JOHN A. SEAVERNS

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A TREATISE
ON
HORSE-SHOEING
AND LAMENESS

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PREFACE.

THE object of this Treatise is not to make every owner his own horse-shoer, but to instruct Farriers. Further, the object is to enable the public to appreciate the art, as a technical branch of industry, and to exhibit its bearings upon the national welfare. Horse-shoers are not, as their maligners aver, less teachable than men composing other sections of the community. The difference has consisted in the teaching which they have received, for that teaching has been conducted by those who, never having learned the art, as every art should be learned, by practice, have forgotten that to teach, one must possess knowledge, of that accurate and positive kind, which is only attainable by personal obser-

vation and study ; and that, in the teaching of *any art*, “ example is better than precept.”

The volume now submitted to the public is, in extent, as a drop added to the sea of books which have appeared on the same subject during the last half-century. It is, however, the result of the study and observation of fifty years, constantly spent in the practice of the veterinary art, and the prevention and cure of lameness ; fifty years which comprise periods of apprenticeship—pupilage—practice ; and, lastly, of practice combined with teaching.

To the establishment of the New Veterinary College at Edinburgh is primarily due the production of this work. It was during the nine years—1857-65—of the life of that institution, and of his connection with it as one of its staff, that the Author turned his previous experience to the best account in his power.

After years of oscillation, from one set of errors to another, during which he had found

that very much of what he had been called upon to believe in, and rely on, as scientific knowledge, was nothing but verbose trash, or the expression of crude hobbies,—after much work and earnest thought, the Author felt that the time had come for presenting the tardy, though, he hopes, the ripe, fruits of his labour to the public; and, in now doing so, he expresses the hope that the work may be judged as an earnest attempt to teach accurately, and to counteract the effects of the injurious teaching of the last three quarters of a century.

EDINBURGH, *12th September* 1871.

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PART I.

THE FOOT, AND SHOEING.

INTRODUCTION.

HORSE-SHOEING is that branch of industry which consists in methodically applying iron shoes to the bearing surfaces of horses' hoofs, by means of nails.

The ends to be compassed by that manual procedure are—firstly, to protect the hoof from wear; secondly, to constitute a guard against injury; and thirdly, to maintain and restore the due proportion of the foot, with its active functions unimpaired. To attain these objects a variety and extent of knowledge is required, beyond that which is usually deemed necessary for the forging of shoes; and even their safe and secure application exacts an insight into the constituent parts of the foot and its mobility.

Horse-shoeing, regarded from our present standpoint, is well worthy of careful and thorough

inquiry, with a view to ascertain its actual state, past history, and urgently required reforms. It is an important subject, demanding mind, application, and skilled hand-work; and it is beyond doubt that now, more than ever before, in this country in particular, have those who practise horse-shoeing become a disbanded craft, a body of men the victims of bad instruction, and in want of intelligent leadership.

The importance of horse-shoeing to the State and the public is exactly proportionate to the services rendered by horses; since, without the art for the conservation of their feet, all other cares bestowed on the production and perfection of breed must be of little avail.

The whole question, however, is of a relative character, and comparisons, not always flattering and welcome, are necessary, in order to carry out successfully the investigation which I deem it necessary to undertake.

I propose addressing myself to the intelligence of a class—a numerous one, and one more deeply interested than any other, in obtaining a free

discussion, and fair hearing, of all that may be said on the past and present state of horse-shoeing, and its future requirements; I allude to the working horse-shoers themselves, whom I purpose addressing, as one of their class.

I shall endeavour to make plain what I believe to be the best method of horse-shoeing; and, convinced that this art cannot be taught and learned as a purely mechanical one, I shall strive to acquaint the intelligent horse-shoer, whom I presume I am addressing, with the reasons on which my teaching is based. The homely and elementary style in which this Work is written, will, it is hoped, not prevent its being useful to readers who may have had a different education to the assumed horse-shoer; and it is for the purpose of raising the art of horse-shoeing from its present neglected state that one part of this Work is specially designed—To point out the causes of its degradation, and to make suggestions for its improvement. In treating this part of my subject, I have been obliged to trace the outlines of the history of the Veterinary Profession in this country.

In doing so, as in treating every part of the subject, my first and chief aim has been, to state what I believe to be the truth.

The practical and historical parts of the Work are kept quite distinct, so as not to embarrass the reader, who, on reference to heads of chapters, will be able to select the one to which he wishes to refer.

CHAPTER I.

HISTORICAL OBSERVATIONS.

THE history of horse-shoeing, limited as the knowledge of it is, and often as that amount has been displayed, may be of little interest to people in general; but some reference to the chief phases of it may not be uninteresting to horse shoers, and in particular to those who take an interest in improving their knowledge of the art.

The first thing likely to occur to the mind of an intelligent youth wishing to become a horse-shoer, or the question of a parent placing a son in the way to learn the art as a means of livelihood, would probably be—What is its title? by what names are this calling and its followers known? Such terms as blacksmith and farrier tend to show that it is a calling without a properly distinctive title; yet “there is much in a name,” and the absence of a proper name may generally be taken as evidence of neglect.

That the art of horse-shoeing has been, and is still, greatly neglected in this country, must be at once evident to a careful observer, and will become more so as I trace its development from France, Italy, and farther eastward, since the earliest times whence trustworthy records have been handed down to us on the subject.

Horse-shoers were in Italy called *Manescalchi*, the singular for which is *Manescalco*; and the art was distinguished as *Manescalcheria*.

So soon as books were printed, and modern languages became the medium of communication, we find those phrases, only slightly modified, in use in France as well as in Italy—viz., *Maréchal*, *Maréchaux*, and *Maréchalerie*; and these concise and significant expressions designate the individual member, the body, and the calling. Further, the etymology of the word *Maréchal*, according to authorities, was derived from two ancient words, signifying *Horse*, and *Custodian* or minister. The title was therefore an honourable one, implying skilled knowledge of horses; and this is made the more evident by the fact, that at a later period the

word *Maréchal* was adopted in France as the title of military distinction, was afterwards used in England in that sense, and in later times has become the highest rank conferred on distinguished military commanders. The word *marshal* has, however, never been used in England to denote horse-shoers, though on the Continent it has lost none of its usage or *prestige* in that relation—a *Maréchal de France*, and *un maréchal expert*, are understood distinctly—the former *a marshal of France*, the latter *an expert horse-shoer*. Another word of Italian derivation—*Farrier*, after *Ferro* or *Ferrum*, iron, has been long used in England, but vaguely so. In the original tongue it conveyed a similar meaning to *smith*, a worker of iron; but, as is commonly the case with borrowers, we soon misapplied the word, and a man who treated horses and other animals when diseased was called a *farrier*, hence *horse-farriers* and *cattle-farriers* over the country; while the *village-smith* shod the horses, *farrier*, as the title of horse-shoer, received more general application in London, where shoeing-forges were

kept distinct from forges for different and general purposes.

The English public has been so unaccustomed to look for anything rational and intelligible about horse-shoeing, that the idea of associating the reasoning faculties with physical power in the process of shoeing horses is scarcely entertained. When one reads *farrier*, unless the term is qualified by reference to shoeing, nobody can understand what is meant. Even after reading through part of De Gray's "*Expert Ferrier*," and finding nothing about horse-shoeing in the first thirty pages of the book, I began to wonder what the author meant by *ferrier*, when, on arriving at the thirty-fifth page, I found the explanation as follows :—

“Of what points consisteth the office of ferrier?—Handled dialogue-wise, What is the ferrier's art? It principally consists of four things—to wit: science, experience, knowledge, and handy-work.

“Handywork is to heat the iron well, to sodder well, to forge well, to turn a shoe well, to

make and point a nail well, to pare the hoof well, to cauterize well, to let blood well, to be light and well-handed, bold and handy in dressing a horse well, of such accidents as may happen unto him."

This extract is from the Work of one of the three or four chief English writers on *Farriery* of the 17th century, and De Gray was in the service of Charles II. We here learn that farrier meant the horse-shoer, who was also practitioner in general for the treatment of diseases.

The old English writers are commonly mentioned as not worthy of being consulted now ; but at least references to them are instructing, since they are all we have, besides oral traditions, as a set-off against Solleysel and others in France, of the same period, and to compare with Ruini and his fellow-country writers in Italy, a century and more earlier.

No nation could produce abler men than our own as mechanics for working iron ; but Englishmen did not to any great extent display their usual talents in the development of farriery.

Our country, with its all-the-year-round moderate temperature and well-adapted soil, produces the most powerful horses of any in the old world ; and the want of economy in their management has been equal to the bounteous natural endowments conferred upon us.

Is horse-shoeing an art that can be learned and followed as a distinct calling, with credit and remuneration to those depending on it for their livelihood, and to the satisfaction of the horse-owning public ? I believe not ; and I have neither arrived at this conclusion inconsiderately, nor without ample data for it. Horse-shoeing never has stood alone in Europe, so far as its history shows ; it may sometimes seem to be followed independently ; but on careful inquiry it is always found otherwise.

I deem it expedient to express myself plainly on this point, because on a clear understanding of it very much depends the possibility of carrying out any adequate reformation on farriery.

At the end of the last century and beginning of the present one, the farrier was in England

a general practitioner ; sometimes his field of occupation was among horses and cattle, and not in horse-shoeing ; but we never find a shoer who was not more or less a dealer in drugs, or else a general smith.

These are the facts, and to make them intelligible a few words in explanation may be necessary. I shall adduce one reason to show why shoeing has required to be coupled with something else hitherto, and another to support my own opinion to the effect that it never will be found to be successfully prosecuted alone.

Shoeing of horses has come down from time immemorial traditionally, and we owe almost all the good it has conferred to experience handed down from masters to apprentices, from fathers to sons, and from expert workmen to learners. Meanwhile, we are in profound ignorance about the early state of shoeing—whether it was invented in one part of the world and gradually extended over it, or whether the same contrivance, almost identical everywhere, was extemporised by different men at various epochs and at

an infinity of places; the last supposition has nothing probable to support it, and I believe that shoeing had a central beginning, and from such centre radiated wherever men carried industry and used horses, mules, or oxen, since it has been adopted for all; there are, however, no grounds for the conclusion that it was an ordinary smith who first shod any of these animals, although it required that the operator, or one of those engaged, should have been a smith, to the extent of being capable of hammering the plate of metal into the form of the hoof for which it was intended. The most critical part of the procedure, that which called for technical knowledge and special skill, had all regard to the foot itself; and any one who ever did, or who may in future, apply himself seriously to the subject, would soon discover, that much learning of the organisation and movements, which various degrees of exertion involve, is required, apart altogether from the manual skill.

Not altogether consistent with the conclusion from the above teaching, is the commonly assumed

notion that when and wherever animals were first found to require shoes, the smith was the person employed, and from that accidental circumstance became the *animal doctor* or surgeon. But strict criticism refuses to admit such reasoning as quite conclusive. The animals which were found disabled with worn-down hoofs and sore ulcerated feet (for these conditions were common), required healing. A surgeon's knowledge, and the fixing of a border of metal to the hoof, were necessary parts of the cure. Medicines alone would be mockery where a protrusion of proud flesh lay between the foot-bone and the ground; and therefore the early, if not first thing required was the shoe, and in some way, however rudimentary, the surgeon must have shod the animal; hence probably the blending of these branches of skill in forging, fitting, and applying shoes, with the surgical treatment of the animals, and also the origin of the title "*Maréchal*."

As the primitive state of horse-shoeing is entirely hidden from us by the unknown number of centuries that have elapsed since it was first

adopted, we can only take cognisance of its state and progress, at the comparatively modern period of its written history.

The advancement of civilisation, agriculture, and commerce, multiplied the use of horses ; artificial restraints and conditions were imposed on them, and new resources were required to keep pace with the changes. There is no evidence in the early history of the art of shoeing of its ever lagging behind other arts, to meet an essential want, which could not fail to make itself known wherever the clash of war brought horses with riders or charioteers into conflict. From the north and west of Africa to the Nile, and thence throughout Asia, a distance divided by deserts, and inhabited by people very different from each other, and between whom no one will believe there could exist much intercourse, horse-shoeing has been found wonderfully alike ; nothing in art is perhaps found so constant and little varied over the same regions of the earth ; not even the making of bread.

No doubt it was from that old stock of know-

ledge of horse-shoeing south of the Mediterranean, and eastwards, that the western nations received it.

The inauguration of veterinary schools in the eighteenth century, fixed a new epoch to the history of farriery.

As is generally the case when a new light breaks in upon us, the beginning of the schools does not indicate the beginning of a great movement, but an important phase of it. The light which the renovation of learning had already spread, even on this subject, during the fifteenth and sixteenth centuries in Italy, had extended to this country through the agency of skilled riding-masters and farriers; one, at least, was brought over by Henry VIII., “who was looked up to by his English brethren as an oracle, and who, although he did not display mysteries, taught them more than they knew before.”—*Berenger*.

Whether *Hannibale* was the only Italian farrier brought over to this country does not appear; writers on farriery of the seventeenth century make mention of their Italian masters,

and use their phraseology ; but whether the reference applies to writings or to persons is not clear ; most probably it is to the former.

France, nearer at hand than England, profited by direct intercourse between the Italian Peninsula and her own extensive border connections, reaching from the Mediterranean to the Northern Kingdoms. Solleysel was sent by the French government to Italy to study the subject, and proved himself to have been wisely chosen for the work.

Horse-shoeing was a foremost subject of Solleysel's solicitude, and to that, and everything on which its successful prosecution depends, he devoted himself during his sojourn in the Peninsula. The learned men of his time, and the works of those of earlier periods, favoured his opportunities for study ; the work on *Anatomy*, by Ruini, and the views on the *Action of the Horse*, worked out by his contemporary Borelli, were well known to the keen observant Frenchman, who was afterwards appointed chief over the studs of Louis XIV. Solleysel's great work,

Le parfait Maréchal, appeared in 1664; meanwhile, he used all the means which his position, and then unrivalled acquirements, gave, to establish and diffuse improvements in the whole sphere of the art of farriery. Solleysel's influence during his lifetime, and the works he left, produced good and durable effects throughout France, and over Europe.

In 1761 a new impetus was given with the founding of the first veterinary school by Bourgelat, a man, whose influence on veterinary science, through all future ages, entitles him to a short biographical notice in this place.

*Claude Bourgelat** was born near Lyons in 1712, and died in 1779. He had the advantage of a good preliminary education, and adopted the bar as a profession, which he soon left for the army. Serving in a cavalry corps, he acquired the reputation of an accomplished horseman, and had ample field for learning by experience the necessity of a thorough acquaintance with the

* *Quérard*, la France Littéraire, and Nouvelle Biographie Universelle, Firmin Didot Frères, editeurs.

management of horses, and particularly their feet.

Bourgelat enjoyed the friendship and support of the celebrated surgeon Pouteau. He made the best use of the most able farriers of his time, not despising them, but making store of their experience and enlightening them. He opened and kept up a correspondence with the learned men of Europe, and was elected a member of the Academies of Paris and Berlin.

Bourgelat's literary labours were wonderfully productive, varied, and able. His treatise on cavalry was translated into English, and it may be said, with strict accuracy, that he neglected no branch of veterinary science; the anatomy and physiology of the horse and cattle, *materia medica*, shoeing, the system of education, and many other subjects, were treated by the great Frenchman with an untiring zeal, and a thirst for knowledge which nothing could quench.

The establishment of the first veterinary school in France met with such complete approval, and the work done was so good, that the founder had

the great satisfaction and reward of his sovereign's command to found a second veterinary school, the now world-renowned college at Alfort. Bourgelat was elected to preside over this last institution, while the directorship of both the French schools was conferred on him.

Bourgelat, like Solleysel, and most of the ablest men who have studied the subject, was deeply impressed with the importance of the art of shoeing, as essential to the State, agriculture, and commerce, to the efficiency of an army, and to the general wants of society.

Bourgelat's plan, which is still in vogue wherever his school is held as a model, was not to aim at creating a new profession to supersede the old farrier's art ; but to improve on it to the greatest possible extent, and add new parts to it. His process was one of grafting, not of uprooting. He gave the title of veterinary art to the whole, and of *Maréchalerie* (farriery) to the branch ; and to this branch the first consideration was given, and the greatest care was bestowed on its thorough cultivation at the new schools.

A complete staff of able professors, each eminent in his sphere, was appointed to give instruction in the various departments of science, and thus all means were afforded for the advancement of learning in the wide field of subjects which the plan embraced ; Bourgelat himself undertaking special parts, whilst the art of shoeing was presided over by Monsieur Chabert, a man selected by Bourgelat as being reputed the best horse-shoer in Paris. Chabert became known afterwards as the professor who succeeded to the directorship of the schools after Bourgelat's death ; and also as the author of many works.

In the bye-laws framed by the founder, the importance of horse-shoeing being so well understood, its efficient prosecution was provided for.

Every student admitted to either of the veterinary schools, was required to go initiated in the first rudiments of the work, and to give an allotted portion of time to shoeing at the college, under the appointed instructors. With all necessary means for practice, young men became

accomplished veterinary surgeons, while they went forth from the school after the allotted four years' residence, capable of performing the work of shoeing, and of giving directions on details such as none besides men so trained can understand and communicate.

In 1792, after two or three years of time had been devoted to the consideration of plans, a veterinary school was established in England ; those of France which had stood the test successfully of thirty years' trial being the assumed models ; and a member of the Lyons school, Monsieur Sainbel, was chosen as the principal of the London school, which was inaugurated under his immediate directions. Our school from the first was entitled the London Veterinary College, and still occupies the original site.

The history of the English veterinary school has been so often written, that I do not deem it expedient to trespass on the time of readers by entering into details on it, with the exception of such phases as have a special bearing on horse-shoeing, which I believe have not been placed in

their true light, either before the members of the college themselves or the public; and still less before farriers as a body, who, more than any others, have been deeply affected by it.

In little more than a year after the foundation of the college, Monsieur Sainbel died; and, after a single winter session, during which a small class of ardent students were in attendance, all were left without a guide until February 1794, when Mr. Edward Coleman and Mr. W. Moorcroft were elected joint-professors. The latter gentleman, however, retired forty-five days after his appointment took place, leaving Mr. Coleman sole professor and principal of the embryo concern.

The first programme formed by the committee of managers under Sainbel's advice was at this juncture set aside, or at least so much of it as restricted in any way the free action of the new principal. One notable instance was the alteration in the length of time to be devoted by the pupils to the acquisition of the knowledge of their art. From three years, which was one year

less than the minimum laid down in the bye-laws of the foreign schools, no time in particular was prescribed in the London College. Unlike the way in which they managed these matters in France, where one part of the preliminary examination consisted in the candidate being required to forge a shoe in the presence of the examiners, at our school no question was asked, nor did any of the candidates require to take up a horse's foot, or move a hand in any of the stages which enter into the process of shoeing, during their pupilage.

The time of attendance to learn this immensely important and difficult art,—farriery and veterinary medicine generally,—was in this way limited to a few months instead of years. But the little instruction was the smallest of the evils then being lastingly entailed; it was the kind of teaching on the foot, and on shoeing, that did the incalculable, and, I fear, almost irreparable damage; which has brought suffering on horses and shortened their existence; which has spoiled farriers by leading them astray on false prettexts;

and entailed discredit on the English Veterinary School.

At about twenty-four years of age, Mr. Coleman, having recently qualified in the London medical schools to begin in the general practice of medicine and surgery, was induced by influential friends to become a candidate for the professorship of everything that was to be taught at an English veterinary college. It was never pretended that he had gone out of the way of an ordinary medical student, or that he knew anything in particular about horses, not to say of farriery.

Young, plausible, and inexperienced, with the manners of a gentleman, and with influential connections, Mr. Coleman rapidly gained a position of great power and affluence. We have it on the authority of Blaine, that as Principal and Professor to the Veterinary College, and as Veterinary Surgeon-General to the Army, with the additional proceeds of private practice, and an appointment at the Ordnance Department, Mr. Coleman made an income of £3000 per annum,

which he continued to enjoy for the period of forty-five years.

It is not so easy, as it would be desirable, to show what was the state of the art of horse-shoeing in this country towards the close of the last century ; because shoers themselves are nowhere a class possessing the kind of ability or the leisure to write treatises on their art. Least of all, among the civilised nations, were English farriers qualified or inclined for such a literary task.

Whoever has made the matter an earnest subject of labour and thought in the present century, can scarcely fail to gain a clear insight into its state in the past.

We have no Solleysel to refer to ; our authorities left us mostly indifferent translations from foreign books ; yet we learn from such independent writers as Earl Pembroke the extent of the ignorance of which he complained, with expression of the hope of seeing in future time better-instructed farriers. In one important subject, which has a direct bearing on all intelligence

on the horse, *The Anatomy*, England had, in the middle of the last century, the greatest authority since Ruini; and what is most important, and to our country's credit, George Stubbs appears equally original with the Italian anatomist of a century and a half earlier, whilst the English author produced a work, with all the resources of modern art, so exquisite in design, and exact in detail, that it can hardly be superseded, and probably, taken all in all, has never been equalled. We had, therefore, no need to go abroad to learn anatomy, general or local, of the horse. The century also produced one English monograph on the foot of the horse, of which we may feel proud—Mr. Strickland Freeman's work on the *Foot*. This is not, perhaps, a fair criterion of English farriery at the time it was written, because the author had travelled much, and was an amateur horseman, liberally educated; so that his work displays better knowledge than is found in any similar work on the special branch in England before, and I had almost said since, his time.

In the days of Stubbs, Earl Pembroke, and Strickland Freeman, the master farriers of England numbered many very intelligent and substantial, though not scientifically educated, men ; to wit, the father of Michael Faraday among others ; nor is this illustrious example of men rising by their own talents in their time from the smith and horse-shoer's sphere to very high positions, solitary among men of genius and brilliant qualities.

It were needless to multiply examples of men still living, and filling the highest places in the veterinary profession and among scientific men of the world, who have raised themselves, and delight to think of it, from the provincial cottage and from their father's shoeing-forge. It was from such nurseries as the above that many of those men came, in the beginning of this century, who thronged Mr. Coleman's lecture-room ; and had they had an opportunity of learning from him sound doctrines, and really practical information, we should not have to deplore the destruction of the old race of far-

riers, on which, like the French and Germans, it would have been possible to engraft improvements.

This criticism on the influence which Mr. Coleman exerted on veterinary matters in this country, is not expressed without careful thought. I knew him well, was one of his favourite pupils, and have had very good opportunities of comparing his system of teaching with that of other masters in this country and abroad. But a strict sense of justice demands an acknowledgment of some great advantages which Mr. Coleman obtained for his pupils. The professional circle in which he had been reared, and the society in which he moved, enabled him to give his students the benefit of attending the lectures of some of the most eminent men in London. Thus it was that I, with others, followed the teaching of Professor Brand and his then assistant, Michael Faraday, at the Royal Institution, the lectures of Dr. Pearson at his house in George Street, and the anatomical and physiological demonstrations of Charles Bell at the Windmill Street school.

Mr. Coleman's great error was a common one with naturally clever people, who are deficient of information on particular subjects. The farriers of his time were unlettered, and on a vast number of subjects which they dealt with, ignorant and unintentionally cruel. But they, none the less, possessed a large stock of useful knowledge, which was worth storing up. It is easy to indicate the want of knowledge, but not so easy to supply it. I have already referred to the judicious liberality which led Bourgelat to give an honourable position in his new school to Monsieur Chabert, as the best horse-shoer in Paris. Had Mr. Coleman picked out for preferment some such man in London, and been content to learn from him what he did know, and helped him to learn what he did not, the veterinary world might have been saved a vast deal of nonsense, miscalled theory, and owners of horses would have been saved, without exaggeration, many millions.

As a rule, Englishmen are conservative of what is good, while liberal in promoting reforms step by step, as they are proved to be necessary ;

whereas Frenchmen are notoriously prone to sudden and radical transitions ; but it has been the reverse in the history of the veterinary profession, on all that concerns the management of horses' feet. The French have never departed from the great lessons of experience while seeking the light of science to improve them ;* while in England, since Professor Coleman ruthlessly destroyed the empirical knowledge of the old master farriers, and substituted for it a tissue of fantastic and often cruel notions, we have been a prey to endless speculative theories. The result is that, with the best horses in the world, we have a far larger proportion of lame ones than are to be found in any other country ; we have a body of veterinary surgeons who know little or nothing about the proper mode of shoeing ; and working farriers who, excelling as many of them do as mechanics, can know nothing of the principles of shoeing,

* The author is aware that latterly the bye-law has been relaxed which enjoined that candidates for admission to the French veterinary schools should forge a horse-shoe ; but he has heard nothing of the effect of the change.

since they have no opportunity of being taught them.

These historical observations, founded as they are on facts, represent an evil of incalculable magnitude. Look in our streets; consult owners of horses; and what is the result? Lameness, the common effect, which damages and destroys more horses than all the other diseases put together to which they are liable. The cause is bad shoeing; the remedy must be good shoeing. Veterinary surgeons appear to be growing up in the idea that the forge is not a gentlemanly part of their business. It is certainly a very important one, and if they persist in neglecting it I see no alternative but to organise means for educating working farriers, who are certainly much in need of, and deserving the opportunities for, technical education, which is now engaging so much attention throughout the country. Such a consummation would be of the highest conceivable benefit to farriers themselves and the community.

In honour, the responsibility of devising a remedy rests on the ruling powers in the veteri-

nary profession. The working farriers have no means, intellectual or material, for helping themselves. The numbers of lame horses toiling in pain day after day, and year after year, in our great cities, are assuredly a reproach to our humanity. Unfortunately, the Act for the Prevention of Cruelty to Animals is not sufficient to embrace their case, and punish, as it should do, those who use them; and it is to be hoped that by and by economical considerations alone will be sufficient to prompt horse-owners and their advisers, to remedy some of the evils glanced at in this historical sketch on horse-shoeing.

CHAPTER II.

THE FOOT—ITS FORM AND FUNCTION.

IN entering upon this chapter, I experience some difficulty—that of complying with my plan and aim, of being concise and yet clear, so as to make this work of a thoroughly practical character.

I have no fear that the readers of these pages will, under the specially practical headings, not recognise the production of one who has thoroughly devoted himself to carrying out in practice the principles herein laid down. On the score of conciseness also, it is confidently hoped that no fault will be found in the practical chapters. But conciseness in this place is not an easy matter ; all the more so, as I undertake to describe nothing which I have not myself dissected and carefully examined, and I feel a natural disinclination to describe imperfectly what I have fully seen.

The horse's foot is a "*multum in parvo*,"—

a great deal in a very small compass ; and the mistake usually committed has been to describe the horse's foot by itself, as a small and compact horny box enclosing living structures.

Practically, as well as scientifically, it is no use looking at the horse's foot by itself. It must be studied and treated as a part of the whole limb. This plan is a longer one than that commonly followed ; but it is also a broader, a more instructive, and a safer plan—the only one by which a thorough understanding of the foot can be acquired. To carry it out fully, would demand a more lengthened treatment of the comparative anatomical and physiological aspects of the subject, than is consistent with the scheme of the present volume. Keeping steadily in view the information of horse-shoers, I hope the anatomical facts to be described may be found generally instructive, and by and by be recognised as the foundation, of a more rational, a more humane, and a more economical system of horse-shoeing and of managing and treating horses' feet, than that now prevailing amongst us.

