round, and quietly raising its wing, delivers such a

blow that no dog that we have will face it a second time. It is not meant that a dog could not be made to resent such an attack, but only that of their own accord they seem unwilling to do so.

"It is, however, exceedingly familiar, and would become attached to any one that would notice it kindly, and with me will often make a kind of purring noise when being patted and caressed. Still I have seen it run after children when they have been teasing it.

"On one or two occasions it has recovered the use of its wing sooner than expected, but it never flew beyond the garden—alighting upon the top of its aviary, flying off again, wheeling round in a circle and returning. In their wild state I should consider these birds good flyers; their long wings and light bodies, with a most complete apparatus of external air-cells, would conduce to that result. I hardly know why it should be called a screamer; no noise that I have ever heard it make could be called a scream. It has certainly a tolerably sharp cry, and also a lower note or cry, somewhat resembling the trumpet-note of a peacock, but not so loud; both appear to be notes of pleasure and satisfaction, and may generally be called forth in the following manner. If for instance the bird is on the lawn, and any of those known to it should pass close by, it will utter one or two of the lower notes, and if encouraged by the person endeavouring to imitate the same note, it will utter two or three more, and finish with one of the shrill notes; it will then often lie down to be patted and caressed. Its walk is rather ludicrous, partaking both of stateliness and awkwardness. The head is carried high and well, but as its toes are so long it is compelled to raise each foot very high, in order to get it clear of the other, and this produces the appearance described. In standing, the toes of one foot are crossed a good deal over those of the other.

"It has evidently more confidence in man, and seems also to have more intelligence than most birds."

The reading of Professor Owen's memoir on the Myology of the *Apteryx* was continued.

Mr. Gould then brought before the notice of the Meeting some additional ornithological novelties from Australia, and characterized an *Artamus*, conspicuous for the white colouring of the rump, as

ARTAMUS LEUCOPYGIALIS. *Art. capite, gula, et dorso fuliginoso-cinereis; pectore, partibus inferioribus, et uropygio albis; rostro pallide cæruleo-cinereo.*

Head, throat and back sooty grey; primaries and tail brownish black, washed with grey; chest, all the under surface, and rump, pure white; irides brown; bill light bluish grey at the base, black at the tip; legs and feet mealy greenish grey.

Total length, $5\frac{1}{2}$ inches; bill, $\frac{1\frac{5}{6}}$; wing, $5\frac{1}{8}$; tail, $2\frac{1}{2}$; tarsi, $\frac{5}{8}$.

Hab. Australia.

A new *Pitta*, being the third species of that form from the Australian continent, as

PITTA IRIS. *Pitt. capite, collo, pectore, abdomine, lateribus, et fe-*

moribus nigerrimis; fasciâ superoculari, ad occiput ductâ ferrugineâ; corpore suprâ, alisque ex aureo viridibus, humeris metallice cæruleis et fasciâ inferiore lazulinâ ornatis.

Head, neck, breast, abdomen, flanks and thighs deep velvety black; over the eye, extending to the occiput, a band of ferruginous brown; upper surface and wings golden green; shoulders bright metallic cærulean blue, bordered below with lazuline blue; primaries black, passing into olive-brown at their tips; the third, fourth, fifth and sixth having a spot of white about the centre of the feather; tail black at the base, green at the tip, the former colour running on the inner web nearly to the tip; rump-feathers tinged with cærulean blue; lower part of the abdomen and under tail-coverts bright scarlet, separated from the black of the abdomen by yellowish brown; irides dark brown; bill black; feet flesh-colour.

Total length, 7 inches; bill, $1\frac{1}{8}$; wing, 4; tail, $1\frac{3}{4}$; tarsi, $1\frac{1}{2}$.

Hab. Cobourg Peninsula, north coast of Australia.

Mr. Gould then pointed out the generic characters of two new genera of Finches, the first of which he proposed to designate

Genus EMBLEMA.

Rostrum ferè quàm caput longum, conicum (ut in genere *Ploceus*).

Alæ mediocres; remige primâ parvulâ, quatuor proximis inter se æqualibus; tertiariis elongatis. *Cauda* mediocris, et ferè quadrata, vel paululùm rotundata. *Pedes* plantigradi, digitis gracillimis; digito intermedio externis longiore, illis inter se æqualibus.

EMBLEMA PICTA. *Emb. facie et gulâ saturatè miniaceis; vertice et corpore suprâ fuscis; pectore et corpore subtùs nigris crebrè alboguttatis, abdomine medio miniaceo adperso.*

Face and throat deep vermilion red; the base of all the feathers of the throat black, giving that part a mingled appearance of black and red; crown of the head, all the upper surface and wings, brown; rump deep vermilion-red; tail dark brown; chest and all the under surface jet-black, the flanks numerously spotted with white, and the centre of the abdomen dashed with vermilion-red; feet light red; upper mandible black, under mandible scarlet, with a triangular patch of black at the base.

Total length, $3\frac{1}{8}$ inches; bill, $\frac{9}{16}$; wing, $2\frac{1}{4}$; tail, $1\frac{5}{8}$; tarsi, $\frac{5}{8}$.

Hab. The north-west coast of Australia.

From the collection of B. Bynoe, Esq.

And the second,

Genus POËPHILA.

Gen. char.—*Rostrum* ad basin tumidum, et igitur ferè tam latum et profundum quàm longum. *Alæ* mediocres, remige primâ parvulâ, secundâ tertiâ quartâ et quintâ inter se ferè æqualibus; digitis gracilibus, medio externis longiore, illis inter se æqualibus; digito postico, medio valdè brevior. *Cauda* cuneiformis, rectricibus duabus intermediis productis.

