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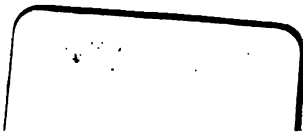




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A
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THE VETERINARY ART:

CONTAINING
PLAIN AND CONCISE OBSERVATIONS ON THE CONSTRUCTION
AND MANAGEMENT OF THE STABLE;
A BRIEF AND POPULAR OUTLINE OF
THE STRUCTURE AND ECONOMY OF THE HORSE;
THE NATURE, SYMPTOMS, AND TREATMENT OF THE DISEASES AND
ACCIDENTS TO WHICH THE HORSE IS LIABLE;
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ADVICE TO THE PURCHASERS OF HORSES;
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SEVENTEENTH EDITION,
ENTIRELY RECONSTRUCTED, WITH CONSIDERABLE ADDITIONS AND ALTERATIONS,
BRINGING THE WORK UP TO THE PRESENT STATE OF VETERINARY SCIENCE,

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VETERINARY SURGEON,
HONORARY ASSOCIATE OF THE VETERINARY MEDICAL ASSOCIATION,
AUTHOR OF TREATISES ON THE INFLUENZA, AND THE STRUCTURE, FUNCTIONS, AND
DISEASES OF THE FOOT AND LEG OF THE HORSE,
AND EDITOR OF WHITE'S COMPENDIUM OF THE DISEASES OF CATTLE,
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P R E F A C E.

SIXTEEN editions of this work have, it is hoped, sufficiently stamped it as a favourite of the public. In undertaking the seventeenth, with which he has been entrusted by the proprietors, the Editor feels that he can best carry out the wishes of the late respected Author by endeavouring to effect what improvements in it he is capable of doing, and such as the advanced and advancing state of the science on which it treats appears to demand.

It will be seen that the work, which has hitherto been published in three volumes, is now embodied in one. In accomplishing this, considerable alterations were necessarily required. Much superfluous matter has been removed; and in arranging the work more systematically, it has been in many instances found necessary to re-write subjects entirely, as the more convenient method of incorporating the Author's ideas with the desired improvements. Besides this, many articles altogether new have been supplied, which it is hoped will add both to the interest and value of the work.

The engravings, fifty-six in number, by Mr. Branston, are entirely new, and most of them are on new subjects.

In effecting these alterations and intended improvements, the original plan has yet been preserved; for although the work has been much extended, it still gives a general and popular outline of the structure of the horse, and a compendium of the diseases to which he is liable.

In former Prefaces the Author has reviewed in some measure the productions of our authors in this country, as well as on the Continent. Veterinary works being now however too numerous to permit us to follow out this plan to the same extent, a glance at them must suffice.

France has furnished a considerable addition to our veterinary

literature. Messrs. Girard, both father and son, have produced works of considerable eminence. Professors Rigot and Delafond have also by their writings established their claims as men of considerable scientific and veterinary acquirements. The Dictionary of Hurtrel d'Arboval, extending to four volumes, possesses great merit, and has reached a second edition; and Professor Gellé has lately produced a valuable work on Cattle Pathology.

To these we may add the writings of Vatel, Renault, Grogner, Moirond, Dupuy, Bernard, and Bouley, besides two veterinary periodicals, which are carried on with some spirit. Professor Gurlt, of Berlin, has published some excellent plates of the anatomy of the horse and other animals, which, with those of Müller, evince much accuracy and research; and Professor Delwart, of Brussels, has presented the public with a useful pathological work.

In this country, although our authors have not been quite so prolific, they have not been less worthy of approbation. First and foremost we must notice the works of Mr. Percivall, who some years since presented us with three volumes of lectures, embracing the greater part of the anatomy and physiology, and extending itself to much of the pathology of the horse; and more recently they have been followed by a work on the anatomy of the horse, which for correctness and comprehensiveness has not been surpassed. This work has been succeeded by two volumes styled Hippo-pathology, both of which justly hold a foremost rank in our veterinary literature.

Mr. Bracy Clark has from time to time presented us with elaborate treatises on various subjects, such as the Foot, Shoeing, Worms, &c.; and, lately, on the Vices of Horses. They all display much talent, and develope considerable learning and ingenuity.

Mr. Blaine's work, both on the Horse and the Dog, have gone through several editions, each of which evinces considerable and progressive improvement. This gentleman has recently completed a work, entitled "An Encyclopædia of Sporting," which for its amplitude of detail and depth of research is well worthy the latter days of this veteran in literature.

Mr. Youatt has, under the superintendence of the Society for the Diffusion of Useful Knowledge, presented the public with

three elaborate works, entitled severally the Horse, Cattle, Sheep. These works evince an extraordinary degree of labour and research. A great portion of each is devoted to the natural history of the animal on which it treats; and the one on sheep contains some interesting discoveries on the nature and structure of the different wools. Mr. Youatt has also written an essay on Humanity to Animals, which has been very generally and deservedly praised. Its arguments are not based on any crude and Utopian theories, but on sound practical grounds.

Mr. Youatt is also the able editor of a monthly periodical, called "The Veterinarian," which first appeared in 1828 under the auspices of Mr. Percivall. This work is greatly supported by the contributions of veterinary surgeons in different parts of the country; and it is not saying too much in its favour in asserting that by thus collecting from so many sources, it has acquired a mine of valuable facts, which by distributing amongst the profession has greatly assisted the progress of veterinary knowledge.

For several years past a large space of this periodical has been devoted to reporting the proceedings of the Veterinary Medical Association, an institution arising out of the ashes of a former society, and consisting of practitioners and students who hold weekly meetings at the Veterinary College during the session, at which meetings many excellent essays have been read, and followed by valuable discussions. The association is composed of four classes, viz., members, fellows, honorary fellows, and honorary associates. Mr. Sewell is the patron, Mr. C. Spooner the president, and Mr. Morton the secretary of this institution; which it is hoped will continue to flourish, as it is calculated to assist greatly the acquisition and communication of scientific and practical knowledge. The council have lately resolved to publish their own proceedings quarterly.

Mr. James Turner has collected together and published his valuable papers on the Navicular Disease, the merits belonging to the discovery of which is justly due to him. He has also more recently published a Register of Experiments on the Nature of the Blood-vessels, which evinces much originality, and in some degree militates against the opinions of physiologists.

Mr. Morton, Professor of Chemistry at the Veterinary College, has published a Manual of Pharmacy and a Toxicological Chart. Each exhibits great excellency, and places the accomplished

writer high amongst our list of authors, and as a diligent inquirer after truth. To the former work this volume stands indebted.

Mr. Stuart, of Glasgow, has published a useful work on the Soundness of Horses; and more lately a larger one on Stable Economy. The latter has obtained a large share of public favour, and contains much useful and practical information.

The Editor of this work has written two others; one on the Influenza, and the other on the Structure, Functions, and Diseases of the Foot and Leg of the Horse. With regard to their claims he begs to refer to the opinions of the various veterinary, medical, and sporting reviewers by whom the works have been noticed.

Mr. Vines has written a treatise on the subject of Glanders, in which he displays some novel ideas, and in which he strongly advocates the exhibition of cantharides.

Mr. Darvill has published a work on the Race Horse, which exhibits much practical knowledge, and communicates useful information.

There are a few other minor authors, some of whom are justly entitled to merit; and there are others whose works we could not notice without expressing censure.

It remains but to add that since the last edition of this work was published, the ruthless destroyer, Death, hath summoned away Mr. Coleman, who for nearly half a century had held the office of senior Professor at the Veterinary College. In his earlier career he was a diligent inquirer after truth, and a zealous friend of veterinary science. His mantle has fallen on Professor Sewell, so many years associated with him, whilst the sub-professorship is deservedly bestowed on Mr. C. Spooner, and Mr. Morton has more recently been appointed Professor of Chemistry. From the extensive experience and intuitive knowledge of the first gentleman, the talents and scientific acquirements of the second, and the active and zealous genius of the third, much is expected towards the future progress of veterinary science, and much will undoubtedly be obtained.

Southampton, December 27th, 1841.



PREFACE

TO THE THIRTEENTH EDITION.

ABOUT two years only have elapsed since the twelfth edition of this small volume was published: such kind encouragement cannot fail of increasing the author's ardour and industry in the cultivation of his profession; and he trusts, by continued and zealous attention to veterinary practice, to make still further improvements beyond those he has now to offer. In the last edition, I gave some account of veterinary writers, especially those of the French nation. I have now to pay some tribute of respect to the memory of those of our own country, who have written many works of great utility, though not what are considered scientific performances; as well as a short account of the works of living veterinary authors.

The earliest English writer on Farriery we have an account of, is Mascal, who lived in the reign of Edward the Sixth. He published a treatise on Farriery, which was greatly esteemed, and passed through several editions. At the same time lived Martin Clifford, who also wrote a treatise on Farriery; but it was not considered of any value, and passed through two editions only. Next to him appeared Captain Burdon, of the Dragoons, who published a very small treatise on Farriery, which was universally read and esteemed in the reign of Queen Elizabeth. This small work was republished, with notes, by Dr. Bracken. Three years after appeared Gervase Markham, the most renowned of ancient farriers. He published a work under the name of "Markham's Masterpiece," in the year 1666; it passed through twenty-five editions, the last of which appeared in 1729. He was in practice more than sixty years. In the year 1740, De Grey published his "Compilation on Farriery," which was not much esteemed. Snape, farrier to King Charles the Second, published the first English treatise on the Anatomy of the Horse; but it was taken in great measure from Ruini, an old Italian author of great merit. In the year 1770, Sir William Hope published a translation of Solleysel's work, which was much read and esteemed. In the reign of King George the First, Dr. Layard published an Account of a dreadful Epi-

demic which raged among Cattle. Other publications of a similar nature appeared about the same time. In the year 1750, appeared the best book on Farriery that had ever been written, by William Gibson, a surgeon. It went through many editions, and is still considered valuable. About the same time Dr. Bracken published two volumes on Farriery, which were greatly esteemed, and are still read. Bartlett's "Gentleman's Complete Farrier" next appeared. He published also a Veterinary Pharmacopœia. The former was in great measure an abridgment of Gibson. It contained, however, a new method of nicking, and a description of Lafosse's supposed cure for the glanders. Osmer next published a treatise on Lameness, containing many new and useful observations; also, a "Description and Recommendation of Lafosse's Half-Moon Shoe" — a shoe that I do not consider proper on any occasion whatever; because, with such a shoe, the heels are constantly wearing, while the toe is growing, which must be a great injury to the flexor tendon, or its appendages, and cause the frog to receive more pressure than it was designed for. He afterwards wrote a book on an epidemic disease that prevailed, which contained many useful observations. In the year 1780, Mr. James Clark, of Edinburgh, published a small work "on the Prevention of Disease by Exercise, Feeding, Bleeding, &c." This is an excellent work, and may be still read with advantage by veterinary students. Lord Pembroke, about this time, published a work on Horsemanship, which contained many sensible observations on the diseases of horses and on shoeing. His lordship was Colonel of the First, or Royal Dragoons, and had the horses of his regiment shod according to a plan of his own. This plan was continued while I was in the regiment, and is, I believe, still in use. This shoe is that which I now recommend for good feet. About the year 1789, Mr. Taplin's "Stable Directory" appeared: a book that was much read, and passed through many editions in a few years. A supplementary volume was afterwards published, and a small pamphlet, named, not very justly, "Mulum in Parvo."

In the year 1792, the Veterinary College was established, and M. Saintbel, a French veterinarian, was appointed Professor. He died about a year after. Saintbel was the person who discovered that glanders may be communicated through the medium of the stomach. A few years after his death, a quarto volume appeared on veterinary subjects with his name to it, but it contained nothing of importance. The Professorship of the College was afterwards filled by Mr. Coleman and Mr. Morecroft, jointly; but the latter soon gave it up for a more lucrative situation, as a private practitioner in Oxford Street, in which he acquired the highest reputation. In 1807, he was induced to go out to India,

to superintend the breeding stud of the East India Company. He published a small but very useful book on Shoeing. I should have noticed before a small book by Mr. Prosser, a surgeon, on Strangles and Fever, in 1786. Mr. Prosser contends that the strangles could be, with certainty and advantage, communicated to colts by inoculation. In 1796, a quarto volume appeared on the Economy of the Horse's Foot and Shoeing, by Mr. Freeman, a gentleman much celebrated for his knowledge of horsemanship, on which he afterwards published a large treatise. The former work contains some good plates of the different parts of the horse's foot. About the year 1800, Mr. Coleman published his splendid work on the Structure, Economy, and Diseases of the Horse's Foot, and Shoeing. This work contained many beautiful and accurate plates of the horse's foot. There afterwards appeared one volume of Veterinary Transactions, and a pamphlet, describing an artificial frog, by the same author. About this time two octavo volumes were published, entitled, "A Philosophical Treatise on Horses," by Mr. John Lawrence. The first volume merits particular notice: it contained a forcible appeal to the feeling of the public in support of the *rights of horses*, and ought to be read by all horse proprietors. The other contained much useful practical information; but, as Mr. Lawrence was not a regular student of the veterinary profession, it of course contained some errors, and is valuable chiefly as a compilation. In the year 1801, Mr. Richard Lawrence published a quarto volume on some of the diseases of the horse, with some useful and accurate plates. This is a work of considerable merit, and has been since published in one octavo volume. Mr. Blaine's work first appeared in 1802 and 1803, in two volumes octavo. It has since been published, however, in one octavo volume. It is the only regular system of veterinary medicine that has been attempted in this country; and, notwithstanding the severe remark of Professor Girard and M. Gauze on it, I think the work much more valuable than that of the latter author, although his large quarto contains more than a hundred plates; and of equal value to M. Girard's works, not excepting his "Traité du Pied." About this time appeared a book by Downing, and another by Topham, on the Diseases of Cattle. Clater's "Every Man his own Farrier" had been published some years before; and about this period appeared his volume "on the Diseases of Cattle." A quarto book on Cattle Medicine was published soon after by Mr. Skerrett, which contained some good representations of the calf in utero, and some useful observations on the subject. But one of the best books that have ever appeared on cattle medicine was by Mr. John Lawrence. The great merit of this work consists in pointing out the propriety of attending to preventive measures, and the absurdity of

incurring the useless expense of inert or poisonous drenches, and of attempting to cure incurable diseases. In 1803 a quarto volume, by Mr. Feron, appeared, which contained nothing valuable. It has since appeared in an improved state in one large octavo volume. About the year 1804, Mr. Riding, of the 28th Dragoons, now of the Royals, published his "Veterinary Pathology;" and Mr. Denny, of the 10th Dragoons, his "Treatise on the Diseases of Horses;" both small octavos, and of considerable merit. In 1805 a large quarto dictionary appeared, by Thomas Boardman, of the 3d Dragoons. This book contained some good plates reduced from Stubbs, and is altogether a valuable compilation. In 1809, Mr. Bracy Clark published his "Dissertation on the Foot of the Horse." This is the best work on the subject that has appeared in any language. He has since published another work, named "Stereoplea," of great merit; and a Treatise on Colts; also, an Essay on the Flatulent Colic, showing that it depends on indigestion. About two years ago, Mr. Goodwin, veterinary surgeon to the king, published an octavo volume on Shoeing, and the various methods practised by foreign nations. He recommends an improvement on the French mode of shoeing, which, he says, has been found extremely useful. As the book will, no doubt, be generally read, no further description is necessary.

In addition to the French veterinary works noticed in the preface to the twelfth edition, the following have since appeared:—

1. *Traitement pour toute Espèce de Maladies des Chevaux.* Par M. Desmaré.

2. *Extrait d'Abrégé de Médecine Veterinaire Pratique,* publié en Italien, 1813. Par J. P. Volpi.

3. *Tableau Indicatif des Maladies du Cheval, et des Remèdes qu'on peut appliquer selon les Maux et Accidens.* 2 feuilles, folio.

4. *Pathologie Veterinaire.* Par M. Dupuy.

M. Jauze's promised work in five octavo volumes has not yet appeared.

In concluding this preface, I think it necessary to observe that, in the present edition, I have not given many receipts for medicines; but these have been so abundantly supplied in the last edition of the second volume, or *Materia Medica*, that I thought it better to let them give place in this volume to what I considered more useful matter.

PREFACE

TO THE TWELFTH EDITION.