The foot of the horse is comprised comparatively in small space, as are the feet of all animals endowed with hoofs. Compared to that of man, it comprises a smaller section of the limb ; as only part of the bones, joints, etc., which form the human foot and hand, and which include ankle and wrist, come under the denomination of foot in the horse.

Yet notwithstanding the accustomed way of speaking of the horse's foot, we can only rightly study and understand it as an inseparable part of the anatomical system of the fore and hind limbs, of which it is the terminal portion or end ; in anatomical language the horse's foot is merely *the last phalanx of the digit*.

Anatomists have usually divided the horse's foot into hoof and the organised structures enclosed by it ; the latter being commonly called the sensitive foot. A separation of these parts may be effected within a period varying from fifteen to thirty days, according to the season and temperature, by maceration, without changing the water in the vessel in which they are kept.

The anatomical preparations from which the drawings for this work have been taken, were all collected and dissected by the author. Of some of the subjects from which these were obtained, the history was in different measures known, and the remainder were procured at the places where the

Fig. 1 is the hoof of the near fore foot of a Pony about two years old, which had never been shod.

animals were slaughtered, or to which, after death, they were taken.

The manner pursued by the author of separating and preserving the hoof for the purposes of this investigation, and to prepare select specimens for illustration, was as follows:—

The feet, while fresh, soon after the death of

the animals, were placed in water, until they could be detached easily by the process of maceration already referred to ; dissection of the other structures was then proceeded with, according to the object in view ; and plaster of Paris paste was poured into the hoofs, as soon as the water was drained from them. Thus a cast of the organised foot was formed, and the hoof exactly filled, unalterably. In this way the hoofs, placed in a drying position, remain for months, when, by breaking, the plaster is removed, and the cavity of the hoof preserves the form it had, when separated by disintegration of the natural bonds of union.

In that state, provided the hoofs be kept dry, whether of normal or abnormal form, no change occurs.

For the purposes of experiment, I have prolonged the maceration to three, six, and even ten months, when, as described, the hoof is resolved into its constituent divisions. The sections made of these hoofs, and separation of the horny frogs, have all been done long after they had been preserved dry, and in this form the frog was re-

moved by tapping it with a hammer, the maceration having been continued sufficiently before drying. No change of form of the dried hoof occurs through removal of the frog. But the hoof collapses if we destroy the continuity of the sole, by sawing through or even removing a portion of it ; or if we press the sole out of its position at the toe, from above downwards, so as to destroy its abutting property from behind against the cylindrical part of the wall, by which the capacity and form of the whole hoof is maintained. Any of these breaches of the sole lead to direct curling in of heels, one or both, according as they are deprived of the strength.

Thus seen, the hoof is a structure of horn, the exact counterpart of its contents. Viewing, when first separated, the inner surface of the hoof and the outside of the compact structures removed from its cavity, these exhibit accurate moulds of each other—convexities on one surface fit the concavities of the other.

For purposes of description merely, we may divide the hoof into two parts—1st, the sole ;

and 2*d*, the wall. It must be remembered, however, that this division is merely adopted for purposes of description. Looking at the plantar or lower surface of a foot, we observe the sole, which is a surface arched from the sides to the centre. This surface is bounded by the wall, with which it is continuous.

Occupying a central position in the sole is *the frog*, a triangular body, with its apex or point in the middle line passing beyond the centre of the foot; the frog separates at about one-third of its length from its point into two ridges, having a hollow, called the cleft, between them.

Before discussing this under surface of the hoof, we may add that, in practical language, we distinguish on its circumference the toe, the heels, and the quarters. The first term is applied to the very front or point of the foot; the second, or heels, to the posterior part of the hoof, on the inner and outer side; whilst the third, quarters, indicates the intermediate or central part of the circumference of the sole—*i.e.*, that part which lies between the heels and the toe.

The sole is bounded by *the wall*, with which it is continuous. Looking at the hoof from the front, we see that the wall is the curved portion of the hoof which constitutes its anterior and lateral surfaces, and which, with the sole and frog, completes the horny substance which envelops the bones and soft structures. The wall meets a horizontal plane, passing through the sole at an angle of about 45° , the exact degree of obliquity varying, however, in different subjects. It is more flattened laterally than in front.

Internally the hoof presents a cavity formed by two surfaces:—the lower one, which is the counterpart of the sole and frog, and the upper and anterior one, which is formed by the inner side of the wall, and has the same shape.

The inner surface of the wall has been aptly compared to the under surface of a mushroom. Running parallel with the horn fibres of the hoof are thin plates, to which the name “*laminæ*” has been given, and corresponding to these are others of like kind, which issue from the fibrous structure covering the coffin bone and the carti-

lages. This bond of union is of marvellous strength, attained by the one set of folds interlaying the other throughout the interior of the hoof, excepting a border at its circumference and the whole bottom surface, where, none the less, the bond of union is very intimate and complete ; so complete, indeed, as to be inseparable, otherwise than by breach of continuity, in fact by destruction.

The hoof is made up of more than one part, but not of so many as authorities have alleged. In speaking of different parts of the hoof, I do not mean, as is the common custom, separate divisions of the hoof, but I refer to parts of the foot in different situations.

The hoof of the horse, like the toe-nail of a dog, bird, or other animal possessing a toe-nail, is composed of two distinct parts only—the true hoof, and its completing covering or tunic, the epidermis proper. The latter is bountifully supplied, and is not only spread as a thin membrane over the outer surface of the hoof, but around its upper margin, constituting that convex border of

soft horn over which the coronary fringe of hair falls most beautifully. The band of soft horn spreads over the cartilages and bulbs, round both sides, merging into the pyramidal structure—the frog. The frog is the horn covering of the large and powerful tendon of the foot, and, like the true hoof, fulfils the office of a shield to the soft parts within.

The hoof entire includes the wall, sole, and frog; the first two names referring to integral parts of the same structure, and the last to one distinct one.

If we attempt to split up the hoof into its constituent parts, we find that the frog is quite easily separated by maceration, and may then be obtained as a triangular body, which, at its base, has two diverging wings; these wings are continuous with the cuticular band, which in the living subject runs round the coronet. The frog, indeed, preserves essentially the physical characters of cuticle. When we attempt to separate the sole from the wall, we notice that there is a blending of the one structure into the other, which is

quite different from that observed in the case of the frog and sole. In front, it is true, the sole is separable from the wall, against which it abuts, and to which it is merely agglutinated, but behind they become quite inseparable. These parts are endowed with various functions in common,

Fig. 2.—The Frog.

of defending from external agencies and exercising a sustaining faculty. Their strength does not merely serve the purpose of bearing weight, but also of preserving the form of parts and governing their proportions. It is the outer encasement acting in concert with the bone and

joint construction, which together regulate the action of the intervening pliable structures.

The character of the horn of which hoofs are composed is such that, by given degree of density

Fig. 3.—Hoof, with Frog removed.

and toughness, it is endowed with strength to bear weight and resist wear, and is little liable to break. Another most important property is clas-

ticity, which the horny hoof possesses in an exquisite degree. An essential condition of the strength and elasticity of the hoof is, that it be preserved in a state of normal firmness and proportion, and that it be neither mutilated out of shape nor soddened by wet, a process fatal to the elasticity and

Fig. 4.

strength of horn, as any one may convince himself by soaking a piece of horn in water.

Figures 4 and 5 represent two hoofs removed

from diseased feet of different horses, and which both alike had been excessively mutilated by cutting and other kinds of treatment. These, after being preserved in their original form, as described, for a not less period than two years, were subjected to removal of portions of the soles ; the frogs having been first removed, and an interval allowed, when no changes in the form of these

Fig. 5.

weakened hoofs occurred ; but a longitudinal section was made with a saw from the space previously occupied by the frog, and one side of the arch of the sole was removed and the other left

intact. From specimen No. 5, the whole anterior part of the sole was removed, by making transverse sections from the frog to the wall at each quarter. Thus treated, a change spontaneously and immediately began to take place by degrees in both; the part with one-half of the sole removed and the other entire, curled in at the heel where support was wanting; the other side maintained its form, and has done so for seven years, from toe to heel. While the last described of the two, No. 5, deprived of all its abutting medium, admits of a collapsing inwardly at both heels, until, in the space of two or three weeks, the wall at the part from either side presses together.

I have no doubt whatever that upon the horny sole of the foot being kept in its integrity and firm condition, in the living state, depends the efficiency of the whole hoof, the health and ease of the foot, and usefulness of the horse.

The construction of the foot may now be, for the sake of convenience and compliance with custom, studied in the commonly understood sense as limited to the parts enclosed within the horny

hoof. The centre or foundation of this part consists of two bones—firstly, the foot bone proper ; secondly, the smaller, the sesamoid or navicular bone.

The foot, or pedal bone, is anatomically the last phalanx, but popularly is known as the coffin bone. It gives the form to the front part of the hoof, and to its sides also, by the addition of the lateral cartilages which are fitted into it. The pedal bone is remarkable for its strength and lightness, its toughness, and its porosity ;—its lower surface is arched. Placed upon a true plane, it will be seen that the pedal bone rests on it nearly level. The concavity of the bottom surface of the bone and its true bearing are points specially worthy of notice as bearing on the principles and practice of horse-shoeing.

Figures 6, 7, and 8 represent, first (*a*), the anterior section of a hind hoof made vertically across the centre. Second figure shows a similarly made section of coffin bone of fore foot ; and figure three, the corresponding section of hind foot bone. This last, and section of hoof,

figure 6, are parts of the same foot; and the section of fore-foot bone is a specimen from a foot of

Fig. 6.

the same horse—a young animal with perfect feet.

Fig. 7.

These several illustrations are produced to help to impress on the minds of readers how

marvellously the arches of hoof and bone of the horse's foot are adapted—the latter placed above the former—to bear pressure, whether of superincumbent weight or the result of force and action ; they will also serve to show how destructive it obviously must be to the foot's functions and the energy of the horse, to destroy the sole by *paring*, or to impair its texture in any way. Weaken

Fig. 8.

the horny sole by any means whatever, and the pedal bone, which is supported upon its arch, is deprived of that support, and injurious consequences ensue, in various degrees, according to conditions. In extreme, and by no means unfrequent cases, the result of weakening the sole is to

destroy the natural functions of the foot and the use of the horse for service.

The small bone of the foot is out of the line of bearing, and does not affect external shape, but serves most important uses. . From a supposed resemblance to a boat, the late Professor Coleman called it the *navicular bone*—a name now in common use amongst Englishmen. It more closely resembles a weaver's shuttle; and some writers, after the example of Mr. Bracy Clark, have preferred calling it the *shuttle-bone*; but the name which anatomically and physiologically is the most accurate, is the sesamoid bone of the foot, employed by Stubbs and by Continental veterinarians.

This bone is flattened from above downwards, and elongated from side to side. Its upper surface is covered with cartilage, and forms the posterior part of the articulating surface on which the lower end of the small pastern bone moves; the lower surface also has a cartilaginous cover, and serves as a pulley over which the tendon of the perforans muscle moves.

The sesamoid bone is firmly attached to the foot bone in front, and laterally, by means of ligamentous structure. It is also firmly connected to the great pastern bone above, by means of

Fig. 9.

powerful ligaments, which have connections below with the perforans tendon, with the lateral cartilages, and with the fibrous frog. Taking origin

from all these structures, these ligaments wind round and are inserted into the anterior and lateral surfaces of the larger pastern bone.

The object of the author in reproducing the drawing of specimen No. 9—for it was published in another aspect in the *Edinburgh Veterinary Review* in 1861—is to draw attention to the two lateral ligaments referred to, and to which it is proposed to give the name “Lateral Phalangeal Ligaments.” These ligaments—one on either side—are inextensible. They pass over more joints than one, and are the first of a series of similar structures to be noticed, through whose agency the foot is sustained while being raised upon its point in action. These are not ligaments which merely bind bones together to form joints, nor must they be looked upon as ordinary ligaments between bone structures. The office of the lateral phalangeal ligaments is to be acted on by a lever, and to be instrumental in moving the bones which they connect. The two pastern bones, extended in their oblique attitude from above downwards, constitute the powerfully ener-

getic lever which plies by means of those ligaments upon the navicular bone, the lateral cartilages, and the whole of the fibrous structure conspicuous over the plantar region of the foot.

I shall have to refer again to this illustration in another chapter, where notice will be taken of connections with parts above.

From the time I made out the office of the structures I am endeavouring to describe,—functionally in particular,—I have regarded the insight into them as the most important I had acquired for the solution of unsolved questions, on the economy of the foot and limbs of the horse. The lateral phalangeal ligaments were seen by others, but only received passing recognition, while their functions were either not alluded to, or the most inconsistent notions propounded—of their being yielding suspensories, allowing the navicular bone to descend, etc.; whereas they are in no degree or sense elastic.

The function of the navicular bone is similar to that of all typical sesamoid bones. The perforans tendon plays over its smooth surface as

its pulley and fulcrum, and it does so obviously at great advantage, both during the extension and flexion of the foot.

In addition to the structures already described, other parts are comprised within the hoof, which require some description in this place—viz. the lateral cartilages, and the so-called sensitive frog, which is to be looked upon essentially as a powerful interosseous ligament.

The lateral cartilages are two large cartilaginous structures, which are firmly connected with the upper and posterior margins of the basilar and retrorsal processes of the foot bone, and which extend upwards and backwards on each side, so as to protect the articulation between the coronary bone and the pedal bone.

These cartilages are continued backwards in the line of the foot bone, and then bend in, in the form of the hoof. They not only are connected with the os pedis, but likewise with the coronary or small pastern bone. Now, those cartilaginous structures cannot be well considered by themselves, seeing that they are so intimately

connected with the so-called sensitive frog. This, and the ligamentous structure, are connected, *1stly*, with the large pastern ; *2dly*, with the lateral cartilages ; and, *3dly*, very firmly inserted into the lower surface of the foot bone. When we consider that the lateral cartilages are connected not only with the pedal bone but with the coronary bone, we understand how important is the function of that powerful structure—the fibrous frog. This is, in truth, a most beautiful interosseous ligament, serving to co-ordinate the movement of the foot, navicular, coronary, and large pastern bones.

The frog has externally much the shape of the corresponding surface on the inside of the hoof, which is, as it were, its mould. Above the frog we have the very strong plantar fascia, which is tightly stretched across the half-moon shaped border, on the posterior edge of the inferior surface of the foot bone.

The frog is chiefly composed of white fibrous tissue, and careful investigation of its structure in no way justifies the very ridiculous and mis-

leading term which has been applied to the structure in England, *i.e.* fatty frog.

These few anatomical details on the structure of the foot of the horse are not sufficient of themselves, but require to be supplemented by other observations, to enable us to reason in a perfectly accurate manner with regard to its functions ; for

Fig. 10 represents a vertical section of a fore-foot—in a line from front backwards—so that the relative position of the bones, joints, and component textures is delineated.

the foot is only the terminal part of the limb, by the action of which it is of course affected. The knee of the horse corresponds to the wrist of man, and the hock to the ankle ; and just as the wrist or the ankle is affected by any influence exerted on the muscles above these joints, so we find the foot of

the horse affected by, or affecting, the conditions of structures situated above it.

Any interference with the life and action of the parts contained within the hoof, and any change from the healthy proportions of the hoof itself, must act prejudicially on the joints immediately above it—on the pastern, the knee, and the entire limb; and these effects are gradually, but steadily, developed to the detriment of free action, even though the ill-shod horse may not actually be said to go lame.

This part of the subject will be further developed in other parts of this work, under the headings of "*The Action of the Horse*," and "*Lameness of Horses*." Meanwhile, it will be sufficient to add, that the more the practical shoeing-smith accustoms himself to look upon the foot which he has to shoe, as a part of the anatomical system of the limb, the better will he understand the importance of the duty he has to perform. He will at the same time accustom his eye to look upwards from the ground through the limb; he will understand the necessity of preserving the strength of

the hoof in all its parts, of giving it a true surface of bearing, and furnishing it with a shoe which shall give good cover, avoid jarring, secure good leverage, and allow the joints of the foot and leg to act with that freedom and suppleness which are indispensable to easy action, and to a full development of muscular power ; whether in drawing or carrying great weight, in cantering round a park or galloping over a race-course.

It is perfectly obvious, however, that it would be hopeless to attempt, within the limits of this treatise, to describe the structures of the whole limb of the horse, or to prove in a detailed manner how the condition of the foot necessarily reacts upon all the joints of the limb above it.

In describing the accompanying anatomical preparations, which are the basis of the opinions herein advocated, I shall, however, of necessity be led to allude to cases where an abnormal condition of the feet has been followed by other affections of the limb. I shall then give a description of certain preparations which illustrate my views as to the functions of certain structures, as,

for instance, that of the so-called suspensory ligament. By this arrangement, it is hoped that while each chapter of the work may be understood and referred to singly, the reader who wishes to understand the whole subject, may be induced to study the whole work.

The object I am trying to keep in view, of making this work as intelligible as possible to a large number of readers, precludes the discussion of much that I should deem otherwise essential. Such technical questions as the consideration of the character and effects of the splint bones, of elasticity as a phenomenon, and of the abuse and misuse of the term, are subjects closely allied, and forming links in a common chain ; but they must, for obvious reasons, give place to matters which come more within the province of this work ; some references to these and allied subjects will, however, be found in the Chapter on "*Action.*"

CHAPTER III.

PREPARING THE FOOT.

IN commencing a chapter on preparing the foot for shoeing, it may not be inappropriate to attempt to answer the question proposed, as to how one would proceed to shoe feet that had never been shod before? I reply, that no general rules can be laid down for such cases different from those which apply to all.

Shoeing of colts forms so very small a part of our work, that shoers in towns are rarely called on to shoe one for the first time; still, the thing has to be done, and no feet come to hand under a greater variety of conditions than those of unshod young horses, artificially kept and treated as these are in England.

This view, however, pursued into a thorough discussion of the questions involved, would carry me beyond the province of this work, and, after all, the cultivation of horse stock—the production

of good horses and formation of sound strong feet—is not a business in which horse-shoers can do much; though those among them who have mastered details and principles to the extent of presuming to teach it, may, without unduly intruding, ask to be heard on the matter. Bad management of young horse stock is among the first and greatest evils that have grown out of the false teaching, and consequent bad practice that has sprung from it, during this century among us—the teaching on the structure and economy of the horse's foot. Horses with good feet—or with sound or unsound feet—suggest the same questions for consideration as the adage, the hare must be caught before it can be cooked. More and more horses have been produced after the manner pursued successfully to a great extent with meat-producing stock, regardless of the quite opposite purpose to be served by horses and oxen respectively. This, however, is a great subject—one that is kept in view throughout this work, but which can only be incidentally treated on here.

It is otherwise where horses are less artificially bred, and where the breed runs more of average form. If our horses were under the conditions enjoyed by the most favoured of the forest deer regarding freedom of exercise and firmness of soil, the feet of the former, like those of the latter animals, would then be strong proportionately, the feet of one animal differing from those of another in hardly any other respect than size. But it is totally different with our horses. The mistakes which have prevailed, and which have so deplorably vitiated English shoeing, have begun to operate in the management of horses. We are required to shoe the thorough-bred yearling, with its (in many instances) small foot, with uneven bearing surface and twisted limb, or the differently bred and larger type, one or two years older, with feet broader, sometimes with the point of the hoof worn short, and more or less unequally spread laterally, where the margins of the wall are thin, therefore giving the notion of a circular foot. Shortening of the *toe*, and leaving the spreading edges of the wall, make up the approxi-

mate round, but nothing like the natural foot. Horses of any age, from one year old, may exhibit deformities and weakness of feet, without having ever been shod, merely as the result of their own imprisoned state, and standing upon wet and soft ground.

With these remarks, it will be inferred that I attach no importance to the age of the horse, whether he be twenty months or many years. If the truths I have endeavoured to impart be worked out by shoers for themselves, and a sufficient practical experience at the work has been acquired, the real guarantees of success will be secured; and it is to men under such circumstances, or aiming to achieve them, that detailed directions will be most useful; practitioners will thereby be enabled to put the directions properly to use, and those who are not practitioners, to understand who are and who are not well informed on the subject. In proportion to the knowledge of horse-shoeing thus acquired by different classes, they will learn how to appreciate and trust accordingly.

Preparing the foot for the shoe is in many respects the most important part in the process of shoeing ; firstly, because it presupposes a thorough knowledge of the whole ; and secondly, because, when a foot is really well prepared, an undeviating outline is presented for the fitting and applying the shoe. Still, this is but one side of the business, and the skilled workman who does the rest, if all be not done by the same man, has enough left to do to test his intelligence, no less than his manual skill. In fact, from beginning to end, a knowledge of details and expert handwork are required, or bad performance of one part may defeat the good done in another, whether by the same or by different hands.

I attach much importance to the adoption of proper tools. It is sometimes said, that a good workman will produce good effects with indifferent tools ; admitting the statement, it proves nothing after all ; there can be no doubt that effects are often due to tools, and that the success of pioneers in the arts is often

due to their extemporising, and adoption of improved instruments.

For preparing horses' feet for shoeing we use two instruments — the drawing-knife and the rasp; for the reduction of the hoof to form and proportion, besides these, the hammer, pincers, and buffer. The last three tools, with only slight and unimportant modifications in form, are used in the process of shoeing everywhere.

There is scarcely a horse that comes under our hand to shoe that does not require some portion of the hoof to be removed, even though it may be so excessively weakened by mismanagement, as to require several months' conservation before due quantity and proportion can be produced.

Bad management and disproportion of hoof go together, and though the latter may be slight, it requires attention and adjustment; all the horn we may remove with a file (not a coarse rasp) will, in some cases, amount to no more than would cover the surface of a shilling, yet the bearing surface of the foot is thereby both increased and

greatly improved. It is just in these cases, when with equal mastery a shoe is selected and fitted out, so that the surface of the foot and shoe are the counterparts of each other, and the latter is nailed in its place with all possible care, that the animal which reached the shoeing-forge in torture and unable to walk, leaves it with freedom of action and a cheerful countenance.

If I be asked, From what part would any hoof require to be removed in various degrees in those cases vulgarly termed *stumped-up cases*? I reply that it is impossible to state this here, and nothing but an apprenticeship at shoeing, or some such equivalent, can make a man reliable for putting into execution details of the kind, where rule helps so little; but generally, if not exclusively, the wall is the part requiring adaptation of surface; at the toe it may be projecting, and the edge require the file to be passed transversely across it; or, the toe being too short, the columns of the heels, on either side, may be lowered slightly, by holding the foot in the left hand, and passing the flat part of the file over the bearing

surface from behind forward in one, say outside, extremity of near fore, and backwards over the inner heel, taking care that both heels be level; the off foot, by reversing the action of the hand, is treated in the same way. But many men will say, Why not take the horse's foot between the legs, as is the custom? Because where so very little has to be done, I want to see how to do it, and I don't require the greater purchase which the firm hold of the foot between my knees gives. I am only stating, however, what I do and how I do it; in the hind feet we see and can manage best by taking the foot in the ordinary way.

Passing now to horses with a fair quantity of hoof, those shod at intervals varying from twenty to thirty-five days; we take off *one* shoe, or if the floor be level and the case that of a sound-footed horse, two or all the shoes may be taken off. I then take each foot forward upon my knee, and having seen exactly how much hoof is required to be removed, and from what parts, I take the rasp, and with either the rough or file surface, according to the quantity of hoof to be

removed, I pass it vertically, so as to take off the outer edge to the extent required ; then, placing the foot between my legs, remove the exfoliated sole and detaching parts of the frog, the first by means of the buffer, raising the loose flakes of horn from the front backwards, by tapping the tool with the hammer ; the superfluous exfoliations of the frog are then removed with the drawing knife, not by paring it at all, or much cutting, but more by raising the flakes with the left thumb and finger, and detaching them with the knife. This done, the bearing surface of the wall is to be adapted, and, holding the foot in the ordinary way, fore or hind, the rasp is passed over the point of the wall to reduce it to its proper depth. I myself keep to the habit of taking the foot in my hand, after reducing the hoof to the required form and proportion, and then finish it as directed in the former instance, carrying the flat surface of the file transversely across the bearing surface at the point, and then over the surface of each posterior column from behind forward ; being careful that

both heels of the foot are of equal depth, and that an equally appropriate firm surface be given to the point. If the instructions just given be intelligently carried out, the quarters—the surface across the bottom of the foot—will be fairly provided for from the extreme ends to the middle, which is commonly left flat or hollow and weak ; the shoer will be assisted in avoiding this defect by acquiring the habit of glancing down the foot, from heel to toe on each side, in parallel lines ; his eye will then be able to judge if he has secured the object on which I am laying stress—*a fulness in the surface across the centre of the foot*. The centre of the foot is the region of greatest breadth and depth of its arch ; on the preservation of its breadth and depth depend the strength of the arch and of the foot itself, and the firmness, safety, and power of the horse's action.

The third class of feet are those in which, by mismanagement, a morbid accumulation of hoof places them out of form. Some of these are not in this state because they have not been shod at regular intervals, but because those who shod

them have not known their art—how to reduce the abundance of horn to due proportion in different parts of the hoof. These feet are the most difficult for a non-competent man to understand, and require the greatest amount of labour from the most intelligent and skilful.

There is a common saying, that in shoeing “the shoe should be made to fit the foot, and not the foot to fit the shoe.” This hackneyed adage, when closely examined, amounts to nonsense. The horse-shoer, if he be an artist worthy of the art, is required to know the foot, so that he can, to the greatest possible exactness and extent, economise its want of substance and energy ; he must, like the sculptor with his clay or marble, bring out the true figure from a mass of deformity. That the over-reduced and weak hoofs are the most numerous, is granted ; but I have seen numerous bad cases of deformity and lameness due to excess of horn in the wrong places.

There is no difference in the mode of preparing hoofs in these last conditions to that directed for feet in a medium state ; full knowledge of the

subject, with indispensable experience, will teach the removal of the right portion of horn from the right parts. A hoof may be an inch too deep at the heels, or two inches too long at the point—common anomalous conditions—occurring singly or combined; and as the fibres of the hoof take an oblique forward direction, every part will be not only that much deeper, and give that extent of abnormal disproportion to the limb, but the points of the hoof in contact with the ground or the shoe, are, to the same extent, in advance of their relative internal structures; the result of this state of things is, that parts which in their natural position support each other, are so displaced that co-operation is impossible. To say nothing of extreme cases, it is very common to find the heels of shoes in a position corresponding to a line drawn across the centre of the foot; on the other hand a shortened point of hoof, with or without wrong interference with the heels, alters the degree of obliquity of the whole limb, and diminishes the power and possible rate of speed of an animal, from the

instant such a state of things is produced. One of the first signs of this occurrence, in a young horse of high cast, is a swelling of the back sinews below the knee, and it is that enlargement which attracts attention, and not the foot. Here is a condition marking one of the early incidents which, by subsequent stages, condemns some of the most valuable horses in the world to work when lame, and brings them to a premature end.

In no other country have I found these extreme abnormal conditions in such proportions and to such extent as in our own ; and I think it is impossible to devote too much attention to ascertaining the cause of a state of things which is not honourable to our calling, and must be deplored.