This form is nearly allied to *Erythura* and *Estrelda*.

Type, *P. acuticauda* (*Amadina acuticauda*, Gould in Proc. Zool. Soc., Part VII. p. 143).

POËPHILA PERSONATA. *Poë. rostro ad basin fasciâ irregulari nigerrimâ circumdato, vertice, dorso, alis, caudâque pallidè cinnamomino-fuscis.*

Base of the bill surrounded by an irregular ring of deep velvety black; crown of the head, upper surface and wings, light cinnamon-brown; lower part of the abdomen banded with deep velvety black; lower part of the rump and under tail-coverts white; upper tail-coverts white, striped longitudinally with black on the outer side; tail graduated, and of a deep blackish brown; irides red; bill bright orange; legs and feet flesh-red.

Total length, $3\frac{1}{8}$ inches; bill, $\frac{3}{8}$; wing, $2\frac{1}{4}$; tail, 2; tarsi, $\frac{9}{16}$.

Hab. The northern parts of Australia.

Mr. Gould then characterized two new species of the genus *Ptilinopus*, Swainson, as *P. Swainsonii* and *P. Ewingii*; the first in honour of the founder of the genus, and the second in honour of the Rev. T. J. Ewing, of Van Diemen's Land.

PTILINOPUS SWAINSONII. *Ptil. fronte et vertice splendidè coccineis, hóc colore lineâ angustâ flavâ nisi apud frontem cincto; pectore sordidè viridi, singulis plumis ad apicem bifidis, more furculæ, cujus apices maculâ triangulari argenteo-cinereâ notantur; abdomine medio aurantiaco; caudæ apice latè flavissimo.*

Forehead and crown deep crimson-red, surrounded, except in front, with a narrow ring of light yellow; back of the neck greyish green; all the upper surface bright green tinged with yellow, the green becoming deep blue towards the extremities of the tertiaries, which are broadly margined with yellow; primaries slaty grey on their inner webs, green on the outer, very slightly margined with yellow; tail deep green, largely tipped with rich yellow; throat greenish grey, stained on the chin with yellow in some specimens; in others the chin is white; breast dull green, each feather forked at the end, and with a triangular silvery grey spot at either extremity; flanks and abdomen green, with a large patch of orange-red in the centre of the latter; under tail-coverts orange-yellow; thighs green; irides reddish orange; bill greenish black, horn-colour at the tip; feet olive-brown.

Total length, 9 inches; bill, $\frac{5}{8}$; wing, $5\frac{3}{4}$; tail, $3\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. The brushes of the River Clarence and Moreton Bay.

PTILINOPUS EWINGII. *P. fronte et vertice roseis, hóc colore lineâ flavâ nisi ad frontem cincto; pectore virescenti-cinereo plumis bifidis, et ad apicem pallidè cinereis; fasciâ infra pectorali pallidè sulphurèâ; abdomine medio saturatè aurantiaco, cum lunulâ centrali helvo-cæruleâ; caudæ rectricibus ad apicem flavis, non sine tincturâ viridi presertim in rectricibus duabus intermediis notandâ.*

Forehead and crown of the head rose-pink, bordered, except in front, by a narrow line of yellow; back of the head and neck greenish grey; all the upper surface bright green, passing into deep blue on the tertiaries; primaries, secondaries and tertiaries slightly margined with yellow; tail largely tipped with yellow tinged with green, particularly on the two centre feathers; chin pale yellow; sides of

the neck and chest greenish grey, each feather forked at the end and tipped with grey; below the chest an indistinct band of sulphur-yellow; flanks and lower part of the abdomen green; centre of the abdomen rich orange, in the middle of which is a lunar-shaped mark of lilac; under tail-coverts orange; thighs and tarsi green; irides reddish orange; feet olive.

Total length, $7\frac{3}{4}$ inches; bill, $\frac{3}{4}$; wing, $4\frac{5}{8}$; tail, 3; tarsi, $\frac{5}{8}$.

Hab. Port Essington.

Mr. Gould next instituted a new genus among the *Columbidæ*, under the appellation of

Genus GEOPHAPS.

Gen. char.—*Rostrum* perbreve et robustum. *Oculi* cute denudatâ circumdati. *Alæ* perbreves et rotundatæ, apicibus latis. *Tarsi* mediocres digitis longiores. *Digitus* internus paululum cæteris longior.

Of this form a new species was described as

GEOPHAPS PLUMIFERA. *Geo. capite cristâ occipitali ornato; hâc sic et vertice, colli lateribus, pectore et alarum paginâ inferiore pallidè ferrugineis; gulâ alternatim albo nigroque fasciato; pectore lunulis duabus albis inter se junctis cuspidemque mediam efficientibus, ornato.*

Lores and orbits naked, and of a yellowish red; head furnished with a lengthened occipital crest, which, with the crown, sides of the neck and chest, and under part of the wing, is light ferruginous; chin black; throat banded alternately with white and black, the latter colour extending to the ear-coverts; on the chest two semilunar marks of white, which, meeting, form a point in the centre; middle of the abdomen light buff; under tail-coverts brown, with lighter edges; back of the neck, back, rump and upper tail-coverts, rufous brown; wings light ferruginous, with the basal half of the feathers silvery grey, the two colours separated by a transverse band of black; primaries rufous brown; secondaries rufous brown, with a large patch of bronzy purple towards their tips; tail black; bill black; feet reddish brown.

Total length, 7 inches; bill, $\frac{3}{4}$; wing, $3\frac{1}{8}$; tail, $2\frac{5}{8}$; tarsi, $\frac{7}{8}$.

Hab. The north-west coast of Australia.