NEARLY twenty years have elapsed since this work was first published, and during that time eleven very large impressions have been sold. So favourable a reception could not fail of stimulating the author to continued and increased exertions for the improvement of veterinary science, and leading him to consider it as a duty he owes the public to communicate, when opportunities offered, any useful discoveries that may come to his knowledge, whether the result of his own experience or that of others. The present edition is called for at a favourable time, as the ready intercourse we now have with the Continent enables him to give a short account of the state of the veterinary art in foreign countries, particularly in France, where it attracted the notice of scientific men, and where veterinary schools were established at an earlier period than in any other country. Bourgelat, the first director, and the principal projector of the French veterinary schools, has been justly regarded as the founder of the veterinary art, being the first who placed in a clear point of view the indispensable necessity of anatomical and physiological knowledge to the veterinary practitioner. Several works were published by Bourgelat on veterinary subjects, which are still held in considerable estimation: the principal are,—“A Treatise on the Anatomy of Domestic Animals;” “A Rational Materia Medica;” “A Treatise on the Exterior Conformation of the Horse;” “Essays on the Theory and Practice of Shoeing and on Bandages,” &c. “Bourgelat’s Anatomy” appeared first in 1769, and has passed through several editions. It was translated into German, Italian, and Spanish. Though Bourgelat was the first to place the veterinary art on a proper foundation, some attempts were made, at a much earlier period, to diffuse a knowledge of veterinary anatomy, the principal of which was by Ruini, an Italian. This work was published at Venice in 1598, and entitled, “Anatomia del Cavallo; Infermità, et suoi Rimedi: dal Signor Carlo Ruini, Senator Bolognese.” It treats of the anatomy of the horse as well as of diseases. This book seems to have been the groundwork of many others that were published

at different periods afterwards, particularly the anatomical part and the plates, which appear to have been almost literally copied by all of them. Vitet, in his "Analysis of Veterinary Works," in speaking of Sollysel's, which was published in 1698, says, "In the 16th century, many veterinary books appeared, but Sollysel's work has caused them to be forgotten; nor have we reason to regret their loss, as they contained only a very imperfect description of the structure of the horse." It appears, however, that Sollysel's celebrated work is in great measure copied from that of Ruini. "Snape's Anatomy of the Horse," and the little that Gibson wrote on that subject, seem to have been drawn from the same source. One difference is observable in the plates; those of Ruini being engraved on wood, and his imitator's on copper. La Fosse was contemporary with Bourgelat, and communicated several memoirs on veterinary subjects to the Royal Academy. In 1766 La Fosse's son published his "Farrier's Guide," which treats, also, of the anatomy of the horse; and in 1772, his *Cours d'Hippiatrique* appeared, a splendid folio, containing sixty-five highly finished plates, illustrative of the anatomy of the horse. In 1775, a Dictionary of Farriery was published by the same author, in 4 vols. 8vo. This work contains much useful information. In 1771 Vitet's "Veterinary Medicine" appeared, in 3 vols 8vo. This work treats of the structure of the ox as well as the horse. After the revolution, the art seems to have made but little progress. In 1797, a useful pamphlet on the glanders appeared, the joint production of MM. Chabert and Huzard. This book was printed and distributed by order of the government, in consequence of the great number of horses that had been lost, and the contagious nature of the disease. It does not contain, however, any information that would be new to the English reader. About the same time, M. Chabert published "A Description of the Digestive Organs of Ruminating Animals," and soon after there appeared "A Manual of the Veterinary Art," by La Fosse, son of the author before noticed, in one 12mo. volume. This practical compendium of the veterinary art seems to have been much esteemed, as a third edition was published in 1803. From this work, as well as from others of a more recent date, it appears that the practice of veterinary medicine has not made much progress in France since the time of Bourgelat. In 1811 an account was published of some successful experiments on the treatment of glanders and farcy, by M. Collaine, Professor of the Royal Veterinary School of Milan. The successful remedy in these experiments was sulphur, given in very large doses, beginning, however, with four ounces, and gradually increasing the dose until it caused purging and violent colic. It was then discontinued until these symptoms ceased. On repeating it afterwards, it was found that much larger doses could be given

without inconvenience. In some cases it was given to the extent of two pounds in the course of the day, made into an electuary with honey. It is stated that a considerable number of horses were thus cured. Besides giving the sulphur, about two quarts of blood were taken off every third or fourth day during the treatment. The following statement is annexed to the pamphlet:—

“The veterinary surgeon attached to the imperial breeding stud of Borculo in Holland has practised M. Collaine’s mode of treatment, and after two months’ trial, thirty glandered horses were perfectly cured, ten are in a state of convalescence, and twenty have died during the treatment.” Notwithstanding the boasted efficacy of this mode of treatment, it appears from a recent publication on glanders, by M. Dupuy, that it has been fairly tried at the Veterinary School at Alfort, and has not in a single instance succeeded. M. Dupuy’s work appeared in 1817, in one volume 8vo., and treats of glanders as a tubercular or tuberculous affection, having for its title, “De l’Affection Tuberculeuse, vulgairement appellée Morve (glanders), Pulmonie (consumption, or phthisis), Gourme (strangles), Fausse Gourme (spurious or bastard strangles), Farcin (farcy).” Some observations on this work will be found in the Appendix, under the head *Glanders*. The most valuable work that has appeared in France since the Revolution is A Treatise on the Anatomy of Domestic Animals, by Professor Girard, 1807, two volumes 8vo. In 1813, there appeared A Treatise on the Feet, &c., by the same author, in one volume, 8vo., with six plates illustrative of the anatomy of the foot, not only of the horse, but of the other domestic animals, and poultry: this, also, is a work of considerable merit. In 1817, the first part of a theoretical and practical treatise on the horse’s foot, and on shoeing, was published, under the title of “Cours Théorique et Pratique de Maréchalerie Veterinaire, par F. Jauze.” This work was completed in 1818, and forms one large 4to volume, with no less than 110 plates. M. Jauze announces another work as about to be published in five volumes 8vo., with numerous plates. This work is said to treat of the internal and external pathology of the larger domestic animals, the veterinary *Materia Medica*, and the veterinary jurisprudence. “Every article in this treatise,” the author says, “will be described with particular order and precision, and *nothing superfluous* will be found in it.” If we may judge from the work already published, and the number of volumes announced, it seems probable that the readers of the work will be of a different opinion. The introduction to his “Cours de Maréchalerie” consists of an enumeration and short description of the works that have appeared from the earliest times on the art of shoeing; and among these, the ingenious and valuable works of Mr. Bracy Clark made a conspicuous

figure, but appear to be brought forward merely as a subject for criticism. "Mr. Clark," says the author, "takes great pains to prove that he has discovered that the hoof is elastic, a circumstance that has been known for more than two hundred years; and that shoeing is productive of injury to the feet, which was known even before it was generally practised. Wild horses, as well as the greater part of those employed in agriculture and commerce, in Persia, Ethiopia, Tartary, Japan, &c., are never shod; how is it, then, that shoeing is so generally practised in Europe? The answer is, that shoes are absolutely necessary, in consequence of the heavy burdens they have to carry, the hard stony roads they are obliged to travel on, and the necessity they are under of exerting, with so little cessation, the whole of their power," &c. "These considerations are sufficient to prove that shoeing is both injurious and necessary, and should arrest the pens of those modern writers who are daily claiming as discoveries what have been known for four hundred years." Mr. Clark has certainly taken pains to prove that shoes, of whatever form they may be, are always injurious, and that however carefully the hoofs are pared and otherwise treated, as long as inflexible iron shoes are nailed to them, the feet are constantly in a progressive state towards disease. If this be really the case, — if shoeing is invariably so injudicious, — Mr. Clark has an indisputable claim to the discovery.

I cannot find any passage in Mr. Clark's work to justify our author's assertion, that he has taken great pains (*fait tous ses efforts*) to prove that he is the discoverer of the elasticity of the hoof. He says, "I have detected some undiscovered parts in the hoof, and some circumstances in the plan of its structure, before unknown, and especially pointed out for observation its elastic properties." This surely cannot be considered as laying claim to such a discovery. One of the circumstances or parts of the hoof which Mr. Clark claims as a discovery is that which he calls the *coronary frog band*. "This," says M. Jauze "has been described by Bourgelat, under the name of *Bourrelet gris-seux*." Bourgelat, in his Essay on Shoeing, says, "When the foot is taken out of its horny box (the hoof), the first thing that strikes us is *un bourrelet*, which forms the superior part of it." This name is evidently applied by Bourgelat to that part which Mr. Coleman has named *coronary ligament*. In speaking of the *hoof*, Bourgelat says, "the thickness of this horny box is not the same through its whole extent; it is most considerable in front, and diminishes gradually towards the heels; it is much thinner at the upper part, or coronet, than below, and the inside quarter is weaker than the outside; the thickness of these, as well as the fore part, increasing towards the bottom. On examining the inner surface of the *hoof*, we find it extremely

thin in its upper part, and presenting a sort of circular groove (*un sorte de biseau*)." This blunder has been noticed by the translator of Mr. Clark's work, and M. Jauze attempts to pass it off as an error of the press; for in the third part of this work, which was published some time after the first, there is a list of errors, in which the word *corné* is substituted for *graisseux*. There is also a reply to some observations on M. Jauze's book, by M. Huzard; but it is evident from the above quotation from Bourgelat, that the coronary frog band of Mr. Clark was not noticed by that eminent veterinarian, nor is there any description of it in his other works, or in the "Traité du Pied" of Professor Girard. "Mr. Clark," he says, "has erred in many other passages (*dans une infinité*)." Page 28., line 1., he says, "In the foot of the ox there is neither pad nor cushion to diminish the reaction of the ground. (*Il n'y a ni matelas ni coussin pour pallier les reactions du sol.*)" He is in error also when he states that the camel and the elephant have a cartilaginous pad on the under part of their feet. Now, in Mr. Clark's work, p. 119., the reader will find the matter thus stated: — "Indeed, we discover most clearly, on investigation, that to every animal is given a share of elastic yielding to the foot, in order to destroy all jar and resistance, reciprocally to the parts of the foot as to the body, and a change of form takes place in the foot according to the weight or exertion brought upon it. *In the elephant, cartilaginous cushions, for this purpose, are seen disposed under the foot, and in the camel oblong pads; in the ox this non-resistance to the load is effected by a deep division of the foot to the fetlock joint, thus making of it two members, thereby giving a flexibility that answers the same end.* In the horse, a single pad is seen, for of such nature is the frog; and this yielding property in the foot of him and his tribe, or family, is less, perhaps, than any other family of quadrupeds, on account, it would appear, of the difficult combination of properties found with him, viz., an extraordinary degree of speed with a large or heavy body, which, to be impelled with effect, required parts that should not be too yielding, by which the impulse had been diminished, and hence it is that this property has been nearly overlooked, and the foot treated by the smiths as though this necessary provision and property had in him no existence more than in a mass of wood of the same figure." It appeared necessary to transcribe the whole of the passage from Mr. Clark's work, that the reader may form a just estimate of M. Jauze's criticism.

Mr. Clark is accused of another error in saying that "the thickness of the wall of the hoof diminishes from the front to the back part." There may be some few exceptions to this rule, but the truth of the statement with respect to the fore feet is

well known to those who are acquainted with the structure of the foot, and the hoof is so described by Bourgelat in the above quotation.

The reader will not, it is hoped, think it wholly uninteresting, if a brief account be added of the present state of the veterinary schools in France and Germany; drawn from a report made by Mr. Sewell, assistant professor of the Veterinary College, London, to the governors of that establishment. Mr. Sewell first visited the Veterinary School at Lyons, which was established January 1st, 1762. "The museum," he says, "contains many preparations of great utility and novelty; particularly subjects of the full size, displaying the muscles and blood vessels and the whole of the nervous system with the brain, entirely separate from the other parts, and well preserved: shoes of every description and from various countries, are also shown. The infirmary stables are not extensive, but paved and drained in the ordinary way, and ventilated by the windows only: there are appropriate places for the other domestic animals. The forge is commodious, and well adapted for shoeing horses, and instructing the pupils in the art of making and putting on shoes; all which is superintended by a director of that particular branch of the art. A botanical garden is attached to the school, and lectures are given on botany and chemistry in rooms adjoining a laboratory. The theatre of anatomy is capable of containing about one hundred pupils; where lectures are delivered on veterinary anatomy, surgery, and diseases; and a convenient dissecting room is contiguous to the theatre. Behind the building are a yard and paddock, into which sick or lame horses are occasionally turned."* The present director is M. Bredin, who furnished Mr. Sewell with letters of introduction to M. Huzard, inspector of the French veterinary schools, with which he proceeded to Paris. He was accompanied by M. Huzard's son to the Veterinary School at Alfort, about four miles from Paris, which was opened in 1766, and is now the principal school in France. This is much more complete than the school at Lyons: three large rooms are occupied by the museum and an extensive collection of veterinary works. There is a powerful electrical apparatus for medical purposes. Lectures on agriculture, rural economy,

* According to a report, made to the National Convention by Messrs. Gilbert and Huzard, in 1795, the veterinary school at Lyons was in a very bad state, and so situate (in the *faubourg de la Guillotiere*), as to be sometimes inundated by the Rhone. In consequence of their representation, it was removed to a spot opposite to the city near the road leading to Paris. During the siege and bombardment of Lyons, the students were dispersed by the bombs or shells that were thrown into the house and stables; but M. Bredin, the director, contrived to secure the preparations, &c. that were in the museum, and sent them off to a house he possessed at some distance from Lyons, where he collected the students and continued his instructions.

and medical jurisprudence are delivered at this school, in addition to those given at Lyons. Stallions are kept at the expense of government, and sent annually into the provinces to improve the breed of horses; asses are also sent for the purpose of producing mules, which are much used in some of the provinces. The infirmaries for horses and the other domestic animals are more extensive, and better arranged than those at Lyons; and the forge affords more convenience for giving instructions in shoeing: there is also a portable forge, which may be removed to any part of the stables where its use is required. A field of about six acres is set apart for agricultural experiments. The royal stables at Paris are well constructed buildings — well paved, drained, and ventilated: the horses do not stand on litter during the day. They appear capable of containing about two hundred horses. An infirmary and forge are attached to the stables. All the royal stud, as well as the cavalry horses, are shod upon the plan established by the veterinary schools, under the superintendance of a resident veterinary surgeon.

The following year Mr. Sewell visited the veterinary schools in Germany; and, on his return, made a report of his observations to the governors of the London Veterinary College, of which the following is an extract: — The Veterinary School at Vienna is inferior to that at Alfort; but it affords a greater scope for practice, the stables and other accommodations being calculated for receiving a considerable number of patients; all of them were then occupied, which afforded Mr. Sewell an opportunity of seeing some diseases peculiar to the season which was very hot and dry; the principal of these were lameness, called fever in the feet, and lethargic attacks. The lameness was treated as it is in this country, with the addition of turning the patient into a paddock, where the grass was high, kept watered, and well shaded with trees. The horses with lethargy were also kept in the paddock under the trees, and their heads were often placed under a shower bath. From the number of those that were in a convalescent state, Mr. Sewell concludes that the treatment was successful; though he says, it does not accord with the theory or treatment of the disease taught in this country. They consider the lethargic symptoms as dependant on some disorder of the digestive organs and liver, and treat it accordingly. The pupils are taught shoeing practically at the forge. The shoes are different from our own and those of France.* The stables are not of the first order, but roomy and

* According to M. Jauze, "the German shoes are, of all others, the most injurious for horses that have sound feet. There are three large crampons (caulking); one at the toe and at each heel, which make the shoe very heavy, and takes off the *aplomb* of the foot."

floored with wood, a common practice in Germany. The other accommodations are very good; such as box stalls, and places for other domestic animals. The stables have no other means of ventilation than by the windows, some of which open above the horses: the plan of draining is very good, and the litter is removed during the day unless required for particular cases. The *pharmacy* (place where medicines are prepared and dispensed), and other offices are well arranged. The buildings are constructed of wood, and are considerably dilapidated; but it is expected that the whole will be soon rebuilt. An old hermaphrodite horse is shown here in which the male form seems to predominate; of which, Mr. Sewell considers it a malformation. The imperial stable is a fine spacious building, floored with wood, well drained, and ventilated, and capable of accommodating several hundred horses; an infirmary is attached to it; also a forge, and a good contrivance for suspending and securing restive horses, for shoeing, or other operations. The horses, as well as those of cavalry, are shod upon the school plan. Prince Charles's stables are exceedingly good as a model on a small scale; the floor is peculiar, being made of wooden piles or pieces, cut out of a rounded figure, like large paving stones: they are well drained and ventilated.

At Prague and Dresden, Mr. Sewell found nothing very interesting except the royal stables at the latter place; in the coach horse stable, a covered stream of water passes down the centre, which keeps it always clean and sweet. They are well ventilated, lofty, light, and spacious, and floored with wood. The saddle horses work unshod from spring until autumn; when the wet season commences; their feet are in a fine state of preservation in consequence: the kennel of boarhounds is worth attention.