One change in practice, among others, introduced by Mr. Coleman, has entailed, I believe, a more lasting damage on the art of farriery than any of his many other crotchets, which have, unfortunately, become thoroughly parts of English horse-shoeing. He introduced the drawing-knife, and made it supersede the buttress for

preparing the feet for shoeing. The buttress is the instrument still in use for paring down the wall surface of the foot to receive the shoe, everywhere except in England and in parts of the New World to which English hands and language have carried our mode of shoeing, such as it has become only within the present century.

Only old men can remember the buttress being in general use throughout Great Britain, but the way it was banished from English practice is known to few ; and its supersedence, and these remarks on the effects of the change, may astonish many. The drawing-knife, or searcher as it was also called, a small, hooked, crooked, little instrument, was formerly kept for the purpose of exploring wounds, and extracting foreign bodies from the foot ; and was to that extent in vogue on the Continent as well as in England. But theorising, and a fancy for change, led the professor to order the general use of the little hooked knife instead of such a broad level tool as the buttress. He had unfortunately conceived such notions as that the sole of the foot did not bear

the weight of the animal, that it was necessary to pare it thin every time horses were shod, and that the broad, level buttress was not suited for that ; hence the preference to the little, scooping, crooked searcher. As these incidents have had a disastrous effect on shoeing which we have scarcely in any degree begun to relieve, I will quote from Mr. Coleman's work of 1798 :—"Those who supposed that the weight of the animal was chiefly supported by the horny sole, have attributed a function to that organ which it does not possess ; but although the laminæ are capable of sustaining the weight of the animal, yet as they are elastic, and at every step elongate, the horny sole is necessarily pressed down in the same degree, and by first descending, and then ascending, as the laminæ dilate and contract, the horny sole contributes very materially to prevent concussion." (Pages 102-3.) "This union of the crust with the coffin-bone sustains the weight of the animal—the crust supports the weight even when the horny sole and frog are removed ; if the sole and frog in reality supported the weight, then the

foot would slip through the crust when the frog and sole were taken away.

“The soles, bars, and frogs, were taken away from both fore feet of a horse ; the feet were then alternately lifted, by placing the hand on the loins of the horse ; he kicked, all his weight was then sustained by the laminæ of the fore feet, and yet this made not the smallest degree of change in the situation of the bones.

“From this experiment, therefore, it appears that the union of the sensitive laminæ with the horny laminæ is sufficiently strong to support the whole weight of the animal on two feet.

“The first thing to be attended to is to take away a portion of the sole with the drawing-knife ; to avoid pressure, the sole should be made concave or hollow ; if there be any one part of the practice of shoeing more important than the rest, it is this removal of the sole between the bars and crust. In common practice these parts of the hoof are removed by an instrument called the buttress.

“The removal of a proper quantity of horny

sole has been represented to be a delicate operation, and in the hands of common smiths liable to do mischief. But any smith capable of paring a hoof cannot fail to be equal to remove part of the sole with a drawing-knife. That the practice may be faithfully executed in the army, a farrier from each regiment of cavalry has been permitted to attend the College to learn the practical part of shoeing."

The foregoing passages, abounding as they do in errors, afford evidence of the manner in which some of the greatest changes in the practice of horse-shoeing have occurred since its history has been written, and changes too which have led to the worst possible results. Once, however, the notion got possession of the minds of the men at the wheel, that the bottom of the foot, its arched sole, was not destined to support the weight, but to yield under pressure downwards, everything had to give way to that idea. The sole and frog were torn away, and because, during the barbarous experiment, the connection did not yield and the bone protrude, as a finger

would through a torn glove, negative evidence was taken in confirmation of the theory framed ; the paring away of horses' soles with the drawing-knife was thus established, and the army, by sending farriers to learn the new system, became the means of enforcing the absurd and cruel practice of thinning the sole, throughout this kingdom and the colonies.

It is interesting to see the differently constituted mind of Mr. Moorcroft on the natural bearing of the question in 1800 : "The sole ties the lower edge of the crust together ; by its upper part, forming a strong arch, it affords a firm basis to the bone of the foot ; and by its strength it defends the sensitive parts within the hoof." This is true.

We fail to discover a single passage in any work, or any traditional account, to show that any objection was raised to the continuance of the use of the buttress in England, any more than over the rest of the world, where it had been adopted from time immemorial, until, along with his other new theories about shoeing, Mr. Coleman believed

it to be the wrong thing to employ, and then a crooked knife and the coarse rasp were adopted as weapons that might do more destructive execution than the one dismissed.

Almost the only thing recorded against the custom of shoeing, where the buttress is prominently mentioned, was by Earl Pembroke, where he says: "They completely destroy the inner part of the hoof with their buttress;" and in another place, in his work on horses, shoeing, etc., in 1761, the noble Earl wrote, "Physic and the buttress, in well-informed hands, would not be fatal; but in the manner we are now provided with farriers, they must be quite prohibited." Here we find complaint against incompetency and bad use of the instrument.

Since horse-shoeing is not the business of any locality or country, but of all countries and required for all seasons, I will venture to make use of experience derived from comparative observations of the modes of preparing horses' feet for shoeing. The whole subject of shoeing is one of comparison of relative good and bad practice,

and it is not enough to take pains to observe the merits of different methods, but it requires courage and will to apply them. To begin near home, I will only ask readers to go from Dover to Calais to see how horses' hoofs are periodically reduced to normal proportion and prepared for shoeing there; once seen, the example may be taken to represent the practice of all other nations, north, south, and east, even including, I am told (for I have never been there), the practice among the native farriers of British India.

One difference between the English mode of shoeing from that adopted in all other countries of the old world is, that we hold up the horse's foot and work at it. I only incidentally allude to the fact, because the origin of our custom is as much hidden by antiquity as the more extended mode. It is that of holding the horse's foot and working at it to which I allude, while the continental farrier has the foot held while he shoes it. This last is the chief difference, which first attracts the notice of travellers. In using the buttress the rasp is superseded as well as the drawing-knife,

the latter altogether, and the former, a small fine rasp, employed only to smooth off the surface of the lower circumference of the wall, as the last act in the process. Together with the buttress, the Continental shoer uses a tool analogous to that which we formerly employed under the name of *toeing-knife*; but a modern Continental shoer, if a good workman, uses this, which in wrong hands would be very destructive, with admirable effect. This foot-rounder, the literal translation of the name of the instrument, is a straight steel blade, of about nine inches in length by one and a half in breadth and moderately sharp, by means of which the hard margin of the wall of the hoof is cut off by light taps of the hammer, while the instrument is held so as to regulate the quantity to be detached. The plan I have given, which I adopt with the rasp, of taking the foot forward, was founded upon this method; but when we come to those hoofs where overgrowth and disproportion to an indefinite extent prevail, I find that no amount of skill in the application can bring the rasp and drawing-knife, with the rest

of our tools, up to the *rond-pied* and buttress of the Continental shoer. To produce the same effect, we, with equal knowledge of the requirement, take much longer time and devote more labour to the work; while in ordinary practice with us the work is liable to remain undone or be badly done, as a rule it is fairly accomplished on the Continent. Take a foot grown to one or two inches beyond its normal depth and length, curled over at both heels upon itself, the bottom of the column being in an almost transverse line with the centre of the foot, and a morbid thickness of sole and frog imprisoned and bound immovably together; such a foot puzzles a workman; with such a weapon as the rasp and knife, he does not know how to begin, or proceed, with a view to its proper reduction. In such a case the foreigner lays his foot-rounder transversely, with its edge towards one heel or column, about one-fourth of an inch from its lower surface, and with two or three taps with the hammer, cuts transversely forward from one to two inches; the same thing is done with the other

column, and then usually, but not always, a greater depth is rounded off the toe, and a little, if there be abundance, at the sides; all which can be effected in the space of a minute or two; the man then takes the buttress, and in the foreign mode of holding the foot, cuts from toe to heel, and when the hard edge of the wall and some of its depth has been removed, that which remains is pared down to give the required surface. One advantage, at this point of the operation, I find favourable in the Continental practice is, that when there are morbid accumulations of sole, which come into the way, and are as much foreign and incompatible with its functions as a snowball at the bottom of the foot, they are met and easily broken up by the direction in which the buttress is pushed; whereas, by holding the foot ourselves, and working more from heel to toe, our instrument slips over the exfoliations of horn, which have their fixed basis behind, and rise in front as they become ripe for being cast off.

Having learned these conditions by experience, acquired late, and working according to what

I was taught in the course of apprenticeship, I fairly met the inconvenience by making use of the buffer for breaking up the thick imprisoned sole and the exfoliations of the frog; these parts would detach spontaneously after the wall was reduced to normal proportion, and the local condition would not ensue, but for the general state and want of motion of the foot; such motion implies health and freedom, in the enjoyment of which sole and frog cast off their flakes and maintain their proper substance. It might appear that this disengaged horn, if left unheeded, would fall with time—plausible theory, but incompatible with good practice. Such incumbrance must be got rid of, not only before the shoe is put on, but before the proper surface can be adapted for it. A knowledge of what is required, and of the fact that there are various ways more or less easy of attaining the end, is necessary to a proper execution of the work; economy, and proper use of means, will be the result of the requisite knowledge.

CHAPTER IV.

ON MAKING HORSE-SHOES.

SHOES should be kept in readiness at every forge in sufficient numbers and varieties, so as neither to keep horses waiting while they are being made, nor yet cause men to hurry over the work of fitting and applying them. With a knowledge of the horses of any locality, it will only rarely happen that a shoe, or pair of shoes, may require to be made for some special object while the horse is kept waiting. It is a mistake to suppose that shoeing is best done when the shoes are made apparently for the occasion, at the time of applying them. Every farrier works best, and to most economy of time and labour, who can take from the wall several shoes to try to the feet of every horse, so as to be able to select the exact size, substance, and cover, that the foot requires. Another general rule to be attended to, is to make shoes of a good quality of iron ; a fine-

grained tough iron is preferable to hard. These remarks apply particularly to the shoeing of all horses used for fast work. The reasons I have for this preference of a fine quality of iron are, *firstly*, that on paved roads horses go with better foothold than with shoes made of crude hard iron; *secondly*, tough iron wears long after the margins of the shoe are worn conformable to the action of the foot, in which state horses usually go in their best form. Shoes made of such iron, and fitted in the way I shall describe, hardly ever break or bend though they be worn ever so thin.

I shall confine myself to general advice on making shoes; localities, classes of horses, and their employment, have to be taken into account in forging shoes. Therefore this section of the work varies more than that in which I have described the preparation of the feet, which is required to be done the same for all horses, and also differs from the next part to be treated, ---fitting the shoes.

Good forgemmen have from time immemorial

abounded in England, and if shoes have not been well made, it has been for lack of proper instruction as to what is needed, not defect of skill in workmanship. Speaking, as I do, of the part performed by firemen, it is implied that the iron is to be well worked and the shoes sound. The question of preference in the use of new or old iron is an unsettled one, and will bear a few remarks. It is common to make the fore-shoes out of new, and the hind out of old scrap. There is a prejudice in favour of the custom, in the idea that old iron wears best, and a mould formed by doubling up old iron enables the maker to leave the substance in the shoe, as the saying is, where it is wanted. These notions prevail and are acted upon extensively in London, and in provincial town forges in England, while in Scotland toe-tips are added instead of leaving a lump of iron. That well-worked old iron, however, wears longer when made into horse-shoes, than do shoes of equal weight made of new bar, is acknowledged, therefore let us give hard wearers hind-shoes made of scrap iron.

Fig. 11.—Near fore Scotch cart-horse shoe.

Hind-shoes of old iron, up to 1 lb. weight, may be made by two men, and above that, up to 22 oz.

Fig. 12.—This figure is a drawing of a London dray-horse off fore-shoe.

each, they should be made by double hammer—two sledges; and above that weight all shoes, fore

as well as hind, should be made out of new bar iron, of thickness sufficient to allow of its being drawn to required substance. It will presently appear why the new iron is preferable in all respects for the large shoes, but I will here name two valid reasons ; first and last, there is a saving of coals, and if the shoer is both master and workman, he will get also the larger and double benefit, the saving of labour. Any man who has had to take his place at making draught-horse shoes of one and a half to three pounds weight each, out of old iron, will understand the importance of the question to which I am directing attention. Cruelty to men, and that is what this practice amounts to if followed up, is a matter worthy of serious attention, and I may incidentally mention that the amount and kind of labour exacted from working farriers is a fit subject for inquiry with a view to amendment.

The annexed four illustrations will give readers a good notion of the different modes of shoeing cart-horses at London and Edinburgh. The Scotch fore and hind shoe, respectively Nos.

11, 13, were made by W. Urquhart, and fitted on my own method; these Scotch shoes are distin-

Fig. 13.—A Scotch near hind-foot cart-horse shoe.

guished by being fullered and furnished with toe-tips, and the heels turned down.

Fig. 14.—An off hind-foot London cart-horse shoe.

The London cart-horse shoes, Nos. 12, 14,

were obligingly supplied to me from one of the largest breweries. They are stamped, and not fullered. The London and Scotch shoes used for these drawings were of the same size, and found, on being put into the scale, to be within a trifle of the same weight, viz. one fore and one hind shoe together, of both specimens, weighed 7 lbs.

Machine-made shoes need not occupy much space here, since, up to the present time, none have come under my notice that I could adopt, either for their being relatively superior or equal to hand-forged shoes, or on the score of economy—a consideration that should be always subordinate to, and never worthy of entertainment apart from, the first and essential requirement—good effect. Yet, from specimens of shoes produced, I am persuaded that much can and will be done by machinery to economise hard labour, and to no class of men should such a consummation be more welcome than to working shoers themselves. But hitherto the manufacturing firms have all mistaken the requirement. They have been ill-advised in generally starting with some crotchet, and seek-

ing a market for the products of their machinery by affirming that their shoes were found successful in the prevention of some evils complained of. The real object should be, and if machine-made shoes are ever to be successful, must be, to advance the work of shoemaking to some given point beyond that of producing the iron in the bar; it should be cut into lengths, and turned into an approach to crescent shape, and then the forging to begin by hand, and the work be completed up to the point of fitting the shoe to the foot.

In all the machine-made shoes that I have seen, too much has been done, and I should only consider the specimens as equal to old iron of very inconvenient form for working up by hand. If I could get the iron of given sizes, comprising all those used for making shoes, and the bars cut into lengths of a given number of inches, to be defined, and these turned to the shape of a mould such as we begin with for making the first side of a shoe, and these moulds sold in bags of 1 cwt. or parcels of different quantities, I grant that would be an acquisition; a saving of labour to the extent

probably of one-fourth or more, and when fairly introduced would be equally beneficial to iron-founders and to both master and journeymen horse-shoers. Anything that tends to diminish hard labour, and leaves men to exercise their ingenuity where it is most required, in such an essentially head and hand work as horse-shoeing is, cannot fail to confer advantages on owners, and diminish the sufferings of horses.

Shoes require to be of proper substance, whether they be of the lightest or heaviest weight, beginning with ten ounces for the smaller and lighter horses, up to sixty and even seventy ounces for the more powerful descriptions of cart-horses in use in commercial towns. A good deal is written, and is constantly being repeated, about the advantages of light over heavy shoes, and those who dogmatise unconditionally in favour of the former, couple their argument with the adage—"an ounce attached to the foot tells more than a pound placed on the horse's back." More correct knowledge and experience weaken and almost destroy the above conclusion. The use of shoes

being to support and defend the feet, just sufficient iron properly distributed is required to fulfil these purposes.

In saying that shoes should be of good substance, I do not mean iron should be left in lumps, or thick round the circumference and hollowed out from a given line to the inner margin, called seating. The web of the fore-shoe should be kept as strong at the inner margin as round the outer circumference, with exceptional slight diversions to be noticed. Hind-shoes have properly been made without any bevelling; but there is another prevalent fault in making these already alluded to, and it is a great fault, that of leaving the iron in a lump at the toe, flattening it down thin at the quarters, and leaving the heels thick when not turned down. This is called leaving the iron where the horse wears, and of course, with hind-shoes so made, placed as he is upon a tripod, the prominent points must be worn down before the hollows can touch the ground or be brought into wearing action. The evil results of this custom are, that the horses get no true

bearing surface, no staying support for the feet, and the same weight of iron if properly distributed would wear from one-fourth to one-third longer time; for as soon as the thick toe of the shoe has become worn down (and being of small circumference, and the foot unstable on the ground, it wears fast), the shoe is finished in 15 or 20 days, whereas a better form, with better effect, would last the horse a month.

While horses whose hind-feet are shod on the plan under discussion usually return to the forge with the toe of each shoe nearly or quite worn through, the gross lumps at the heels are found to be but very little diminished.

Shoes for horses of any given class, having regard to their breed and employment, should be proportioned in cover and substance to these conditions. A horse which has been some time in work, whose coffin-bones have suffered by absorption, and the soles of the hoof accordingly become flattened, will require a larger shoe and proportionately more cover than the same animal would have done at some earlier

time, or than one of his stamp in a normal state does. Therefore the exception applies more, with others I shall have to mention, in the shoeing of diseased feet than of those in normal conditions.

Forming the nail-holes is a very important part of shoemaking ; so much depends upon that last stage of the process of forging shoes, that their fitness for the purpose depends on it.

The perfection of horse-shoe making consists in the iron being well worked and put into form, and in the proper position being given to the nail-holes ; with these qualities the shoes after selection admit of being easily fitted to feet.

With these general observations regarding the importance of provision for proper application of the nails, I must make some remarks on the different modes of accomplishing the work. Of these, two quite different plans are known to English farriers, as they are in vogue in the United Kingdom—viz. the fullered and stamped shoe. The first is the old method, and is strictly a national one,

for we do not learn of the same process being adopted anywhere else, only as it has been carried from these shores ; but this fullering of shoes

Fig. 15 is an engraving from an off fore *French shoe*, made at the veterinary school of Lyons. It is a good specimen. The shoe is not yet *fitted*.

The different parts of a shoe are distinguished by various terms : —The toe, or point ; the heels, or posterior extremities ; and the inner and outer quarters, midway between the heels and toe of either parallel half.

This shoe is made quite as thick inside as out, and the observer will be struck by the systematic manner in which the nail-holes are stamped.

consists in making a groove around the outer margin of the shoe, into which, at given positions

Fig. 16—*A French shoe* which has been worn, and indeed worn out, obtained by the author, at a provincial French forge, as it was taken off the foot.

Notice how evenly with the shoe the countersink nails have worn.

on both sides, the holes are made with a steel

Fig. 17 exhibits a view of the upper side of the shoe represented by preceding diagram. In this figure may be seen the flat nail-shanks, regular in length and firm in position, after the shoe was taken off. The adjusture and manner of wear of the bottom surface may also be seen.

Fig. 18.—A *plain Scotch shoe*, fitted by the author, and worn out.

Shows all the essential properties of the French specimen, the difference being that this shoe is fullered instead of stamped.

stamp, with its point drawn to the shape of the shank.

There are conventional expressions in use by which an important variation in the mode of giving the direction of the nail-holes is understood by farriers, which may be made to apply to a system or to a particular part of any shoe—viz., coarse and fine fullering and stamping. Coarse fullering for the outer, and fine for

the inner half of the shoe, or coarse stamping at the toe and fine at the heel, and *vice versa*—these qualifications indicating the distance of the nail-hole and fullering from the outer margin of the shoe, and also the facing of the hole.

Fig. 19.—A *hind-shoe* (not fitted) of the form adapted by the author for the larger proportion of horses.

Two turned-up calkins are seen, as the author thinks they are generally advisable in hind-shoes.

When fitted, the clip would, as a rule, be taken up from the front of the toe, or exceptionally from one or both sides.

The essential object to be kept in view in the relative degrees of coarse and fine nail-holes is, that they should be so placed as to enable the

driver to take sufficient hold of the hoof with the nails, to combine security of hold with perfect safety and freedom from restraint to the foot. Our practice of fullering encountered disapprobation some years past, on account of the propensity of farriers to fuller the shoes fine, which necessitated their driving the nails to a needless and objectionable height, in order to make up the security, guaranteed more effectually, and with better effect as regards the functions of the foot, by making the fullering and nail-holes moderately coarse, so that more hold is taken upon the wall of the hoof. But from that we were led into an indiscriminate and opposite extreme of coarse stamping, whereas the right method consists in systematically varying these properties of shoes for different classes of horses, and in different positions of the same shoe.

Mistaken notions have in our time been formed on the relative merits of the old English fullered shoe, and stamped shoes, and these arose by admitting the *real* merits of stamped shoes, as they were found in use abroad, and then adopting

a mode essentially different and inferior to that old method. There formerly were two modes of forming nails and nail-holes—one with, and the other without the fullering—viz. the Continental stamped shoe, and the English fullered shoe. It is at the forge where practically the mode of fullering and stamping shoes can be explained and comprehended, and we can here mainly discuss the principles involved which affect results. The shoe is to be fullered, each half in succession, as we forge it; and, with the web kept of equal thickness from toe to heel, we proceed by holding the side to be fullered on the middle of the anvil, and with the tool firmly fixed in a rod (an iron rod being preferable to a wooden one), we place the edge of the tool on the margin surface of the half, and the striker with the sledge hammer gives in quick succession a number of strokes with regulated force, to sink the fuller to the required depth; the fireman meanwhile, raising the heel of the fuller as the sledge is lifted, draws it backward at every stroke received by the sledge, and with his left hand the position of the shoe is regulated upon

the anvil by turning it. That done, the half is to be stamped ; and though fullering, unlike stamping, is necessarily about equally coarse from end to end on either side, we can regulate the position of the nail-holes in a measure by the direction in which the stamp is held by the facing of the hole.

Assuming that the outside of a near fore-shoe is being made and fullered, the first hole is to be stamped at about an inch from the centre point—more or less, according to the size of shoe, and both first and second nail-holes require the point of the stamp to be held in ; the quarter-nail to be stamped straight, and the heel-hole pitched outwards—the distances between each nail-hole to be from an inch and one-eighth to an inch and a quarter, according to size of shoe. In fullering and stamping the inner halves of shoes, the differences to be observed between them and the outsides are, that in the first the fullering must be finer, and the stamp be held upright, so as to give a straight direction to the nails. The reason for this finer stamping on the inner halves is the necessity of keeping the shoes even with the margin

of the hoof, so as to avoid cutting, while a degree of fulness on the outside is advantageous for support.

A foot well furnished by the shoe is understood, in technical phraseology, as distinguished from narrow, straight, and skimpy shoeing.

The relative merits of fullered and stamped shoes, and the conditions that affect both, according to the plans followed, are questions worthy of consideration. The English stamped shoe was brought into vogue at the end of last century by Professor Coleman; the reputed better success of shoeing on the Continent—as compared with the practice in England, testified to by travellers on the Continent, judging by the relative proportions of lame horses—was attributed to our neighbours stamping their shoes, whilst the English farriers fullered them. Hence the stamped shoe, which was adopted at the London Veterinary College, and at the same time through the British army service. But at no time has there ever been anything in common between that old Continental method of stamping shoes and that in vogue in this country, excepting the name. The new

English plan is so unlike the old one, that one can only conceive its being an imitation, carried out at hazard, at the suggestion of one who had never seen the method in practice which presumedly was being followed. Shoes were made altogether different to any before seen, quite unlike the old and tried method, and a new kind of workmanship was therefore introduced under the name of stamped shoeing, which retained nothing of the old Continental system, and is also greatly inferior to the old English method.

The plans of making shoes, fullering and stamping, require to be understood for reciprocal objects, and carried out accordingly. By capriciously adopting a particular form of nail, it will be discovered in practice that a modification in the substance, and therefore in the form of shoe, will be required, in which case the shoe and shoeing are subordinate to the form of the nail; and that is precisely what happened in introducing a stamped shoe, and not the stamped shoe of immemorial tradition.

The first simple mode of stamping that we

find is the oriental, where the thin shoe of the desert is a mere flattened-out plate, hammered into the shape of the foot; there being little or no countersink for the nail-hole, owing to thinness of substance of iron, and therefore the head of the nail is made flat. Similar in this

Fig. 20 is the engraving of an Egyptian shoe—one that had been used, and was brought by an English nobleman from Upper Egypt.

It is a near hind-shoe. The form, positions, and regularity in which the nail-holes are stamped deserve notice. Further description of the shoe, and the use of the system, will be treated on in another Chapter.

respect are the shoes and nails applied at present to oxen in southern Europe; but Continental horse-shoes, in which the substance of the shoes

is proportioned to the required conditions of soil and roads, have a different form of stamp and nail.

Continental shoes are stamped with a tool that forms a die of prismatic shape, and the heads of their nails are struck into a hole of corresponding form. This mode of stamping affords the greatest possible facility of driving the nails, as from the exact form and opening through the shoe, the nail can be held and driven in any direction. By this, safety in driving is secured, and the nails may be and are driven all of a given height, taking just as much hold upon the hoof as is required. Another merit of the system consists in the exact adaptation of the nail to the shoe, so that both wear together, without any liability of the clinches moving, since the head cannot pass through the shoe however much consumed it may be.

English fullered shoes do not quite fulfil the above conditions, but when well executed all requirements may be accomplished. The open fullering, when the shoe is also well stamped,

admits of latitude for directing the nails, and good English nails—or rather Scotch nails, which I prefer—are in effect the Continental nail with the head flattened. Our nail is not a four-sided prism, but is sufficiently supported by the bottom of the fullering to fulfil the requirement almost equally well. Totally different from the above methods are the English stamped shoe and wedge-formed nail, invented at the same time. The tool with which these nail-holes are stamped in the shoe is no other than that which has been always used to stamp the holes in fullered shoes, with its point corresponding to the shape of the nail-shank, tapered down from a wedge-shaped base. Nail-holes so formed are so narrow that no latitude is afforded for the proper direction of nails in driving; but this is not all, the form of nails has now to be considered. This new-fangled nail is literally a spike, drawn out of the rod to a wedge-formed shank, without any line of distinction between head, neck, and shank; and although, under the excellent workmanship of English nail-makers, prompted by suggestions of practical men,

some of the worst features in their shape have been partially overcome, still the principle is bad, and no workmanship can produce good nails made on it. The long tapered head and neck of these wedge or counter nails produce bad effects in two ways:—Want of flatness and breadth of shank, and liability to bind the foot by the carpentry form; and the objectionable thickness of the rim of the shoe to afford depth of hole to receive a nail so formed; and since this form of nail, from the way in which it was introduced and enforced, has been generally used to the exclusion of the old one, for fullered as well as for stamped shoes, both these have been made with disproportionate thick outer margins. Deep fullering and deep stamping have been found by farriers necessary for the reception of tapered thick-shouldered nails; and to avoid the great weight to which shoes would run if the web were made level, as it should be, excessive bevelling or seating prevails. North of the Tweed, I am glad to say, better judgment has prevailed on this practical question. Neither stamped shoes nor the

wedge nails are used in Scotland, other than to the extent to which these are kept up for military service.

The advice with which I shall conclude this Chapter is—to Scotchmen, to keep to their plan of nail-making and fullering their shoes; and to the English, to get back to that plan, and abandon the wedge-formed stamp, which has just one recommendation to horse-shoe makers—a little less labour; but this, I repeat, is at the expense of good effect.

CHAPTER V.

ON CLIPS, CALKINS, AND TOE-PIECES.

CLOSELY allied to, nay a part of, the process of making horse-shoes, treated in the preceding Chapter, is that of clips, calkins, and toe-pieces, which I have arranged under a separate heading, for two reasons—firstly, convenience ; secondly, a sense of the necessity of making myself clearly understood on matters which are commonly held to be of secondary importance, but which I regard as of the greatest practical interest.