From the collection of B. Bynoe, Esq.

A second genus of this tribe of birds was then characterized as

Genus OCYPHAPS.

Gen. char.—*Caput* cristâ occipitali elongatâ. *Alæ* paulò breves, remige tertiâ gradatim ad apicem coarctatâ. *Cauda* mediocriter elongata, et rotundata. *Tarsi* et digitus intermedius eadem longitudine. *Digitus* internus externo brevior.

Type, *Columba Lophotes*, Temm.

A second example of the genus *Pedionomus* was described as

PEDIONOMUS MICROURUS. *Ped. à P. Torquato diversus, staturâ minore, collo haud torque circumdato, caudâ ferè carente.*

Crown of the head, back and upper surface mottled with black,

brown, and fawn-colour, the latter occupying the external edge of the feathers, and the black and brown forming alternate circular markings on each feather; throat, neck, chest and flanks dull fawn-colour; the feathers of the neck and chest blotched with brown; flanks marked with the same colour, assuming the form of bars; tail-feathers, which are almost invisible, marked the same as the back; centre of the abdomen and the under tail-coverts buffy white, without spots or markings; irides straw-yellow; bill yellow, passing into black at the point; feet greenish yellow.

Total length, $4\frac{1}{2}$ inches; bill, $\frac{11}{16}$; wing, $3\frac{1}{4}$; tarsi, $\frac{7}{8}$.

The above are the measurements of an old male.

Hab. Plains of the interior of South Australia.

Differs from *P. torquatus* in its smaller size, in the absence of the collar, and in the almost total absence of tail.

Mr. Gould also brought before the notice of the Meeting a new species of *Megapodius*, from the north coast of Australia, which he characterized as *M. Tumulus*, and read a very interesting account of its habits, which tends to confirm the opinion he had previously expressed, that *Megapodius Talegalla* and *Leipoa* form part of one great family of birds, whose range will be found to extend from the Philippines to Australia.

MEGAPODIUS TUMULUS. *M. capite, et cristâ saturatè cinnamomino-fuscis; nuchâ, et corpore subtùs saturatè cinereis; dorso, alisque cinnamomino-fuscis; tectricibus caudæ, crissoque saturatè castaneis; pedibus permagnis.*

Head and crest very deep cinnamon-brown; back of the neck and all the under surface very dark grey; back and wings cinnamon-brown; upper and under tail-coverts dark chestnut-brown; tail blackish brown; irides generally dark brown, but in some specimens light reddish brown; bill reddish brown, with yellow edges; tarsi and feet bright orange, the scales on the front of the tarsi, from the fourth downwards, and the scales of the toes dark reddish brown.

Total length from 15 to 17 inches; bill from $1\frac{1}{8}$ to $1\frac{1}{4}$; wing from $9\frac{1}{2}$ to 10; tail from 4 to $4\frac{1}{2}$; tarsi from $2\frac{1}{2}$ to $3\frac{1}{8}$.

Hab. Cobourg Peninsula, on the north coast of Australia.

GEOLOGICAL SOCIETY.

Feb. 23, 1842.—A memoir was read, entitled, "Report on the Missourium now exhibiting at the Egyptian Hall, with an inquiry into the claims of the *Tetracaulodon* to generic distinction," by Richard Owen, Esq., F.G.S., &c.

Mr. Owen proceeds to consider the species of animal to which the skeleton is to be referred. It was, he says, a mammiferous animal, and while the anterior extremities disprove the existence of clavicles, they establish that the fossil belonged to the Ungulata. The enormous tusks of the upper jaw further show that it was a member of the proboscidean group of Pachyderms, and that the molar teeth prove it to be identical with the *Tetracaulodon* or *Mastodon giganteum*. With respect to the horizontal position of the

tusks in the skeleton exhibited at the Egyptian Hall, Mr. Owen states, that it may have arisen from compression, the tusk of the *Mastodon*, like that of the Elephant, being inserted by a nearly straight cylindrical base in a socket of corresponding form, and can be rotated in any given direction when the natural attachments are destroyed by decomposition; and he alludes to the skeleton exhibited in London in 1805, in which the tusks were bent downwards.

Having, by a series of comparisons of the teeth and bones, which the author does not conceive it necessary to recount, arrived at the conclusion that the *Missourium* is either a *Tetracaulodon* or [a] *Mastodon*, he next considers the relations in which these supposed distinct genera stood to each other; premising that Mr. Koch's skeleton illustrates the osteology of the gigantic *Mastodon* far more completely than has been done by any other collection of North American fossils brought to Europe. The genus *Tetracaulodon* was founded by Dr. Godman on the lower jaw of a young Proboscidean having two tusks projecting from the symphysial extremities. Mr. W. Cooper of New York, however, suggested that the *Tetracaulodon* was nothing but the young of the gigantic *Mastodon*, and that the tusks were lost as the animal became adult. This opinion has been also advanced by others, but without being illustrated by any analogies; and it has been opposed by Dr. Isaac Hays, in an elaborate memoir on additional specimens, which he states present all the proofs necessary for refuting the opinion that Dr. Godman had committed the error of describing as a new animal the young of a known species; and he observes with respect to Mr. Titian R. Peale's suggestion that the lower tusks might be only a sexual distinction, "that it is impossible in the existing state of our knowledge, and with our present materials, to confirm or positively refute this suggestion." The most recent opinion on the subject, Mr. Owen states, is contained in the last edition of the '*Ossements Fossiles*,' in which M. Laurillard, after alluding to the opinion that the lower jaws with tusks may be immature *Mastodons*, proceeds to say, "others have been led to believe that the lower jaws of every age which have tusks belong to a different species of large *Mastodon*: some characters taken from the form of the jaw would seem to justify that opinion."—*Oss. Foss.* 8vo. vol. ii. p. 373, 1836.