Late in August, Mr. Sewell visited the Veterinary School at Berlin; which was founded by the late king, Frederic II. The theatre of anatomy, museum, and dissecting rooms, form one detached building, probably the most handsome and commodious structure of the kind in Europe. The museum is less extensive than that at Paris, but larger than the museum at Vienna, and contains some novelties which the latter does not possess. It has a complete series of skeletons, from the horse and ox down to the smallest quadruped, and the skin of an African horse, which has not the slightest appearance of hair upon it; there is a good collection of shoes of different countries. The forge is well conducted, and the pupils, manually instructed by the professor. The method of securing horses for shoeing, or operations, is very ingenious, and worthy of imitation. The king's horses are shod at the school forge, and the cavalry are shod according to the plan of the school. The stables are well con-

structed, paved, and ventilated; the box stalls, and places for other domestic animals, are well arranged. Litter is not used during the day, but sand is strewed under the horses. The stables were full of patients of all descriptions: there were several cases of lameness and lethargy similar to those at Vienna, and their treatment was nearly the same. There was a case of locked jaw that had been cured by a method different from that employed in this country.* A riding house is attached to the school, for the instruction of pupils intended for the army; who receive pay from the time of entrance. There is a beautifully constructed warm water and vapour bath, with a room adjoining, to receive the patients after bathing, which is heated occasionally by a stove; the bath is supplied with hot or cold water by an ingenious hydraulic contrivance. The royal stables are handsome buildings, and kept in excellent order. Sand is used under the horses instead of litter in the day time. They adjoin the river Spree, into which there is a paved slope, which enables them to bathe or wash their horses. Mr. Sewell brought with him some useful instruments for relieving oxen or sheep that are *hoven* or *blown*; he has, since his return, sent them into the country for trial; they are said to be employed, with great success, in Germany.

On arriving at Hanover, Mr. Sewell was introduced to Professor Havemann by assistant Professor Housemann, whom he had seen in England. The infirmary stables had much dilapidated during the war, from being occupied by foreign cavalry. There were no patients in them. The royal stables which will contain between two and three hundred horses, are near the school; they are handsome buildings, well constructed, light, airy and spacious; the windows have canvass shades.

In Holland there are no veterinary schools. The royal stables at the Hague are well constructed, and in fine order. The heads of the stalls and bottoms of the mangers are lined with glazed Dutch tile, and are kept in the cleanest state, with very little trouble. Sand is used in the stalls in the day time. At Brussels, there was nothing worthy of attention, except an effectual method of draining a large barrack stable, which Mr. Sewell does not describe. He says, that by inquiries and observation, he obtained in Holland some *useful practical information*, which, with the new remedy for locked jaw, the German method of treating lethargic complaints, and the various im-

* Had the governors of the Veterinary College known that locked jaw is very rarely cured in this country, they would perhaps have desired Mr. Sewell to describe the successful mode of treating it to which he alludes. This communication, probably, with the other *useful* observations he may have made, will be published at a more convenient time.

provements he may have observed in the practice of the veterinary art, he will, no doubt, communicate to the public.

It is difficult, perhaps impossible, to form a correct comparative estimate of the state of veterinary science in this country and France, merely by perusing the works of the French professors and veterinary practitioners; but if one might presume to judge from such evidence, the author would feel no hesitation in saying, that he thinks the veterinary art has made greater progress in England than in France. In the latter country, it was cultivated by men of science, at an early period; but here, it can scarcely be said to have existed till the establishment of the Veterinary College. Some good practical works appeared before that time, particularly Gibson's and Clarke's; but the anatomy and physiology of the horse had not been attended to. Since that period, however, it has been assiduously studied; and to the acquisition of this essential branch of knowledge we may attribute the great improvement that has been made in the treatment of diseases. French practitioners appear to be still influenced by the humoral pathology, as it is termed, and, consequently, depend too much on decoctions of plants, and other vegetable preparations, in acute diseases, many of which are nearly, if not quite, inert, with respect to the horse; while similar diseases in this country are often subdued by one copious bleeding. Much praise, however, is due to the veterinary practitioners of France for the great attention they appear to pay to morbid anatomy. The accuracy and minuteness with which morbid subjects are examined after death, and the scrupulous attention with which every symptom of a disease is observed and noted, is worthy the imitation of British practitioners.

Wells, Somerset, October, 1819.

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ERRATA.

- Page 65., in the description of the cut, read "duodenum" instead of "liver."
 Page 253., in the description of the cuts, for "left" read "right," and for "right"
 read "left."

A

TREATISE

ON

VETERINARY MEDICINE.

PART I.

THE ECONOMY OF THE STABLE.

INTRODUCTION.

As the preservation of the horse's health is an object of the highest importance, I shall begin my treatise with some observations on that subject. The most effectual method of accomplishing this is to keep him in a wholesome stable, work him fairly, feed him properly, and to observe all those attentions which, taken together, and considered generally, are named grooming. According to this view of the subject, the first object of consideration is the construction and arrangement of the stable.

CHAPTER I.

ON THE STABLE.

LOFTINESS is very desirable in a stable. It should never be less than twelve feet high, which will admit of its being properly ventilated, without the necessity of currents of cold air. The air, by being breathed, becomes unfit for the purpose again, having undergone a change in its constituent principles. This change consists in the deprivation of a portion of its oxygen, which is essential for the purpose of life, and the substitution in its stead of carbonic acid gas, the inhalation of which would quickly deprive an animal of existence. Fortunately the respired air, from being heated, quickly ascends, whilst a supply of fresh air enters the nostrils. The foul air, from this circumstance, does not enter the lungs again, unless the pure air of the stable be exhausted, or so diminished as to become mixed with that previously expired. Thus the partial deprivation of oxygen is

productive of disease, and its total loss fatal to life. Ventilation is necessary all the year round: in the winter, for supplying pure air for the purpose of breathing in the place of that which is impure and unfit; and in the summer, not only for this purpose, but also to cool the stable as much as possible. Stables should, therefore, be constructed to admit both these purposes—in the summer to admit as much cool air as possible, and in the winter sufficient for the purpose of purity, without rendering the stable too cold, or occasioning draughts. It follows, however, that if we can ensure our end in cold weather, we can readily do so in hot weather, by means of the doors and windows. The heated foul air may be allowed to escape by means of a chimney, or square opening in the ceiling, communicating with the open air, or it may be made in the form of a dome or cupola, which would be more ornamental. The chimney need not be open at the top, so as to admit the rain, but should be roofed, and have lateral openings by means of weather-boards, as they are termed. A still better plan is, by having smaller openings over each stall, any of which may be closed when the horse is absent. The admission of pure air is likewise to be provided for: if allowed to come in at the windows, there will be a great draught on the horse's hind quarters, where it is least required. The best plan is to admit it towards the animal's head, by means of a pipe or wooden box having a number of perforations, so that there may be no sudden draught in any direction. Cold air should not be allowed to enter the stable door or near the horse's heels, as this is very likely to produce grease, or chapped heels.—ED.]

A stable, when properly paved, and kept moderately clean, requires only a shallow wide gutter, twelve inches wide, and one inch deep. The best floor for a stable, by far, is hard brick; and, next to that, limestone, not less than one foot square. I have seen a stable belonging to Mr. Lovell of Wells, that is thus paved, but with wider stones, and so chipped as to have numerous small furrows, all of them tending towards the centre and back part, and I never before saw so clean or so nice a stable, except one belonging to Mr. Atkinson, at Cheddington, and that, I think, was superior to any I ever met with, especially in its interior arrangement. The floor of the stall should never incline more than one inch in a yard, and the inclination should be continued back to the gutter only. Some litter should always be allowed for a horse to stale upon, which should be swept away as often as is necessary. This, with a pail or two of water thrown upon the floor, and swept off while the horse is at exercise, will keep the stable perfectly clean, and free from offensive smells. This plan can be further insured, and the litter saved, by means of small gratings, nine inches by four, placed in the middle of the stall for horses, and at the back part for mares, covering a small

underground drain, which may be made to communicate with the dung-heap or cess-pool. The depth of a stable should not be less than eighteen feet, nor the height, as I observed before, less than twelve. The width of a stall should not be less than six feet clear. But, when there is sufficient room, it is a much better plan to allow each horse a space of ten or twelve feet, where he may loose and exercise himself a little. This will be an effectual means of avoiding swollen heels, and a great relief to horses that are worked hard. With respect to the rack and manger, I have given a plate of one which I have seen employed in a waggon-stable with the best effect. It is intended for two horses; for horses when a little accustomed to each other, and working together, will always agree well when kept in the same stall, especially when they have, as is the case here, separate mangers, and are prevented by their halters from interfering with each other's corn. The space for two horses is twelve feet. The mangers and rack are all on a level, and about three feet from the ground. The manger should never be less than eighteen inches deep, eighteen inches from the front to the back part, and two feet in length. The rack should be four feet for one horse; for though the cut represents a stall for two horses, the



A, The rack.

BB, The mangers.

CC, The sides of the stall.

DD, The right-hand D represents the end of the halter, with the common

ring and plug: the left-hand D shows the head-stall, its reins being drawn between two rollers by invisible pulleys; an improved plan, by which the danger of casting is avoided

same kind of contrivance is equally or better adapted for one, and that is what I am now describing. The rack is represented with staves in the front, like a common rack, but this is not necessary; indeed, it is better to have it closed in front. The back part of the rack should be an inclined plane, made of wood;

should be gradually sloped towards the front, and should terminate about two feet down. Such a rack will hold more hay than ever ought to be put before one horse. The advantages of this rack are numerous. In the first place, the hay is easily put into it, and renders a hay-loft over the stable unnecessary; and this may be an inducement to the builder to make the stable as lofty as it ought to be, and render other ventilation unnecessary. All the hay that is put into this manger will be eaten; but in the common rack it is well known that a large portion of the hay is often pulled down upon the litter and trodden upon, whereby a considerable quantity is often wasted. It prevents the hay-seeds or dust from falling upon the horse, or into his eyes; and what is of considerable importance, though seldom attended to, there will be an inducement to the groom to give the horse hay in small quantities at a time, and frequently, from the little trouble which attends putting it into the rack. The saving in hay that may be effected by the use of this rack is so apparent that it need not be dwelt upon. Some mischievous horses will throw out the hay with their noses: but this may be effectually prevented by one or two cross bars—that is, crossing the upper part of the crib from the back to the front.* A great saving, also, may be made in oats by so fastening the horse's head during the time of feeding that he cannot throw any of them out of the manger.† If a horse is allowed a peck of oats a day, and has, as

* Mr. Stacey, lately groom of the stables of the Earl of Derby, produced some models of his newly invented and improved racks and mangers before the Veterinary Medical Association. A wooden partition is erected at the head of each stall, reaching from the pavement to nearly or quite the ceiling, and with a closed lateral division, or floor, a little above the height at which the top of the manger would be placed. The partition is divided by this floor into two compartments, one above the other. The upper one is designed to receive the hay for each feeding, which is introduced by means of a circular aperture in the upper part of the front, and which a sliding door immediately closes. Below this is another opening, square or circular, or of any form that the owner pleases, containing round upright staves, constituting a rack, and against which the hay introduced at the upper opening lodges. Moveable slides may be drawn before this aperture also.

Under the rack are three parallel drawers, each of which may be pulled out or returned at pleasure. The central one is the manger; that on the near side may hold a mash or gruel, while the one on the off side, by means of a cock projecting from the back, and communicating by means of a pipe with the pump or reservoir, supplies the horse with water.

In the central drawer, or manger, green meat may be placed; and then there are some iron bars which run across it, thus preventing the forage from being drawn out in too large quantities, and consequently wasted. This constitutes a very good soil-rack or manger. The space under the rack has likewise sliding doors to it, and here the straw and litter may be kept. The situation of the rings to which the halter is attached may be varied at pleasure. (*Veterinarian*, vol. 12. p. 193.)—ED.]

† This may be effected by a cross-bar six or eight inches from each side.—ED.]

he may have, one eighth part thus saved, it will amount to nearly a peck in a week. There must not, however, be a diminution in the horse's allowance on this account, if my advice with respect to feeding be followed. This kind of rack and manger, from being boarded up in front, will effectually prevent the litter from being kept constantly under the horse's head and eyes, by which he is compelled to breathe the vapours which arise from it. The length of the halter should be only four feet from the head-stall to the ring through which it passes: this will admit of his lying down with ease, and that is all which is required. The ring should be placed close to that side where the manger is, and not in the centre of the stall. The sides of the stall should be sufficiently high and deep, to prevent horses from biting and kicking each other. In post and waggon stables, where the stall is made for a pair of horses, the manger will be placed at each end, as described in the plate, and the hay-crib in the centre.*

The window of the stable should be at the south-east end, and the door at the opposite end. The window should be as high as the ceiling will admit of, and in size proportioned to that of the stable. In one of twelve feet high, it need not come down more than five feet, and will then be seven feet from the ground, and out of the way of being broken. The frame of the window should be moveable upon a pivot in the centre, and opened by means of a cord running over a pulley in the ceiling, and fastened by means of another cord. It is a good plan to have two doors, or to have the common door divided transversely, about four or five feet from the ground; the upper part may then be occasionally left open. Where much light is admitted, the walls of the stable should not be white, but of a stucco or lead colour, and better if painted; for then they may always be washed clean with soap and water, as well as the stalls, rack, and manger; and this should be done once in two or three weeks, or a month at furthest. If the walls are boarded up to the height of about five feet, and this, as well as the stalls, painted of a light wainscot colour, it will look extremely neat, and the under part of the wall will be kept drier, and look more comfortable. A stable, may be lighted by means of an Argand lamp suspended from the ceiling, and moveable. This will give a far better light, is cheaper, and more secure than any other contrivance whatever, except gas-light, and, if properly trimmed, will burn without a particle of smoke. Instead of having a large corn-chest in the stable, a handsome seat may be made at the back of the stable, extending as far as may be necessary: in this there may be partitions to separate the beans, or the bran, and places may be

* Perhaps, on the whole, the best situation for the rack, in ordinary stables, is on a level with the horse's head.—ED.]

made to rest the arms upon, so that a gentleman may sit down comfortably in his stable, and see his horses taken care of. A stable thus constructed will be found conducive to the health and the comfort of horses, and will afford an inducement to the groom to attend to every little circumstance which may contribute to cleanliness. He will not allow the smallest bit of dung to remain swept up at one end of the stable, as it commonly is. The pails should be kept outside, and not standing about the stable, as they commonly are. If it is necessary to take off the chill from water, it is much better, and more easily done, by the addition of a little hot water, than by suffering it to stand in the stable; and while the horses are at exercise, the litter should be all turned out to dry, and the floor well washed or swept out. A little fresh straw may then be placed for the horses to stale upon. Litter thus dried during the day will serve again as well as fresh straw for the bottom of the bed, and be perfectly free from smell. The litter necessary to be kept under a horse that he may stale with comfort, and without splashing himself, is not considerable, and may be changed once a day. A great saving may be made in litter by turning it out, and drying it as I have described; and if a shed were built adjoining a stable, it may be done at all times, and may serve also to exercise and clean a horse in wet weather.

Neither dogs, fowls, nor goats should ever be permitted to enter a stable*; and dung should be kept at a distance from it. In speaking of the arrangements of the stable, it may not be amiss to notice what I consider a good contrivance in cleaning horses; that is, to have two straps, one on each side the stall, about one yard from the head of it. By these the horse may be fastened during the time he is cleaned, by which means he will be effectually prevented from biting the manger or the groom; and being kept back in the stall, the groom will be better able to clean the front of his fore legs, chest, and neck, and be able to move round him: this is better than strapping him to the rack. When the common rack and manger are preferred, the rack staves should be straight, and brought nearly down to the manger, and this may easily be done without the necessity of a hay-loft, and the manger may be made deep and wide, as I have described it.

* When a horse that has been accustomed to company is taken to a situation where only one horse is kept, the society of a goat may contribute to his comfort, and make him more cheerful than he would otherwise be; and cheerfulness is certainly conducive to health.

CHAP. II.

FEEDING.

THE best food for horses is oats and hay; but it is of importance that such only should be given as are of the best quality. Oats that are musty, or that have any degree of bad smell, are not eaten with that relish that good sweet oats are; therefore they are not so perfectly digested, nor is the chyle that is formed from them so pure; hence arise indigestion, foulness of blood, looseness of the bowels, and general debility. This is more especially the consequence when the hay also is bad. I have known a serious loss sustained by a proprietor of post and coach horses, from keeping a considerable stock of oats, and neglecting to turn them. Many horses became glandered and farcied, apparently in consequence of this circumstance. Beans, when broken or bruised, may be an useful article of diet, joined with oats, for horses whose work is constant and hard. I have been assured, however, by some experienced coach and post masters, that during the hot summer months it is better to discontinue the beans.* Some horses, it is said, do not eat bruised oats with an appetite; in which case it is probable they do not digest them quite so readily as those which are not bruised. And when we consider that there is often a defect in the grinders, which causes a horse to masticate slowly and imperfectly; that horses have sometimes a voracious appetite, and swallow a considerable part of their corn without chewing it; and as corn that is swallowed unbroken is known to be indigestible; the bruising of oats must be considered as a matter of great importance, and may be the means of saving a considerable quantity of that article.† Another circumstance to be considered is, that when oats are taken into the stomach unbroken, being indigestible, they cause a great deal of useless exertion of the stomach in endeavouring to digest them. This exertion is not only useless, but very injurious, gradually weakening that important organ, and laying a foundation for many diseases, especially that named flatulent colic, or gripes.