Anything which enables a horse to develop his utmost power with the least expenditure of force and the greatest ease and safety, is alike worthy of attention from horse-owners, and all who are engaged in their management, or have an interest in their services.

Clips to horse-shoes are often made profusely, and in an objectionable manner. There is an adage among farriers that “one clip is worth two

nails," and, it should be added, is often more injurious than twice that number. One clip at the toe is in all cases advisable; it steadies the shoe while being driven on, and prevents the shifting back afterwards, which happens to the hind-shoes of harness-horses in particular, in the absence of clips; but I object, with exceptional instances, to the use of clips at the quarters. We use clips at the sides, instead of at the front of the toe of hind-feet for hunters, and some other classes of riding horses, purposely to allow the wall of the hoof to project in advance of the shoe at the toe; we thereby prevent the chance of injury by over-reaching, to which hunters are liable, and the clacking noise which some young, weak, and bad-actioned horses are liable to make in trotting. Side clips, in addition to one at the toe, are in vogue among farriers for draught-horses; and not unfrequently two of them are applied to each hind-foot. Some heavy large cart-horses are apt to twist their feet, and may require a clip at the outside of their hind-shoes; and even carriage and other light harness horses, when aged, and

their joints become stiff, may, though rarely, be the better for a clip so placed. Whenever clips are applied, there should not be a deep space cut in the hoof, which is commonly done and is one of the prevalent means of destroying horses' feet. The wall should be left with all its substance and strength to stand against the clip, with only the edge of the hoof taken off with the file. When the shoe is fitted the clip should be left open, and when cooled, be tapped up to its place with the shoeing-hammer before it is nailed on; no violent hammering up should be used afterwards. Such violent hammering, when practised, jars and is often a source of pain, and of much injury to the foot.

Security of foot-hold is one of the most important requirements of shoeing; to be never lost sight of, and always to be secured in the most efficient manner. Firm foot-hold is the first condition of any progression whatever, and the nearer we can bring our art to the fulfilment of that object, so proportionately do we economise horse-power and diminish horse-suffering.

In most countries a rational system has been devised for the purpose of enabling horses to use force upon their feet with effect, beginning with those countries where horses go partly upon the shifting sand.

When we bring our observations to bear on every-day practice in this great commercial country, and in some parts of the Continent, we find much ingenuity exercised to meet an indefinite variety of conditions. More is undoubtedly to be learnt on the matter by seeing the practice of different countries, and in some instances different parts of each country, than could be gathered in any locality, or than could ever be extemporised by one man in a lifetime, however industrious and ingenious he might be.

England, with her extensive dependencies, could advantageously use all the best known means for affording foot-hold on whatever ground surface, and in any climate where horses are employed. But we have never fully utilised what I would call our indigenous resources. As one instance, may be adduced the different modes of

shoeing draught-horses for common work in the southern and northern divisions of the kingdom, without any pretext whatever for equal difference of conditions of road or climate.

Without confounding degrees of skill in the execution with the difference of plans, I assert that dray-horses, as they are shod in London, compared with the same stamp of animals used for similar work in Edinburgh and Glasgow, work at an incalculable disadvantage, estimated by an established standard of horse-power exerted for many hours consecutively and daily.

These remarks apply to most of the draught-horses used in towns with paved streets. Coming to details, the methods of giving security of hold, to which these remarks refer, involve projecting points made to the shoe to penetrate the ground, or catch hold upon the fixed pavement, and thereby prevent the foot from slipping in any direction.

In the absence of such holding points the foot slips forward on alighting ; and as it is being revolved while the limb changes from the

oblique to the vertical line, the foot slides back, causing not only loss of ground already got over, but waste of power expended in holding the body steady by the other limbs, and in the efforts made under such disadvantage. If we look at millers' horses drawing singly or in pairs up the incline from Leith to Edinburgh, each animal on an average drawing a ton and a quarter, we can see the freedom with which each foot is lifted, held up, and carried over to its next position, because meanwhile the other three feet are securely holding, and being moved in different attitudes upon the ground; hence the freedom of the walk acquired. If we contrast the action of these horses with that of the magnificent dray-horses of the Metropolis, we find these struggling for hold upon the pavement, and instinctively and necessarily making short steps, while their limbs look as upright and stiff as posts, whereas they naturally are, and under proper applications of art should appear, supple, with their varying oblique and vertical lines adapted to leverage and action.

Passing to other draught-horses, those of the

London omnibuses afford a good example of that great waste of power and cruelty to horses, of which I am pointing out the causes before venturing to suggest remedies. Let any one who desires to witness those phenomena take his stand in Oxford Street, London—a street which is remarkable for its open space and level surface, both conditions favourable to draught-horses—and a quarter of an hour will enable an observer to realise to some extent the constant waste of horse-labour, by seeing the feet of every horse on alighting slip forward, say four to six inches, or more, and, like a pendulum but without any of a pendulum's office, move back again for want of stay and support. No one will have to wait long for the opportunity of seeing an omnibus and pair pulling up, and both horses, with their eight feet planted on the ground, slipping over it to the extent of a yard without lifting a foot; such an incident often happens without any intention on the part of the driver to stop, and is purely an instinctive effort of the horses to balance themselves and avoid falling. Such sights are all-the-

year-round exhibitions, greatly aggravated in winter with the occurrence of frost and a fall of snow, when periodical complaints are heard, as if such anomalies had never occurred before, and were not of periodical recurrence as productive of constant mischief.

Englishmen have a dread of calkins to shoes ; such appendages are against current notions on the economy of the horse's foot—no amount of old and even surviving experience to the contrary, availing. It has never been denied that in Switzerland, the Tyrol, and the whole of Germany, from the courses of the Rhine and Elbe to that of the Danube, horses work all the year round with shoes armed with calkins, and in the case of heavy draught-horses, with toe-pieces also ; equally certain is it that free movement of these horses, and proportionally little lameness, is as conspicuous over that vast part of Europe as the opposite is in England. We have gone on heedlessly, as if nature had decreed different laws in the economy of the feet of horses of different countries.

We have an old plan of shoeing in Scotland adapted for all draught-horses, and which only requires to be intelligently worked out to fulfil effectually most useful and humane requirements throughout the kingdom. Taking shoes of the draught-horses in London and in Scotland as we find them in general use, there is not much difference in the weight of iron used, but difference in its distribution. In the south, the toe of the hind-shoe is left, as has been said, twice as thick as an Edinburgh or Glasgow workman leaves it, and in the fore-shoes the margins are left thicker ; while in the gross squared-off heels there is as much iron as, if drawn out, would form the calkins (see Figures 11-14 of previous Chapter). In both hind and fore shoes, therefore, are formed thick heels and thick toes, with a depression or hollow across the middle of the foot, with short and limited bearing surface. Scotch cart-horse shoes, well made, are left with both heels turned down, of the full substance of the shoe, slightly narrowed before turning. The toe-pieces, which are from two to four inches long, for different-

sized shoes, are cut off rods of about seven-eighths of an inch square, and are then welded transversely across the toe—placed so as to allow the web to project a little. It is this slightly projecting part of the toe from which the clip is taken up.*

Lighter descriptions of draught-horses may be shod in this way, by making every part proportionate. But it is found that toe-pieces do not answer for the fore-shoes of horses which go at a pace beyond the walk in their work. I do not use them either for fore or hind shoes for the more active description of draught-horses or carriage-horses, except for sharpening in frosty weather, when I adapt toe-pieces to the hind-shoes only, from which a sharp point can be drawn at each side of the shoe; these, with the heels turned down and sharpened, make up four holding points for each foot.

* In the actual operation of making the toe-pieces, the rod from which they are made is, after being heated, *nearly* cut through, so as to leave a piece of the length of the required tip. This is then brought together with the shoe to the required heat, and being still held by the rod to which it has all along remained partially attached, is placed in position on the shoe and welded to it.

A common objection prevails to the use of calkins for shoeing riding-horses, with the exception of one on the outside of each hind-shoe; and for the fore-feet of such horses calkins are objectionable, except where they are used on yielding ground, where, however, they are little required, but for the variation of ground they may be useful in the hunting-field, where both heels of the hind-shoes turned down are very advantageous, both for giving a level foothold and to afford purchase under exertion. It is a mistake to suppose that nicely turned-down heels of hind-shoes, on the inside as well as on the outside, endanger cutting, and that a thick inside of the shoe to correspond in depth with the outside calkin is preferable. The clumsy inside of shoes just referred to, offers much more powerful means of offence and injury than the evenly turned-down heels, with the well-balanced foothold they secure. This is no theoretical question, for I have constantly adopted the method for all riding-horses, hunters, and race-horses in training as well as with their plates for running, and have never had an accident by a

tread of one foot upon another. I know well that such an accident cannot happen to a horse in running, whatever the pace. It is only in the very rare cases where we do properly employ two calkins to each shoe, that a tread may and does sometimes happen—viz. with cart-horses when made to back under heavy loads; but even in these cases a thick clumsy iron heel without calkin does quite as much harm, and the occurrence will be tenfold more common, because slipping, which is the cause of misplacement of the foot, occurs mostly in backing without calkins, and is the result of the efforts made by the horse to recover his loss of balance.

The plan of shoeing the hind-feet of carriage-horses, and those of the artillery, in England—of making the heels of their shoes into a narrow rail of iron for the inside of the foot to stand upon in the former, and on both the outside and inside of the latter, the artillery horse—is a miserable sight to look on, for any one who understands the inconsistency and the pretexts put forth for the adoption of such measures.

CHAPTER VI.

ON FITTING HORSE-SHOES.

THE process of fitting shoes, after they are made, and the feet are *specially prepared*, demands accurate technical knowledge. The results of horse-shoeing are in great measure determined by the process of fitting; and it may, on that account, be considered of the highest importance as regards proper execution.

One who understands how the horse's foot should be prepared for shoeing, cannot be ignorant of the way a shoe should be fitted to it, although the ability may be wanting to do all that is required with the shoe. On the other hand, the forgeman who makes the shoes according to the directions furnished in Chapter II., cannot lack the manual dexterity to give any form to the shoe in fitting which the mind suggests: but the latter may not be furnished with

sufficient knowledge, or, it may be, charged with wrong ideas on the subject. It is therefore clear that to be able to fit out shoes, to adjust them well, the whole requirement and system of shoeing must be thoroughly understood.

Parts of the process may come either under the denomination of making or fitting, such as those we adopt to give security of foot-hold on particular surfaces of ground, paved roads, and ice. Some of the necessary appendages are done at the time of forging the shoes, such as the turning of the heels; while welding on toe-pieces, sharpening, etc., are deferred until the shoes are being prepared for the particular horse.

The remarks in the present Chapter will be restricted to the process of fitting, strictly so called—the shoe being made and the foot prepared according to directions given in other parts of this Work.

In the ordinary way, we reach down the proper shoes from the wall of the forge, and after trying them to the horse's feet, and choosing them of right size and substance, one pair at a

time is placed in the fire, heels first, and made red hot; one shoe at a time is then taken to the anvil, and the proper form given to both heels, which we either round off with a tool, or if calkins are given, whether for fore or hind shoes, those are required to be made level and put into form with the hammer. That done with both shoes, they are heated all over to a dull red heat, and not to a white heat, so as to blister the surface and make it rough; the nail-holes are then to be passed through, one by one, with a sharp pritchel, the shoe put into the form of the foot, and a clip taken up at the toe. The shoe then is placed with its bottom surface on the middle of the anvil, and the upper surface is to receive, under the action of the hammer, such form as is found necessary to render it the exact counterpart of the foot just prepared to be shod; that point attained, the next essential is secured, viz. that of a proper surface for the shoe to come in contact with the ground. The same action with the hammer, and the same turn of the left hand which holds the shoe in the tongs, regulates the form which the surface of the shoe

takes, the two surfaces being formed by one series of actions.

Having adjusted the shoe, stick the pritchel into one of the outside nail-holes, and try it to the foot, to ascertain what alterations are required, and if any, return to the anvil and make them. Confident that the shoe is right as to size and form, I then cool it in the water-trough, and return to the foot with the shoe, and a rasp in hand ; and after very carefully examining both surfaces, that of the foot first and then that of the shoe, if these appear right I place the shoe to the foot, mark the place on the hoof for the clip, and remove the margin of the wall at that point, with the file-side of the rasp. I do not sink a notch as is commonly done, but merely enable the shoe to come into its place without impediment. So placed, I look round, and under, the foot, and try the shoe, to find out if the bearing is everywhere accurate ; and, if not, determine where the hoof or shoe requires adjustment ; if the former, the file usually accomplishes it, and if the

shoe requires the slightest alteration, I go back to the anvil and make it.

The above is not the common method, but the one I practise. I shall briefly describe other methods, which have the appearance, at least, of being more favourable to despatch. My first and chief aim is good effect ; the second as much speed as is compatible with it.

The custom in vogue is to take the shoe to the foot while hot, upon the point of the pritchel, and if it be of the size, and, according to the notion of the shoer of the circumference of the foot, it fits, the hoof is singed by the shoe and a piece cut out of the point of the wall with the drawing-knife, to let up the clip ; the shoe is then applied hot to the surface, and pressed to the hoof, to singe it down, to make what is called a close fit.

On this subject, Earl Pembroke makes the following wise remark :—“ *The utmost severity ought to be inflicted upon all who clap shoes on hot ; this unpardonable laziness of farriers in making feet thus fit shoes, dries up the hoofs.*”

Apart from the effects pointed out by the experienced author of the above quotation, false adjustment of surfaces is the result. Close approximation of two surfaces does not prove that either is true, but, on the contrary, it is most frequently found, by the process in question, that both are wrong—the ground surface of the hoof, and the upper surface of the shoe. What the singeing does is to imbed the shoe into the hoof while it is hot, notwithstanding any defects which may exist; whereas the art of shoeing consists in giving a true surface of bearing to the hoof, and making a shoe to fit it, so that it can bear weight without doing violence, and allows free movement of the limbs without binding or jarring the foot.

The shoe may fit in the sense implied, it may be of the proper length and breadth, and so closely burned down upon the lower margin of the hoof, that it will hold water, as expert hands boast; and yet, for anything such fitting guarantees to the contrary, the bearing surfaces of the hoof upon the shoe, and of the shoe upon the ground, may be such as to cause discomfort to the whole

limb ; both heels may be too high, the foot much shortened, or the hoof rasped lower on one side than the other, so as to tilt the foot, and prejudicially affect all the parts above it. I would not be hard upon farriers, knowing that a man has to fit shoes to forty-eight feet for his day's work, but it is my duty to speak the truth plainly, as I believe it to be, and to check faults of which the chief causes are want of knowledge and suberviency to blind custom.

I feel the necessity of dwelling a little longer on the application of hot shoes to the feet; I never adopt the practice myself, but tolerate it to some extent in others. It is inconvenient to prohibit the hot-shoe custom of fitting, even in one's own practice ; and yet when the practice is allowed it is difficult to guard against the excess and abuse of it. To explain, I repeat that I carry the shoe while hot to the foot, present it to see what more is to be done, but do not singe the hoof. Now it would be inconvenient at that stage to have cooled the shoe, because I can still work the iron while it is hot ; it is the excess, the burning a badly or even well

adjusted shoe to a badly or well prepared hoof, that is extremely injurious.

Statistics have been presented by some foreign veterinarians to show that better success attended hot-shoe fitting than the opposite mode; but, without questioning the accuracy of their figures, I attach no value to the deductions. In the first place, though I disapprove of burning the hoof, as I see it done at home and abroad, and prefer reducing it to its normal state by proper instruments, yet, in the hands of ordinary Continental shoers, all the conditions are favourable to the foot's immunity from injury by the hot shoe. They proceed systematically to the preparation of the foot, and then, with a good understanding of it, a proper adaptation of the shoe is given, before being tried to the hoof. The shoer then carries his hot shoe to the foot, and presses the surface of one against the other, and in an instant takes away the shoe, and with the buttress pares a thin slice of horn from the singed parts of the hoof where the shoe had pressed; the work is done, the shoe cooled, and nailed on.

Now, this is not only singeing the horn, but apparently very much like what people complain against, *i.e.* paring the foot to fit the shoe. But the fact, as I have found it, is this: the skilled Frenchmen bring the surfaces of their shoes to great accuracy, and in preparing the foot something is left to be done when the shoe is brought to it; hence, as a rule, the shoe requires nothing, but the foot requires a little more adjusting when the surfaces of both are brought together.

It must not be forgotten that those who use the loud-sounding words, “the shoe must be fitted to the foot, and not the foot to the shoe,” display ignorance of the fact, that it is the shoer’s business to form the surface of one as well as of the other; and that unless that kind and amount of knowledge of the matter is possessed, which will insure the right proportion to the hoof, and therefore exactly adapted surface for the shoe, no fitting of the shoe, no bending of the iron to the hoof, will redeem the work from the character of bad.

Laying the shoe off at the heel, or what in Scotland is called springing the shoe, is one of the

most common of the injurious parts of the British customs of shoeing. The two expressions indicate different modes of carrying a common theoretical idea into practice—the idea that the heels of the hoof are required to be kept free from contact with the shoe, so as not to take their natural share in the exertion of the foot, by sustaining the incumbent force and weight. The theory is wrong, in so far as strength to bear weight, normally imposed, is concerned; but the practice makes restraint complete, and transfers the bearing from the natural positions to parts incapable of sustaining it, multiplied with such leverage as by degrees to entail the greatest torture on the horse that it is possible to conceive.

One mode of *laying the shoe off* consists in cutting or rasping down the heels of the hoof when the shoe is fitted, so as to leave space between the foot and shoe for about an inch from its extremity behind forward.

The other plan, *springing of the shoe*, to accomplish the same end, is done by deflecting or bending each extremity from the foot, pro-

ducing a bend in the web of the shoe, forming a convexity to the foot and a hollow surface towards the ground. In the abstract, turned-down heels are useful, but, combined with springing of the shoe, they constitute a system of leverage which becomes an engine of torture, the most complete that misguided ingenuity and manual dexterity could produce.

In all instances the shoe is necessarily nailed fast to the anterior region of the foot, while it is at points corresponding with a transverse line drawn across the centre, where the bottom of the foot is broadest, and where bone construction gives place to a less rigid combination—*i.e.* elastic cartilages—that the deflected heels of the shoe attain their points of resistance, or fulera, and where the shoe pinches. The heels of the shoe take first bearing on the ground at every step, as the foot alights, and their lever action is induced by the action of the limb, and the force and weight brought to bear on the foot.

Such a state of things is utterly inconsistent with firm and easy bearing, and the horse in-

stinctively, as much as possible, shrinks from bringing the heels firmly to the ground, and is thereby prevented putting forth his full strength ; but, however careful, he cannot altogether avoid

Fig. 21 represents a worn-out near-fore cart-horse shoe, which I selected for this drawing, on purpose to expose and comment on a prevalent absurd practice of turning out the extremities of the heels of the shoe. This habit of shoeing, though occasionally seen in Scotland, as this specimen testifies, is more prevalent in the midland and north-western towns of England, and is in full vogue at Manchester. It is only of late that I have seen an apology put forth for this form of shoe ; but at length a veterinary

producing painful injury to the foot. Thus it is that springing of the shoe deserves condemnation, as causing pain, a wasting of power, and the destruction of horses.

Curving, or turning the toe of the shoe up out of the line of wear. This would seem too great an absurdity to justify my drawing attention to it, but for the appearance of books from time to time, whose writers emulate each other in wordy attempts to persuade every reader interested in horses, that they—the writers—are either originators or pioneers in developing that idea as an improvement in horse-shoeing.

Theorists, who illustrate the adage that “lazy people take most pains,” assert by turn that the quarters of the horse’s foot cannot bear pressure, that the heels must be left free, and the toe curved out of the line of bearing, and that the sole of the hoof must be pared away, instead of

surgeon has published a book, in which this identical form is recommended, though no reason is given why. But the author of the book has done one service—he has given the form a name. He tells us that it is called “*Donkeying the Heels.*” The candour of the author is remarkable. The fact is that these heels become causes of torture, as has been shown of all divergencies of the heels of the shoe from the foot.

leaving it alone in the integrity of substance as nature formed it.

All these bewildering propositions may be found in many English works of professional men and amateurs of this century. I deny that any practical good has resulted, or can result, from turning the front of the shoe up, and necessarily demolishing the hoof to the same extent at its deepest and strongest part. To illustrate the reasons of my opposition, I beg to say a word on the origin of the plan, and on the pretexts used for keeping it up and advising its extension.

The origin was partly due to an anatomical blunder, and partly to an attempt to blend a feature of an old Continental method with a new English theory, in the hope of constructing a new system by such fanciful combination. The French practice was assumed to be understood, not learnt, from such hints as travellers brought from France after the restoration of peace.

The late Mr. Joseph Goodwin, veterinary surgeon to the Prince Regent, and thereafter to the King, published a work, in 1820, *On the*

French System of Shoeing Improved. And he altogether misunderstood what is called by our neighbours the *ajusture* of the shoe, which, when well done, preserves symmetry, and is conducive to harmony of action. He also committed a mistake in accepting from the author of a prior work his description of the coffin-bone, that author having by accident taken for his model a diseased coffin-bone, one deformed through bad usage:—

“*Bearings of the coffin-bone.* The *pince* or *front* of the bone will also be found to take hardly any sensible bearing, being slightly turned up, and away from the table (plane), obviously in order that it might more conveniently make the rotation which the foot performs on leaving the ground.”* This was the unfortunate mistake of a conscientious man; a double mistake of fact and theory—of fact, because a diseased bone taken by chance was represented as a perfect specimen; of theory, in looking for rotation or smooth bearing-surface in a bone in which sharp asperities exist on the margin for giving the strongest pos-

* *Treatise on the Horse's Foot*, by Bracy Clark, 1809. 2d ed. 1829.

sible attaching bonds to all the structures of which it is the base. Clark, in 1809, first inadvertently fell into this anatomical mistake ; but more serious consequences arose from his followers framing a practice according to notions induced by Clark's theory. Hence the origin of "Curving the toe."

The practice of curving, or turning the toe out of the line of wear, has had many imitators, as it is always easier to work upon a theory than to investigate facts. The toe of the horse's foot is the point of the lever, which cannot be interfered with by rounding or undue shortening, without limiting the safety, power, and speed of the horse.

Prevention of Cutting.

Cutting, as it is apt to occur with some horses, especially in those employed for fast work, is a practical matter, well deserving attention.

I must first advise, according to my own experience, what *should* be done, and what should *not* be done. Use no thick heel or feather-edged shoes, nor yet rasp away the hoof, which invariably increases the particular evil, and adds others, by

distortion of the limb, and weakening the foot. Pay particular attention to the adjustment of foot and shoe to it; keep the inner half of the shoe within the margin of the hoof; leave out the nails where the foot touches any ascertained part of the opposite limb. It is usually advisable, where it is required, to keep the shoe close the whole length of the inside, and to shorten it a little at the heel to diminish the leverage length behind the nail-holds. For two reasons the nails are required to be left out on the inside, though at least two of those near the toe may be driven. Firstly, because, by keeping the shoe parallel with, or within the margin of the hoof, nails cannot be applied with safety. Secondly, if the foot be strong and the nails can be driven, it can only be by taking short holds when the clenches will rise with work, which done ever so little, they chafe the part against which the foot unavoidably rubs, and unless the hoof is perfectly smooth, wound where they touch.

CHAPTER VII.

NAILS, NAILING, AND FINISHING.

THE nails used in horse-shoeing, though constituting a distinct branch of manufacture, deserve special attention here, for on their shape and quality, apart from the manner in which they are pointed and driven, a great deal depends.

Horse-shoe nails should be made of the finest quality of iron; they are required to be of a peculiar form, so that when driven they are flat to the foot, having their strength in breadth and not in thickness, so as to secure firm hold without producing pressure on the sensitive parts within the hoof, and admit of flat level clenches being made after the nails are driven.

The shape of the shank, and the softness of the iron used, render the process of pointing the nails essential, with the twofold object of hardening the metal, and securing a true point, so that the nail may be driven in the right direction,

without bending. The nail-head is somewhat flattened, in the best Scotch nails, and made of pyramidal form, with its base, when driven, resting against the margin of the nail-hole, while the flattened shank begins abruptly from the head. The statement that this form of head wears off, and lets the shoe loose, has no foundation in fact; no nails hold better, and none more rarely break or exhibit signs of the clenches rising, than these just described.

The breadth of the nail-shank should, with very slight diminution of substance, continue to within $\frac{1}{4}$ th or $\frac{1}{3}$ d of an inch of the point, so that the full substance and strength be equal from the head to the clench.

Pointing nails is with horse-shoers very much like what quill-pen making and mending used to be to writers; every man likes to point for himself, and it is, though a simple matter, one that is rarely acquired efficiently without much practice, when, as men become accustomed to nailing on shoes, they acquire the habit of pointing their nails to suit their hand, and tact in driving them.

Fig. 22.—Three kinds of nails, of various sizes in each pattern.

Good shoeing, feet kept in full substance and proportionate, and shoes well holed and fitted, demand the least nail-pointing. Englishmen point their nails more—hammer the shank from head to point more—than any other shoers, and they are the most expert hands of any at driving them. There is a cause and effect, order and sequence, to account for this.

Where horses' feet are in general in good condition, the hoofs strong, and shoes properly fitted, with each nail-hole of the best possible form, and in its proper position, nothing is easier than to drive the nails, and but very little hammering is required—none, in fact, beyond giving the direct line to the shank, and forming a strong safe point, with its shoulder for a guard. Frenchmen take hold of the head of the nail, and by turning the point a time or two upon the pointing stake, or, as they more frequently adopt, the anvil, a few taps with the shoeing-hammer do the work ; while we have a much more elaborate process to perform, especially with the English countersink nails.

By our method, each nail to be pointed is

taken in the left hand, near the point, and the first tap with the hammer given is upon the neck of the nail, placed flat upon the stake; the nail is instantly turned sideways upon its head, and one stroke is given, then turning it round between the left thumb and finger, successive strokes with the hammer are given, both flat and edgeways, as the nail is drawn back from head to the point, which is formed by the last tap. This pointing is very expertly done, and is very essential for the purpose of accurate driving, where all the conditions combine to make driving both difficult and dangerous. But although, under difficulties, hammered nails and finely-tapered points facilitate the process of driving, they increase, when done to excess, the nail's liability to break, and impair its holding power.

Nailing on the shoes is the part of the process of shoeing usually done very well, and therefore requiring the least said about it. The skill displayed in nailing on shoes seems to have kept pace with the multiplicity of defects that have been introduced in the practice of shoeing, and

which have made the operation proportionately difficult. Indeed, bad as have been the results, and lame as a large proportion of horses are seen to be, our drivers or door-men have done their best to avoid wounding the feet by nailing, or incurring the displacement of the shoes. If the feet are not understood, and shoes are badly adapted to them, the best driver cannot make the work good, while workmen instantly appreciate the ease with which they put on well-fitted shoes.

As a preparatory step to nailing on the shoe, place it to the foot, and see well to the fair bearing and freedom from any rocking action ; the latter is a common fault, to avoid which the shoe should be pressed to the foot diagonally from heel to toe, and from toe to heel, before a nail is driven.