Mr. Koch's collection of detached bones contains, Mr. Owen states, a number of lower jaws with the molars of *Mastodon giganteum*, which prove the important fact, that an animal of the same size and molar dentition as the *Mastodon* was characterized in the adult state by a single tusk projecting from the symphysial extremity of the right ramus, and that the two inferior tusks are manifested only by immature animals.

Mr. Owen then details the evidence by which he arrived at the conclusion that the *Tetracaulodon* of Dr. Godman is the immature state of both sexes of the *Mastodon giganteum*, that in the adult male only one of the lower tusks is preserved, and that in the adult female both are wanting.

A table is given in the memoir of the measurements of six lower

jaws of full-grown animals; three which retained the right tusk or exhibited its socket, and three in which the tusk was wanting, and the socket more or less obliterated; and Mr. Owen says that the dimensions prove the close similarity in size and proportions between the lower jaws of Mastodons with and without the tusks; and further that no individuals of the same species could resemble each other more closely in the conformation of the molar teeth. In both, the inner boundaries of the molar series are parallel, and the interspace is of the same breadth: the general form of the ascending ramus and the symphysis, the place and size of the great foramina for the dental nerves and vessels, are alike. The only differences consist in the *Tetracaulodon** having larger condyles, and the outer side of the horizontal ramus being less convex and prominent; the coronoid process also is higher; and the broad canal, which is impressed upon the upper part of the symphysis, is nearly straight, not sloping down to the deflected part as in the Mastodon; but the breadth of the canal is the same in both, though the symphyseal part of the jaw is larger and broader in the *Tetracaulodon* than Mastodon. These differences, Mr. Owen observes, may relate to the additional motions of the lower jaw, connected with the uses to which the incisor may have been put.

The incisor in full-grown *Tetracaulodons* or male Mastodons is a comparatively small, cylindrical and straight tusk, projecting forwards and a little downwards; its circumference is five inches; the length of the projecting part of the most entire of three specimens was five inches, but an unknown portion had been broken off; the socket was three inches in depth, uniformly one and a half inch in diameter, and slightly concave at its termination.

With regard to these incisor teeth and the importance attached to them as a generic distinction, Prof. Owen says, it must be remembered that in many species, both of Cetacea and Pachyderms, incisors as well as canines vary in relation to the age and sex of the same species of animal. In the male Dugong the upper incisors are protruded, scalpriform, and of unlimited growth, while in the female they are concealed, cuspidate, and solid to their base. In both sexes the lower jaw is provided at its deflected extremity with six incisors, which disappear in mature animals, only one or two remnants being occasionally discoverable in the cancellous sockets. In many of the Hog tribe, incisors are present in the young animal, but are lost in the full-grown. The most remarkable case, Mr. Owen says, of distinct conditions of incisors, teeth or tusks, relative to age and sex, is in the Narwhal. In this animal the young of both sexes have equally developed on each side of the upper jaw a single tusk, one of which grows rapidly in the male, constituting the well-known long, spirally twisted tusk, while the other remains stationary; but both continue rudimental in the female.

Were the Dugong and the Narwhal extinct, and to be judged of only by their fossil remains, the skulls of the two sexes of the herbivorous cetacean, viewed irrelatively, would doubtless, Mr. Owen

* The author retains the term *Tetracaulodon* in his description for the male Mastodon.

observes, be referred to two distinct species, though the identity in the molar teeth might impress the more cautious palæontologist with a strong suspicion of their generic identity; but the cranium of the male Narwhal, with its unsymmetrical distortion, increased by an enormous tusk, would, it can scarcely be doubted, be referred to a genus of Cetaceans quite distinct from that which the edentulous and more symmetrical skull of the female would be considered to represent.

In determining the real nature of differences in these extinct animal remains, Mr. Owen says it is necessary to inquire what other modifications are associated with those of the tusks;—are the more essential parts of the dental system, as the grinding teeth, alike or different in the jaws with tusks and without tusks? Do the jaws themselves and the other parts of the skeleton offer the modifications of form which usually attend distinction of species? Above all, are the same characters presumed to distinguish the genera, present in the young as in the adult skulls? are there, for example, young Mastodons as well as young Tetracaulodons?

The youngest of five full-grown Tetracaulodons or male Mastodons, examined by him, had two molars and half of a third developed in each ramus; the first or antepenultimate having three transverse ridges, each divided into two tubercles; the second also three bicusped ridges; and the third two ridges extricated, and two others within the alveolar cavity. In the next jaw in the order of development, the third ridge of the last molar was extricated; in the third specimen the antepenultimate grinder had been shed, and the last molar exhibited the same degree of development; in the fourth jaw the ultimate molar was fully extricated, exhibiting four bicuspidate ridges and a talon; and the fifth or oldest Tetracaulodon retained its penultimate but worn grinders, the two anterior ridges of the last molars being a little abraded, and the talon being developed into a pair of small tubercles.

A series of jaws of female Mastodons (Mastodon proper of Dr. Godman and Dr. Hays) presented the same order of development.