It is generally thought, and I have been of the same opinion, that chaff, especially of clover, is an useful addition to oats, in

* Many large horse proprietors give green food in the summer instead of hay, in which case beans should be given to counteract the tendency the grass may have to produce scouring. Most horses eat green provender with avidity; and if given with moderation, and with some portion of hay, it is found very beneficial; but if given too profusely, and particularly if just cut, it is apt to produce flatulent colic.—Ed.]

† Bruised oats are apt to produce diarrhoea, particularly if the animal is worked hard; they should therefore be given with chaff and beans.—Ed.]

causing them to be perfectly masticated. It is also thought, that if the horse's hay were given principally, or even wholly in the form of chaff, it would be the means of a great saving of hay, as well as of insuring a perfect mastication of the oats. There are circumstances to be considered, however, which may make rather against this opinion.* Horses certainly prefer eating hay from the rack: and when it is good, and given four times a day in small quantities, the horse will eat his allowance with avidity, or with that appetite which will insure a perfect digestion and assimilation of the food; and so will it be with oats when they are good, cleanly sifted, and given in small portions at a time; and if spread thinly on the bottom of a wide manger, there will be no danger of his eating them too greedily. If he has any sharp edges in his grinders which prevent him from masticating properly, they must be rasped or filed, as will be described hereafter. Oats thus given, and not in excess, but duly proportioned to the horse's work, will be perfectly masticated, digested, and assimilated: the chyle formed from such a diet, and so dispensed, will be pure, and consequently the blood will be so also. Now let us contrast with this simple, wholesome, and economical mode of feeding, that which is commonly adopted. The hay, in the first place, is either of indifferent or bad quality, and given in unlimited quantity. The oats are generally, perhaps, tolerably good; but sometimes they are indifferent, or even musty and unwholesome: they are dispensed irregularly, and often in too large quantities at a time, and so thrown into the manger that a horse may easily fill his mouth, and in such a way that he must

* Mr. Stewart, in his work on *Stable Economy*, after enumerating at length the advantages and disadvantages of chaff-cutting, thus sums them up:—

“That, where the stablemen are careful, waste of fodder is diminished, though not prevented.

“That, where the racks are good, careful stablemen may prevent nearly all waste of fodder, without cutting it.

“That an accurate distribution of fodder is not a very important object.

“That no horse seems to like his corn the better for being mingled with chaff.

“That, among half-starved horses, chaff-cutting promotes the consumption of damaged fodder.

“That full-fed horses, rather than eat the mixture of sound and unsound, will reject the whole, or eat less than their work demands.

“That chaff is more easily eaten than hay: that this is an advantage to old horses, and others working all day; a disadvantage when the horses stand long in the stable.

“That chaff ensures complete mastication and deliberate ingestion of the corn: that it is of considerable and of most importance in this respect: that all the fodder need not be mingled with the corn, one pound of chaff being sufficient to ensure the mastication and slow ingestion of four pounds of corn.

“That the cost of cutting *all* the fodder, especially for heavy horses, is repaid only where the hay is dear, and wasted in large quantities.

“That, among hard-working horses, bad fodder should never be cut.”—ED.]

of necessity swallow some of them unmasticated or unbroken. This is more especially the case when two or more horses are feeding together without a separation; each of them is eager to finish his allowance as quickly as possible, in order to rob his neighbour; and in doing this, however perfect his teeth may be, he cannot avoid swallowing some of his corn without chewing it.

In the usual way of feeding and treating horses, no attention is paid to the state of the stomach when they are put to work, but frequently they are put into a chaise, or coach, or ridden off at a quick rate with their stomachs loaded with food; the consequence of this has often been gripes, inflammation of the bowels, and even sudden death. In the simple and economical mode of feeding I recommend, the horse is always ready for his work, digestion goes on rapidly, every particle of nutriment that is contained in the food is extracted by the stomach without any injurious exertion, and is converted into pure blood. But when the stomach is loaded, as in the other case, even with good food, digestion is always imperfect, and performed with difficulty; and when the hay, as it often is, is bad, the consequence is still worse. The stomach, by such management, is sure to become in time more or less diseased; and when this happens, a foundation is laid for many diseases.

Thus, besides the additional expense of this imprudent method of feeding, many disorders are engendered by it; and, I may safely add, that a horse so fed will not do his work half so well as one that is fed properly. A horse whose work consists in travelling a stage of twenty miles three times a week, or twelve every day, should have one peck of good oats, and never more than from eight to twelve pounds of good hay in twenty-four hours.*

Hay, as it is often given, is too dry for mastication, and often for digestion. For hay that has been suffered to stand until the seed becomes ripe is very deficient in nutriment, and difficult of digestion; and however perfectly it may be masticated, will only serve to oppress the stomach, without affording any thing that is capable of being formed into good chyle. Hay that has been kept more than one year becomes dry and deficient in nutriment, especially when kept in small mows, and exposed to the wind. When such hay, therefore, is given to horses, it requires to be moistened with water, and given in moderate quantity.

The hay, as well as the corn, should, if possible, be divided

* In stating eight pounds as the daily allowance of food for a saddle-horse, his stomach is supposed to be in a healthy state, and not stretched by immoderate feeding. In this healthy state of the stomach the appetite is always moderate, both for hay and for water. When the stomach has been accustomed to a much larger allowance, the necessary reduction in the quantity of hay should be gradual.

into four portions, and each portion, both of oats and hay, may be wetted with water: this will facilitate mastication and swallowing, and likewise digestion; a horse thus fed will so quickly digest that he will always be fit for his labour. The largest portion, both of oats and hay, should be given at night; and the next in quantity to this, early in the morning; the other two portions in the forenoon and the afternoon, or about twelve and four. But this must, of course, depend upon the kind of work a horse is employed in, and must be regulated accordingly. Horses that have been accustomed to an unlimited allowance of hay will often eat their litter when put upon a proper diet, but this must be prevented by a muzzle. It may require a little time, when a stomach has been injured in this way, to restore it again; but, by persisting in the mode of feeding I have recommended, it may almost always be accomplished. The injury done to the stomach, by the common method of feeding, and consequently to the animal's health or constitution, arises from the distention of the stomach with food, and the large bowels with excrement, which impedes respiration, and debilitates the stomach, considered only as a muscular organ; for digestion is performed in the horse, not only by a juice secreted in the stomach, but also by muscular contractions. When the stomach is debilitated to a certain degree, its secretion, the gastric juice, becomes unhealthy and deficient, and is incapable of converting the food into chyme, which is essential before the chyle *can be extracted* from it.

In a state of nature, and even in his domesticated state, under good management, the horse has a moderate and a very delicate appetite, and is very nice in his choice, both of food and water. I have seen a large stud of horses that were kept in the highest condition on an allowance of eight pounds of hay in the day and night, and five quarterns of corn. Horses so fed will not drink much water,—perhaps from two to four gallons in the day and night: while one that has acquired a voracious and depraved appetite has been known to drink four pailfuls at a time, that is, from twelve to sixteen gallons, and eat from thirty to forty pounds of hay in a day and night. With such a load in the stomach and bowels, what can be expected but an abridgment of the animal's life and services to one third of the period to which they might have been extended under proper management? and his labour during this short period is often interrupted by sickness.

The manner in which horses are commonly fed is apt to deprave or vitiate the appetite, and probably cause some degree of acidity in the stomach and bowels. This is the only way in which I can account for the propensity so common in horses to drink muddy water, and eat earth or dirt of any kind. Mr.

Feron, in his "Treatise on Farriery," says, "Horses at camp are very apt to eat earth or sand;" and that he has "opened horses that have died from this cause, and found nearly two buckets of sand in the large bowels, named colon and cæcum." Whenever this propensity is observed in a horse, a small knob of clay should be mixed with his water; but this will only afford a temporary relief: the propensity can only be cured by a mild dose of physic, and a change of diet. Though horses are often permitted to indulge this propensity because the groom or the proprietor does not perceive any ill effect immediately resulting from it; yet it is always, sooner or later, productive of ill consequences. It may, indeed, neutralise some acidity in the stomach and bowels, caused by immoderate or unwholesome feeding, and thereby do a little good for some time; but then it is only protracting a disorder for a short time, which such feeding is sure, sooner or later, to bring on. Disorders of this kind may be very slow in their accession and in their progress, and on that account may escape notice for a considerable time, and when they do appear are generally referred to some other cause. The same may be observed of disorders produced by pond water impregnated with excrement.

It is a very common opinion that the water an animal prefers must be the best for him: and were its appetite consulted when in a state of nature, this rule might be safely followed; but as horses are at present managed, it is generally necessary to choose for them, with regard both to food and water.

CHAP. III.

ON THE TREATMENT OF HORSES IN SUMMER.

It is too much the practice in turning horses out in summer to choose the richest pastures, as if the intention of giving them this indulgence were to fatten them. Many inconveniences result from this practice, and not unfrequently much injury is done to the animal, and great difficulty found in getting him into working condition when he is taken up. The best time for turning out a horse is the latter end of May, or beginning of June. High land is better than meadows, especially such as adjoin rivers, or are otherwise wet. Short sweet pasture should be chosen; it is better, indeed, to have it rather bare than abundant, and if there should not be sufficient, some hay and oats should be given. If the nights are cold he should be taken up at night, and put into a cool airy box, where he should also be kept during the day, when the weather is very hot and dry. A

small field or paddock is better than a large one; and if there is a stream of water or a pond in the field, and the horse has been accustomed to drink immoderately, it should be fenced off, and a moderate quantity given twice a day with a pail. A moderate quantity of vetches may be given with advantage in such a situation; taking care not to give them soon after they are cut, or with the dew upon them. By keeping a horse in this manner for a month or six weeks in the situation I have described, he will receive all the benefit to be expected from a run at grass, and avoid the inconvenience which so often results from the method commonly pursued. Another important advantage will be obtained by it; for when the horse is taken up there will be no difficulty in getting him into good working condition in a short time. If there is no convenience for managing the horse as I have described, it will be better to soil him with vetches or short sweet grass in a large airy box for about a month, than to turn him out in the manner generally practised. In soiling, only a moderate quantity of green food should be given at a time, and a small quantity of hay and oats should also be allowed.

[The practice of soiling hunters in the stable during the summer is strongly advocated by Nimrod, the celebrated sporting writer, who forcibly argues, that the preservation of condition, and a good state of the feet, and other benefits, will more than repay the increased expense. There can, indeed, be no doubt that the condition of the hunter is better preserved in the winter by not allowing it to be lost in the summer; and it is easier by this method to get a fine silky coat in the former season. The only objection to Nimrod's system is the increased expense incurred; its adoption must, therefore, in great measure, depend on the value of the animal.—ED.]

CHAP. IV.

EXERCISE.—TRAINING.

EXERCISE must be considered under two heads: first, that which is necessary to preserve the horse in health, and make him capable of ordinary exertions, or moderate work; secondly, that which makes him capable of extraordinary exertions, such as hunting or racing. Exercise of the last kind is commonly named training, which term, however, includes also the mode of feeding necessary to raise the muscular power to the highest degree it is capable of attaining. The horse was evidently designed for exercise, and for the use of man. His vast muscular

power, and the impenetrable defence attached to his feet, were certainly not given for his own use only. If kept in a stable, without exercise, his muscular power declines, his digestive organs become diseased, and so do the organs of respiration. The hoofs grow, and there is no wear; for the little that may be worn off, merely by the pressure of his own weight when standing still, is prevented by the shoes. The toe being thus elongated, the back sinews are often strained; the foot becomes hot and inflamed, its horny covering contracts; the frogs become rotten, and incapable of performing the office for which they were designed; in short, the whole body becomes diseased. Exercise, then, it is evident, is essential to his health, and even existence; and every part of his structure and economy appear to demonstrate that he was intended for the service of man. His powers, however, are limited, and so should his exertions be: but it is a fact, which must be regretted by all considerate persons, that the immoderate work in which he is often employed, so far from being salutary, or proportionate to his strength, as undoubtedly it was designed by his Creator that it should be, is injurious, and even destructive in a very considerable degree. And what greatly aggravates the mischief is, the early and premature age at which he is commonly employed.

When a horse is brought in for training, after having been kept in the manner described in the preceding chapter, he should be fed with hay and oats; and if greedy of water or hay, or if he appears inclined to eat his litter, he should be limited in hay and water, and be muzzled the last thing at night. For the first week he should have walking and gentle trotting exercise for an hour or two every morning. The stable should be kept clean and cool. The second week his exercise may be increased a little, and so may his oats. Should he appear, however, rather dull, the membrane of his eyes rather red or yellow on lifting the eye-lid, and the dung hard, in small knobs, and shining or slimy, it will be advisable to bleed moderately, and give a mild dose of physic, for which he should be prepared by giving two or three bran mashes a day for two days. The fourth week he may be worked moderately, and if wanted for hunting, he should be put into a canter or hand-gallop once a day; and after this it will be necessary to increase his pace twice or three times a week, so as to make him sweat freely; taking care that he is walked for some time afterward, that he may become rather cool before he returns to the stable, when he must be well dressed, fed, and watered, have a good bed placed under him, and be left to his repose. When a horse has been brought up from rich pasture he is generally loaded with fat, and requires a great deal of walking exercise and careful feeding. He may be trotted gently, however, after the second

week, but will not be for a quicker pace for a month at least. During this time he should have two or three doses of mild physic, and when first taken up, such horses sometimes require to be bled. When a horse is not taken up till the latter end of July or beginning of August, he has often a troublesome cough, which sometimes proves incurable; and sometimes dropsical swellings of the hind legs, which are not easily removed. Such horses give a great deal of trouble, and it is a considerable time before they can be got into condition. It must be obvious, that when a horse is taken in for training, the treatment to be adopted must depend upon the state of the horse's condition at the time, and the manner in which he has been previously kept; and, whether he is wanted for hunting or racing, the principle to be kept in view during the process is to keep him in a state of health, and gradually raise his muscular power and wind to that degree which may be necessary for the work he is to be employed in. This can be done only by proper exercise and feeding, giving, however, a little mild physic when necessary.

[Although there is little mystery required in getting horses into good condition, considerable care and constant attention are necessary. To give bulk and strength to the muscles, a good supply of nutritious food is required; but in order that this should not produce superfluous fat as well as flesh, plenty of exercise and occasional sweating is necessary.

A fine glossy coat is next essential, which can only be obtained by heat, assisted by plenty of grooming and hand-rubbing. The stable must be kept moderately warm, but it must be borne in mind that though warm air is useful, foul air is injurious: ventilation, therefore, must not be neglected. The necessary heat to produce a fine coat must be principally obtained by an abundance of clothing. Warm cordials and stimulants will assist in producing a glossy coat, though it is better, if possible, to avoid them: this is owing to the intimate sympathy between the skin and the stomach.

Since the former editions of this work were published, the practice of clipping and singeing has been introduced, and, it must be confessed, with considerable advantage. Where a fine coat can be obtained by the means before mentioned, clipping is not required; but many horses will carry a long thick coat in the winter, in spite of all grooming, and in others, it is impossible to bestow the necessary attention and expense required. In these cases, by removing the coat with the scissors, the horse that before could not travel a mile without sweating, can now perform a journey with neither inconvenience nor loss of condition; and when he comes home he can be cleaned in the course of an hour, instead of remaining wet all the night. Two things, however, must be borne in mind. The horse must have ad-

ditional clothing to supply that which is removed, and care must be taken that he does not stand still when without it, as, of course, he is more likely to take cold from this cause than before. The fact is, the horse must have a temporary coat instead of a permanent one, one that can be removed when at work and supplied when at rest.

The advantages of clipping are unquestionable; many horses can thereby be kept in condition throughout the winter that cannot by any other method.

The chief difference between singeing and clipping is, that by the former the hair is removed more completely; by the latter, it can be done several times during the season.—ED.]

DIRECTIONS FOR MANAGING A HORSE DURING A JOURNEY.