In applying the nails, the best plan is first to drive a toe-nail, and then the one immediately opposite,—not close home, but just far enough to bring the shoe firmly to the foot ; care being then taken to ascertain that the shoe is straight. It is good practice to continue driving the other nails, one alternately on each side, instead of making

one side of the shoe fast before the other. This suggestion is of more practical importance than may at first appear. As farriers all know, the shoe is apt to be forced across the foot when only one nail supports it on one side and all are driven on the other, and then the remedy adopted consists in trying to hammer the shoe back to its right place, and keeping it there by driving the other nails—a proceeding which sets up an injurious antagonism between the necks of the nails and sensitive foot, so liable to restraint and pressure. Each nail, from first to last, should go easily and straight, the well formed and directed point being our surety that, with the natural construction of the hoof, the nails pass obliquely through it.

The number of nails for each shoe should vary from six to eight. I never use less than the former for a pony, and seldom more than eight for a large horse ; though for these latter, used for heavy draught, when their feet come to us defective, a couple of nail-holes may be stamped just before the toe-piece, and an additional nail may be required.

Seven is the number of nails I commonly use, four on the outside, and three for the inner side. Much discussion has taken place of late about the number of nails proper to use, not amongst farriers, but amongst members of the veterinary profession and amateurs, who look on the nails as the great cause of injury to horses' feet, and answerable for all consequences. Some of these theorists began by trying to use shoes without any nails at all, and finally prescribed the fixing the shoe to the foot on one side only ; and others make a boast that they apply as few as five, and even three, nails to each shoe. These gentlemen do not understand that, all the rest being well done, the nails are altogether free from offence to the foot, and that a first condition of shoeing is, that over the greater part of the circumference, *where the nails are placed*, there should be no perceptible motion between the shoe and hoof.

The finishing of the work after the shoe is nailed on consists in drawing down, or, in farrier's phraseology, drawing up the nails, clenching them, and smoothing the surface with the file. We have

two methods of wringing off the points of the nails preparatory to clenching them. In Scotland every shoer wrings off the point of each nail as soon as he has driven it, by partially turning it down and then taking it between the claws of his hammer and giving it a twist, which he does very expertly, and the point drops on the floor.

The English farrier, on the other hand, turns each point down upon the hoof, after the nail is driven home, in succession, and when all are placed, puts the shoulder of the pincers under the bend of the nail, and gives this a stroke with the hammer ; this done to all of them constitutes the drawing up ; the foot is then let down, and its fellow is taken and proceeded with likewise. In the next stage the feet are taken forward by turn upon the shoer's knee, or rather placed upon his thigh just above the knee ; he wrings off the points at their bend, passes the edge of the file under each clinch, before turning it with the hammer, which he then does in succession ; the clip is tapped up, and the file passed over the clinches and the hoof below, to make the whole

smooth. It cannot be too often repeated that the less filing is done to the hoof the better, and the remark applies to the clinches, which are not unfrequently deprived of their requisite substance and strength by excessive filing.

The Scotch are the only shoers who take off the point of each nail as it is driven, and the method has much to recommend it, in point of safety ; a tear of the hand from a turned-down nail being among the accidents that occasionally happen to shoers ; the Scotch also leave the points to be turned down, of more equal lengths and flatter than is done by twisting them off by the pincers.

Customs of working are not easily changed, and these plans may be equalised by the manner of taking off the nail-points with the pincers ; these should be kept in good order, be stronger and broader in the bow than they usually are ; in taking off the point, the pincers should only grip the nail flatways at the bend, which done firmly, with one turn the point comes off, leaving in succession the ends to be turned down of equal lengths, and flat ; whereas, it commonly happens

that much twisting is done, and the ends are left like the ends of screws, thick, and of unequal lengths; to remedy this the file is used, but this should scarcely be required, as the flat shanks are in better form for turning and laying even, as they break off, than when filed to an obtuse stump.

I have mentioned the filing-up of the foot, of which the less done the better, since good work requires but little additional polishing, and no amount of the latter can change bad into good. But, since all who have taken part among good workmen know how they abhor any slovenly or neglectful appearance, it may be said that all the pride of the workman may be satisfied without robbing the foot, and that a rasp-mark left upon the hoof is a reproach to farriery; whilst, again, to use first the rough rasp and then remove the marks with the file, is deceptive, and therefore doubly blamable. The foot properly prepared for the shoe, and well furnished by the latter, proves the shoer's merit.

The following extract, taken from the work of

Earl Pembroke on horsemanship, published 110 years ago, is so much in accordance with my present views, that I deem it proper to reproduce it. It is a good example of old wisdom, unheeded when first spoken, then ill-used, and lastly, buried in neglect; but, like all true wisdom, it never perishes:—

“The best way to forge shoes, in respect to the nails, is to make the holes for the nails at twice, with two different instruments: first, on the outside of the shoe punch a place, not quite through the shoe, big enough to receive the head of the nail when driven: next punch a smaller hole, from the centre of the above-mentioned larger one, for the blade of the nail, quite through the shoe: thus the nails are well driven in, protected, and cannot be pushed by use too much into the foot, but always keep their firm, proper place, full as well as, nay better than, in a grooved shoe.”

CHAPTER VIII.

SHOEING HORSES FOR THE FIELD AND THE TURF.

HAVING, in the foregoing pages, dwelt at large on the most important questions relating to the horse's foot, and the rules to serve for guidance in the practice of shoeing, I shall refrain from saying much on exceptional means which are had recourse to by different practitioners. I have become convinced that the better a man understands shoeing in general, the more simple and uniform in all respects will be his practice.

The necessary deviations are few, and are mostly such as are prompted by the occurrence of lameness, cutting, or other anomalous conditions.

There are forms of shoes in vogue, known by names to which practical objections may be urged. Those who order them, and farriers who have to

execute their orders, neither understand the effects these shoes exert, nor anything of the why and wherefore of their origin. For instance, *a hunting shoe*: a groom attentive to his horses thinks he has done his duty in indicating a special mode of shoeing for a special object, when he says that the horse is "*to be shod for hunting.*"

By that is now generally meant a shoe made concave on its lower surface; the seated shoe, of Moorcroft's choice, *turned upside-down*: this is supposed to grasp the ground by the circumference of the shoe sinking into it, and, as is said, resembling the unshod foot. Practically, this custom is found to be bad; and in principle, when the action of the foot becomes understood, it is found to be very absurd. That the foot sinks into the ground when so shod is true, but that is exactly an occurrence which the natural foot does not favour, and which it should be the aim of shoeing to prevent.

As the horse's foot is required to get hold and be firm upon the surface of the road, so it is required to do on soft or shifting ground, and it

must find stability before the limb can act on it. In the case of a horse, whose feet are in perfect condition and strength, and unshod, security is perfect on all natural ground that horses can move upon, and hold is secured by the inverted arched form of the foot ; first the slanting columns of the heels and bulbs of the frog, forming together what our neighbours call the arc-boutant—flying buttresses, which arrest the foot on alighting, prevent it from moving forward ; as the foot revolves, while its shaft is being raised from an oblique to a vertical line, the larger front arch embraces the surface of the ground, and the foot can slip back only to the extent that the soil, if soft and loose, recedes. As soon as the bearing surface of the foot is placed upon any artificial medium, the natural provision is so far interfered with, that we are required to contrive artificial compensation for those provisions which we destroy, as much as we are prompted by reason to feed the animal, and take other measures for his preservation, when taken from the free, and to him natural, state. Horses, whether drawing

the plough or other agricultural implements, carrying a weight in the hunting-field, or running

Fig. 23.—A worn shoe made according to a plan to some extent in vogue in the early part of the century in England, as a hunting-shoe, with a view to prevent slipping. A double fullering is seen, and the inner border of the web on the ground surface is cut after the manner of a rasp.

This surface plan of roughing is ineffectual.

a race, should be kept as much as possible on the surface of the ground, and not armed with expedients to facilitate the feet sinking deeply into it.

I put my plan to test, first, on plates for race-horses, and, finding it effective, adopted the principle for shoes for hunters, and which is not

only found excellent for the purpose, but of most decided advantage to horses employed in towns and upon ordinary roads, both for riding and harness. I adopt the plan for fore-shoes only, leaving the turned-down heels to do duty for the hind feet; but for plates, as will be seen, I jag the fore and hind alike.

The subjoined illustrations and descriptions explain the principle of the shoe; and the

Fig. 24 represents a shoe made in the ordinary way, in so far as fullering is concerned; it presents, however, on the ground surface, in each parallel half of the shoe, four concavities made with a gouge.

It will be observed that the direction of these concavities differs. The two posterior ones look forwards and inwards, the two anterior ones look backwards and inwards. According to this invention certain indentations are formed, and sharp angles arranged on the inner margin of the web and on the lower or ground surface of the shoe, in directions radiating from the centre of the foot.

mechanism of the plate will be shown in the following chapter.

Fig. 25.—The above is an engraving of a shoe of the same pattern as the preceding one, but worn excessively, yet the gouged concavities are still perfectly efficient. The shoe was worn by a commercial traveller's mare thirteen weeks and five days, during which she is estimated to have travelled upwards of 2000 miles on common country roads in the eastern counties of England, in the summer of 1866.

The contrivance, exhibited on the opposite page, was devised by the Author, and the object of the whole arrangement is to give firm foot-hold. The posterior concavities, four in all (two on each side), prevent slipping forwards ; and the anterior ones, as the foot revolves, prevent it from slipping backwards. These shoes have been found most effectual, both in the hunting field and on the pavements of London and Edinburgh.

Having introduced these shoes, and applied them in general practice in London during the years 1866-7, and afterwards returning to Edinburgh, where I have no forge, I anticipated danger of the plan, whatever its merits, falling into disuse—or worse still misuse, for want of intelligent application. But I am glad to know that my fears had no grounds. One at least of our former pupils, on establishing himself in a veterinary practice in the neighbourhood of Mayfair, Mr. W. Hunting, perceiving the merits of the plan, adopted it, seconded by the desire of some noblemen and gentlemen on whose horses I had applied the shoes. Mr. Hunting also, to insure faithful execution of the system, secured the services of my old trained foreman, William Urquhart, who, for eight years, had given me the greatest possible satisfaction at the New Veterinary College. In such hands I see that this incidental outcome of my labours is secured from oblivion, and will, I think, become extended in practice.

I am not disposed to praise this or any other specialty of shoe too much, knowing as I do

that it is not so much a shoe, as knowledge of shoeing, that is required—a system of shoeing to be established rather than a special shoe, which, in the hands of the practitioner, may be a boon, and in those of another, an instrument of torture. Insisting on all this, I nevertheless feel it my duty to state that the indented shoe, figured at p. 156, offers practical advantages even greater than I at first anticipated.

In discussing the special requirements of shoeing for the field and the turf, one cannot ignore the fact that these are matters on which we as a nation stand so prominent above other countries, that it may appear futile to look beyond our shores for comparative standards of perfection. It is true that in recent years France afforded some wholesome lessons by the achievements of the race-horses she has sent over to this country, but then we are told she has only beaten us with our own arms! Meanwhile there is the fact. But hunting is so much an English sport, that I can look nowhere else for example—nowhere else for the horse or rider, or

for a hunting saddle, and, I must add, for a farrier, who, all circumstances considered, will do the special work equally well.

Looking back to my early experiences with the Hertfordshire (Puckeridge) Hunt, more than half-a-century ago, and making allowances for the fondness which men cherish for the fashions of their youth, I find that fanciful novelties have told as unfavourably in the altered manner of shoeing of hunters as of other horses. I am no opponent of novelties as such, for progress of real knowledge involves change ; but what I do maintain is, that in shoeing, the old school practice has been destroyed, and no school or rational system of shoeing has been established on its ruins ; hence the countless number of disabled, useless, and crippled horses.

CHAPTER IX.

ON PLATING RACE-HORSES.

THERE is nothing in shoeing and plating race-horses that calls for more skill than shoeing horses in general ; and judging from effects, such as the condition of the feet of race-horses and the large proportion of lame ones among them, there are no grounds for the pretension to more knowledge or care being available for their better preservation. Galloping upon turf requires, as has been shown already, that exactness in fitting the shoes be observed, and that no undue projections of the shoe beyond the hoof should exist, since they would be liable to injure the opposite leg, or be caught hold of by either the parallel hind or opposite fore foot. All that has been said about the preparation of feet and the adjustment of the shoes in other cases, is particularly applicable to race-horses ; and it must be borne in mind that

the higher rates of speed bring under severe test all the structures of the limbs.

As horses hard worked upon the road usually wear their shoes out in about a month, no recourse is had by good managers to removing their shoes. But as horses working on turf only wear their shoes much during intervals, when they are doing strong work, removing them is more common. Race-horses in full work should go, from one shoeing to another, fully thirty days, and their feet, if properly shod, will maintain normal proportion, since, by the wearing away of the shoes at the outer margin, and the rounding off of heels and toe that occurs, those parts will be reduced as much, in the time, as the depth of the hoof is increased by growth. But such shoes are not good to remove, and new ones should be applied every time of taking the worn shoes off.

Plates (and these I find generally well made) should be applied upon the surfaces from which the shoes are taken for the purpose, without disturbance of the hoofs; nothing else being required but to drive the nails with care, and

turn the clenches flat, leaving them level and the surface of the wall smooth, without either the hoof or clenches being filed away.

Almost all the success of plating depends on the relative success of the ordinary shoeing, in keeping the feet in good form and full energy. Upon all turf, except where the grass is very scanty and the soil sandy, the strongest-footed horses can run better, through having a firmer foot-hold, with plates than barefooted; and *all* horses run better with plates than with ordinary shoes, if the ground be at all of the character of English turf.

Plates are made by a tool fixed into the anvil, well known to all shoers employed to shoe race-horses. Rod iron is used; that for making horse-nails of the largest size is the best, or rods may be drawn out of old scrap iron to any desired size. The swedge which is used makes the crease in the plate correspond to the fullering of a shoe; the crease should be mid-line through the length of the rod, flattened into form. These rods, reduced to proper substance and creased, may be cut into

proper lengths, according to the size of horses' feet; for young blood-horses 10 inches will be about the length required, and for aged horses and those with larger feet, from 11 to 14 inches. The rod-lengths are turned round and put into the form of the feet, the nail-holes are stamped, and then the plates are filed up to be ready for application. The only difference of make, between fore and hind plates, should be a little more breadth of cover for the former; the hind being narrower are a trifle lighter. There is a custom of making the fore-plates much broader on the foot than the ground surface, and the crease is made in these upon a narrow ridge, the breadth on the upper surface being made up with a depressed thin ledge.

I prefer the first-described mode for several reasons. *1stly*, The plate is required to have ample substance of inner margin to support the sole of the foot, and by the same means good foot-hold on the ground is afforded. *2dly*, The nails are more secure with the crease in the middle of the plate, both as regards the depth of crease to receive the heads of the nails, and also

for the nails taking the better hold of the hoof. If horses have to run on other courses than turf, their feet should be armed for the purpose accordingly.

Fig. 26 represents two racing plates—an off-fore and off-hind one—made according to the system of the Author. Instead of gouged concavities, as adopted for the shoes already described, we have here jagged projections made by a cold chisel after the plate is put in shape.

These are found to act precisely in the same manner on the turf as the gouged concavities of the shoes, previously described, do on an ordinary pavement, or in the hunting-field.

While maintaining that these jagged plates must have advantages on the turf not inferior to those experienced on the road with shoes con-

structed in the same manner, I candidly admit that my advocacy of the plan with race-horses is not based so much on tested experience, as on reasoning from analogy and from a knowledge of the structure and functions of the feet and limbs of horses.

Experience with race-horses is limited to comparatively few, and these in particular districts from which I have been absent, since I devised, and applied to ordinary shoes and plates, the system for giving foot-hold already described.

This admission will, it is hoped, not prevent the plan being experimentally tried by the owners of race-horses, who, above all men, have the opportunity of learning practically that everything which tends to give increased firmness of foot-hold is conducive to speed, economises power, and diminishes the risk of sprains, which in a large number of instances are the result, not so much of the speed at which the horse is going and the weight he is carrying, as of a sudden and violent effort, instinctively made, to compensate a momentary failure of foot-hold, or of extraordinary

exertion, rendered continuously urgent by the defective condition of the feet.

Weight of Plates.—Sets of four plates for the fore and hind feet weigh from ten to sixteen ounces, and the medium between these figures is the average weight of plates.

The difference in weight between the plates for fore and hind feet is usually as four to three, for fore over the hind. But the question of weight must be determined by the intelligent shoer, and should not be regulated wholly by the size of feet, but by their relative perfection of form and strength. Weak hoofs require the strongest plates, dimensions of surface of foot being equal. Therefore aged and most used horses usually require plates of more substance than young horses that have been well done by, and have feet nearest to perfection of form.

The above remarks, I hope, will be found to embody as much of principle as will serve for practical guidance in this country—for English turf practice. I make no more pretence, in this

than in any other chapter, to exhausting the practical details of the particular subject under consideration. My first aim is to lay down and demonstrate principles, which may be of general application ; and I do not aspire to teach in a book what can only be learned at a forge.

Connected with the plating of race-horses, there are other matters, the discussion of which may interest many readers, and which I purpose considering in the next section—the chapter on roughing. I refer to the general question of foot-hold for horses upon different surfaces.

CHAPTER X.

FROST-SHARPING, OR ROUGHING SHOES.

SHARPING is done by drawing out the heels of the shoe after turning them down, by flattening and narrowing the calkins of both heels to a sharp point ; in the fore-shoes a transverse broad hold is preferable to narrow and high heels. Additionally the hind-shoes of all draught horses, whether for light or heavy work, should be toe-tipped ; this consists in a piece of rod iron being welded transversely across the toe of the shoe, on the ground surface, behind the clip, and from each end of the toe-line an acute point being drawn out—the toe-tip so armed becomes concave in the centre, and the foot finds ample stay upon the hard frozen roads and ice by this contrivance.

The four sharpened points at the bottom of each foot form two transverse and two lateral

parallel holds, which afford complete security. Heavy draught horses should have toe-tips to their fore-shoes also sharpened; while with riding horses, turning and sharpening both heels of all the shoes is the proper practice, and suffices.

In adopting toe-tips for sharpening, though the process of doing the work is the same as has been described for toeing new shoes, the object calls for modifications. Instead of using new square rod for sharpening, a lighter rod, flattened, to the proportion of five to three of the substance of iron prescribed for new shoes, is used; the rods for sharpening purposes are kept prepared during the season, of sufficient difference of substance for small and large shoes. Those rods are commonly formed by opening old shoes of convenient substance, drawing them roughly out, and welding them to the convenient lengths of about three feet.

In Scotland the shoers are very expert hands at the above plan of sharpening; as a rule the shoes are nailed on with unpointed nails, driven

in the old holes, with the exception of occasions in which new shoes have to be used ; better work is done in sharpening with the old shoes than with new, until they have been sharpened two or three times, when they become too short, even if not worn out, and must be changed for new.

Roughing, like everything pertaining to horse-shoeing, is required to be more uniformly well done than it is. It is not so much new knowledge that is required, as the more uniform adoption of the best known modes of doing the work. Effective sharpening, with freedom from injurious tendencies to horses' feet, is necessarily dependent upon a rational and well-carried-out plan of shoeing. But custom is more imperative than system on this incidental part of shoeing, which is called for very much on emergencies ; the work is best done, most simply and most effectually, where it is annually required during several months of the year, and accordingly it is to Germany and Switzerland that we should look for the best practice, as we find it in this part of shoeing. I shall not enter into details on the different plans,

because some are adapted for localities, or the particular services of horses. A simple and effective method is adopted throughout Germany ; at Berlin and Vienna, all the shoes, from the setting in of winter until the end of it, are made with the heels tapped, to receive screw-formed calkins, made obtuse or sharp-pointed, which, by means of a small key kept in readiness, may be changed as required. This plan is admirable, and, for the military service at least, should undoubtedly be adopted in this country. But for ordinary purposes the conditions of climate render the German plan scarcely practicable here. Our streets are rarely covered for more than a few days at a time with loose frozen snow, and the screws would bend and break under the exertion of horses upon hard roads. But, assuming that this could be overcome, there are other difficulties: firstly, our common practice of shoeing does not encourage one to engraft the incidental part on it. Our workmen are strangers to it ; and lastly, frost comes suddenly, and, as stated, rarely lasts long in England, and therefore owners of horses would

not generally keep them shod in a way prepared for the emergency. The school for such change should be in the army service, where the practice would be at once useful, nay would seem most essential for prompt and efficient service, and whence it might become extended to civil purposes. But any adoption of new modes of the kind, in order to be effective and not mere shams and deceptions, should be carried out by imported workmen. In this respect a useful lesson may be learned from manufacturers. When a new process or machine is introduced from the Continent or America, often at great cost, the investor, to make sure of the result, brings over the people accustomed to work the system. Our own countrymen soon learn by practical example, and the result is generally beneficial. Horse-shoeing may not be a directly profitable concern to those engaged in it; but that is no reason why a Government Department, or a wealthy College, specially interested in the good management of horses, should not procure the country some of the good derivable from well-chosen importations of foreign skill.

The old adage — “Riding rough-shod” — is significant of notions of advantage over riders in the opposite condition — smooth-shod ; and the difference is incalculably in favour of the former where any trial of strength is called for, whether it be of speed, carrying, or drawing. I have found myself under circumstances where means have had to be extemporised instantly to avoid imminent disastrous accidents ; and I have seen the very accidents happen, to prevent which, knowledge of causes, and how they may be controlled, was the only requirement.

It must be borne in mind that the horse, in his natural state, is a very sure-footed animal, though for climbing and descending inferior to the sheep and goat ; in practice, then, what we have to do is to overcome difficulties chiefly due to the material with which the horse is shod, and the variable soil on which he has to work in different localities and at particular seasons. When the ground is slippery from any cause, except a wet surface, the emergency may be met by taking off the horse’s hind-shoes ; and since

two feet are always in diagonal positions on the ground, it follows that when any two feet are able to hold the animal is safe. In the case of sudden frost, horses drawing a heavy load may suddenly become unable to stand; under such circumstances, straw, sand, or horse-clothing, placed on the slippery ground, will enable the animals to stand at ease, while a couple of shoes are taken off from each; it will then be found that draught and progression have ceased to be impossibilities. These hints may be useful in military and civil life, and in time suggest a variety of resources for giving horses foot-hold under circumstances of exceptional occurrence.

The only other example of methods for giving foot-hold, adapted to conditions of soil and the economy of power, is the so-called Turkish shoe, in use south and east of the Mediterranean, over many thousands of miles. In Figure 20, p. 106, we have the representation of an Egyptian shoe, which, as is shown, while hammered into form and made thin and light, covers almost the whole of the circumference it embraces. It is a

shoe admirably adapted to economise the power of the horse going upon dry loose sand ; the shoe, in fact, acts upon that shifting medium like an oar on water, or the wing of a bird against the air. Such is the effect, upon the foot of a horse so armed, over one shod suitably only for an English road or the hunting-field. The use of the shoes last referred to, and the length of time they have been used,—an era beyond knowledge,—is to me one of the most remarkable facts for contemplation in the whole history of horse-shoeing.

PART II.
ON LAMENESS.

I.

PRELIMINARY OBSERVATIONS ON LAMENESS.

THE ten chapters which I have devoted to the subject of Shoeing are not an exhaustive treatise on the subject; they are the results of my own observation and experience, and are intended to convey information which, if carefully put to practical use, will help to lay the foundation of a system of shoeing, and lessen the evils which are the inevitable result of want of knowledge.

Lameness is unquestionably the most apparent, the most frequent, and the most serious result of bad shoeing; but few persons can form a correct estimate of its great prevalence.

Upwards of half-a-century ago, the late Professor Sewell was sent to the Continent by the Governors of the London Veterinary College, to gather information on the state of the Veterinary Art. On his return he told the Governors—

“I have seen more lame horses while posting from Harwich to London than I have met with in all my journey, and during my inspection of Veterinary Schools and public places in France, Switzerland, Germany, and Belgium.” The lapse of time has not improved our case.

Lameness of any other animal besides the horse, however slight in degree, is readily recognised,—in the horse it generally escapes notice, except in extreme cases. If one deer among a herd, or one hound in a pack, were seen to limp, the exceptional case would attract notice, while a street may be full of horses, and one-fourth of the number lame, without giving rise to remark. It is not for me to attempt to explain the matter, but to prove the truth of what I assert. People see so many lame horses that they have become familiar with them. A large percentage of lameness amongst working horses is the rule; and if they were all restored to soundness, and could display their natural graceful action, that would for the instant be the exceptional state.

With a view to prove the frequency of lame-

ness I have instituted a series of observations, which others may repeat and extend ; and I have spared no pains to investigate, by dissection, the anatomical condition of the limbs of lame horses. The results of these inquiries are about to be submitted. To do the subject full justice would require a treatise ; but I only aim at furnishing materials for the foundation of such a work, while supplying knowledge of facts carefully observed and noted by myself.

II.

OBSERVATIONS ON THE FREQUENCY OF LAMENESS IN EDINBURGH, BIRMINGHAM, LONDON, AND PARIS.

Edinburgh.—On the 14th May 1869, at 9.40 A.M., I began a series of observations (by taking a position in West Princes Street Gardens) on all the horses that passed along the street during the time ; and in making several observations there, at the middle and east end of that street, 607 horses were observed to pass in the space of two hours ; the observations were made at three different times on the same day. Of that total number 171 were very lame.

Edinburgh.—July 23, 1869. I repeated the observations in the same way. In 45 minutes 270 horses in all passed me, of which 88 were lame.

Birmingham.—August 16, 1869. Similar observations to those taken in Edinburgh were made. New Street was selected, between 10 and 11 in

the forenoon, and in 20 minutes all the horses that passed numbered 101, of which 25 were lame.

London.—August 24, 1869. My observations here occupied in each instance about 15 minutes in these several positions :—

1st. Tottenham Court Road, 91 horses passed, of which 30 were lame.

2d. New Oxford Street, horses passing on one side, and in the same direction, 102, of which 40 were lame.

3d. August 25. Horses of all descriptions 86, of which 47 were lame.

4th. At west end of Piccadilly, took note of cab-horses only, 44, of which 35 were lame.

5th. All omnibus-horses, 48, of which 20 were lame.

6th. All other classes, excluding the above, 51, of which 21 lame.

7th. August 25, 1869. Oxford Street, London. Observed all horses going the same way on one side of the street. Total 163, of which 54 were lame. Cab-horses only, 54, of which 28 were lame.

8th. Cab-horses in Bayswater Road, 25, of which 14 were lame.

9th. In Bayswater Road, omnibus-horses only, 34, of which 9 were lame.

10th. All horses, excepting the above, 41, of which 25 were lame.

11th. Second observation on omnibus-horses only, 35, of which 16 were lame.

12th. August 28, 1869. New Charter-house Street. Observed all horses descending westwards, 124, of which 75 were lame.

13th. All horses going in the opposite direction, 123, of which 61 were lame.

14th. New Oxford Street. Observed all horses, total 85, of which 50 were lame.

15th. Edgeware Road. Omnibus-horses only, 50, of which 22 were lame.

16th. Cab-horses only, 89, of which 56 lame.

17th. All others except the above, 67, of which 34 were lame.