Having already shown that the molar teeth are identical in number and form in the Mastodon and Tetracaulodon, Mr. Owen proceeds to point out their correspondence in the mode and order of succession. The lower jaws of both present, moreover, those characters by which the *Mastodon giganteum* is distinguished from the genus *Elephas*, namely, by the higher coronoid, the less-rounded angle, the straight inferior margin, the parallel inner alveolar border, and the more produced symphysial extremity. They present, besides, equally the minor characteristic of the sharp process on the inner side of the neck of the condyle, and the ridge continued from the outer side of the neck. Both have an oblong depression on the outside of the coronoid process, but varying in depth in different Tetracaulodons. In both the posterior aperture of the dental canal commences in the same place; and the inner side of the angle of the jaw is concave, and bounded by an irregular margin, indicating the attachment of the fascia covering the internal pterygoid muscle, the irregularity being stronger in the lower jaws of older individuals. The relative position of the principal anterior outlet of the dental canal is the

same in *Tetracaulodon* as in *Mastodon*, varying in both in its relative position to the teeth as these alter their position in age.

When the striking modifications by which the lower jaw of the Elephant differs from that of the *Mastodon* are considered, it cannot be supposed, observes Mr. Owen, that no corresponding differences should be present in the lower jaws of the *Mastodon* and of another genus of Proboscideans characterized by a difference in the number of the teeth, and he says, he knows of no analogy in the whole mammalian series that would justify such a belief. *Tetracaulodons* are as numerous in Mr. Koch's collection as *Mastodons*, yet there are not found in it two forms of humeri, ulnæ, radii, femora or tibiæ, only the merest difference of variety being detectable; whilst the femora of the *Elephas primigenius* associated with them are at once recognizable by modifications which might be expected to accompany true generic differences in the rest of the organization. With the exception of a few bones of the *Elephas primigenius*, all the other remains of proboscidian *Pachyderms* in Mr. Koch's collection, Mr. Owen is of opinion, belong to the *Mastodon giganteum*; and the great skeleton he considers to be that of a male individual, on account of the size of the tusks and the strongly marked external characters of the principal bones of the extremities; but he points out that the lower jaw belonged to a female, and he states that the proprietor acknowledged that it was not discovered with the other portions of the skeleton. The true height of the animal, taken at the dorsal spines, Mr. Owen estimates at ten feet, and the length, from the intermaxillary bones to the end of the sacrum, at sixteen feet, or four more than that of the Asiatic Elephant in the Hunterian Museum.

The supposed spinal column of a man fourteen feet high, Mr. Owen refers to the *Lophiodon*: Mr. Koch's collection also includes some interesting remains of the *Myiodon Harlani*, also portions of large species of *Bos*, *Cervus*, &c.

With respect to the use of the lower incisor, Mr. Owen says, if indeed this diminutive inferior tusk were a generic character constantly associated in both sexes with the enormous upper tusks, no explanation could be given of so apparently useless an appendage; but if regarded as a sexual character, there are in the animal kingdom abundant examples of the functional importance of external distinctions in the male; and such he considers to be the explanation of the persistent single or prominent tusk in the male *Mastodon*. Further, with respect to the question why two tusks should be originally developed, especially in the female, in which neither is to be retained, Mr. Owen replies that there is an equal difficulty with respect to the two rudimental tusks in the female Narwhal, and of the single one in the male; to the abortive incisors in the symphyseal part of the lower jaw of the Dugong; to the rudimental teeth in the lower jaw of the Foetal Whale-bone Whale; and in the upper jaw of the Sperm Whale. In these, and many analogous instances, the author observes, a structure which is merely sketched out, and is functionless in one species, is perfected and performs important uses in another closely allied. Thus the teeth which are shadowed forth in

the lower jaw of the Foetal Whale are fully developed in the Cachalot. The upper rudimentary maxillary teeth which remain hidden in the gum of the Sperm Whale are functionally developed in the Grampus; and in like manner in the gigantic *Dinotherium*, discovered by Dr. Kaup, is exhibited the full and functional development of the inferior rudimental tusks of the Mastodon.

The molar teeth of the Mastodons offer, Mr. Owen says, a beautiful transitional modification connecting the lamellated structure of the triturating molar with those having simply a transversely-ridged grinding surface. The interval between the molar teeth of the Elephant and those of the Tapir is too great to have allowed their fundamental resemblance to have been detected in the existing creation; but a study of the extinct *Pachyderms* brings to light, he says, a beautiful series of gradations leading through the elephantoid Mastodon of Ava and the gigantic Mastodon of the Missouri to the *Dinotherium*, which it may be remembered was the gigantic Tapir of Cuvier. Moreover, he adds, the indication of the singular armature of the lower jaw of the *Dinothere* might be most closely discernible in that species of Mastodon which makes the nearest approach to the *Dinothere* in the form of the grinding teeth.

The report from which the above extracts have been taken had been completed when Mr. Owen received a copy of the notice* of Dr. Hays's description of Mr. Koch's collection. After an attentive perusal of this document, in which the generic distinctness of the *Tetracaulodon* is maintained, Mr. Owen has been only more convinced of the truth of his own theory; he, however, in justice to Dr. Hays, gives the arguments of that esteemed naturalist. Dr. Hays considers the existence of a single tusk in the lower jaw to be only an accidental occurrence, referring, as examples of two tusks, to the specimen described by Dr. Godman, and to that belonging to the Museum of the University of Virginia. Respecting this statement, Mr. Owen observes, that the jaw described by Dr. Godman is that of an immature individual, retaining on the left side the first small molar, and therefore affords no proof of the persistence of the two inferior tusks in the adult animal, or evidence of the accidental nature of the absence of the left tusk in the mature jaw. With regard to the specimen in the cabinet of the University of Virginia, he says, that if this belong to a mature animal it would be an unique specimen, and might be paralleled with cases on record of two projecting tusks in the male Narwhal, and considered by all naturalists to be accidental. Mr. Owen further calls attention to the figure of the specimen in pl. 27. fig. 2. of the *Transactions of the American Philosophical Society* (vol. iv.), where only the right tusk is represented, the left being merely indicated by a dark spot of corresponding size, of the nature of which the text is silent.