Previously to setting off on a journey the horse should be brought into good condition by being worked out for two hours every morning, and fed as I have directed in the chapters on feeding and exercise. The feet should be carefully attended to, and if they are dry and brittle, the soles should be stopped a few days with cow-dung, then pared rather thin, and for about a week before he begins his journey the feet should be kept stopped with tar ointment, which is then much better than clay or cow-dung, and in the course of a week will considerably improve the quality of the horn, and tend in a considerable degree to cool the feet. This ointment is of great use, also, about the heels of the frog and coronet, especially when they are dry and cracky. A horse had better be new shod about the same time; for when it is done just before he sets off, the shoe may not fit exactly, or a nail may be driven too close, and the horse be found lame in consequence during the first or second stage. The saddle or harness should be carefully examined, as much inconvenience sometimes arises during a journey from saddle or harness galls. The most important thing to be attended to during a journey is the method of feeding, as, by improper management in this respect, not only great inconvenience and delay often arise, but sometimes the most serious diseases are the consequence. The hay should be examined, and the best that can be obtained should be given. It is usual not to limit the horse in hay; but leave that part of his diet entirely to the discretion of the ostler, who takes care to keep the rack full. If a horse travels every day from ten to twenty miles, one peck and a half of corn will not be too much for him, provided he has only about 8 lbs. of hay, and the less hay he has the better; for by distending the stomach a morbid appetite is produced, which leads a horse to eat and drink much more than is proper for him, and this often proceeds to a depraved or voracious appetite,

which leads him to eat even his litter. While I was in practice at Exeter, and attended the horses of commercial travellers, I met with numerous cases of cough, broken wind, gripes, and other diseases produced by this cause. So common, indeed, is the practice of giving too much hay, that most horses have a greater appetite than in the natural healthy state; the capacity of the stomach having been increased by frequent distention, and the capacity of the lungs, or wind, not unfrequently proportionably diminished. When a horse comes in from a stage, the feet should be picked out and examined the first thing; and the common practice of tying up a horse at a stable door, and washing his legs, is not injurious if the horse is cool and has been walked quietly in; but he should never be taken to a river to be washed. The horse should never be put in a hot close stable, however comfortable it may appear, nor is a dark stable desirable, unless a horse is very tired, and then, perhaps, he lies down more readily. When there is no work for a horse, he should always be taken out and have one hour's exercise, at least, early in the morning; he may then have his full feed without injury, and be perfectly fit for the work he is wanted for; but when this cannot be done, especially for two or three days, he should have less corn and some cold mashes. These few hints will, perhaps, be acceptable to the young traveller; and if any disease or accident happens during the journey, he will find it noticed in this volume.

PART II.

THE STRUCTURE AND ECONOMY OF THE HORSE.

CHAP. V.

A GENERAL VIEW OF THE STRUCTURE OF THE HORSE.

[ANIMAL bodies differ from those of vegetables chiefly in the possession of sensation and voluntary motion. Whilst the vegetable is confined to the soil in which it is located, and derives its subsistence from the surrounding elements, animals have the power of moving from place to place, and of gratifying the various sensations with which they are endowed. The structure of animals is, consequently, much more complicated than that of vegetables; but in proportion as an animal is low in the scale of creation—as it approaches a state of vegetable existence—we find its structure more simple—its sensations fewer, but its vitality greater.

In the horse we have a high degree of organization, and consequently a vast variety of complex structures.

The body is composed of solids and fluids; the latter exceeding the former in weight in the proportion of six or eight to one. To the solids, however, is owing the organization of the frame; for they surround and contain the fluids. Late anatomists consider that animals are composed of three forms of tissues, which they have denominated the *fibrous*, the *lamellar*, and the *globular*. The two former are exemplified in the structure of the *cellular* substance, which composes the greatest portion of the animal fabric: the fibrous is characteristic of the muscular and ligamentous structures: the fibrous, united with the granular, is exhibited in the texture of the glands, and in the medullary substance of the nervous system; and the globular is shown in the composition of the chyle, the blood, and several of the secretions. These several textures being combined together in different proportions, we have the various organs of which the body is composed.

To give support to the animal frame, and afford fixed objects for the attachment of various parts, is the use of the skeleton, which is composed in the horse of nearly two hundred bones of various sizes and shapes. These bones, in order to admit of motion, are connected one to another by means of strong bands, called ligaments; the ends of the bones being constructed in

various ways, so as to admit of motion: in many we have the form of a hinge; in others that of a ball and socket.

The motion of the limbs is effected by means of the muscles or flesh, which, although to a casual observer appearing as a homogeneous mass, is readily separable into a greater number of distinct bodies of various forms and sizes. These muscles have commonly two separate attachments, which are usually bones, and, by contracting in length, they bring these points of attachment nearer to each other. Muscles are composed of a vast number of fibres, which, on being acted on by nervous influence, diminish in length and increase in bulk, and thereby approximate the different objects to which they are attached. They are usually fastened to bones by means of a strong white substance called tendon, which, however, possesses in itself no power of contraction, but merely communicates the contractile force to the object to be acted on. Where the two objects of attachment are distant from each other, the greater portion of the distance is occupied by the tendons, the advantage of which is obtained from their diminished size in proportion to their strength: thus we find the legs of horses below the knee are light and slender, from the absence of muscular and the substitution of tendinous substance. The greater part of the muscles are voluntary, being under the control of the mind; but some are involuntary, such as the heart and the diaphragm.

Muscles are extensively supplied with vessels of various kinds, such as arteries for their nourishment, and veins for the return of the blood after this purpose is effected. There are likewise nerves, which not only furnish sensation, but also communicate to them the mandates of the will.

These nerves proceed either from the brain or spinal cord, which, therefore, may be considered as the fountain of sensation, and the residence of the mind; and thus sensation is first sent from the extremities to the brain by the nerves, and then by another set of nerves the will is conveyed to the muscles.

The brain is a soft pulpy substance contained within the head, and the spinal cord is somewhat similar in appearance, and extends from the brain to the tail, through a hole in the bones which form the spinal column.

The body is divided into two principal cavities, the chest and the abdomen; and separated by a muscular partition called the diaphragm. The former contains the lungs and heart, whose uses are to purify and distribute the blood by means of respiration and the circulation; and the latter contains the stomach and bowels, in which the functions of digestion are carried on, besides several important glands, such as the liver, kidney, and pancreas, together with other supplementary parts.

The food having been well triturated by the teeth, and mixed

with a sufficient quantity of saliva, which is chiefly secreted by the parotid glands at the root of the ear, is then conveyed into the stomach by means of a long muscular tube which passes through the cavity of the chest. In the stomach the food is acted on by a peculiar fluid called the gastric juice, and is then passed into the small intestines, where the chyme, as the food is then called, becomes mixed with the bile, a yellow fluid secreted by the liver. Both the small and large intestines are fastened to the spine by means of a strong membrane called the mesentery, which, besides veins and arteries, are furnished with a vast number of small vessels called lacteals. These lacteals open into the intestines, and there absorb the nutritious part of the food, which is a white milky fluid, the chyle, and convey it to a vessel running along the course of the spine, which empties itself near the heart into the circulatory system. Thus by these means the blood becomes enriched with nutriment, and is thus enabled to supply the constant waste the system is continually undergoing.

The blood being furnished with nutriment, requires to be purified before it is fit for circulation: for this purpose it passes into the right side of the heart, by the muscular contraction of which it is sent to the lungs, where it becomes exposed to the action of the atmosphere, by which it is changed from a dark to a light red colour, and being freed from impurities, it enters the left side of the heart, and from thence is sent, by means of the arteries, to all parts of the body, supplying every part with nourishment, and also the various glands of the body not only with their own proper nourishment, but with materiel for the secretion of their peculiar fluids. Thus, the salivary glands separate the saliva from the blood; the pancreas a juice somewhat similar; the testicles the semen; and the kidneys the urine. Each gland separates its peculiar fluid and no other. The urine, being secreted by the kidneys, is conveyed by means of two small but long tubes into the bladder, whence it is excreted from the body.

The liver is nourished by the arteries, but separates the bile from the dark impure blood, which is conveyed to it by a large vein.

The contents of the bowels are passed onwards by the influence of their peculiar action, and having had the nutritious part extracted, are excreted from the body generally in a solid form.

The *cellular* membrane is a very elastic substance, and enters largely into the composition of the body; it connects the various glands together; forms frequently a covering for the muscles as well as for various vessels, and exists in the form of cells, which have communication with each other.

The *adipose* membrane is found in various parts of the body, and, indeed, secretes the fat, which is deposited in a liquid form

and in small circumscribed bags. The fat thus contained often performs the important office of affording a cushion for parts that would otherwise be exposed to injury; thus we find that the socket of the eye is abundantly furnished with this material.

There are two other important membranes which are extensively found in animal bodies; they are the serous and mucous membranes. Whenever an internal part has an external opening, we find that it is furnished with a *mucous membrane*, which secretes mucus for its protection; but when the cavity has no external opening, that it is lined with a serous membrane, which secretes a thin watery fluid to lubricate the parts, and preserve them from injury by friction. Thus from the entrance of the mouth and nostrils to the anus, throughout the whole internal surface of the bowels, a mucous membrane exists, by which the fluid is secreted, the nature of which gives a name to the membrane, and which protects it from injury either by the external air, or by the contents of the bowels. In like manner, we find the bladder and urinary organs similarly lined.

On the other hand, the cavity of the chest and the abdomen, with their contents, as well as the internal surface of blood-vessels, are furnished with a *serous* membrane, which secretes a watery vapour.

These different membranes are very frequently the seat of disease, and are subject to severe and dangerous inflammations.

The admirable manner in which the various organs are packed away in their proper cavities is worthy of particular notice. The lungs and the heart are so adapted to the shape of the chest, that there is at no time any vacant spot; and the more numerous contents of the bowels are so disposed, that while each has sufficient freedom for the proper performance of its functions, yet the whole are packed away with the most economical care:—there is no void to be found.

From this cursory view of the matter, it will be seen how numerous and complicated are the structures which compose the frame of an animal, and yet how admirably they are combined together and harmoniously agree. — ED.]

CHAP. VI.

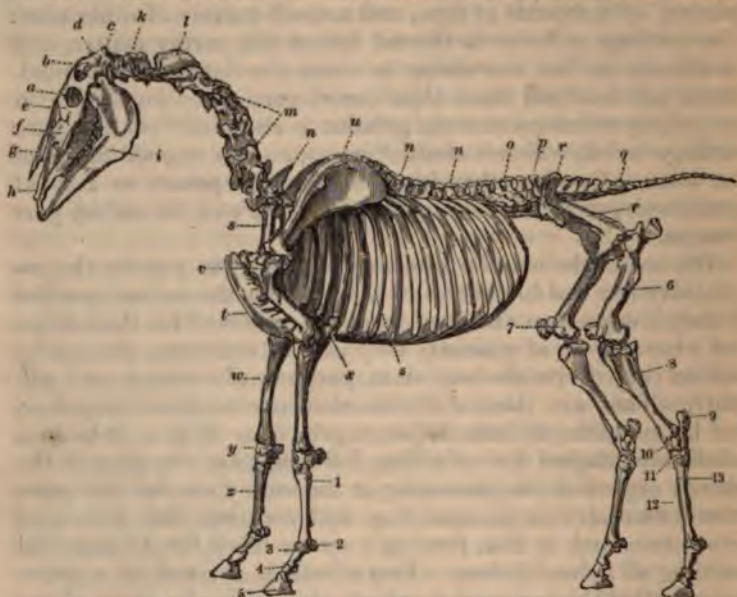
ON THE SKELETON.

[THE skeleton of animal bodies is formed of bone, a substance possessing firmness and stability for the attachment of muscles, the protection of the vital organs, and the support of the softer parts. It is composed of animal matter and earthy salts; the

former consisting of cartilage, gelatine, and fat or marrow, and the latter of phosphate of lime in considerable proportion, a lesser quantity of carbonate of lime, and a small portion of other salts. The cartilage of bones is formed before the earthy matter, and constitutes in fact the nidus in which the latter is deposited. Bones can be freed from their earthy portion by immersion in an acid, by which process the gelatine is also dissolved, and pure cartilage is left, which is elastic, but retains the original figure of the bone. On the other hand, bones by exposure to a great heat are deprived of the animal substances, and the earthy part remains.

The use of the marrow is more particularly to prevent the too great dryness and brittleness of bones. To the animal portion of their composition are they, therefore, indebted for their shape and what degree of elasticity they possess, and from the earthy portion they derive the important purposes of strength and stability. Thus are these different elements combined together, and by an union of their different principles form a substance admirably adapted for affording full scope for the play of the various organs of life, protecting at the same time the vital parts from external injury, admitting and assisting the powers of locomotion, and, in fine, forming a secure fabric for the beautiful building of animal frames. Every bone is covered by a membrane called the periosteum, which also lines the internal cavities, and secretes the marrow: its use is to circumscribe the form of bones, and protect them by its tenseness, as well as to afford the medium whereby they are furnished with their vessels. The shape of particular bones intimately corresponds to the purpose for which they are intended: where for the office of protection, we find them flat, and where for the purpose of motion, long and cylindrical, as in the extremities. In the construction of the skull the most perfect mechanism is displayed. The first object to be obtained is the protection of the brain from the accidents to which, from the peculiarities of animals, it is mostly exposed. For this purpose the skull consists of two tables or plates; the outer thick and tough, the inner hard and brittle: the former, by yielding in a measure to resistance, diminishes concussion, whilst the latter by its hardness prevents sharp bodies from penetrating to the brain. Now, if these two plates were reversed, the *brittle* would not only be in great danger of fracture, but would also vibrate considerably; and the injurious effect of this vibration may well be conceived when we are told that, even with the present wise precaution, it often occasions greater mischief than the most serious fractures. Between the skull and the brain are interposed several membranes, which also assist materially in preventing vibration, just as a piece of parchment would inside a rummer glass. The skull is composed in animals of upwards of

thirty bones, which are connected together by a dovetailed suture. It used to be considered that the object of this exten-



- | | | | |
|-------|---|----|--|
| a | The frontal bones. | y | The bones of the carpus, or knee. |
| b | The parietal bones. | z | The metacarpus, or cannon bone. |
| c | The occipital bone. | 1 | The small metacarpal or splint bone. |
| d | The temporal bones. | 2 | The sesamoid bones at the back of the fetlock joint. |
| e | The malar bones. | 3 | The os suffraginis, or large pastern. |
| f | The superior maxillary bones. | 4 | The os coronæ, or small pastern. |
| g | The nasal bones. | 5 | The os pedis, or coffin bone. |
| h | The inferior maxillary bones. | | The navicular bone is unseen. |
| i | The posterior maxillary bones. | 6 | The fæmur, or thigh bone. |
| k | The atlas, or first vertebra. | 7 | The patella, or knee-pan, situated in front of the stifle joint. |
| l | The dentata, or second vertebra. | 8 | The tibia, or leg bone. |
| m | The other five vertebræ. | 9 | The os calcis, forming the point of the hock. |
| n n n | The dorsal vertebræ. | 10 | The astralagus, the principal bone of the hock joint. |
| o | The lumbar vertebræ. | 11 | The small bones of the hock, the seat of spavin. |
| p | The sacral bone. | 12 | The metatarsus, or cannon bone. |
| q | The ossa coccygis, or bones of the tail. | 13 | The small metatarsal or splint bone. |
| r r | The haunch bones, or bones of the pelvis. | | The other bones of the hind leg correspond with those of the fore extremity. |
| s s | The ribs. | | |
| t | The sternum, or breast bone. | | |
| u | The scapula, or blade bone. | | |
| v | The humerus, or shoulder bone. | | |
| w | The radius, or fore arm. | | |
| x | The ulna, forming the elbow. | | |

sive division of the bones was the convenience of ossification, which always commences at the centre, but a more extended view has discovered other wise purposes; for not only is the dovetailed suture the strongest mode of union, but it is also the best adapted for securing the brain from injury, as it yields con-

siderably to the impression received, and thus wards off both concussion and vibration. There is an exception, however, to this usual connection in the temporal bones, which form the sides of the cranial cavity, and which are connected to the other bones by what is termed the squamous suture — one bone, in fact, simply overlaps another. This union is inferior in strength to the former; but nature has here another office to perform, and the reason of this exception will at once be comprehended on examining the skull. If a considerable blow be received on the upper portion of the arch, its sides are the parts most likely to give way; and to guard against this consequence, the *under* bone overlaps the upper, and thus acts like the tie-beam of an arch in keeping the parts together. This dovetailed suture does not connect the bones of the inner table; for though a carpenter might find this mode of union serviceable in joining the sides of a wooden box, a workman would by no means find it applicable in connecting together brittle substances, as it would be extremely liable to chip off at the edges.

The *Cranial* cavity, or that part which contains the brain, is not more than a fourth the size of the other parts of the skull, the remaining portions being devoted to mastication and smelling. There are no less than nine bones which enter into the composition of the cranium. The *two Frontal* bones form the anterior part, usually called the forehead; but the internal plate of these bones separates and recedes from the external plate so as to form a cavity between them, which is called the frontal sinus, and is divided by a septum or ridge of bone between them: the internal plate forms a covering for the anterior lobe of the cerebrum.