18th. August 27, 5 o'clock P.M. Went to Hyde Park by the Serpentine Road, and observed carriage-horses, 85, of which 27 were lame.

Edinburgh.—August 31, 1869, 10.35 A.M. :—

1st. Observations made on all horses passing through Princes Street. Total 100, of which 72 were lame.

2d. Observed cab-horses only, 50, of which 41 were lame.

3d. September 30. By Register Office. Observed all horses, 139, of which 64 were lame.

After I had made the above observations I was anxious to extend them to horses in different localities, and especially in the capital cities of different countries ; but such opportunities have not occurred to me since I conceived the plan. But I have been so fortunate as to get some observations taken for me in Paris, by one who assisted me on the occasions when I was engaged in taking my notes in London. These, taken at Paris at my request, are perfectly reliable, as being made by one very able ; and the result agrees with comparative notes I have before often taken there, but in a different way.

Observations in Paris.—On the 21st April 1870, standing on the south side of the Boulevard

des Capuchines, 86 horses were seen trotting past in the course of 10 minutes. Of these 5 were lame on one fore-leg only, 3 on both fore-limbs, and 1 on the off-hind.

Another ten minutes were devoted on the north side to see the off-side horses. 100 passed, and of these 3 were lame on the near fore-leg, 1 on both fore-limbs, 1 on the off-hind, and the other on the near-hind.

A hilly spot was next chosen above the Boulevard des Italiens, on the Boulevard Montmartre, and another 100 horses watched in about twelve minutes. The observations were from the south side, and restricted to the horses trotting down the Boulevard des Italiens. Of these 100, 8 were lame on one fore, 1 on both fore, 1 on the off-hind, and another on the near-hind limb.

The general remarks to make are, that the fore-limb lameness was obviously due to foot injury and derangement; that of the hind-limb to spavins. The omnibus-horses were sound, with a single exception. The lamest horses appeared old stale hackney-coach workers, that had seen

better days. The small French horses, while certainly devoid of action, moved with perfect freedom on all-fours. The horses in private carriages were quite remarkable for free action and soundness. The observations were not hurried, and there was ample time to notice satisfactorily the regularity of movement, or otherwise.

As this is the first attempt made, or that has been published, of establishing some reliable criterion of the actual number of lame horses to be found at work upon all ordinary occasions, and in all places, I shall not try to make an analysis of the facts observed, but merely make such remarks on them as the present early working of the method will bear; confident as I am, that when and wherever tried, the phenomena discovered in the past will repeat themselves. The comparative aspect of the question is perhaps that which will most likely lead to improvements where they are most needed; and I think too much value cannot be given to the comparisons, taking those observations made by myself in London, Edinburgh, and Birmingham, and those

with which I have been favoured, and which were made under similar circumstances in Paris. But, on the other hand, I believe that for the present it will be best to group the results obtained by myself in England and Scotland, because all classes of horses working have been included, and all, in a few instances, taken distinctly to test results.

Notably, the cab-horses at the west end of Piccadilly, among which seven-ninths were very lame, whereas in the Bayswater omnibuses, and all horses at Birmingham, the proportion of lame to sound was not more than a third so great. There are many conditions which regulate these results, quite independently of difference of shoeing, but the experience gained by all these instances being most unsatisfactory regarding the state of that art.

The London omnibus-horses, among which the fewest were found lame, were of a powerful active stamp, bought in fresh, no doubt, for that kind of work, and probably draughted and sold out as they deteriorate. On the other hand, what is quite positive, the Piccadilly cab-horses were

mostly seen in *hansoms* driven fast; they were mostly thorough-bred, such as are cast off from the racing studs when they have become of no value there. These, bought at low prices at the auction marts, end their short lives under torture in the hansoms, and other light vehicles. Therefore, in one case, sound horses adapted for the work are constantly being brought in, and in the other, prematurely worn-down lame horses form the recruiting material; but there is no evidence of these poor animals being worse shod in the cabman's possession than they were when on the turf. And, in fact, we have not a good and a bad system of shoeing; and if we had, the charge of culpable cruelty might be established for putting the one into practice and excluding the other. But I make no such charge, believing that in all men act according to their intelligence, which on shoeing in this country at the present time is inadequate to the requirement, and that the horse of twenty pounds value is quite as rationally, and seldom so irrationally, treated as others of fictitious value of fifty times that amount.

But when comparisons are made between the horses of the greatest centres of luxury and commerce in this country and those of the whole of France, where the influencing conditions are so diverse, the matter is altered, and from comparisons made we may profitably turn attention to the causes of so much lameness on one side the Channel and so little on the other.

The two thousand six hundred and sixty-four horses, of which I took careful note, in this country, exhibit an average of lame animals among them of 42 per cent; while observations made on two hundred and eighty-six horses at Paris, and in the thronged streets of commercial traffic there, only exhibit 9 per cent of lame animals.

But one cannot form an adequate idea of the amount of lameness on our side of the Channel from the above statistics, which, at first sight, would only lead to the conclusion that here the number of lame horses is only four or five times as great as in France.

Taking our own case first, we must remember that the lame horses are of no class or age in par-

ticular. Within the space of a year after they are first put to work or broken in for sale, and doing no useful work whatever, lameness often appears, and remains throughout their existence. A very large number of the choicest horse-stock too never render any service through lameness, nor make any appearance amongst the numbers observed in the street. Again, early termination of service is common—old age, viz. from twelve to twenty years, being very exceptionally attained by our working horses.

As age advances, so do foot disorders ; and, proportionate to the havoc made among seasoned horses, is the necessity of rapid replenishment from the young stock ; and the effect is, the rapid wearing down of the available horse-power, sparing the animals at no period of their working existence. This waste tells most heavily on those forming the largest numbers of between three and eight years of age, the period when, under a more happy system, they would reach maturity, and be of the highest value for all general uses.

The wear of the component structures of

horses' limbs is an inevitable condition of the uses they render. But it is for men to contrive artificial resources to counteract the ills that artificial usage tends to entail on horses, though perfect immunity from lameness cannot be attained.

Turning now to the result of observations taken last year in Paris, we have 9 per cent of lame horses there, against 40 per cent observed for the most part in London and Edinburgh. But these proportions do not, as I have previously remarked, to my mind anything like represent the worst feature of the case on our side. Four and two-thirds more lame horses were discovered on this than on the other side of the Channel. There the 26 lame horses, that made up the proportion, exhibited in 16 of them lameness of one fore-limb; 5 of both fore; and 5 others were respectively lame of one hind-limb, while amongst those observed by myself in this country the majority were lame on both fore-limbs, and many of these lacked a sound leg at all, so that the relative amount of lameness on

our side is actually much greater than that represented by the figures above quoted.

But at Paris these were all found in the throng of the city, among the hard-working worn-down class, mostly hackney-carriage horses ; and my correspondent states that, among the equipages, not a single lame horse was seen on the day these observations were made, and only one among the omnibus working horses. I regard these statistics of lameness as capable, by extensive prosecution, of bringing out instructive truths, such as must ere long awaken public opinion to the deplorable state of the art of farriery in this country. I believe, and therefore state my belief, that in no age or country can it be shown that lameness has victimised so many horses of all descriptions in the prime of their age, as it has during the present century in our own country. The great proportion of the cases occur through preventable causes, which are constantly being renewed and added to.

III.

DESCRIPTION OF SOME OF THE PATHOLOGICAL CONDITIONS OF HORSES' FEET, COMMONLY PRESENT IN THE VARIOUS STAGES OF CHRONIC LAMENESS.

THE morbid specimens selected for the drawings which illustrate this section of my work, comprise some of the most important conditions commonly met with in lame horses, the occurrence of which it is my object to prevent and remedy.

The chronic anomalous conditions of horses' feet, entailing lameness of more or less acute degree, present two quite opposite appearances to our view ; the one a *wasting* and the other an *engrossment* of structures, the textures of the parts affected being in both instances greatly changed. In describing these conditions I shall make use of the appropriate short terms—Atrophy and Hypertrophy.

Fig. 27 represents a transverse section of the hoof of a fore-foot of an aged cart-horse, in which

Fig. 27.

the sole had become flattened, and at some points had even passed the plane, and assumed the convex, in contrast to the normal *concave* form of surface.

Fig. 27 b.

Fig. 27 b represents the coffin-bone of the same

foot, as that of the hoof described, and shows how exactly the outline and surfaces of one accord with those of the other ; which characteristics are made more manifest when the parts are handled. It is true that these surfaces are not met with quite regular, but the irregularities are constantly reciprocal. It has been said, and I believe truly, that nature “abhors plane surfaces” in animal formation, and such is found to be true as normal and altered forms are studied.

The above-described aspect shows the atrophy of the bone, but this coffin-bone affords a typical example of *hypertrophy* also, and I can submit no better specimen, though I have many others analogous to it, to show the twofold condition of wasting and enlargement existing together in the same bone at different parts. Atrophy—viz. wasting of the bone, precedes hypertrophy—viz. augmentation of bone ; and yet, both are effects due to prior adverse causes, without which neither of these conditions would have happened.

Figs. 28 and 28 *b* represent the hoof and last three bones of the near fore-foot of a horse, which,

in a state of great lameness, was taken to an Edinburgh tan-yard to be destroyed. I obtained

Fig. 28.

and dissected both fore-limbs, which were deformed precisely alike, and were affected by altered conditions of structures, as these specimens prove.

Figure 28 shows the conditions of the hoof, which displays obvious traces of mutilation on the exterior surface of the wall, by means of the rasp, and of the indiscreetly-applied drawing-knife. By

this twofold action of paring the hoof below, and rasping it exteriorly, a result was attained which has been admirably characterised in the technical phraseology of modern Italian farriers—"The horse's foot so treated is peeled like an orange."

Fig. 28 *b* represents the skeleton of the foot to which the above-described hoof belonged.

Fig. 28 *b*.

Similarly placed upon a plane, the hoof and coffin-bone exhibit corresponding anomalous conditions, the most obvious being their tilting inwards, due to the reductions of the hoof, chiefly

in its inner part. The tilting was caused by reduction of the hoof, and by absorption of the coffin-bone — nature's common accommodating provision for the mitigation of pain by the removal of margins, when these, being deprived of support and defence, become exposed to injury.

Here, again, that provision is seen, as in the former instance of compensation, by new bone-structure being formed at different points.

Succeeding to the atrophy of the coffin-bone, its appended cartilages become ossified, and two bone-columns rise up laterally, one on each side of the short pastern bone, which is seen leaning against the inner one, and is held by ligamentous bands extended from the outer column.

Figures 29 and 29 *b* also represent a hoof and the skeleton of the near fore-foot of a horse. This case is of great interest, and I adduce it for the purpose of explaining something in a positive and also a negative way about *corns*.

In the estimation of all concerned, corns were the great cause of suffering to this horse. Besides the usual paring of the sole, Fig. 29 shows two

openings due to the scooping away of the hoof where "*the seat of corn*" was said to exist. The more the scooping away of the hoof was persisted in, the greater was the suffering caused by the

Fig. 29.

destruction of the quick. The openings through which the blood-coloured discharge descended are shown in Fig. 29 by two bands of paper passing through each angle of the hoof, at its extremities, by the sides of the frog.

Fig. 29 *b* represents prominently a lateral view of the inside aspect of the coffin-bone. A

Fig. 29 *b*.

deep ulcerated cavity is shown at the side of the extremity of the bone, and one similar in kind, but less extensive, exists on the retrorsal margin on the other side. Apart from the lesions of hoof, soft structures, cartilage, and bone, atrophy of the coffin and navicular bones, with deep excavation of the latter, existed to the same extent in both fore-feet.

The termination of this case was extraordinary in its occurrence, and more than justifies, it seems, a short digression from my subject; the termination was by sudden death. The incident which I am

about to narrate happened nine years ago. While in the performance of my duty at the Edinburgh New Veterinary College, I was called in haste by a groom to attend a horse that had accidentally fallen in a street close by. I accompanied the man instantly, and when we reached the stable found the horse lying quite dead; only a few minutes had elapsed from the time the groom left the horse standing in his stall, and only about twenty minutes from the time the horse fell. The immediate occurrence, as related by the man, happened thus:—The horse, lame on both forefeet, was being ridden by the groom, who was returning to the stable with a sackful of forage placed before him on the horse's back. The animal, so encumbered, was being trotted on the pavement of a narrow street, and the way he was going was on a decline. The horse stumbled, and after making efforts to recover himself, fell, pitching the man and sack over his head. The man escaped injury, but the horse was with difficulty, and only by help, raised upon his feet, and staggered into the stable, which was only a few yards distant.

An examination of the carcass revealed the cause of the almost instant death that succeeded the fall of the horse. The midriff was rent in its centre, making an aperture so large that the stomach and other contents of the abdomen had shot through, in the forward fall, and these filled up the chest and were immovable. Ruptures of the diaphragm of the horse have come under my notice on several occasions, from well-understood causes of spasmodic kind, but the above is the only case I ever knew of similar occurrence.

The rest of the history of the subject was soon made out. The horse was the property of a grocer, who used to run him in a light cart, and who stated that he had possessed the animal for about two years, that he had been a reputed good hunter, and came to the last owner at a low price through being lame, in which state the animal had continued, and had worked till the termination now detailed; thereafter I obtained both fore-limbs of the horse for dissection, with the results shown above.

Figures 30 and 30 *b* represent component struc-

tures of the foot of a horse whose case was intimately and long known to me.

Fig. 30 shows the hoof placed on a plane surface ; it is seen to be depressed across the front of

Fig. 30.

the wall, and a light-coloured streak, marking an inveterate sand-crack, extends from top to bottom at the quarter. Corresponding to the hollow depression of the foot above referred to, there was necessarily a bulging of the sole downwards—that is, a flattening—and more or less convexity at parts of the sole. Altogether a total abnormal state is observable. The horn fibres are seen

in the illustration of the hoof to have attained an undue obliquity, and curve in their course from above downwards.

Fig. 30 *b*.

This engraving of the coffin-bone of the foot, of which the above-described hoof forms part, is remarkable under the twofold aspect of deformity and diminution of substance. The space occupied by the bone within the hoof, and its weight, are reduced probably to two-thirds the proportion of its primitive complete growth, while the hoof, viewed superficially, greatly exceeds the normal size. I have mentioned the superficial aspect of

form—that is, the deceptive view—the one common to aged horses with defective and diseased feet. Surface and substance do not amount to the same thing ; weakness and disease are common to the first, but strength and perfection are only compatible with depth of cubical capacity, with proportionate substance, and form of structure.

The animal which supplied material for the above illustrations was sent to the New Veterinary College, when very lame, in 1859. With difficulty the horse had been led from his stable. Bar-shoes, with leather soles, hid from view surfaces of soles and frogs painful even to look on when exposed.

The coachman expressed surprise, and exhibited displeasure, when he saw me taking up the horse's foot, ordering the shoe to be taken off, and a new pair of shoes to be made, while I proceeded to prepare the feet. It subsequently transpired that putting the horse out of his misery was contemplated, and that our opinion was expected to have been in accordance with advice tendered to that

effect. We took pains, and employed the knowledge and skill at command, with the result that the horse which arrived in pain and difficulty walked from the forge two hours afterwards, almost free from pain, and was put to work either on the next or second day, and went on rendering excellent service for three years afterwards, when, being then nineteen years old, and a casualty having happened to him, he was put away. Meanwhile, the favourite horse of a medical gentleman was restored to a state of freedom of action, and enabled to render service, scarcely excelled in effect or for appearance by that which he accomplished antecedent to the crisis.

Fig. 31 represents a coffin-bone, selected for the purpose of showing one in a more advanced stage of disease than any of those yet brought under notice.

The differences in the degree of absorption of this bone which had taken place, and its consequent shortened form, will, it is presumed, make impression on the minds of readers. I have to state, moreover, that such phenomena are not very

uncommon, but often lie hidden from observation within a hoof excessively prolonged and turned up

Fig. 31.

in front, with depressed sole. By looking at the bottom surface of this bone, it may be seen that at the centre, which normally is the point of the deepest concavity of the arch, columns of bone are formed which give attachment to the fibrous bands, tendons, etc., the natural bony crest and arch being destroyed.

The three succeeding engravings represent

distinct views of the same foot—one of the two fore-feet of a cart-horse, both of which were in precisely the same abnormal state; the history of the subject only known to the extent of the

Fig. 32.

limbs having been obtained by the author at a tan-yard in Edinburgh, where the horse had been taken to be slaughtered.

Figures 32 and 32 *b* show respectively a front and back view of the same parts—the bones of the near foot—in a complete state of anchylosis. I shall only attempt to give a brief description

Fig. 32 *b*.

of these anomalous specimens; to treat fully the causes, the conditions, and the order of sequence of occurrences would require more space

than can be assigned here to a single specimen or a series.

Fig. 32 c.

The hoof is drawn as if one were looking down into its cavity, showing the bulged form corresponding to the large bone formation on the outer aspect of the foot, occupying the space from the pastern joint downwards, and rigidly fixing the joints involved.

In this case, so faithfully illustrated by the figures produced, phenomena are exhibited that are rarely seen so well—in the back view, Fig.

32 *b*, of the specimen—firstly, the wasted and irregularly flattened state of the coffin-bone ; the extent to which cartilages and ligaments have become replaced by bone ; and, lastly, how some of the ligamentous bands are developed, and their courses modified by attachment to strong spars of bone-substance, displayed to afford hold for these essential bands, without which no movement would be possible, strength would be wanting, and the bones would be crushed by muscular force exerted from above. I find the same order of sequence in this case as I have described in others ; firstly, external anomalous conditions, alterations of the surfaces of the coffin-bone, and these succeeded by other compensating provisions. The case is typically illustrative of the two conditions to which I have referred as common to these anomalous changes—destructive and reparative ; the first of these in this case is obscured by the excess of the latter. I venture to submit that the lesser in appearance was the real diseased state, set up by artificial measures badly applied, and that the additions represent Nature's pro-

visions of palliation, following as the necessary sequels.

Figure 33 represents the last six bones of a

Fig. 33.

near fore-foot, and is another typical illustration of the waste and increase of substance, mostly of

bone. These phenomena, so marvellous in their character, are more common to horses under adverse influences than to any other race of animals. But this figure, and the succeeding one, show still further Nature's provision ; the elongations of bone, transformation of cartilages and ligaments into bone, and the substance of one uniting with that of the other, to give strength, are brought about by the dragging of the periosteum. That which modern surgery has accomplished by transposing the membrane of bone from one position over another, is done in the case of the horse by the dragging leverage of shaft bones upon pliable intermediate structures, having their fixed points upon the surface of bones below, which constitutes their base of action, and that failing, a new order of reparative construction ensues.

Atrophy in most instances escapes notice, or from lack of knowledge is alluded to under the vague phrase of "Contraction of the foot." Then occur swellings, which are tortured with assumed remedies ; that is beginning at the wrong end, and

in the wrong manner to effect a cure or afford relief. No other animal is subject to the natural compensating order of effects referred to, because no other race of animals is equally exposed to the causes to which these effects are due. The horse never refuses to serve ; so that, while his limbs are placed mechanically under painful disadvantages, his powers are taxed beyond estimate or consideration. The Figure 33 was taken from one of the two fore-feet, both of which were affected with *corns*. The hoofs were reduced so as to be incapable of performing their office ; and while the drawing-knife was doing its scooping work, nature's fence of bone was closing the breach. Leather soles and bar-shoes hid the bottom of the mangled feet.

Fig. 34.—The pathological conditions represented by this engraving, which includes the bones of the foot corresponding to the last referred to—excepting the navicular bone—offer much in common with the last for contemplative instruction. All that has been said about the urgent causes which induced such extensive sub-

stitutions of bone for ligaments and cartilages, the augmentations and complete ankylosis of joints,

Fig. 34.

applies to this case. The history of both subjects is alike unknown ; the specimens were obtained at the place of slaughter to which the lame horses were taken at Edinburgh, and the dissections and observations were carefully carried on by me, and

much time was devoted to the work. The cause and origin of the disease in this instance differed from those of the former, and so, in the sequence and termination, obvious differences in external appearances and conditions were observable.

The original and essential seat of disease in the case represented by Fig. 34 was caries of the pyramidal process of the coffin-bone, which the drawing admirably shows; the foot represented is the near one, and an enlargement and deep excavation of the bone is seen in the lateral aspect of that projection. The disease had been of very long standing, as all the changes the foot had undergone testify. The front of the lower surface of the coffin-bone, upon which alone the limb rested, had become absorbed, the object being to constitute a straight column, since the parts were incapable of performing any of the motive functions of the healthy foot, for leverage effect. The hoof necessarily took the vertical line of form with the whole region—the heels were deep. All bearing was conveyed to the point, at which part the shoe was worn, proving that

the animal had been worked to the last in the state in which the foot was found after death, there being no signs of recent change in the case, nor any means of relief having been resorted to.

Fig. 35 represents the four last bones of the off hind-foot, and the mutilated fragment of hoof that remained when the animal died. I obtained the limb at the tan-yard for the purpose of dissecting it.

The engraving, or even the inspection of the dried specimen from which the drawing was taken, can only convey a faint notion of what the deplorable case was, as seen in the dying stage of the victim. The inner quarter of the hoof, wall, sole, and frog, were cut away by the drawing-knife, and the cartilages, ligaments, and all the contiguous soft structures, were in a state of partial mortification and extensive ulceration, which state had penetrated to the three lower bones, as may be seen by the rough line on the coffin-bone, the inner transverse extremity of the navicular bone, and thirdly, above that, on the surface of the short pastern bone. Instruments and corro-

sive applications were the destructive agents which had produced all the effects observed. The history of the case was made out, in so far as the

Fig. 35.

last twenty days of the horse's agonised existence were known, but nothing as to the first stage of it; most probably it was a wound, by a nail in

shoeing, or otherwise inflicted—a simple matter in itself, and curable in a painless and ready manner; but, under the circumstances, death became inevitable, and was merciful.

Fig. 36.

This representation, in some of its phases, is a repetition of the last—for the deplorable barbarity practised, of which it affords the most conclusive evidence.

The specimens from which the drawing was

taken, the hoof and navicular bone, are those of the fore-foot of a fine mare—apparently thoroughbred, which I was in the habit of seeing with mingled feelings of pity and admiration of her form, as she worked a cab in Edinburgh seven years ago. The navicular bone, as is plainly shown, was extensively wasted and ulcerated. The mare, long before her death, which, like that of the previous case, was caused by the torture she endured, had been the victim of inveterate chronic lameness, which could have been readily relieved, but progressively advanced from bad to worse. Reduction of the hoof by cutting induced absorption of the lower surface of the coffin-bone and also that of the navicular bone—until, as in the previous case, the knife repeatedly employed destroyed the hoof first, then the cartilage, and, lastly, reached to the navicular bone and the joint—the latter injury proving fatal to life.

The following case of compound fractures of the coronary and navicular bones of both the fore-feet of a mare, which occurred at Edinburgh eight

years ago, and which came under my observation, is of so extraordinary a character that some assurance seems necessary to be given in order that readers may peruse this narrative as strictly within the boundary of facts, and not one enlarged upon for sensational objects.

Fig. 37.

Fig. 37 represents the dissected parts of one of the feet, drawn from the dried preparation. The subject was an aged—probably ten years old—mare, the property, at the time of the occurrence of the casualty, of a cab proprietor, who had owned her for nearly a year. The prior history of the animal is unknown, beyond that she was sold to the last

owner by a dealer for a small sum, had the appearance of a worn-out huntress, and was believed to have been brought from Ireland.

On a winter evening the owner sent a cab with a message requesting my attendance on the mare, and on being driven to the north end of Frederick Street, into Queen Street, I found the mare, standing by a lamp-post, released from a cab she had been drawing, and which stood close by. I had been prepared to find some unusual occurrence by the messenger, who stated that a mare had "cast her hoof." But I discovered that the mare was standing not upon her foot, but the lower end of the pastern bone—the coronary and navicular bones being crushed to innumerable fragments; the soft structures were lacerated, and the skin was worn away, so that the end of the bone was exposed to contact with the rough road. One of the feet only, the near, presented the above appearance; with the other a fair standing was maintained. This part of my investigation over, the animal was put out of her painful state, and the carcass carried to a yard to be further inves-

tigated next morning. Meanwhile inquiry was made into the whole matter and occurrence, and, strange to say, scarcely anything could be learned of a positive kind from the man who had driven the mare all day until the casualty was noticed, when he was hailed and stopped where I found him. It was from the bystanders that I obtained most information. The spot was at the cab-stand, West Queen Street, where many cabmen were waiting ; and their attention was drawn to the incident by the noise made by the mare's foot, with the shoe attached, dangling on the pavement as she was trotted along Queen Street, in the direction from west to east. On being hailed, the driver pulled up, and on descending saw the state of the animal he had driven from Randolph Place, distant half-a-mile, and I believe that the whole of that distance had been traversed with the mare's foot in the condition in which it was seen when her course was stopped. All the further information that the driver could give was, that he "found the mare move queerly off the stand when the last *fare* engaged him, and that she

had stumbled once or twice in the course of that afternoon, while on service."

On removal of both fore-limbs, and proceeding to examine the feet, it was found that the corresponding bones of both were fractured, identically, and similarly in extent, the only difference being the displacement, which had only occurred in one ; the surrounding soft parts had not so far given way in the off-foot as to lead to the displacement of the fragments.

The engraving at page 222 shows the position of the foot as the mare was standing ; the hoof, with its contents, and shoe attached, was turned up before the limb-stump, and the pastern bone, in an oblique position from above downwards, was bearing with its front part on the ground ; it is much worn, like the end of a walking-stick, by the distance traversed. I believe that extirpation of the nerves had been practised in that mare's feet, but was unable positively to declare it, owing to the mutilated state of the structures before death.

The two following figures are engravings of one preparation, taken in different aspects ; it

represents one of the fore-feet of a strong but under-sized cart mare. The condition of the feet showed that she had been long lame, and it was stated that the animal had passed the latter months of her existence in a straw-yard, being quite unfit for rendering any service. She was taken to an Edinburgh tan-yard to be destroyed, and I availed myself of the opportunity, and removed both the fore-limbs for dissection. Both feet were in precisely the same state of disease and form.

Fig. 38.

Figure 38 shows the state of the lower surface

of the coffin-bone ; the convex form of the plantar surface of that bone had, as is always the case, its counterpart in the form of the hoof, the sole of which was paumace—after a French expression—literally apple-shaped, or round instead of concave and arched. But the typical character of those coffin-bones, as represented by the single specimen, is that of both being fractured in a transverse direction across the bottom of the bone, at an inch from the point.

Fig. 38 *b*.

Figure 38 *b* shows the foot, drawn as it was placed upon a table, and will help in this description the comprehension of the state of the case. The point of the bone is turned up. The bone,

which had become shallow and weak, at length, under the weight and exertion of the animal, gave way at the part indicated, *i.e.* it fractured, but was held together by the network of fibrous texture which laces and invests the bone. The lesion may be regarded as a partial fracture, associated with a bending upwards of the loosened end of the bone, held in proximity chiefly by the fibrous tissues, but supported also by the hoof, which, though thinned and weak, took the form of the broken bone, and was bent upwards in front. The other foot I prepared, differently from that used for these engravings, by sawing longitudinally through the hoof and the included parts while fresh ; these together are remarkable specimens.