Respecting the symphysial portion of the jaw exhibiting the alveoli of two tusks, both much smaller than the alveolus of the right tusk in the presumed male Mastodon's jaws of corresponding size, and considered by Dr. Hays to constitute a distinct variety, if not a new species of *Tetracaulodon*, Mr. Owen considers it to be the jaw of

* *Proceedings, American Phil. Soc. October 1841.*

a young female Mastodon in which the obliteration of the tusks had not been completed.

A lower jaw without tusks, considered by Dr. Hays to have been a young Mastodon, but with "the chin slightly broken, so that it is impossible to determine whether it had the foliated termination so conspicuous in the adult;" Mr. Owen remarks, that notwithstanding the prominent end of the symphysial part containing the chief portion of the tusk-socket is wanting, yet "two foramina are recognized at the anterior part of the chin," and these, he observes, must be either portions of the alveoli of the tusks, or the canals of the nerves and vessels for the tusks in these alveoli.

Thus, Mr. Owen says in conclusion, all the examples which seemed to show that the genus Mastodon at no period of life possessed tusks in the lower jaw, and that the genus Tetracaulodon was characterized at all periods of life by two projecting tusks in the lower jaw, become invalidated on a close inspection, and enter into the series of facts which support the proposition that the *Mastodon giganteum* has two lower tusks originally in both sexes, and retains the right lower tusk only in the adult male.

BOTANICAL SOCIETY OF LONDON.

November 18th, 1842.—Adam Gerard, Esq., in the Chair.

A paper was read from George Clarke, Esq., of the Island of Mahé, on the *Lodoicea Sechellarum**. The *Lodoicea* of Sechelles is an inter-tropical plant peculiar to the Sechelles Archipelago, where it grows naturally in two islands only, Praslin and Curiense. Praslin lies north-east of Mahé, distant twenty-one miles; Curiense to the north of Praslin, and is much smaller; a deep arm of the sea, from one to two miles in breadth, separates these two islands. They lie between $4^{\circ} 15'$ and $4^{\circ} 21'$ S. lat. and $55^{\circ} 39'$ and $55^{\circ} 47'$ E. long. In the other islands of this Archipelago there are but few *Lodoiceas*, which have all been planted, and only two or three appear to thrive. The trunk or stem of the *Lodoicea* is straight, and runs to the height of eighty or ninety feet, terminated by a splendid crown of winged, palmated leaves; it is only from twelve to fifteen inches in diameter, and so flexible that it waves to the slightest breeze. When the wind is moderately strong the huge leaves of this giant palm are clashed together with an astonishing noise. The outside of the stem is very hard and compact, but the interior is soft and fibrous. The leaves, winged and palmated, open like a fan, and in the early growth are more than fifteen feet long, without reckoning the foot-stalk, which is as much more. In the mature trees the leaf-stalk is not more than eight or ten feet long; and the whole leaf does not exceed twenty feet in length by ten or twelve in breadth, and is entirely destitute of thorns.

The nascent leaves are enveloped, till the period of their expansion, by a thick covering of cottony down of a nankeen colour; but this is occasionally wanting. The unanimous testimony of the in-

[* A very interesting account of this plant by Mr. Clarke, illustrated by wood-cuts, will be found at p. 408, vol. vi. of this Journal.—Eds.]

habitants of Praslin proves that each tree produces only one leaf a year, and "as three leaves occupy about eight inches of the trunk, and twenty years expire before that appears above the surface, a tree of eighty feet in height must be about 400 years old." The flowers, about twenty in number, succeed each other one at a time, but occasionally two. The nuts are two-lobed, and sometimes two nuts are enclosed in one husk. Three-lobed nuts are very rare, but some are met with; and it is said that specimens with five lobes have been found. The form of the nut is very singular, and cannot be compared to that of any other production. Two highly remarkable circumstances in the history of the *Lodoicea* are, the duration of its blossoms and the period necessary for maturing its fruits; for the latter, seven or eight years are required. The *Lodoicea* grows in every variety of soil, but delights most in the vegetable mould of the deep gorges of the mountains. It is, nevertheless, found on the bare mountain-tops, and forms a very conspicuous and remarkable object in such situations. It is curious that the vegetation of the nut is prevented by burying it, but if suffered simply to rest on the earth in a situation not too much exposed to the sun, germination readily takes place. The fruit in its unripe state is an agreeable and refreshing aliment; when ripe it yields oil. Its germ furnishes a very sweet food.

November 29.—Sixth Anniversary Meeting. J. E. Gray, Esq., F.R.S., &c., President, in the Chair.

The Report of the Council was read, from which it appeared that thirteen new members had been elected since the last Anniversary, and that the Society consisted of 152 members. The donations to the library had been very considerable.

Many valuable parcels of British and Foreign plants had been received, and the return parcels sent to the members had given the greatest satisfaction.

Mr. Edwin Lees had forwarded an Herbarium of the Malvern Hills, accompanied by many very valuable remarks upon the geographical distribution of the plants of the neighbourhood; and it was hoped next year to report the receipt of other local herbaria now in course of formation for the Society.

Amongst the most valuable parcels received during the past season, may be mentioned a large collection of British plants, from Mr. Hewett C. Watson, comprising upwards of 5500 specimens; also numerous Jersey plants, from Mr. G. H. K. Thwaites; a large collection of Shropshire *Rubi*, from Mr. H. Bedwell; 300 specimens of *Bupleurum falcatum* collected in Essex, from Mr. F. Doubleday; and numerous specimens of *Lastræa cristata*, collected in Norfolk by Mr. B. D. Wardale, and presented by that gentleman.