The *two Parietal* bones are situated at the upper and middle parts of the cranium, and cover the middle lobes of the cerebrum, to which their internal part closely corresponds. These bones become closely united after the second or third year.

The *Occipital*, a single bone of great strength, is found at the back and base of the cranium. Its internal surface covers the cerebellum, and on a strong process at the base the medulla oblongata rests. The external surface of this bone is extremely irregular. At its upper part we find a crest or ridge of bone, to which the cervical ligament is attached, as well as several muscles of the neck. Below this is the occipital hole, through which the spinal cord, as well as some nerves and an artery, make their exit from the brain. On each side of this hole the bone is smooth and rounded, for the purpose of articulating with the atlas, the first bone of the neck; besides which there are several curious processes for the attachment of muscles. In the foal this bone may be separated into four pieces.

The *Temporal* bones, forming the sides of the cranium, are composed of two parts, the squamous and the petrous. Though in

man these pieces are united, yet in the horse they are distinct from each other. The *squamous* portion is externally a convex plate, with a hooked projection arising from it; this process assists in forming the zygomatic arch. The squamous portion affords at the posterior part a shallow cavity for the articulation of the lower jaw bone. This glenoid cavity, as it is termed, is much deeper in carnivorous animals, who require to open their jaws more extensively; and an inspection of this portion of the skeleton alone will enable the comparative anatomist to decide to what order the animal might have belonged. In herbivorous races a grinding lateral motion of the jaws only is required, and, accordingly, the articulation is wide and shallow. The zygomatic arch, too, is much more arched in the carnivora, in order to afford more room for the development of the temporal muscle which governs the jaws, than is required for the more moderate exertions of herbivorous animals.

The *petrous* portion of the temporal bone, so called from its rocky nature, is apparently a solid convex figure. It contains, however, the organ of hearing, and has on its internal surface orifices for the passage of the auditory nerve, and on the external part we find a larger orifice for the passage of sound. The internal structure of this bone is as beautiful as it is curious; possessing vestibules and canals for the ramification of the nerve, and a singular cavity having a communication with the mouth, in which are discovered four diminutive bones, with their corresponding muscles, which serve the purpose of propagating and modifying the sound.

The inferior and middle parts of the cranium are formed principally by the *Sphenoid*, a bone which somewhat resembles a bird in flight, having a body and four processes, two of which are called the wings, and two the legs. This bone supports the middle lobes of the cerebrum, and presents several holes and depressions for the passage of nerves.

The cranial cavity is separated from the nasal by the *Ethmoid* bone, which also somewhat resembles a bird in flight, but without legs, and is situated in front of the bone last described. It supports the anterior lobes of the cerebrum, and has holes for the exit of the olfactory nerves; and on its internal and inferior surface it forms cavities, called the ethmoidal sinuses, which are separated by a bony septum from each other, and are perforated by a vast number of small holes for the passage of the olfactory nerves to the nasal cavities.

Such is a very brief, and consequently imperfect description, of the bones composing the brain-case, which are arranged in a form at once the most compact and most durable; so that the noblest bridge which spans our rivers, or the finest dome that surmounts our cathedrals, is inferior to the mechanism displayed in the simple construction of the skull.

The *Face* occupies in horses much the largest portion of the skull, which is necessary more particularly to afford sufficient room for the development of the molar teeth. The superior and anterior part of the face is occupied by the nasal bones, which thus form the roof of the mouth, and the cavity of the nose. These bones are somewhat conical in shape, the base being above, from whence they taper irregularly to a point below.

The *Superior Maxillary* bones form the greater portion of the face, extending the whole length of the molar teeth, for which these bones form suitable sockets, and laterally, from the molar teeth to the nasal bones. Within the cavity of the mouth these bones form the roof of the palate, being united together in the middle by a suture. They also form the greater portion of the nasal cavity, thus having three surfaces, the facial, the nasal, and the palatine.

The *Anterior* or *Inferior Maxillary* bones are singular, inasmuch as they are wanting in the human subject. They commence in the angle formed by the separation of the nasal from the maxillary bones, whence they extend downwards, connected to the latter bones, but reaching much beyond them; they then become larger and stronger, so as to afford deep and secure sockets for the upper incisor teeth.

The *Molar* bones are situated on the sides of the face, above the large maxillary bones; they are somewhat singular, and very irregular in shape, a part being situated within the orbit of the eye. They form nearly half the border of the orbit; and their upper part assists in forming the zygomatic arch, from whence a ridge of bone, called the zygomatic spine, is continued downwards, not only to the extent of these bones, but also to that of two inches of the superior maxillary bones.

The *Lachrymal* bones, so called because the lachrymal duct for the conveyance of the superfluous tears to the nostrils passes through them, is situated about half within and half without the orbit, the latter portion being between the malar and the nasal bones.

The *Palate* bones are situated at the base of the cranium, and at the upper part of the palatine surface of the superior maxillary bones. They jointly form the concave or semi-oval border, which separates the cavity of the nostrils from that of the mouth. A small portion of the bones assists in forming the back part of the orbit.

The *four Turbinated* bones are situated within the cavity of the nostrils, the two superior being attached to the nasal, and the two inferior to the maxillary bones. They are oblong, porous, and extremely thin, and rolled up somewhat like a turban. By this conformation their surfaces are greatly extended for the spreading out of the olfactory nerves.

The *Vomer* is a long thin bone, situated at the floor of the nostrils, and running throughout their length; its upper or anterior part forms a deep groove, into which the cartilaginous septum of the nostrils is closely imbedded, by which these are separated into two distinct cavities.

The *Inferior Maxillary*, or lower jaw bone, is formed of two symmetrical halves, united at the inferior part by cartilage in the young subject, but by bone in the adult. This united portion forms deep and strong sockets for the inferior incisor teeth, and posterior to this for the tusks: above this, each half separates, and forms the bars of the mouth, as the space between the incisor and the molar teeth is termed; the bone then becomes gradually wider and deeper, so as to form the sockets for the inferior molar teeth; after which it diminishes in size, and terminates in rounded extremities which correspond to the glenoid cavity in the temporal bone before described, thus forming the maxillary joint.

The bones which we have mentioned as composing the face are none of them solid in their structure: but in order that the requisite amount of surface should exist without too great weight, they are most of them hollow; and thus various sinuses are formed, which are called after the bones in which they are found. First we have the *frontal sinuses*, which are situated between the orbits; they are triangular in shape, their flat surface being above, and two irregular ones below: they have inferiorly blind terminations, which are called the nasal sinuses, being in the nasal bones; and they communicate with the maxillary sinuses, which are situated somewhat below and in front of them.

The *Maxillary* are the largest of the sinuses of the head, extremely irregular in shape, and are formed principally by the superior maxillary bones: their upper part is separated from the orbit by the lachrymal and malar bones, which form their superior parts; their lower extremity is blind, but above this there is an opening into the chamber of the nostrils, besides the communication before spoken of with the frontal sinus.

There are other small sinuses, called the *Sphenoidal*, the *Ethmoidal*, and the *Palatine*, being found within the bones after which they are called. The first of these is a single sinus, and the last is situated between the palatine and the maxillary bones.

These singular cavities are not found in the young subject, but are gradually formed as the size of the head increases: one important purpose which they therefore serve is, to increase the size of the head, without adding to its gravity. These sinuses are often the seat of disease in glanders, when they often contain matter, and are in an ulcerated state.

The manner in which the head is connected to the body is very remarkable, and demands particular consideration. In

man it rests upon the spine, nicely balanced, as on a pivot; but the larger heads of quadrupeds are suspended from the body. Now if we consider the immense weight of the head of the horse, which is much increased from being placed at the extremity of a lever, we cannot fail to be convinced of the prodigious power necessary to support it. If this weight were supported by muscular power, there would be a very considerable consumption of vital energy; but to save the exhaustion this would produce, there is a large ligament rising from the occiput, attached to the bones of the neck and the spines of the back, which, being elastic, admits the motions of the head, and supports it at all times, even when the muscles are in a dormant state. This ligament is known as the *ligamentum colli*, or, commonly, as the *packwax*.

We must now proceed to describe the spine and chest. The spinal column has three important offices to perform: it is the great bond of union between all parts of the body; it forms a tube for the passage of the spinal marrow, a part as important as the brain itself; and, lastly, it is in animals the fixed object from whence the head is suspended. If the protection of the spinal marrow were the only object to be effected, it would have been simply a strong bony tube; but whilst it possesses great strength for this purpose, considerable flexibility is also required, and accordingly it is composed of a multitude of bones, more or less in different animals, according to their wants and habits. The feline races require the utmost degree of elasticity, in order to climb up and spring from eminences, and seize their prey with facility; but if these animals could be tamed sufficiently to make them bear burdens or go in harness, they could render us but little service in this new capacity, from the want of strength and stability in the spinal column. But in herbivorous animals, which are required to draw or sustain heavy weights, strength is the principal object, and accordingly we find they have much less flexibility than carnivorous animals: this stability is the distinguishing feature of the whole skeleton, but more particularly of the spinal column of the horse.

The *Neck* of the horse is composed of seven bones, the two first of which will more particularly demand our attention, as they essentially differ from the others in their aspect and their use. The first is called the *atlas*, from the circumstance of its sustaining the head, as it does in man, although in the horse the head is rather suspended from it. The second is called the *dentata*, from having a tooth-like process on its front part. The atlas has concavities on its anterior part, which articulate with two smooth condyles or prominences on the occipital, the last bone of the skull; this joint is called into requisition in bending the head backwards and forwards, and particularly in

the act of nodding; but it scarcely admits of any lateral motion, as a double movement, and too great flexibility, would have endangered the safety of the spinal marrow, which passes from the occipital hole through this bone. However, to admit the necessary horizontal motion required by the animal, the second vertebra is called into requisition, and its odontoid process fits into a cavity in the under and posterior surface of the atlas, and forms a sufficient resemblance to a ball and socket joint to allow considerable lateral motion. We cannot sufficiently admire the beautiful mechanism by which these important movements are safely secured; the second joint would have been as inapplicable for the uses of the first as the first would be for that of the second; for if the second joint admitted vertical motion, the consequence would be that the tooth-like process would be forced against the spinal marrow every time the head was bent forwards; but by the actual structure, the joint being underneath the spinal cord, either a rotatory or a vertical motion can be safely enjoyed.

The remaining bones of the neck are very similar to each other, their shape being very singular and irregular. They have each a large hole running through them, for the passage of the spinal marrow; a ridge on the upper part for the attachment of the cervical ligament; processes on the side for the insertion of the powerful muscles that move the head and neck; small foramina or holes, for the passage of nerves and blood-vessels; and on the anterior part a round head, which is received into a cavity in the back part of the bone in front of it; also processes or legs which proceed from the front part of each bone, and meet and correspond with similar processes on the back part of each bone. These bones, however, never actually touch each other, for if they did there would be too much concussion; but between every two bones, and extending throughout the whole spine, there is interposed a gristly substance, enclosed in an elastic body, which yields and recoils like an air cushion. In the human subject this power of dilatation exists in a very considerable degree, owing to which men will often measure more in the morning than in the evening after their daily toil is completed.

Though in horses this power of dilatation is not possessed in an equivalent degree, yet the elastic intervertebral substance greatly contributes to the elasticity of the frame. With the seven bones of the neck the spine is composed of no less than thirty separate pieces, which are distinguished as the dorsal, or vertebræ of the back, and the lumbar, or those of the loins. All these bones have a hole through their bodies for the passage of the spinal cord. The *dorsal* vertebræ, eighteen in number, are connected with each other in a manner similar to those of

the neck. They have on the upper surface long processes, which proceed upwards and backwards, forming the withers; these processes gradually increase in length from the first to the fifth*, when they gradually decrease to the twelfth or thirteenth, and then continue the same. Each dorsal vertebra is connected, by means of a joint, with two ribs, of which there are usually eighteen pairs in the horse.

The lumbar vertebræ are five, and sometimes six, in number, and differ from the other vertebræ from having much longer lateral processes; but their spinous processes are somewhat shorter than those of the back. The lateral processes serve, in some measure, to supply the absence of the ribs, giving support on their upper surfaces for the strong muscles of the loins, and below forming a roof for the protection of the abdominal viscera. When we see a horse with a very light carcass these transverse processes are usually very short.

These bones compose the spine, but the spinal cord is continued through the *sacrum* or rump-bone, which, in the young subject, is composed of five separate pieces, like the lumbar vertebræ, but in the adult is consolidated into one bone, and forms a roof for the pelvis, and a protection for its contents. At the extremity of the sacrum the bones of the tail, about eighteen in number, called the *ossa coccygis*, begin. The sacrum is slightly arched, so as to afford greater room below, and its spinous processes differ from those of the loins in sloping in an opposite direction.

The *Pelvis*, so called from its resemblance to a basin, is an irregular cavity which contains the urinary and genital organs, and is formed by the sacrum and the *ossa coccygis* above, and the two *ossa innominata*, or haunch bones, on each side and below. In the fœtus this bone is composed of three separate pieces, the *ileum*, the *ischium*, and the *pubes*. The *ileum* is the largest division, forming the upper and anterior part of the bone, and those visible projections in the horse, the hips, at the sides, and the part above close to the sacrum, which projects so much in goose-rumped horses, as they are called; the *ischium* is the part which projects backwards, and the *pubes* the portion which joins inferiorly the corresponding part on the other side, the union forming the symphysis pubis. All these separate pieces unite in forming the socket into which the first bone of the hind extremity fits, thus composing the hip joint.

The Bones of the Fore Extremity.

A superficial observer would be apt to imagine that animals differ from each other, and from man, and from birds, in

* These bones are often diseased in fistulous withers.

no respect so much as in the shape, the structure, and bony conformation of the fore extremity; and certainly when we observe the great length of it in some animals, and its extreme shortness in others, scarcely projecting from the body, in some expanded out into the form of the human hand, in others consolidated and protected by a horny case, we cannot wonder at such an idea being entertained. The anatomist, however, finds that this diversity is much greater in appearance than in reality; indeed, in all warm-blooded animals there is a general resemblance, all having four parts in common, viz. the shoulder, the arm, the forearm, and the metacarpus, or shank. The most striking variety obtains in the mode of connection with the body. Whenever the fore extremity is not used for the purpose of sustaining the body or for locomotion, but for holding and retaining objects, as in man and in monkeys, or for that of flying, as in birds—where, in short, a degree of rotatory motion is required, the connection is bony, by means of the clavicle, or collar-bone. But in animals in whom the weight of the body is to be sustained by the fore extremities, such a connection would be inadmissible, and would expose the body continually to concussions and fractures. In most quadrupeds, therefore, the connection is by means of muscle or flesh; the body is in fact suspended, like a carriage on springs, between the two shoulder-blades. This it is which in great measure gives that springiness to the motions of the horse so delightful to the rider, which enables him to alight from the highest leaps with safety to himself, and to bear his master harmless over a brook or ditch nine yards wide. To accomplish this desirable faculty of sustaining great burdens without concussion, free motion is admitted in a backward and forward, but scarcely any in a lateral direction. In dogs and cats a much greater degree of lateral motion is possessed, but the connection with the body is considerably weaker, and the power of sustaining much weight is not possessed.

All animals have a *Scapula*, or shoulder-blade, which in the horse is a flat triangular bone, having its external surface divided vertically by a ridge, which serves as a protection and an object of attachment for muscles. This bone is flat, in order to afford greater space for connection with the body, but its breadth diminishes towards the lower part, for the purpose of forming the shoulder joint.

The *Humerus*, the next bone, is rounded at its upper part, and is received into a cavity at the end of the scapula, which is extremely shallow in most animals, as there is but little danger of dislocation when the motion of the limbs is limited to two directions. In man the motion of the joint is much more extensive; and although the cavity is considerably deeper in him, yet dislocation frequently takes place. The humerus is a cylindrical

bone, possessing great strength; and we shall always find that when strength is chiefly required, a cylinder is the favourite form. In addition to this, in common with most of the bones of the extremities, the middle is hollow, and contains the marrow, a very light fatty substance, deposited in cancelli or bony cells. The reason of this conformation is, that a certain bulk is necessary for the attachment of muscles, and the utmost degree of strength is required with the least quantity of matter and a diminished weight, which purposes are effected by removing the material as it were from the centre, and accumulating it on the circumference. The extremities of the humerus, as well as all cylindrical bones, are much larger than the middle portion, which is for the purpose of affording a greater surface for the articulation of the joints, and the insertion of muscles to mechanical advantage. This extension of surface, however, is procured without any increased weight; for there being but little danger of fracture at the ends of bones, great strength is not there required. The bony case is therefore much thinner than in the middle of the bone, and the internal part is filled with the cancelli, or bony cells, which contain the marrow. The lower portion of the humerus forms a very important joint, viz. that of the elbow, which in man admits of considerable rotatory motion; but in the horse, as lateral movement is not required, the action of the joint is limited to one direction, backwards and forwards, and thus dislocation never takes place.