Figure 39 represents another form of fracture of a coffin-bone, but though differing in its appearance, and place of the occurrence of fracture, from the case previously described, the two help to elucidate each other as to the cause and mode of occurrence. As shown by the engraving, this bone was flattened down by absorption until it became so attenuated as to be unequal in sub-

stance and strength to bear the burden imposed, and it therefore gave way under it. It will be observed that the bone broke where, from greatest

Fig. 39.

pressure and absorption, it had become weakest, and, as in the former case, it broke where the greatest strain of lever action was brought to bear upon it. To explain, I must state that the coffin-bone is one of the most energetic levers in the whole system of animal-construction, in the line of its long axis

from heel to point. The fracture of the bone, represented by Figure 38, happened near to the point of the lever, while being raised, under weight from behind, upon the point. In the case under consideration the bone had become weakest on its inner half, precisely at the centre line of the foot, so depressed by its thinness that the foot tilted inwardly, and gave way immediately beneath the pivot, the mid-line of the coronary bone ; this was also the fulcrum of the lever, the front of the bone being its point of resistance. As in the former case, the raising of the foot from a plane towards a vertical line fractured the corresponding bone in the two cases in different positions, but through the same causes—weakened hoof, and the other adverse conditions which led to atrophy of the bones.

Figure 40 is a representation of a fractured navicular bone, a casualty of more frequent occurrence to horses in this country than is commonly known, but which has scarcely been noticed. Fractures of this kind are entirely effects due to long-protracted adverse conditions of the feet, such

as have been already dwelt upon. I have never met with a case of fracture of either coffin or navi-

Fig. 40.

cular bone where previous long-prevailing diseased action of the foot was not manifest.

In the instance represented above, the reader may see that the bone was extensively ulcerated and excavated like a decayed tooth, and at last the fracture occurred in two lines diverging from the excavated centre to the anterior margin of the bone, where it is connected to the coffin-bone. But I must request the learner to go back with

me to see the order and sequence of occurrence : the excavation of the navicular bone is a secondary occurrence, an effect due to preceding and continuous deviations from health.

The coffin-bone in Fig. 40 is wasted down to about two-thirds of its natural depth and substance. Its semi-lunar crest is gone ; there is no sufficient concavity behind the plantar surface of the coffin-bones ; tendons and other strong bands, requiring strong bony points for attachment, lack such hold, and the space between the navicular bone and the tendon upon which it glides is diminished ; the joint-capsule lacks space, all the functions are deranged, and the navicular bone, if in normal condition, would be too big for the lessened space ; it becomes flattened, its substance is diminished, and is so much weakened, that at length it breaks down under less than ordinary exertion.

Fig. 41 represents another case of fractured navicular bone, in which all the complications are still more manifestly extensive than in the last. The foot that supplied this specimen was obtained

after the horse was slaughtered, and nothing was learned of the history of the case.

The fractures in both cases had occurred long before the horses were destroyed, and there was

Fig. 41.

ample evidence to my mind that the horses had been made to work almost as long as they lived, judging, as I did, by the appearance of the feet and shoes, and by the pathological conditions revealed by dissection. It may seem to some that there is

not much to be learned from seeing these dried bones ! still less from engravings from them ! All depends upon what kind and extent of research may follow from the promptings of such incidents : and I cannot refrain from stating, that all that is presented to the view, though it be as much as could be saved, is insignificant, compared to what the explorer sees in the researches and dissection. Much more is removed than can be left, and each layer of structures unfolds its own tale.

All the subjects which supplied the specimens illustrated were selected on account of indications which led me to investigate them.

When I first saw this animal after death my whole mind was absorbed in the case, and it would have been of no use if I had only detached the foot, strictly so called, for examination. When trying to make out anything natural or unnatural about the foot, I always take a great part of the limb, so as to include the whole carpal region ; and if a hind limb, then of the tarsal region. In this instance I divided the radius a little above

the knee. I had perceived, in the condition of the leg, a rigidity induced by thickness and hardness of all the flexing apparatus of the foot, especially from the fetlock-joint to the knee ; the *back-sinews* were as thick as the fore-arm of a man, and to the touch felt hard like a cable. I shall refrain from entering into a detailed description of the condition of these parts, my object being now plainly to show how one may be drawn off the scent, and led to mistake an after-effect for the original state of the case—an effect for a cause. I knew that the massive hard bands were but symptoms of serious conditions below ; that it was a coiling of these bands, with the design of shortening their track, by which the range of bones could be held firm, and in a vertical line. With such notions I proceeded to dissect the limb, firstly by disarticulation at the pastern joint, and placing the foot in the maceration-tub for six weeks ; meanwhile I dissected the parts above, confirming my views of the conditions, and greatly extending my knowledge. In due time the hoof becoming detached, I dissected the foot, with the re-

sult shown in Figure 41. All practitioners, and horsemen of much experience, will have noticed that when horses begin to get uneasy on their fore-limbs and unsafe in action—in other words, when permanent lameness is threatening—a commonly prevalent characteristic anomaly is a tightness of the sinews just behind and below the knee. Attention is usually fixed on that part, and all the rest overlooked. Very early in my career I noticed these conditions, and doubted in my own mind the conclusion that a sprain had happened locally, to account for what was observed.

It was long, however, before I arrived at any exact knowledge on the matter, or succeeded in doing anything beyond following the ordinary injurious and useless practice. But it was a good beginning to get rid of all mischievous interference. I next made out that the state of the limb was in some way caused by that of the feet—by the shoeing ; for it never appeared in unshod horses if ever so severely exerted. Having determined that I had a foot-derangement to deal with, I then succeeded in curing cases ; my remedy con-

sisting in taking off the shoes, and taking measures for strengthening the hoofs. Nor did I find it necessary to keep the horses at rest, though it is not often practicable to find work that horses can do, and a ground surface congenial to their going barefooted. But when the mind is awakened, and intent on the furtherance of an object, opportunities are made; and so it happened with me. I was in practice at Florence in those years, in a climate favourable for making some such trials as I aimed at prosecuting; I had the advantage of observing customs in other localities. I saw horses trained without shoes able to hold their own with those more systematically brought out on our plan, and perceived that their legs stood sound. So far I had achieved little more than negative results for all practical purposes, because a plan that prescribes that horses must go barefooted does not accomplish any of the requirements of the art of farriery. The next stage in the inquiry was, to determine the relative effects between good and bad shoeing, and in what these respectively consisted.

That I was able to do, though it was a work of much cost, labour, and years of time.

Figure 42 is a representation of the coffin and navicular bones of one of the fore-feet of a horse similarly affected in both ; with the difference

Fig. 42.

in the one represented that a compound fracture of the navicular bone had occurred, as is plainly exhibited. Firm reunion of the fragments was completed before the horse was destroyed.

The subject was an aged grey, latterly white,

gelding, in his time well known to horsemen of Edinburgh as an exceptionally good horse—fast-goer in the field and on the road.

In 1861 the pupils of the New Veterinary College bought the poor horse, in a miserable state of lameness, as a subject to dissect. One of the complications, which was a source of inconceivable agony, was a quittor. As it appeared that relief might soon be afforded, and the case made very instructive, the subject was taken up for treatment, with the most satisfactory result. Relief from pain was soon attained; and restoration ensued, and progressed as rapidly as such complication admits of. It was subsequently ascertained that the horse had been unnerved two or three years previously, had been for years lame, and for some time had worked in a cab. The recovery of the horse having been advanced, so that he was capable, under special care, of rendering some service, the question arose what should be done with him. We had no requirement for such services as might have been rendered on a farm, and it was resolved not to part with him; the only alternative was

taken of putting an end to his life, and finally of making the best possible use of the case for future instruction.

Dissection of the feet revealed more than we had made out during the life of the animal; the fractured bone was not predicted, nor was it possible, beyond guessing, that it could have been, amidst the mass of change and destruction of parts; but in the sequel it has been of inestimable value as a pathological specimen, unique—as far as I have seen—in character. I have seen no other instance, nor do collections contain one, of a navicular bone, as the sequel to inveterate degeneracy, being broken into so many fragments, and then uniting so completely, the foot rendered painless, and the horse becoming, to a possible degree, useful.

Fig. 43 represents another complicated case in which extensive disease and wasting of the coffin-bone was followed by fracture of the navicular bone. The subject, a grey cart-horse, was taken to the New Veterinary College in 1864, when excessively lame, and left there for treatment. At

the time no opinion was pronounced on the case, —the horse had been under treatment.

The foot was mangled, and shod with a bar-shoe and intervening leather sole, all combining

Fig. 43.

to augment and perpetuate the painful condition of the animal. The limb of the afflicted foot was kept as much as possible flexed, obviously so at the knee, and the foot reposed upon the front of the hoof—not the natural bearing-surface, but the anterior surface of the wall—tilted

over. The knee was swollen to twice its natural size.

After the lapse of a few days, with persistence of pain and all the urgent symptoms unabated, the parties who left the horse were advised that an unfavourable issue of the case was prognosticated. I had formed the opinion that either the coffin or navicular bone was fractured, while nothing could be made out to enable one to determine the fact positively. Difficulty was encountered in discovering the real owner of the horse, and it was not until twenty-nine days had elapsed that consent was obtained to have it destroyed. Time and care being taken for the maceration of the parts, so that dissection could be proceeded with, the ultimate revelations were the state of the two bones represented. The case is remarkable, for the presence of at least one phenomenon I have in no other instance met with, that is, fracture of the navicular bone without the appearance of any antecedent excavation of its substance by ulceration. There were other more remarkable appearances, but which could

not be kept for exhibition, and could only be observed by the eye and touch of the dissector; the fractured bone was held together by its investing ligamentous textures, and I could feel the bone yield at the broken part, under pressure of the thumb, while the line of fracture was scarcely to be seen. Neither was there any blush of marginal redness to indicate the commencement of reparatory vascular action. But, although that navicular bone is exceptional among my morbid specimens of the kind, in regard to the absence of obvious excavation, I am not prepared to testify to its being in a normal state; on the contrary, I suspect—for no analysis of the bone, still in my possession, has been performed—that its constitution was defective, and that the bone was destitute of natural strength. The wasted, deformed, and weakened state of the coffin-bone is extraordinary, and quite accords with all my experience, gained by these investigations, that such casualties of the navicular bone are secondary, and due to the partial destruction of both substance and functions of the coffin-bone.

Figure 44 illustrates a typical case of advanced navicular disease, apart from the com-

Fig. 44.

plications which commonly ensue as additional consequences.

The never absent accompanying phenomenon, atrophy of the coffin-bone, is, however, well marked in this case. In the navicular bone itself, two openings into chambered cavities of the bone are seen about the middle of the hindmost and

lower surface, and an oblong excavation is observable on the lower inner margin of the bone.

Fig. 45.

The above figure represents a case of navicular disease, not essentially different in character from that last described; only that this was a worse case, with more complications and extensive ulceration. I adduce it, not to show the little difference, or to produce a duplicate, but because the case has a history worth relating.

The subject was a grey mare of high courage and breeding, belonging to Mr. James Stewart, cab-proprietor at Edinburgh. The mare had been, for an unascertained length of time, lame of both fore-feet, when she was bought for a trifle by Mr. Stewart, who thereupon took her to the New Veterinary College shoeing-forge, to get her shod. This happened in the autumn 1858. I had charge of the shoeing; that is, did the chief part of the work in this as in similar cases—prepared the feet and fitted the shoes. Mr. Stewart, being then a beginner in business, and driving the mare himself, procured abundance of work, so that in the space of seventeen days she wore out a strong set of shoes, and was brought back to the forge to be re-shod, which was done as before. At the expiration of about the same number of days as before, the mare was brought to be shod again for the third time; and this time the intelligent owner was elated at the way his mare was going, and at the manifest improvement that had taken place, notwithstanding the inordinate amount of work the animal was doing, in drawing

a four-wheeled carriage over the hilly streets of Edinburgh. I may state that the progressive improvement in the action of the mare went on up to recovery to the extent of complete freedom from lameness. There was no delay in the effect following the cause, or rather, inversely, of effects ceasing when the causes that produced and kept them up were removed. The result was so much the more gratifying to the owner of the mare and all concerned, from the fact that she proved to be one of the best animals of her class in Edinburgh, and continued to work uninterruptedly for three years, thereby helping in no small degree to give the worthy owner a start in business.

I shall not dwell on the termination of the mare's career, beyond stating, that during the severe frost in 1862 she encountered an accident by falling on the frozen snow which encumbered the streets of Edinburgh that winter. One of the bones of the knee, the *os magnum*, was fractured transversely through its narrow axis, and the animal was consequently destroyed.

On dissecting both the fore-feet, it was found that their condition was nearly the same; the degree of ulceration of the navicular bone, and diminution, with subsequent incrustation of the coffin-bone, was a little in excess in the specimen from which the illustration was drawn. But most remarkable and instructive of all was the obviously improved state of those ulcerated bones that had taken place. As was seen by the mare's action, her feet revolved, if not fully, at least fairly upon the ground—and that was quite manifest by the appearance of the joints. The cartilage lining the navicular bone, less the breaches on the surface, was smooth and white, and the synovial capsule healthy, and in full secreting function. In fact, the joint was amply lubricated and free.

In anticipation of reasonable inquiries as to how the good result was brought about in this case, I answer, By shoeing. What principle or mode of shoeing? Rational method, elaborated after long individual experience, founded on observation, and on the experience of able men of

all times and countries—in other words, by means which are only acquired by application of mind and hands for years to the art. I used no differently made shoe for that mare from those I use for other horses of her class doing the same work—viz. shoes with calkins adapted to the pavement and hills of Edinburgh ; nor was there anything special in the way I fitted her shoes ; they were adapted to the motion and requirement of the feet in the mare's particular case, according to the principles inculcated in this work. No other agencies were used beyond the ordinary measures I recommend for the feet of all horses, to be hereafter noticed.

The two following and the last figures of the series are representations of the different structures of the same foot ; a section of the hoof, and the coffin and navicular bones of the off fore-foot of a horse, whose case I am about to describe by the help of these illustrations.

The subject was a five-year-old Clydesdale stallion, for which a nobleman in the west of Scotland paid £300, and at whose instance, not many

months after the purchase, I was called to attend the animal, not, however, until too late for my services to be of any avail. The horse died a few hours before I reached the place where he was, in Ayr-

Fig. 46.

shire. With the splendid carcass lying extended before me, I made inquiries into the history of the

case, and after receiving the necessary replies for my purpose, and obtaining permission to bring away the feet of the animal, I removed them and returned with them to Edinburgh. The disease from which the horse had suffered was inflammation of the feet, and death ensued through long-continued irritant fever, ending in a blood-contaminated system.

Figure 46 is that of the inner half of the hoof of the off fore-foot; the section, made longitudinally, passes through the middle of the frog, sole, and wall. The bulging down of the sole and its thin state are apparent; the white spot represents an opening through which an excrescence of the inflamed texture protruded.

Figure 46 *b* represents the coffin and navicular bones, upon the latter of which no further remarks are necessary than to state that that bone was found in perfect health. But to the coffin-bone and hoof together I must devote myself, with the view to make intelligible what I have to state.

I must premise my description of the case by stating that all four of this horse's feet were alike

affected, and almost in the same degree — the ravages sustained by the two fore-feet somewhat preponderating. My information obtained on the

Fig. 46 *b*.

origin of the disease recompensed the journey to Ayrshire ; I learned that one hind-foot was first affected ; a fissure appeared in the front of the hoof, always a painful affection until the cause is removed, and a cure effected. Lamé of one hind-foot, and all the hoofs in a weak state, inflammation set up in the other hind and over-burdened one ; then reaction, with inflammation of the other hind-foot, and first one fore-foot and then the other became affected : the result was that the ani-

mal was doomed to lie suffering, because he had not a foot that he could stand upon. All this was endured for several weeks before the horse succumbed.

Reference again to Figure 46 *b* shows the flattened lower portion of the coffin-bone, and in some measure the extent to which it became reduced ; not, as in chronic cases, slowly, but rapidly—all in the space of a few weeks ; the drawing taken of the one must be regarded as representing the state of the coffin-bones and the hoofs of all four feet.

I devoted several months, at intervals, to the dissection and study of three out of the four feet, the two fore and the hind one first affected ; and I never investigated such a case before. The ravages that disease had made were entirely confined to the lower surface of the coffin-bone. I wish particularly to place this fact on record, for reasons that will hereafter appear. Beneath the bottom of the coffin-bones and the thin mutilated soles of the hoofs was deposited a dense layer of lymph, about one-eighth of an inch thick, and in which were innumerable particles of bony deposit, im-

parting a feeling as if sand had been sprinkled over the inner surface of the hoof. Such had been the rapid destruction, partly by absorption and partly by casting off of useless matter.

As to the treatment to which the horse had been subjected I have little to say. I saw that the current orthodox teaching had been complied with, in the form of cutting away of hoof, and soaking the feet with moisture; every one in attendance had doubtless done his best according to his intelligence, and was to be pitied rather than blamed for want of the right kind of knowledge of the pathological conditions.

The specimens of disease, illustrated and briefly described in this section, offer material for much more lengthy comment. My purpose in publishing these is to prove the fundamental fact that lameness is a consequence of destructive causes, is associated with changes of structure in the foot, and that it is only by a patient and thorough inquiry into these anatomical changes, that what I may be allowed to call the natural history of lameness can be understood, its causes prevented,

and the proper remedial measures based on well-defined knowledge applied. This is a line of inquiry which I particularly commend to members of the veterinary profession, many, if not the majority, of whom, have grown up in the habit of looking upon the hoof merely as the investing termination of the limb, and not taking cognisance of the whole digit as a complex organic structure, to understand which, in health and disease, dissection of a large number of specimens is indispensable.

IV.

SPECIAL CAUSES OF LAMENESS.

THE matters referred to in this section, while related to each other as injuries or diseases of the horse's foot, and as special causes of lameness, are otherwise dissimilar, and are only grouped together for practical convenience, without attempt at scientific arrangement. The prick of a nail, a sand-crack, a quittor, and a so-called thrush, are different conditions, of very variable degrees of importance, but equally deserving careful attention. I do not pretend that this section embraces all the special causes of lameness, but those which are of most frequent occurrence; neither do I aim at discussing the merits of the many plans of treatment advocated by contradictory authorities; the remedial measures advised are such only as I have found beneficial after long experience.

[*Wounds of the Feet by Nails and other
Penetrating Bodies.*

Occasional casualties of the above description happen in the act of nailing on shoes. These accidents are of three kinds—*firstly*, pricking, with knowledge on the part of the driver of what has happened; *secondly*, rucking of the nail—*i.e.* when the point has reached the outer hard layer of horn, the shank of the nail bends under the next stroke of the hammer, and presses, in its doubled form, inward; the *third* mode of occurrence is by binding—*i.e.* when the nail is driven so close to the quick as to do injury, more or less immediately, though the quick be not actually wounded by the passage of the nail; and therefore the risk is run of a horse leaving the forge without any one being conscious of the state. The liability to occurrence of the last of these casualties is almost entirely excluded by a proper system of shoeing—strong hoofs well done by, and shoes rightly fitted. The first two belong to the class of accidents that cannot be altogether provided against.

The first rarely leads to any bad result, and calls for no notice. The nail is drawn back instantly, and no other nail put in the same hole of the shoe. The second—rucking—sometimes causes trouble to the shoer, by the shank of the nail breaking while the attempt is made to draw it back, in which case the shoe must be taken off, and a little hoof must be cut away, by the hook point of the drawing-knife held obliquely or vertically, sufficient to expose the fragment of nail so as to be able to get hold of it with a pair of pliers and to extract it, when nothing more follows. Nothing happens from a nail being driven too near the quick, provided it be noticed as an accident, and not be a part of a series of faults in the shoeing, when it often happens that not one only, but several of the nails do injury; the accidental one is detected, and withdrawn by pincers in good time. I cannot too strongly caution all to whom working farriers are made subordinate, against using strong words of censure to men in whose hands any of these accidents happen; the intolerant manner in which the accidents are

regarded, as faults almost equal to crimes, tends to produce secrecy and neglect, instead of open acknowledgment and timely adoption of means of precaution. No men know so well as farriers whether a nail has taken its right course, or if not, the extent of deviation from it; and no one can know so well as the particular farrier who is engaged in driving the nails. Little or nothing is to be done in those cases, when no complication calls for special measures. A common practice among farriers of cutting the hoof down along the line of the nail or nails, should be peremptorily prohibited. The cutting does incalculable harm, though the nails may not have done much. The custom is old, supported partly by ignorance, partly through the eagerness of the shoer to show that his nails have not passed into the quick; and lastly, encouraged through a spirit of rivalry, when the horse has been shod at another place, to prove that the foot had been damaged. When the foreign body — the affecting nail — has been withdrawn, the less the place is disturbed the better. Exclusion of moisture and air are the

requisites, and these are best fulfilled by using a piece of the hoof-ointment described in a subsequent section of this work. The ointment is to be laid upon the nail-holes at the bottom of the hoof, while the foot is held up, and warmed by means of an iron ; after which apply the shoe with care.

*Overreaches, Treads, and Wounds of the Coronet,
otherwise occurring.*

An overreach is an injury to the bulbs of the heel of one of the fore-feet, through being violently struck by the toe of one of the hind-feet in action. This happens to hunters galloping in the field, almost exclusively. In other words, the accident can only happen to horses in general when they are doing what hunters do—galloping and leaping, especially when the feet sink deep into the ground, and the horses are unaccustomed to the work, and weak ; or, in the opposite state, when young or fractious, by placing their feet in false positions. These injuries are never serious, though with a large piece of the cuticle peeled off from above downwards, the injury appears great.

Treads on the coronet happen mostly to draught horses in towns, owing to the hind-feet slipping while being backed ; difficulties of weight, etc., give rise to false positions of the feet, and attempts at recovery lead to the infliction of wounds more disastrous than the former, because they occur upon the solid parts of the foot, where, from the resistance, the wounds are deeper and the structures implicated not so susceptible of prompt reparation.

In all these cases the proper treatment to pursue is the same ; firstly, not to do too much—that is, not to cut the torn parts away. First bathe the foot in a pail of warm water for a sufficient length of time, to remove all dirt and foreign matter, so as to be able to see exactly the extent of injury. And then, as I have directed for another case, bandage the coronet by using two flannel bandages, first laying a pledget of tow, soft lint, or chloralum wool over the part wounded. Change the application every twelve hours for two days, when the skin and horn detaches, and dead will be distinguishable. A good disinfectant

lotion may be used, and as the dead detachments shrivel up, they may be clipped off. The hoof-ointment becomes the best restorative in the sequence. In cases of deep injuries by treads, sloughing may take place, when the issue must be waited for patiently. In such cases from fifteen to twenty days may be requisite to restore horses to a fit state for work.

Sand-crack and Fissure in the Front of the Hoof.

These conditions are both characterised by the appearance of a fissure in the wall of the hoof, running in the direction of its fibres ; yet they are altogether different in their character ; causes, position, and amenability to treatment constitute the essential differences. Sand-cracks occur in the fore-feet only, at the quarter, most commonly the inner ; but a sand-crack may happen in either quarter, and appear in both at the same time. Their situation is at an oblique line behind the connection of the lateral cartilages with the coffin-bone ; and it occasionally happens that two fissures appear in the same quarter and heel of the

same foot. Many attempts have been made to explain the cause of these affections; the name implies connection with the presence of sand, either as the cause, with dryness; or because sand, dirt, or gravel, is apt to get into old standing cracks of the hoof. But there are two facts that may be relied on, that will serve for starting-points in the inquiry—viz., unshod horses never have sand-crack; nor do they happen to well-formed strong feet—at least I have never seen such occurrences; and what is still more remarkable, though feet, which are naturally perfect, may attain to extreme deformity and complications of disease, sand-cracks are among the most rare of the successive anomalies that happen to such feet. The fact is, it is the horses bred on low flat ground, characterised by want of depth in their feet and flatness of their bottoms—the soles—which are liable to sand-crack. Horses bred on marshy ground, or reared chiefly in stables, pounded in small spaces, or staked by tents as some of those we see come from the northern part of Africa are, having thin hoofs and shallow coffin-

bones, defects always found together, and which, besides lacking substance, want the arch form, with the capacity and adaptation for the circulation of the blood,—a most important functional requirement for which nature has been bountiful in her provisions. But natural provisions did not contemplate all the artificial restraints to which horses are subjected. The blood-pressure within, when the horses are exerted, with the defective feet just described, further deteriorated and held under constraint by shoes, causes the wall to split. Sand-cracks always occur at the uppermost thin margin of the wall; at first the fissure appears from one-half to an inch in length; it never closes, but always descends; though under favourable conditions and care it may be stopped from extending at any time. Much difference is found, of course, in the degree of imperfection of feet thus affected, but it will be found in degree only.

Proper shoeing is everything, both for prevention and cure of sand-crack; but however masterly the shoeing be done, the first step to be taken for the cure should be to take the horse's

shoes off, and put him into a loose space, with a dry clean hard bottom, if paved the better; and let the feet be rubbed with the hoof-ointment twice a week; at the expiration of six weeks the crack will be of its former length, more conspicuously gaping open, but descended with a firm growth of continuous wall above it, and the feet will have become greatly strengthened. No transverse firing should be practised; if it were, the fired line would descend with the hoof by growth, and people deceive themselves by seeing the livid line at the bottom of the sound horn and at the top of the crack, and the hot iron is credited with cementing the breach.

Fissures in front of the hoof happen mostly to draught horses and to hind-feet, but are occasionally met with in fore-feet, and no class of horse is exempt from the occurrence. The origin, cause, and really bad features of these cases is disease of the coffin-bone. Often, most commonly I believe, it is the upper anterior part of that bone that is first affected. It was only by numerous dissections of feet thus affected that any right con-

clusion could have been arrived at, on these very troublesome and partially incurable forms of foot-disease. During thirty years of practice I attained no knowledge worth consideration about these feet with fissures in front; all that was evident was, that horses so affected were worked on in miserable plight, with a foot bound up, and subjected to innumerable operations, until they were at length sent to the slaughter-house. I accordingly betook myself to the tan-yards, and bespoke all the horses' feet with fissures in front that arrived there; the result was complete solution of the matter—condition and character. During eight years, from 1857, I dissected all the feet so affected that came to hand. The front of the coffin-bone was uniformly the seat of mischief; caries of the pyramidal process was a common phenomenon; deep depression down the front was also frequent.

What have I gained by the time and labour devoted to that investigation? In the first place, the material for this chapter; I determined that some of these cases are from the first appearance

of a kind to admit of hardly any relief, and that it would be humane and consistent with economy to destroy the subjects. Then I made out that the majority of such cases do admit of palliation, and of being restored, so as to render service at slow work, without suffering. Lastly, that all experimental operations are contra-indicated, and that a conservative and restorative line of practice should be pursued.

Shoeing, firstly.—As the fronts of these feet are weak and deficient both in hoof and bone, care must be taken of the former; the bottom of the foot must have nothing removed beyond loose fragments of the frog. The hind part of the foot must almost alone bear the weight; therefore the posterior columns of the wall may be rasped to a given line, and the front of the hoof should be left rather long and deep; the shoe to have each parallel half of uniform power and substance, and the heels turned down. Clips to be taken up, one at each side of the toe; but when the shoe is applied, the clips are neither to be let into the wall nor rudely hammered up to

it; the toe of the shoe affording sufficient rest, the clips may be close, without giving constraint.