Numerous specimens of Mosses, Lichens, and Algæ had been received.

Foreign Plants.—These form a valuable part of the Society's collection, and comprise plants from North and South America, British Guiana, New South Wales, Cape of Good Hope, Sierra Leone, China, and various other parts of the world.

The more interesting plants are 350 species collected by Mr. R.

H. Schomburgk in British Guiana; 250 species collected by Dr. F. Krauss in Natal, South Africa; many thousand specimens collected in North America by Dr. Gavin Watson; and numerous species from South America, presented by Dr. C. F. P. von Martius.

The Museum had been enriched by specimens of sections of wood, seed-vessels, barks, &c. &c.; many of them purchased at the sale of the Botanical Museum of the late A. B. Lambert, Esq., and presented by some of the members.

The Report was unanimously adopted, and a ballot then took place for the Council for the ensuing year, when the Chairman was re-elected President, and he nominated J. G. Children, Esq., F.R.S. and Hewett C. Watson, Esq., F.L.S., Vice-Presidents. Mr. E. Doubleday, M.E.S., Mr. G. Francis, F.L.S., and Mr. J. G. Mitchell, M.E.S., were elected new members of the Council in the room of Dr. Meeson, Mr. G. Cooper and Mr. W. H. White, who retire from the Council in accordance with the rules of the Society.

Mr. J. Reynolds, Mr. G. E. Dennes, F.L.S., and Mr. T. Sansom were respectively re-elected Treasurer, Secretary, and Librarian.

MICROSCOPICAL SOCIETY OF LONDON.

At a meeting of this Society held December 21st, 1842, Professor Lindley, President, in the Chair, a paper was read from the Rev. J. B. Reade, entitled "Microscopic Chemistry, No. 1, on the Existence of Ammonia in Gum, Sugar, and other 'non-azotized bodies.'" A second paper was read by H. H. White, Esq. of Clapham, "On a new species of *Xanthidium* found in flint which he had named *Xanthidium tubiferum aculeatum*," and was characterized by having the tentacula, which were twelve in number, quite pointed and free from any appendages whatever; it measured $\frac{1}{160}$ th of an inch from the extremities of the opposite tentacula, and the specimen was afterwards exhibited to the Society. Arthur Hill Hassall, Esq. then read a paper entitled "Observations on the Production of Decay in Fruit by means of Fungi" (*continued*). The author, after stating that in order to set aside any doubt which might exist of the power of Fungi in producing decay in fruit, he had inoculated sound fruit whilst on the tree, and found that the decay was as rapid as in those specimens which had been previously removed from the tree. He contended that the mere binding of fruit was not sufficient of itself to cause decay, but that the presence either of fungi or of the sporules of fungi was necessary before the decay could take place.

Jan. 18, 1843.—J. S. Bowerbank, Esq., F.R.S., in the Chair. A paper was read from that gentleman "On the Structure of the Shells of Molluscos and Conchiferous Animals*." The researches of the author into the structure of the organic tissue of the *Corallidæ*, published in the 'Philosophical Transactions,' part 2, 1842, suggested to him the idea of pursuing a similar course of investigation into the nature and origin of the testaceous coverings of the Mollusca and

[* A paper on the Chemical Components of Shells by Dr. Carpenter was read at one of the late meetings of the Royal Society, which we shall notice in a future Number.—Eds.]

Conchifera. He commenced his researches during the spring of 1842, and the first subject for examination was the young cartilaginous lips of the common Garden Snail, *Helix aspersa*; subsequently he has directed his attention to the testaceous coverings of numerous species of adult univalve and bivalve shells. The general results of the examination of the lips of the Garden Snail were as follows:—The newly-formed lip was found to consist of a thin yellow-coloured horny substance, with a number of minute globular vesicles (incipient cytoblasts and cells) in various stages of development, with a nucleus very visible by means of a power of 600 linear in the greater number of them; these cells were most numerous on the inner side of the lip, or that part in contact with the shell; the young shells were transparent, but in the neighbourhood of these there may be seen aggregated together small patches of a deep yellow colour, which appeared as centres of ossification. Besides these other cytoblasts occur, which are developed in the form of tessellated cellular structure, which ultimately form a minute vascular tissue which is imbedded in bands corresponding in their direction with the lines of growth of the shell; as these tissues approached maturity, the periostracum advancing from the old lip covers them and binds the whole firmly together. The examination by transmitted light of thin sections of univalve shells, made by the lapidary, afforded but little information of their true structure; but fractured surfaces at right angles to the outer and inner planes of the shell, and either parallel or at right angles to the lines of growth, when examined by the Lieberkuhn, exhibited three distinct strata uniform in the nature of their structure but alternating in the mode of their disposition: each structure is formed of innumerable plates composed of elongated prismatic cellular structure, each plate consisting of a single series of cells parallel to each other. The structure of bivalve shells is rather more complicated than that of univalves: the interior surface of some specimens exhibits a thin stratum of columnar basaltiform cells at right angles to the natural surfaces of the shell, whilst the upper is dense, uniform, and composed of numerous thin laminae parallel to the natural planes of the shell; in other species the inner surface of about half the substance of the shell is composed of numerous thin calcareous strata, whilst the outer half presents the appearance of numerous basaltiform columnar cells having their planes at right angles to the surface of the shell: several other differences in the arrangement of the cells in other genera were then given. The author went on to describe a minute vascular tissue which embraced some of the elongated prismatic cells and gave them a striated appearance. Minute canals corresponding to the Haversian canals in bone, only much more minute, were also to be seen in some specimens; the author then alluded to the fact that there must be of necessity some vascular connection between the animal and its shell, although he had at present failed in detecting any. He concluded by describing the mode of reparation of injured parts, which was found to be precisely similar to the formation of the new lip in *Helix aspersa*, as before described.