The *Forearm* is composed of two bones, the *radius* and the *ulna*. In man, both bones offer separate surfaces for articulation with both the elbow and the wrist, or carpal joint, by which means the arm possesses a rotatory motion; but, in the horse, this not being required, the strength of the limb is concentrated in the radius, and the ulna serves merely as a powerful lever for the attachment of muscles, and the security of the elbow joint. The radius is therefore a strong cylindrical bone, whilst the ulna is large at the upper part, which rises above the radius, and is attached to it, and gradually tapers downwards, but does not reach the knee.

The *Carpus*, or, as it is commonly termed in the horse, the knee, corresponds with the human wrist, although apparently so different. It is composed of seven bones in the horse (one less than in man), which are arranged in two rows, thus forming three distinct joints — firstly, that between the radius and the first row; secondly, between the first row and the second; and, thirdly, between the last and the metacarpal bones.

Each of these joints possesses considerable action, moving as it were like so many hinges, the fulcra of which are placed at the back parts of the knee; the lowest joint, however, does not enjoy so much latitude of motion as the others. One of the

carpal bones is placed at the back of the knee, where it sustains no weight, but acts as a lever for the attachment of muscles, and forms that prominence so perceptible at the back of the knee in horses. Although the knee does not possess so much motion as the wrist in man, yet the horse requires a certain number of bones and joints, in order to obviate the concussion to which he would be otherwise liable; for it is necessary that he should move with great celerity, and, at the same time, that the vital organs should be secured from the shock that would be experienced, if the same concussion that the feet received were communicated to the internal organs. To accomplish this purpose, the joints greatly contribute; and none more so than that of the knee, which is placed at an equal distance between the body and the ground.

To neutralise the jar, no two bones are permitted to touch each other, for each is tipped with cartilage at the place of junction, and is covered with a fine delicate membrane, by which an albuminous fluid, called synovia, is secreted. This fluid, being confined by what is called the capsular ligament, lubricates the joint, takes away the jar, and prevents the bones from coming into contact with each other. The importance of this fluid is strikingly shown in cases where the joint is opened by some severe injury, and the synovia escaping, the atmosphere is admitted; the synovial membranes come in contact, and the most severe inflammation is set up, attended with excessive pain; and the result frequently is, unless the cavity can be quickly closed, the horse either dies from irritation, or the motion of the joint is destroyed by the secretion of bony substance in and around it.

The lower row of the knee bones rest upon the metacarpus; which in man and many animals is composed of four bones, nearly equal in size, but in the horse consists of one large and two small metacarpal bones. The large one is commonly termed the *cannon*, and forms the principal bulk of the shank, being a strong cylindrical bone, often a foot in length, reaching from the knee to the fetlock joint. Like other cylindrical bones, the cannon is smaller in the middle and larger towards the extremities. The *small metacarpal*, or splint bones, although they form a portion of the knee joint, yet do not reach more than three fourths of the length of the shank. They are attached to the cannon by elastic ligamentous substance, and gradually taper downwards, and end in bulbous extremities. With age they become consolidated with the cannon, and in many horses a bony substance, called a splint, unites them even in youth.

The length of the metacarpus corresponds inversely with that of the humerus, and in proportion as the former is long and the latter is short, and *vice versâ*. Thus in man the humerus is

long and the metacarpus short, whilst in the horse we find the latter bones long, and the former comparatively short.

The bones below the fetlock, the *Phalanges*, which in carnivorous animals are in four divisions, in the horse are consolidated into one. Thus we have the first, second, and third phalange, with a supplementary bone, called the navicular, or shuttle bone.

The first phalange is called the *Os Suffraginis*, or *large pastern*, which receives the lower extremity of the cannon on its upper surface, having depressions corresponding to the convexities of the cannon, thus forming the *fetlock* joint. Immediately behind the fetlock joint, and indeed entering into its composition, are two small triangular bones, called the *sesamoids*. They are suspended from above by a very strong ligament, and thus, besides protecting the fetlock joint, are the means of affording an important spring to the animal. The large pastern rests entirely on the *small pastern*, a shorter but stronger and thicker bone than the former; thus forming the pastern joint, the frequent seat of those bony tumours called ringbones.

The small pastern bones rest upon two bones, the coffin, or *os pedis*, and the navicular, or nut-bone, thereby forming the coffin joint. The coffin bone is the last phalange, and by means of its connection comes in contact with the ground. It is a very singular bone, both in its shape and construction, and will afterwards demand our more particular consideration. It corresponds in great measure to the horny hoof to which it is attached. The navicular is a considerably smaller bone lying behind the former, supporting a portion of the superincumbent weight, but affording likewise an important pulley for the flexor tendon. This part is the frequent seat of disease.

The hind extremity of quadrupeds varies much from the fore in the manner of its connection to the body. There is less weight to support, and consequently there is less danger of concussion; but as more motion is required, the connection is formed by means of a joint.

The upper bone, called the *femur*, has a large globular head, which is received into a deep socket formed by the bones of the pelvis, and this joint is secured from dislocation not only by means of the capsular ligament, but likewise by one of immense strength situated within the joint. The motion of this joint is greater and the cavity deeper in the human subject; but in the horse the motion is chiefly limited to a backward and forward course, there being but little in a lateral direction. Thus the horse cannot, like the human subject, stretch his legs very wide apart: but, however, nearly all the lateral motion that the horse possesses in the hind extremities is possessed by means of this joint, there being scarcely any afforded by any other. The *femur* is the largest bone in the body, and is extremely irregular

in shape, having a number of protuberances for the attachment of muscles. Its lower end articulates with the *tibia*, forming what is commonly termed the stifle joint, and which corresponds anatomically with the human knee. As an additional security, and to ward off concussion, there are two elastic substances, called from their shape the semilunar cartilages, interposed between the bones which form this joint. In front we find a small bone called the patella, or knee-pan, which performs the office of a pulley, receiving from above the tendons of the strong extensor muscles of the thigh, and firmly fastened by equally strong ligaments to the upper and front part of the tibia. In all animals the length of the femur depends on that of the metatarsus: in horses and cattle the latter is very long, and the former short; whilst in man and in many animals we discover an opposite arrangement. In man the leg is formed by two bones, the *tibia* and the *fibula*, both of which enter into the composition of the joint, and thus afford a considerable extent of motion in every direction. In horses, however, the fibula is altogether small and unimportant, the leg being almost entirely formed by the tibia, which in the horse is much longer than the femur, and its lower end communicates with the tarsal joint, or, as it is commonly termed, the hock. The tibia extends obliquely backwards from the stifle joint, whilst the femur extends from above in a contrary direction, thus forming an angle which is more or less acute in different animals, being in speedy animals much more acute than in slower ones.

The *hock* is composed of no less than six bones, but the motion of the joint is almost entirely confined to the upper bone, the *astragalus*, which articulates with the tibia. In the human subject, the tarsus rests on the ground, and the various bones which compose it, constructed in the form of an arch, form a very important spring, to which very much of the elasticity of the foot is owing. Man is the only animal whose heel rests on the ground; but there are many who tread on the various phalanges, whilst the horse treads entirely on the last toe. Thus, with the long metatarsal bone, which closely resembles the metacarpus in the fore extremity, the hock is elevated considerably from the ground in a similar manner to the knee, but, unlike this joint, it forms an angle from the metatarsus, extending forwards under the body of the horse. The upper joint of the hock possesses very considerable extent of motion in a forward direction, but none laterally; and the joint is accordingly constructed on the principle of the hinge, and secured from dislocation by means of two condyles, or rounded prominences, on the upper part of the astragalus, which fit into corresponding depressions in the tibia, and receive between them also a ridge in the middle of the tibia.

The next bone of importance belonging to the hock is the *os calcis*, which corresponds to the human heel. In the horse it does not bear any weight, but receives the insertions of some important tendons, and thus acts as a considerable lever.

The other bones of the hock are placed below the astragalus in two rows, the lower of which rests on the metatarsus. These comparatively small bones contribute very much in taking off the jar, and are closely bound together by ligaments, by which all motion is prevented.

The bones below the hock being similar to those below the knee, will need no further description. They are, however, somewhat longer and slighter in their construction.—ED.

CHAP. VII.

THE JOINTS.

THE chief peculiarity in the construction of joints in the horse is that motion is almost entirely limited to one direction, and every security afforded against lateral movement; the result of which is that we scarcely ever hear of dislocation in the horse. Strength and speed are the chief objects required, and accordingly we find that the joints admit of a great extent of motion, but in one direction only. We have before observed that the ends of bones forming a joint are tipped with cartilage, which, being elastic, takes off the jar from the bones. This cartilage is lined by a fine membrane, which secretes a fluid, somewhat resembling the white of an egg, by which means, however rapid or violent may be the motion of the animal, the part is yet effectually secured from friction. This fluid is prevented from escaping by a capsular ligament, which is strongly attached to the neighbouring bones, and thus surrounds and encloses the joint, being however sufficiently loose as to admit the requisite motion. The capsular ligament is also lined internally by the synovial membrane, and is thus secured from injury.

Many of the joints of the horse are constructed on the principle of the hinge motion, being admitted extensively at one part and limited at another.

The *Shoulder* joint is formed by the round head of the humerus fitting into a socket in the lower part of the scapula. This socket, however, is much shallower than in the human subject, there being no lateral motion required. The joint has no ligaments to protect it with the exception of the capsular; but this office is effectually performed by the tendons of the strong muscles of the shoulder.

The *Elbow* joint is constructed on the principle of the hinge,

and is formed by the rounded prominences of the humerus, moving in corresponding depressions in the radius and ulna, the bones of the arm; and dislocation is effectually secured by a strong ligament on each side, besides the capsular.

The *Knee* joint is composed of no less than three articulations, besides a smaller one behind the knee.

The motion, however, is principally confined to the two upper articulations, the bones of which separate considerably in front, but are confined behind. These joints are each invested by a loose capsular ligament, which permits the necessary extensive motion of the joint, and are secured on each side by strong lateral ligaments; besides which there are two annular bands, one behind and the other in front, which serve to tie down and confine the flexor tendons.

The *Fetlock* joint is formed by the rounded extremity of the cannon approximating with the concave surface afforded by the large pastern below, and the two sesamoid bones behind. It has, in addition to the capsular, no less than nine ligaments, seven of which are connected with the sesamoid bones, and thus serve to keep them in their situation, in somewhat the same manner as the masts of a vessel are secured by means of the rigging or stays. The other two ligaments secure the joint firmly on either side.

The *Pastern* joint possesses very little motion. It is formed by the convex extremity of the large fitting into corresponding concavities in the small pastern, and is secured by the capsular and two ligaments on each side, and protected by tendons both in front and behind.

The *Coffin* joint possesses a greater degree of motion than the pastern. It is formed by the upper concave surfaces of the coffin and navicular bones receiving the convex extremity of the small pastern. It is secured by a capsular and three pairs of ligaments, connecting the coffin bone with the small pastern and the side cartilages; and four other ligaments, two of which pass from the navicular to the small pastern, one joining the navicular to the coffin bone, and another to the flexor sinew. These ligaments, however, although numerous, are not strong, as the joint is within the cavity of the hoof, and is thereby well secured from injury.

Joints of the Hind Extremity.

The *Hip or Thigh* joint is situated so deep-seated, and so well protected by large muscles and tendons, that it requires but very few ligaments. It is, as before observed, a ball and socket joint, the ball being formed by the upper part of the femur or thigh bone, and the socket (which is considerably deeper than that of

the shoulder) by the bones of the pelvis. The socket is still further deepened by ligamentous substance attached to its rim. The capsular ligament is thin, protection being afforded by the muscles; but within the capsular there are (unlike other joints) two ligaments, one of which is called the *ligamentum teres*, and is of great strength. It passes from a notch in the ball to a similar notch in the socket, whilst another portion of it is attached to the pubes. This ligament greatly assists in maintaining the weight of the limb during progression.

The *Stifle* joint, which corresponds anatomically to the human knee, is formed, like it, by the apposition of the femur, the tibia, and the patella. Within the joint we find two moveable cartilages, which are confined to the tibia by several ligaments, but which enable them to slide about, and thus increase the motion of the joint without rendering it insecure. The patella is a small bone situated in front of the joint, which it protects, being bound by strong ligaments to the tibia, and receiving the attachments of the tendons of the strong extensor muscles of the leg, thus acting as a pulley.

Besides those mentioned, there is a strong lateral ligament on each side of the joint, attached to the femur and the tibia; and within the cavity of the joint, ligamentous slips, crossing each other, are attached to the middle of these two bones.

The *Hock* joint, like the stifle, is well furnished with ligaments; and it has no less than six separate articulations, the principal of which, however, is that between the tibia and astragalus, to which bones the whole motion of the joint is confined. There are two strong ligaments on each side, both of which proceed from the tibia, and pass, one to the astragalus, and the other to the os calcis, and expand on the other bones. There are other ligaments attaching the astragalus to the metatarsal bones. The os calcis is bound by ligaments to the astragalus, the tibia, and metacarpal bones; and each articulation possesses separately its capsular ligament.

The joints below the hock in the hind leg correspond with those in the fore extremity. Having much less weight to sustain, they are less exposed to concussion, and more rarely become diseased. — ED.

CHAP. VIII.

ON THE MUSCULAR SYSTEM.

It is computed that there are no less than 312 separate muscles in the body of the horse, of which only ten are single, the

rest being arranged in pairs, so that both sides of the body correspond, whereby symmetrical appearance is preserved.

These muscles have been arranged by anatomists into various classes, according to their relative situation. Thus, we have the muscles of the *head*, the *trunk*, and the *extremities*, and these, again, are divided into various regions.

Under that of the head we have nine muscles, whose office is to move the ears; two attached to the eyebrows, eight to the eyes, and no less than seventeen connected with the jaws, twelve of which belong to the anterior and five to the posterior jaw. And between the jaws, the submaxillary space as it is called, there are twenty-four small muscles, six of which are connected with the os hyoideus, the curious bone at the root of the tongue; four belong to the tongue, five to the pharynx, seven to the larynx, and two to the palate.

The muscles of the *Trunk*, one hundred and thirteen in number, are divided into those of the *neck*, the *thorax*, and the *abdomen*. The muscles of the neck are forty in number, and are divided into five regions.

The muscles of the *Thorax* are thirty-seven in number, and are divided into seven regions, of which we have three muscles connected with the shoulder and the back, three with the chest, three with the ribs, three with the breast bone, and three with the back and ribs; besides which, we have three large muscles on the back, one of which, the longissimus dorsi, is of great size and length, extending on each side of the dorsal spine almost the whole length of the back, of which it forms the principal strength: it is particularly observable in stout fleshy horses.

The seventh region of the thorax is composed of one muscle, the *diaphragm*, which separates the thorax from the abdomen, and is the principal agent in respiration, acting independently of the will.

The muscles of the *Abdomen* are thirty-six in number in the male, and three less in the female, and are divided into five regions. There are six muscles belonging to the loins, four to the abdomen itself, their office being to support its contents and to assist in respiration; two muscles belong to the anus; four to the *Genital* region in the male, and two in the female; and four muscles are connected with the tail.

The muscles of the *Anterior Extremity* are forty-eight in number, and are divided into eight regions.

There are twelve muscles connected with the shoulder, two on the outside of the blade, one being in front, and the other behind its spine. One muscle connects the shoulder blade to the ribs, and two others are attached to the back part of the scapula and to the humerus. Two muscles are attached to the lower and

front part of the scapula, one of which is attached to the humerus, and the other to the radius. Another muscle is attached to the humerus just below the shoulder joint, and to the upper and outer part of the radius. Behind the shoulder joint, and filling up in great measure the space formed by the scapula and humerus, there is a very large muscular body, which is exceedingly prominent in many horses, particularly in thoroughbred ones. It is this muscle which forms a principal part of a shoulder of mutton. It is called the *triceps extensor brachii*; and, if we regard it as one, has three separate origins and one insertion, namely, the ulna. One head rises from the posterior ridge of the scapula; another from the outer part of the humerus; and the third head from the inner part of this bone. Thus situated, it principally extends the arm.

There is also another muscle in this situation attached above to the humerus, and below to the point of the ulna and the capsular ligament of the elbow joint.

The muscles of the *Arm and Fore-leg* consist of the extensors and the flexors, so denominated from their use being either to extend or to bend the leg. The extensors are four in number, and occupy the front of the arm, being very prominent in some horses, particularly those who stand firm on their legs. One of these muscles is attached to the lower part of the humerus, and to the upper and front of the cannon bone. Another is attached to both the humerus and ulna above, and below by means of a long tendon which commences above the knee, to the two pastern and the coffin bones.