For the treatment of the fissure, take tar and resin one ounce, and tallow a quarter of an ounce, and melt together; apply this while warm to the fissure of the hoof and coronet, then place a layer of tow over this dressing, and bind the wall of the foot with a broad coarse tape, not too tightly, but so as to support its position, and keep the parts firm. Usefulness and ease of the horse is all that can be looked for under the best management; perfect cure should not be expected, as it can but rarely be accomplished.

Thrushes and Corns.

By *thrush* is understood a special morbid condition of the frog; in the incipient stages the cleft is affected only, and moisture issues from a breach in the soft horn covering. The moisture secreted has a peculiar pungent odour. In more advanced stages the frog appears diseased over most of its surface, is diminished in bulk, and is incapable of forming sound horn;

the fragments of detaching horn being in such a state as to be pronounced rotten.

Treatment.—This must be regulated by considerations of causes and their removal; the common causes are long exposure to wet, decomposing dung, and defective shoeing. As cases occur, these causes and conditions should be taken note of, and after ascertaining which of them predominates, attention must be given to their removal. After attending to the shoeing, and removal of detaching parts of horn, wash the feet with an astringent disinfectant, of which I find the best now to be chloralum,* in the proportion of about eight ounces to a gallon and a half of warm water in a stable pail; let the feet be thoroughly washed with a sponge, and, if necessary, a water-brush used to cleanse them. After

* Chloralum, in the various forms and preparations in which it is sold, may be obtained directly, or through any chemist or druggist, from the Chloralum Company, 1 Great Winchester Street, Buildings, City, London. Chloralum, which is a perfect antiseptic, and healthy astringent, is odourless and non-poisonous, the latter a very great recommendation in houses and stables.

the feet and legs are made dry, rub the frogs and the feet thoroughly with the hoof-ointment; the offensive smell will disappear at once, and by repeating the dressing in the space of four to six days, the improvement will be established. Horses bred on wet soil, or kept in confinement, are liable to thrushes, and are sometimes not easily kept quite free from them.

Corns in horses are bruises, chafings, or injuries caused by shoes, and never happen to horses that are not shod, however hard they may be worked; and instances could be cited of horses working hard unshod.

Being injuries, the corns disappear like other bruises when the cause that produces and keeps them up is removed, less the consequences of protracted injury that may remain. (See illustrations referred to in index.) The name has clearly been adopted through mistaken analogy, after that in use to designate an affection of the human foot, where a hard portion of dense cuticle assumes the form of a grain of corn; but nothing like that occurs in horses. On the contrary, the effect

of a bruise in the hoof is the formation of a soft horn, blood-stained in colour; and the cutting out of this is what, in conventional phraseology, is called "cutting out the corn," or when the cutting is done and there is no corn, "paring out the seat of the corn." As I have stated in another part, I never pare these seats; and when the injury has been done, and more or less extensive blood-stained marks appear, I no more think of cutting and exploring than a surgeon would cut into a black bruise seen upon the skin of his patient. Just as the educated eye and touch suffice for the diagnosis in the one case, so they suffice in the other.

I simply shoe feet with corns just as I have directed shoeing to be done, and relieve the horse at once. Of course I have to encounter the inconvenience of diversities of opinion, and it was only in my advanced years, after I had mastered the subject with attendant success, that I could pursue my course without being questioned. Cutting out the blood marks is as irrational as the procedure is unsurgical. The case may be

illustrated in the words of the *Child's Riddle* :—
“What's that that's as round as a hoop and deep as a cup, and all the king's horses can't draw it up?” “A well.” Well, and that represents the corn: the one well gives water and the other blood; the one can no more be drawn up than the other, but the deeper we dig the more abundant the flow.

In inveterate cases we find horn depressions internally, as I discovered and formerly exhibited; but these, as further investigations have proved, are due to the external injury and cutting combined. As the cutting is carried on, Nature fences up the wound, and horn is formed, which in turn intrudes into the living soft tissues, cartilage, and bone, as is shown in specimens in this work.

I shall not pursue all the terminations of inveterate corns, but I must make reference to one, of not uncommon occurrence, *i.e.* suppuration. No one can be long engaged in farriery in any of the large towns of this country without encountering many cases of suppurating corns, and in dealing with these nothing will be found so embarrassing

as the treatment previously pursued in these cases. Here, indeed, where suppuration is supposed to have ensued or become imminent, my plan of non-exploring from beneath would be thought preposterous, only that I have, in the course of the last ten years, shown the rationale of my practice by results attained, and made it known both by my practice and oral teaching.

Such cases come to us, whether from without or accidentally from among the horses within our own practice, with evidence of pain more or less acute in one of the fore-feet. Heat, and sensitiveness to pressure of the hand, are the ordinary accompanying signs ; there is, in fact, a swelling and tension of the parts within the hoof. At once such patient should be assigned several days' rest, and the treatment proceeded with by taking off the shoe—better all the shoes. See to giving the hoof its proper and ample bearing surface ; then place the foot in a pail, with ample quantity of warm water, and foment the limb from above the knee for an hour ; after which, and as a continuation of the warm emollient

course, I apply a flannel bandage, wrung out of the warm water, round the coronet; this is best done by taking two bandages, about five or six inches wide by two yards in length, and applying one first round the pastern to fill up the hollow between the joint above and foot; then lightly, and without constraint, pass the second bandage, likewise wetted, over the lower part of the first, so as to fall on just below the upper circumference of the hoof; after this put the horse into the stable (a loose place if attainable) with clean and dry floor, and clean straw to lie down upon. No change in the bandages will be required for twelve or fifteen hours, and I seldom keep them on longer than twenty-four, thirty-six, or at most forty-eight hours, when I discontinue the water and have recourse to the antiseptic chloralum wash, followed by assiduous application of the hoof-ointment.

In the majority of cases the suppuration prognosticated never occurs; and if it does, it happens about the second or third day from the beginning of the treatment, in an insignificantly small

quantity, often passing unperceived by a raising of the cuticle under the coronary hair, when the swelling and pain subside. It is erroneously held by the orthodox teaching that pus formed within the hoof gravitates, and must be met by a hole made at the bottom for its exit. Nothing is more contrary to fact, and inconsistent with physiological and pathological teaching. Nature does not burrow channels to impassable walls, but takes the easiest and truest way for throwing off effete material.

Cases of the above kind usually take about a week to cure, and for the horse to be shod up and fit for regular work.

Quittor.

Quittor, like some of the other diseased states of horses' feet already noticed, is a condition, the nature of which is, in an intelligible manner, conveyed by the name in common use. A quittor is frequently the culminating crisis of indefinite chronic diseased states of the horse's foot.

But we may properly, and with advantage, limit the application of the word, by excluding many conditions arising from wounds, which, when they become perplexingly complicated, are called quitters. Treads upon the coronet of cart-horses, already treated on, present among the worst of them deep lacerations, destructive to thick hard skin, and to the textures blending with and underlying it. Considerable sloughing does, and naturally must, occur in such cases; and unless men know that, and instead of doing what is right and necessary to assist and soothe, on the contrary apply irritants, the healing process is interfered with; under such disadvantages the wound assumes an aspect often designated a quitter, whereas it is nothing of the kind. Again, it is alleged that every festering corn that discharges itself at the coronet—the line to which matter always rises—is a quitter, whereas the difference is as marked as that between a black eye and a broken head. That quitters follow upon corns is true, and so do an indefinite series of disastrous terminations, since corns, in the widest sense, denote crushing up of

the foot, the first stage in the process being recognised by a red mark in the hoof at a given place. A quittor I define to mean a fistula, with an open orifice in the skin above the coronet, always appearing at one quarter of the foot. Fore and hind feet are equally liable to quittors; the opening of the sinus appears at a prominent point of a hard tumour, usually of an oblong form like the section of an egg, diverse respectively in size, and convex without. The tumour is always diffused, and affects in particular one side of the foot, extending upwards and downwards, bulging out the wall of the hoof. From the mouth of the sinus or pipe issues a limpid discharge, bearing a medium appearance between water and the white of an egg, and emitting a peculiar offensive smell. These are the signs by which we understand more or less of the conditions within the foot—the seat of the whole mischief. We have always either diseased cartilage or bone to contend with; commonly disease of both, caries, and sometimes fracture of bone. We have therefore, pent up and painfully bound

within the hoof, a nucleus of effete and diseased structure which cannot be cast off; and unless such a case be radically treated, it inevitably goes on from bad to worse. Spontaneous cure never in my experience occurs. I have enumerated fracture of bone as a common complication in quittor, and the bony substance to which I here refer is ossified lateral cartilages in cart-horses, projecting high and far backward, as has been shown in a previous chapter by illustration; these compensative but spurious growths of bone are liable to fracture under exertion; and it is detached portions of such broken spurious bone that we have to contend with in the cure of particular cases; when a piece of dead bone comes through the upper aperture in the course of treatment, it is what the old farriers called the quittor bone.

Treatment. — Desperately intractable, and painful to the poor animal affected, as these cases are, they are none the less curable, in a large proportion; and as many valuable horses, of the heavy class especially, become affected with quit-

tor, a right understanding of the affection, and of the required treatment, is very important. I have been very successful in treating these cases, and also in making out the pathological conditions, in proportion to the investigations undertaken. As I have at different times made my method of treating quittor known, besides affording practical proof in the treatment of cases, progress in the same line of practice is no doubt being made, though slowly; in many instances the treatment is partially carried out with relative results. Cases of quittor, above all others, require to be dealt with thoroughly; and if the good effects I have obtained are to be achieved, the directions must be carried out faithfully as a whole. I proceed as follows:—After taking off the shoe, and doing all that is necessary to the hoof, I prepare to inject a mixture, for the pharmaceutical combination of which I say nothing, though I can say a very great deal for its practical efficiency. To prepare the mixture, take bichloride of mercury one drachm, rectified spirit one ounce; after rubbing and dissolving

the sublimate in the spirit, add half-a-drachm of liquor plumbi acetatis. By means of a small syringe, elastic gum, or pewter, with small tube two inches in length, and bulbous end, I inject the mixture down the sinus. This requires to be carefully, but very effectually done. The direction of the syringe must therefore be changed from the vertical to the oblique, in both a forward and backward direction, the object being to infiltrate the mass as far as it can be penetrated by the innumerable small sinuses converging to the outer channel. To do this part well one strong man is better than several hands, if the horse's head be held steady, and an assistant hand the instruments, etc. I take the horse's foot forward upon my knee, and, as a rule, succeed in performing the operation without giving much pain to cause the horse to resist, though difficulty, requiring a little exceptional care, may occasionally occur when previous treatment and torture have been resorted to. Now for the effect that follows :—The foot is released and placed on the ground, and once or

twice the animal stamps, indicating that a smarting is produced by the caustic agent; but in a brief space of time that passes, and signs of ease are manifest. On examining the foot in as short a time as four hours after the operation, I have found the tumour sensibly subsided, and all the symptoms favourable. We have been in the habit (members of my family used this excellent remedy before me) of repeating the injection of the preparation a second time after the lapse of twelve to twenty-four hours, and again, after a similar interval, a third time. And this general rule seems to me to recommend itself, and admit of explanation in this way:—At first all the structures are so engorged that the agent cannot be forced through the morbid deposit; but, in proportion as the diseased structures are reached, they are destroyed, and shrink, and in each succeeding application the fluid caustic is pressed round the withered, wasted substance, until the whole comes away in the space of a week or little more, when the cure is far advanced, and thereafter rapidly effected. This represents the progress of

a good cure. Sometimes the application has to be repeated several times, at intervals of two or three days ; but where delay is essential, I diminish the activity of the preparation by adding a double portion of spirit.

Three different modes of treating quittor have been in vogue during the memory of living practitioners, besides that which I adopt ; those are, firstly, the traditional custom of the farriers of this country, which consists in the free use of active caustics, such as corrosive sublimate and nitrate of silver, which are most commonly used in substance, powdered, and passed by probing into the sinus ; secondly, a mild course has been pursued, in which solution of sulphate of zinc is the favourite remedy ; and, thirdly, there has been the continental mode of extirpating the lateral cartilage ; implying the destruction of one quarter of the foot, beginning with the hoof. The objections to these three modes of procedure are—firstly, the old English one, though in some instances a slough (core) was brought away, in a greater number of cases violence was done to

structure, and even joints were laid open, by the corrosive substances being pressed in contact with these, in considerable quantities in their pure state. I have found the red precipitate (red oxide of mercury) lying unchanged, and scarcely moist, deep in a cavity of the foot, after the death of the horse had been caused by it.

Then, secondly, the attempts at cure and pretensions to such results having been effected by solution of sulphate of zinc, copper, or any agent of this class, are mistakes. I witnessed that practice extensively tried during my studentship, but never saw a case of quittor cured by such treatment; those that did recover were comparatively superficial injuries, and not quitters.

The last mode—extirpation of the lateral cartilages—long a rule of practice in old French farriery, and subsequently adopted by French veterinary surgeons, is on all accounts objectionable, and is now, I learn, considered so by themselves. The destruction of hoof, and much that was in no way involved, was excessive; the removal of the diseased part, by making such a breach, even

when a cure was effected, was at a cost of time and animal suffering out of proportion to the gain. It was after being fully acquainted with the above that I secured the great success by following the system above described.

V.

ON HOOF-OINTMENT.

SHOEING, though the most influential of all the means that art can supply for the prevention and cure of lameness, is not the only resource—others are brought to aid ; and the neglect or misuse of other means may defeat the farrier in the otherwise too limited application of his skill.

The most conflicting notions have been propounded as to whether humidity is favourable or detrimental to the condition of the hoof, that is to the feet of horses. Even the mild atmosphere and gleam of the sun in these isles, is supposed by some theorists to be too drying for horses' feet, and therefore wet cow-dung, etc., is employed for stopping the soles to soften them. If people could be once induced to see this matter as it lies open to us in the field of nature and daily practice,

they could not stop from investigating, nor long fail to see extensively into the matter. Nothing impairs hoofs more than, or deprives them of their strength and elasticity so much as, wet, except that which I trust has been already sufficiently exposed—destruction by cutting.

As a preventative of the injurious effects resulting from changes from humidity to dryness, and *vice versa*, I have used a hoof-ointment, which I have found an admirable adjunct to all other good management of feet, including good shoeing.

Hoof-ointment is no novelty, but a very old means fallen into disuse, partly through neglect, and partly among ourselves, in recent times, through the domination of new-fangled theories regarding horses' feet, and what is proper to be done. When I began to see that humidity impaired the texture of the hoof, I had recourse to oil, lard, or tallow, with the view to exclude moisture; but my experiments were attended with questionable effect, except in the case of mutton-tallow, which, during wet weather, I

VI.

HEALTH OF HORSES, REGARDED IN ITS RELATION TO AFFECTIONS OF THE FEET.

IN bringing this work to a close, I am deeply impressed with the extent and importance of the great subject, of which it only treats in part—the local conditions of the feet—which I may say, in conventional phraseology, is the most important part of the veterinary art, as it bears on the well-being and economy of horse-life.

I have in great measure, I hope, adhered to my programme in expounding views, the fruits of an extended experience, on the art of shoeing, as the chief means of conservation of the feet, the prevention of lameness, and its cure, by so applying the art that it may fulfil its purpose—defence and preservation, without becoming a source of offence and destruction.

I should have liked to have enlarged on the

structure and formation of the limbs, and to have included those important regions the knee and hock joints, on which depends every movement of the feet, and even their passive use, if I may be permitted the expression, as the bases of the animal's support; but that plan of inquiry would have necessitated an examination into the parts above the hock and knee inseparably related to them, anatomically and physiologically, and the result would have been a treatise on the anatomy and physiology of the horse. Necessity has constrained adherence to the limited programme with which I started, but I am anxious that those of my readers who are able to consider the subject in a scientific aspect, may do justice to the comprehensive spirit in which my inquiries have been conducted.

Foot-injuries and foot-disease occur in various ways, and not only affect the general health of horses in such degree as is but little appreciated, but death ensues from affections that are regarded as local; however much of the causes and the effects may be in the early stage localised, they not un-

frequently result in constitutional disturbance. I have endeavoured to show how I proceed in removing local causes, and by soothing measures accomplish the re-establishment of functions. Several cases, however, appear among the small number of those I selected for the illustrations of this work, in which death resulted from the local conditions of the feet, and certainly such cases will repeat themselves; and no man can be long engaged in the prevention and cure of lameness without encountering similar instances.

We cannot rest on our oars by devoting attention exclusively to the original seat of injury and its cause; constitutional effects supervene, which become new causes of mischief, and require to be met by suitable constitutional measures. The bowels become constipated, the vascular system disturbed, and the appetite becomes impaired. We have in fact a case which shows that prompt measures must be used to re-establish health, or no amount of skill devoted to the relief of local parts can avail.

I usually meet these emergencies success-

fully, by means simple in their application and safe in their result. The horse's bowels must be got into action, not by violent disturbance, but by safe, reliable, and prompt measures. The comfort of the body must be secured by proper locality, ventilation, and cleanliness, and the diet in kind and quantity regulated. As regards the alimentary system, the horse is peculiar. Since he cannot vomit, everything that has been eaten must pass through the canal, and in the absence of proper measures, danger is to be apprehended when obstruction from torpidity of the bowels ensues. We have only one medicine to be depended upon as a purgative for horses, and that can be exactly relied on for producing a given effect—that is Aloes. I give this valuable medicine to horses in cases of sickness, and abstain from it when they are well, more than it is the custom to do ; but I administer it with discreet care, both as to quantity and the kind. The medium dose of aloes to stimulate the bowels of a horse into action is six drachms, of the kind known as Cape aloes ; I do not use the more drastic Barbadoes

aloe, but the purest samples of the Cape variety, as these are found in the British drug-market. I find this the same extract of the aloe that is sold over the Continent by all respectable druggists, and officinally employed under the name of Socotrine aloes.

I am particular in expressing myself on this matter about the essential value of aloes, and the necessity of discriminating between the sorts ; it is a matter to which I have given much attention, with corresponding good results. It is supposed by most respectable practitioners that the difference between these kinds of aloe is one of *strength* only, and that five drachms of Barbadoes aloes will produce the same effect on a horse as six drachms of the Cape. My own experience does not support that conclusion, and therefore, when I prescribe a given quantity of aloes I mean the best of the Cape kind found in the British drug-market. It is the drug about the results of which I am most jealous, because it is the most effectual for saving the lives of horses when properly employed.

The best way to administer aloes is in the form of a bolus, made up with glycerine, syrup, etc. The action of aloes on the horse is very prompt, as regards the good effects observable in cases where the use is indicated. We have not to wait for the relief afforded to the system, as is commonly supposed, until purgation follows, nor a twentieth part of the time. To appreciate the promptness with which the effect of aloes produces alteration on the horse, the opportunity should be taken of observing the operation, in a particular case of indigestion, accompanied with spasmodic colic, which, if not relieved, is apt to run its fatal course rapidly.

Notions are prevalent that whatever is given to a horse in a soft or fluid state, whether it be food or medicine, affects the system more quickly than when taken into the stomach in a solid form. That notion has been very erroneously held in regard to the action of aloes—to the extent that when horses are forced to swallow physic, and have nothing the matter with them, it is given in the form of a ball; but when really

required to be given as a medicine, to promote an object, it is prescribed in a fluid form. Having proved, by observations made during many years' practice, that there was no foundation for such induction, I had recourse to an experiment, purposely, to show a class of pupils, and be able to tell the world, the true state. I took the occasion of a horse in good health, that had to be destroyed, to make the following experiment. I gave a ball composed of seven drachms of Cape aloes, and one drachm of glycerine, and then had the horse walked to the place of slaughtering—distance one-third of a mile—and ordered the man to use his most expeditious method of putting an end to the animal's life. Thirty-three minutes elapsed from the time the ball was given to that when death happened. On opening the stomach, as soon after death as could be done, no part of the aloetic ball was found. There was the white paper in which the ball was wrapped, floating amongst the contents of the stomach, but without a vestige of aloes upon it. The paper, in fact, when dry, after removal, was as clean and free

from taint or smell of aloes as a bank-note taken from the bank-till. Though not a particle of aloes was to be seen, the smell of the drug was unmistakably present, both in the contents of the stomach and small intestines. The results of my practical observations—ranging over more than thirty years at that time—were confirmed as sound; the prompt effects obtained bore testimony to the rapid solution of the medicine.

That dose of aloes, in the course of thirty minutes, had not only become diffused through the alimentary system, but was doubtless in process of active absorption into the circulation; and that explains how, at the expiration of fifteen to twenty minutes, the effects upon the vital centres are made apparent, under the conditions alluded to, of colic, etc.

The experiment just referred to was reported in the *Edinburgh Veterinary Review* for 1862, and any physiologist desirous of prosecuting this research farther, may find the stage to which I conducted it an advantageous new starting-point.

When a dose of aloes is given to a horse, with

the view to restore impaired health — and I never prescribe medicine unless for such purpose—the dose should never be such a one as to be liable to harass and weaken the animal, but quite sufficient to clear the passage of the bowels, when renovation of the tone of the whole system usually and soon follows spontaneously.

We have other agencies at our command for effecting the above purpose — evacuating the bowels—quite as indispensable as any kind of medicine—viz. clysters. Clysters have been greatly neglected in veterinary practice among ourselves, while, if their simple and important function were sufficiently understood, their employment would be extended beyond prescribed instances, when danger to life was apprehended.

Much ado is made about what should be administered, and the preparation of the decoction, etc., while it should be understood that simple warm water is the proper and only requirement. I never even use the supposed indispensable portion of oil, except to the extent of dipping my finger in a drop for the purpose of lubricating the

bulb point of the tube, and for that an atom of grease or soap suffices. On the principle that one thing alone should not be relied on for the accomplishment of a great object, when two are known which in combination will accomplish it more certainly and quickly, clysters should be at once used when a purgative becomes urgent. And if only one of these agents be at hand at the instant required, let that one be availed of; in not a few instances I have had to depend on them by turns, singly, with full effect.

Before describing how clysters should be applied, and the extent of their application, a few words may be well said on the means to be adopted for the purpose—the proper instrument.

On the presence and facility of means very much depends whether clysters will ever be generally used for horses just when they are most required. Up to within the last fifteen years, enema instruments, used for horses and cattle, were huge machines, either barrel-shaped syringes, made of pewter, and some of these after the manner of garden-engine pumps, to be placed in

a vessel of water, and by employment of force the fluid was injected into the rectum. About twenty years ago I was fortunate in obtaining a totally different instrument, a funnel, which only requires to be used once to convince any practical man of its superiority over every other form for administration of clysters to horses and cattle, and to *quadrupeds* in general.

Fig. 47.

The instrument consists, as this figure shows, of a funnel, vertically connected to a tube, which, meeting another at right angles taking a horizontal direction, is joined by soldering, as shown above. The proportions are—funnel with soldered rim, bent inwards, $5\frac{1}{2}$ inches deep, and 6 wide at

the bottom of the rim ; the vertical tube is $1\frac{1}{4}$ inch diameter ; and the horizontal part 1 inch, tapering to $\frac{1}{2}$ inch at the opening, which is guarded by a substance of solder of the shape of an acorn, to secure safe and easy passage. Tinned iron is the cheap and well-adapted metal used in the manufacture.

The advantage of this over all other enema instruments, for horses, becomes apparent on trial, no pressure being required to introduce fluid into the rectum of these or other quadrupeds, the position of the body favouring its entry by gravitation. Moreover, the fluid descends through the funnel without exciting resistance, instead of encountering it, as was always the case when propelled through the syringe. As pent-up gas is commonly present, and induces counteracting effects, the fluid, when injected with the ordinary instruments, becomes partially or wholly expelled before time is allowed for any effect from the operation ; whereas, with the use of the funnel, by the absence of force and with the free opening above, the pent-up flatus

gets vent through the tube, and the fluid falls to supply its place. This is an obviously good effect, at once seen in the application of the instrument to horses and cattle.

After I had published an account of the enema funnel, and a description of it, fifteen years ago, I handed it to the instrument-makers at London and Edinburgh, who thereupon made some which were sold under the name of "Gamblee's enema funnels," and in the meantime some practitioners had got them made from my model, and these were approved and the use extended. I found, however, that the specimens exposed in the instrument-makers' shops were widely different from my model, and such as I could not use for the purpose intended. On questioning the makers, and remonstrating with them for abusing the privilege of copying by spoiling, I was told that different practitioners had suggested *improvements* upon the original. I thenceforward took means, besides getting the proper form for myself and friends, of making sure that the public could obtain it. I had come to ascertain that

the same form of enema funnel was applicable to other quadrupeds, and accordingly I reduced it to a scale, and had several sizes made less than that given above, adapted for foals, calves, and other quadrupeds, including the various sized dogs. Mr. Latchford, bit-maker, St. Martin's Lane, London, was good enough to go out of his way to make the instruments so classified, and keep them for sale on his own account. It almost seems that the deviation from instructions was not altogether a mistake on the part of the instrument-makers, for this enema funnel, which is made of the different sizes, and sold at from two to four shillings each, was calculated to supersede in the market the large machines that were kept for sale at higher prices, and which, owing to cost and cumbrous dimensions, are never where they should be when wanted—*i.e.* where horses are kept. In justification of these remarks, which would have been otherwise uncharitable, I may mention that I have seen in the catalogue of a London surgical and veterinary instrument maker, after the enumeration of injecting syringes of great dimensions, these

words added—"Gamgee's enema funnels, made of *glass*." The price marked is in pence, some portion of a shilling, and apparently these low-priced glass articles are advertised with a view to secure monopoly of sale, and bring the instrument that is most effectual, cheap, and easy of application, into disrepute; for of all the uses to which glass has been put, that of adopting it for clyster apparatus to be used for horses is probably the most absurd. Horses turning, and pressing against stall-posts, walls, etc., render such a contrivance dangerous, apart from the fact that these are things to be used for many consecutive hours, or at intervals for days, and have to be thrown down and placed in pails, so that, to say nothing of the danger from breakage, a supply of several would be required to replace the broken ones. The enema funnel is now properly made and kept on sale by J. Gardner, surgeons' instrument-maker, Edinburgh. In using it, as with all others, two persons are required—the operator placing himself on the near side, while an assistant on the opposite side draws the horse's tail aside

and towards him, having in readiness a vessel containing about a quart of warm water. The bulb of the funnel tube being lubricated, and placed in the water to make it warm, is then introduced, the water poured into the funnel, whence it passes on, when an equal quantity may be repeated, which is as much as will usually be required. The instrument is withdrawn when no more fluid flows on.

The clysters may be repeated in acute affections three or four times in the course of the first hour; and in chronic conditions their use may be indicated twice or thrice daily, for several days continuously.

Clysters have the advantage, in their administration to horses under due prescription, of never doing harm, a praise that cannot be given to any medicine; while they are the best adjuncts to other measures, in an indefinite variety of cases.

I shall not extend my remarks farther, on general medical treatment. Nothing can be laid down by anticipation for all emergencies of cases when foot-diseases form the chief part of the

complication. I will only add, that proper attention to diet is important, and as we have more complete control over the horse than most other animals, in regulating both the kind and quantity of the food he eats, it is of practical importance to avoid overloading the stomach and bowels on the one hand, and of falling into the opposite extreme of lowering the condition, and impairing the fitness of horses to return to work when their state admits of it.

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