Beautiful figures of the principal structures described accompanied the communication.

ROYAL SOCIETY OF EDINBURGH.

January 9, 1843.—The following communications were read:—

1. “On the Growth of the Salmon;” by Mr. John Young, Sutherlandshire.

Mr. Young has here taken up the subject of the Salmon's growth where it was necessarily left off by Mr. Shaw. So far as the earliest or freshwater state of the fish is concerned, he entirely agrees with the observer just named. He then states the various opinions which prevail regarding the more or less rapid growth of smolts and grilse, and shows by tabular lists (the result of frequently repeated experiments) that the increase in their dimensions is extraordinary so soon as they descend into the salt water. So far back as the months of April and May 1837, he marked a number of descending smolts, by making a peculiar perforation in the caudal fin by means of small nipping-irons constructed for the purpose. He recaptured a considerable number of them ascending the rivers as grilse in the course of the ensuing months of June and July, and weighing several pounds each more or less, according to the difference in the length of their sojourn in the sea. Again, in April and May 1842 he marked a number of descending smolts by clipping off the little adipose fin upon the back. In June and July he caught several of them returning up the river and bearing his peculiar mark, the adipose fin being absent. Two or three specimens were exhibited to the Society. One marked in April and recaptured on the 25th of July weighed 7 lbs., the other marked in May and recaptured on the 30th of July weighed $3\frac{1}{2}$ lbs. As the season advances grilse increase in size, those being the largest which abide the longest in the sea; they spawn in the rivers after their first ascent, and before they have become adult salmon.

Mr. Young also described various experiments instituted with the view of showing the transition of grilse into salmon. He marked many small grilse after they had spawned in winter and were about to redescend into the sea. He recaptured them in the course of the ensuing summer as finely formed salmon, ranging in weight from 9 to 14 lbs., the difference still depending on the length of their sojourn in the sea. He has tried these experiments for many seasons, but never twice with the same mark. A specimen marked as a grilse of 4 lbs. in January 1842, and recaptured as a salmon of 9 lbs. in July, was exhibited to the Society: it bore a peculiarly twisted piece of *copper* wire in the upper lobe of the caudal fin. Those marked and retaken in 1841 were marked with brass wire in the dorsal fin. With these and other precautions, Mr. Young debarred the possibility of any mistake as to the lapse of time. Both grilse and salmon return uniformly to their native streams; at least it very rarely happens that a fish bearing a particular mark is found, except in the river where it was so marked. Salmon in the perfect state as to form and aspect also increase rapidly in their dimensions on again reaching the sea. A spawned salmon weighing 12 lbs. was marked on the 4th of March, and was recaptured on its return from the sea on the 10th of July, weighing 18 lbs. Mr. Young is of opinion that

salmon rather diminish than increase during their sojourn in rivers, and he illustrates this and other points of his subject by numerous experiments and observations.

2. "On the Geology of Roxburghshire." Part II. By David Milne, Esq.,—the conclusion of a very interesting report.

MISCELLANEOUS.

MAIANTHEMUM BIFOLIUM.

THIS very pretty plant, recorded as British in the 'Annals' for January, is a rediscovery and not altogether new to the British flora. It has been already figured and recorded as English, but a long while ago. In Gerarde's 'Herbal,' 2nd book, 90th chap. p. 409, will be found a very characteristic portrait of it under the name of *Monophyllum* or *One blade*. He classes it with his *Wintergreenes* (*Pyrolæ*), and says "it growth in Lancashire in Dingley Wood, six miles from Preston in Aldirnesse, and in Harwood near Blackburne likewise." "It floureth in May, and the fruit is ripe in September." Let the Lancashire botanists look out for it next spring. It is strange that Gerarde's notice of it should have escaped our older botanists; and stranger still, that in the Linnæan Society's copy it is marked "*Convallaria bifolia*" in Sir James E. Smith's own handwriting, apparently without his having noticed the localities given for it below. In the south of Norway it is very abundant in pine-woods on a gneiss soil*, and should be looked for in similar situations in the north of Britain.—EDWARD FORBES.

DR. PATRICK NEILL.

There are few whose claims to public commendation are stronger than those of Dr. Neill, who has been one of the most useful, but least ostentatious, of Edinburgh's citizens. At a late meeting of the Caledonian Horticultural Society, Lord Murray proposed that the members should at their first meeting in their new hall express their sense of the obligations under which the Society lay to that gentleman for his distinguished and laborious services; which was carried by acclamation. In addition to this, it is proposed to request Dr. Neill to sit for a bust, to be executed by John Steell, Esq., R.S.A. This mark of approbation, however, should not be confined to the members: the Doctor's services as a citizen of Edinburgh, and the interest he has taken in every public and benevolent undertaking, entitle him to a more general compliment.

TO ZOOLOGICAL AND BOTANICAL COLLECTORS.

Mr. William Gardener, Dundee, will prepare during the ensuing summer "Botanical Parcels," each of which "will contain 500 species of Scottish Phænogamic and Cryptogamic plants, including as many of the rarer species as possible, carefully selected, dried, named, and localised; and the charge, inclusive of printed labels, paper and

* It is also a common plant in the neighbourhood of Berlin, where it occurs in profusion in the Park on a sandy soil.—W. FRANCIS.



1843. "Proceedings of Learned Societies." *The Annals and magazine of natural history; zoology, botany, and geology* 11, 141–158.

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