A third muscle is attached above to the radius and the ulna, and below to the large pastern.

The fourth, smaller than the others, is attached above to the body of the radius, and below to the internal splint bone.

The flexor muscles of the arm are eight in number, and are divided into two regions, four being deep-seated, and four superficial. Of the former, one is attached to the humerus above, and below to the bone which projects behind the knee and to the outer splint bone. Another rises from the humerus, and also from the ulna, and is inserted, like the former, into the trapezium. Thus, there are two muscles which are inserted into this small bone behind the knee, which thus forms an important lever, and should therefore be prominent and well developed.

A third muscle in this region is attached above to the humerus, and below to the internal splint bone, and the fourth is attached to the ulna above, and joins the perforans tendon below. The four muscles belonging to the deep-seated region are, of course, situated in front of those just described.

Two of them, called the *flexor perforatus* and *perforans*, so called because the tendon of the former is perforated by the

latter, have a common origin from the inner and inferior part of the humerus, become two separate tendons above the knee, and are inserted, the perforatus into the small pastern, and the perforans into the coffin bone.

A third muscle is attached above to the back part of the radius, and below joins the perforans tendon, which it assists. Besides these, there are some diminutive and insignificant muscular slips below the knee.

The muscles of the *Hind Extremity* are more numerous than those of the fore limb, and are divided into those belonging to the haunch, and those of the thigh and hind leg; of the former there are twenty, and of the latter nine.

There are three very large and powerful muscles, called the *gluteal*, which are attached above to the haunch bones, and below to the upper part of the femur or thigh bone. These muscles are of great importance in progression, as by their action they advance the body after the limb has been brought forward: they also act in both kicking and rearing. In man, they are still larger in proportion than in quadrupeds; and they mainly assist in preserving the erect position of the body. In fat horses these muscles appear externally mingled together, but in well-bred animals, particularly if they have been trained, the lines, or rather the furrows, of demarcation are readily perceptible. It is needless to observe, that these muscles form the greater part of a haunch of venison, and in deer are more largely developed than in sheep.

There are four smaller muscles, attached below to the upper part of the thigh bone, and above to the under parts of the haunch bone, their office being to assist in the extension of the haunch, and, in some measure, to rotate it: some of them are situated within the pelvis, and are connected with the peritoneum.

There are three muscles which form the front part of the haunch. One rises from the spine of the ilium, the hip bone, and is inserted into the membranous covering of the muscles of the thigh, whence it is called the *tensor vaginae*, and is very perceptible in poor horses.

Another large muscle is attached to the ilium above and patella below, and is called the *rectus*.

The third muscle is of great size, and has three divisions, which are often considered as separate muscles. Each of these heads are inserted into the patella below, but above, two are attached to the femur, and one to the bones of the pelvis.

These powerful muscles, although not attached to the tibia itself, are yet connected with it by means of the patella, and thus become powerful extensors of the thigh, raising and advancing the limb, and assisting in the progression of the haunch.

On the inside of the thigh, forming that fleshy prominence so perceptible in muscular horses, and which often causes the thighs to touch each other, we find four muscles. The first is a long slender muscle, attached above to the lumbar vertebræ and the bones of the pelvis, and below to the lower part of the femur and upper and inner part of the tibia. It assists in bending the leg inwards, and is called the *sartorius*, which signifies a tailor, being supposed to be greatly employed by tailors when sitting cross-legged on a board. A thin broad muscle, superficially placed, is attached above to the pubes, and below to the former muscle.

A third muscle, short and thick, is attached to the pubes above, and the femur below; and the fourth is a double muscle, attached also above to the pubes and below to the femur.

The fifth is a powerful muscle, attached above to the bones of the sacrum, and the ischium, and below to the lower and inner part of the femur, and upper and inner part of the tibia.

The outer part of the haunch is formed by two double muscles; one is denominated the *biceps*, and is attached above to the sacrum, the bones of the tail, and the ischium; and below, one portion to the patella, and the other to the upper part of the tibia. This large muscle is particularly conspicuous in thoroughbred horses, and forms the outermost part of the quarter. Its large development is deservedly admired, and is justly considered a sign of breed.

The other muscle is situated behind the former, forming the most posterior part of the quarter; it is well developed, and externally perceptible; and the space between it and the former muscle is denominated the poor mark, being, of course, well marked in lean horses, and imperceptible in fat ones: it is attached above to the same bones as the former muscle, and below to the upper, anterior, and inner part of the tibia. These muscles raise the limb and abduct it.

The muscles of the thigh and leg are divided into three regions, one in front, and two behind. The anterior is occupied by three muscles, two of which extend the foot, and at the same time flex the hock. The first is attached above to the femur, becomes tendinous above the hock, where it passes through a sheath, and takes its course in front of the shank and the pasterns, and is inserted into the front part of the coffin bone. The second muscle rises from the fibula, and joins the former below the hock. The third is attached above to both the femur and the tibia, and below, after passing through a sheath in front of the hock, to both the cannon and the inner splint bone.

The two regions behind the tibia are distinguished as the superficial and the deep-seated: the former is occupied by three muscles, the first of which is attached above to the lower part of

the femur, and below to the os calcis, or point of the hock. The second is attached above to the femur, becomes tendinous above the hock, passes over the point of the hock down the leg, and is there called the perforatus, and is inserted into the small pastern bone.

The third, a very slender muscle, is attached above to the fibula, and inferiorly to the os calcis.

The *deep-seated region* is also composed of three muscles. The first is short and thick, and is attached above to the outer and back part of the femur and the capsular ligament, and taking an oblique direction to the upper and inner part of the tibia. Thus situated, it rotates in some measure the stifle-joint.

The next muscle, the flexor pedis, is attached above to the outer and back part of the tibia and the fibula; becomes tendinous just above the hock, where it passes through a sheath, in a groove on the inner side of the os calcis, and below the hock is denominated the flexor perforans, having a similar destination to the same tendon in the fore extremity.

The third muscle rises from the outer and back part of the tibia, becomes tendinous somewhat above the hock, on the inside of which it passes through a sheath, and joins the former tendon below.

For a more particular account of the muscles, the student is referred to Mr. Percivall's excellent work "On the Anatomy of the Horse;" and also to Mr. Blaine's "Outlines of the Veterinary Art."

The muscles are abundantly supplied with blood by the blood-vessels, which renders their colour dark. The depth of their hue is more or less in proportion as they are exercised, and thus in the horse they are darker than in the ox or sheep. They are also placed to greater mechanical advantage, the joints admitting more extent of motion than in these weaker animals. Besides which they are more abundantly supplied with nervous energy by means of the nerves, to which, more than to any thing else, is owing the untiring energy which a well-bred horse so often displays.

The muscles are susceptible of great alteration by means of training, the object of which is to obtain the greatest possible strength in the smallest possible compass. To effect this purpose, a large supply of nutritious food is given, and the superfluous fat is removed by severe sweating. The muscles are thus rendered hard and firm, and well developed, and the wind greatly improved by exercise, until the animal reaches a degree of excellence, to attain and ascertain which, demands the utmost skill and judgment in the trainer.

The opposite effect to this takes place when a limb is thrown out of work by lameness; the muscles shrink in a short time to

an incredible degree; and thus in horses that have been lame for a long time in their feet, we find the muscles of the chest greatly diminished, from want of the same degree of exercise. From this circumstance, farriers, mistaking the cause for the effect, have given the name of chest-founder to the disease. — ED.

CHAP. IX.

ON THE BRAIN AND NERVES.

THE brain, the seat of the mind, and the fountain of sensation, is a soft body, situated in a cavity of the skull called the cranium. In man it occupies by far the greater portion of the skull; but, in the horse, from its much smaller size, and from the large space devoted to the face, the cranium is much the smaller part. It usually weighs about one pound and a few ounces in the horse. It is closely invested by a membrane, called the *pia mater*, whilst the cranium is lined by a firm, strong membrane, called the *dura mater*. Between these there is another delicate membrane, called the *tunica arachnoides*.

The *dura mater*, by its duplications, forms several processes and sinuses, the former, by descending between its divisions, serve to secure the brain in its position, and the latter act as reservoirs for the venous blood, thus preventing the brain from being injured by any temporary impediment to its passage.

The *pia mater* closely embraces the brain, and dips into its convolutions. The brain consists of three parts, the *Cerebrum*, the *Cerebellum*, and the *Medulla oblongata*.

The *Cerebrum* is considerably the largest, and is divided into two hemispheres, each of which closely corresponds with its fellow.

On cutting into the cerebrum, we find that it consists of two portions, — the medullary, or white; and the grey, or cortical part. The latter is mostly situated towards the surface, and the former towards the centre; but both appear to run into each other. Within the hemispheres there appear to be various cavities, canals, and membranes, which, in this work, it is unnecessary to describe.

The *Cerebellum*, or little brain, is situated behind the cerebrum, than which it is considerably smaller. It appears to consist of medullary and cortical substance mingled together.

The *Medulla oblongata*, the smallest division, is situated at the base of the brain. It is medullary in its structure, and gives origin to the greater part of the cranial nerves. It is by far the most sensible part of the brain, for whilst portions of the cerebrum have been cut away, in some animals, without giving any apparent

pain, the least pressure on the medulla is productive of injury, or death. The brain is largely supplied with blood by means of the carotid arteries, which is returned to the heart by the jugular veins.

The spinal marrow may be considered as the continuation of the brain, running from the medulla oblongata, throughout the spinal canal, to the tail. It is enveloped by the same membranes as the brain, and continues to the sacrum, where it ends in several nervous cords. Its form is cylindrical, and it has been found to consist of six bands, in the centre of which there is a sort of canal.

The *Nerves*, arising from the brain and spinal cord, are forty-six pair, ten of which proceed from the brain, and the remainder from the cord, and are therefore called the spinal nerves.

On examining a nerve, we find that it consists of a vast number of white filaments, each having its particular covering, and yet compactly bound together, and invested by membrane.

Of the *Cranial* nerves, the first pair is the *Olfactory*, the nerve of smelling, pulpy in its structure, and the largest in the body. It rises from the cerebrum, passes out of the cranium, and is spread out on the membrane lining the nostrils.

The second pair is the *Optic*, which rises from the cerebrum, but before they pass out of the skull join together, and decussate, the right nerve going to the left eye, and *vice versâ*. It takes an oblique course, pierces the outer coats of the eye, and is spread out in the form of the retina, and thus conveys the impressions of objects to the brain. The sense of hearing is supplied by a soft nerve, the auditory, which enters an orifice in the temporal bone, where the seat of hearing is contained. The sense of taste is supplied by the fifth, which is a compound nerve, conveying both sensation and motion. The other cranial nerves convey sensation and motion to the various parts of the head; but there is one nerve which demands more particular notice. This is the *par vagum*, or *pneumo-gastric*, of the French. It rises from the brain, passes down the neck close to the carotid artery, and distributes branches to the pharynx, larynx and œsophagus, heart, lungs, stomach, and liver. If divided on both sides in the living animal, death immediately ensues. Its importance may thus be readily conceived; it is intimately connected with life itself, giving to the heart and stomach its power of motion, independent of the will.

The *Spinal* are compound nerves, having a double function, and a twofold origin, conveying both sensation and motion. They arise by numerous filaments from both the upper and under surface of the spinal cord. The filaments coalesce, and, before they immerge from the dura mater, join together, previous to which, the upper nerve forms a sort of knot, called a ganglion.

This latter is the nerve of sensation, the other the nerve of motion; and thus, though united together, the filaments are yet distinct, and a part is endowed mostly with sensation, or with motion, according as the filaments of the former or the latter predominate. There is one other nerve that remains to be noticed; it has been called the *Ganglial*, and also the *Sympathetic*. "It belongs," observes Mr. Youatt, in his admirable lectures, "neither to the cerebral nor the spinal system, and seems, in its function, to be independent of both. At the base of the cranium, and in front of the atlas, I find a pyriform reddish body, which gradually contracts, and terminates in a nerve. I inquire not now into the origin of this ganglion, but a superficial glance at the nerve tells me that it is performing some important office. It is connecting itself with the cerebro-spinal, and with every cervical nerve; but, more particularly, it is forming complicated plexuses on every neighbouring blood-vessel. I trace it particularly on both the external and the internal carotid, and I follow it in the subdivisions of these vessels, until, from the minuteness of the vessel, and the pulpiness of the nerve, it eludes my sight. Hereafter I shall have to trace the course of the nerve in the thorax, forming, with the cerebro-visceral, a plexus, or rather, an investing membrane, around every vessel of the heart and lungs; and then, having reached the abdomen, and combining in the semilunar ganglion its own influence with that of the cerebro-visceral and the phrenic, it becomes the seat or centre of organic nervous power, diffusing its radiations over every artery and absorbent, and gland, and ganglion; every thing connected with secretion, nutrition, and life; itself the very principle of life and action—the soul of the organic system. It was termed, before its character and power were suspected, the sympathetic nerve, because it seemed to connect the whole system together: it is denominated by others the ganglial nerve, from its supposed origin, either in the superior cervical or the semilunar ganglion; but it would more properly be designated the *great organic nerve*,—the secretory, nutritive, chemical,—while the cerebro-visceral is the motor organic nerve. It is the power which presides over, and effects the changes in that fluid which the motor nerve keeps in circulation."—ED.

CHAP. X.

THE CHEST, ITS CONTENTS AND CONNECTIONS.

THE chest of the horse is unlike that of the human body, becoming narrow towards the lower part, and terminating like the

keel of a ship, a form more favourable to the flexion and extension of the fore-legs, as well as of the shoulder-blades, than any other. The upper part of the chest is formed by the spine or back bone, the sides by the ribs, and the lower and front part by the sternum or breast bone. The number of ribs varies in different animals; in man there are twelve, in the elephant eighteen, but in the horse there are sixteen pair. Each rib possesses two heads or protuberances, each of which is connected by a joint with two vertebræ or bones of the back, and to the breast bone by means of cartilage. The *Sternum*, or breast bone, in young animals is chiefly cartilaginous, and may be separated into eight pieces; it afterwards becomes divisible into four only, and, with age, is consolidated into one. The ribs are externally convex, and are divided into the true and the false; the former being situated anterior to the others, and immediately connected with the sternum; whilst the latter are implanted into each other at their cartilaginous extremities, and are only connected with the breast bone by means of the true ribs. Their connection with the spine, by means of a double joint, affords to the ribs a motion backwards and forwards, by which means the cavity of the chest is enlarged or diminished. This motion, however, is considerably less in quadrupeds than in man, for in the latter the rising and falling of the chest is seen in common respiration, whilst in the former it is not perceived, unless the breathing be embarrassed. The ribs are connected together by fleshy substance, termed the intercostal muscles, which are disposed in an oblique course, by which means their length considerably exceeds that of the space between one rib and another, so that a contraction of one third their length will bring the ribs together, which could not be the case if the muscles took the shortest course from one rib to another.

The chest is separated from the abdomen or belly by a very singular and important muscle, called the *Diaphragm*, or midriff, which is convex towards the chest when in a state of rest. This muscle is shaped somewhat like a fan, and is attached to the inferior extremities of the ribs and to the spine, by which means its position is rendered oblique, and its development more extended, and its action greater than it would otherwise have been. The diaphragm, unlike every other muscle, is fleshy at its circumference and tendinous at its centre. The reason of this peculiar construction may be thus explained. The central part of the diaphragm is pierced with two holes for the passage of the œsophagus, the tube which conveys food to the stomach, and the vein which conveys the blood to the liver for the secretion of bile. Now, if these important vessels were surrounded with muscular substance, they would be forcibly compressed every time the diaphragm contracted, and would, in consequence, be liable to

considerable injury; but being surrounded with tendinous substance which possesses no such power of contraction, all danger of compression is at once removed, without any sacrifice of strength or power in the muscle. The diaphragm, when in a quiescent state, is convex towards the chest; and when in action, it becomes flat, thus enlarging the cavity of the chest.

The thorax is everywhere lined internally by a thin serous membrane, which secretes a fluid, by which the surface of the cavity is lubricated, and its contents are enabled to glide upon each other without occasioning any friction or inconvenience. This membrane is called the *pleura*, and the portion which lines the chest itself is designated the *pleura costalis*, while that which covers the lungs is distinguished as the *pleura pulmonalis*. This membrane divides the chest into three cavities, one on the right side, containing the right lung, and the other two on the left side, the smaller of which contains the heart, and the larger the left lung.

The *right lung* is thus the largest, and consists of three lobes or divisions, whilst the left lung only contains two. These divisions of the chest do not communicate with each other, so that if one cavity is injured, or air is admitted into it, respiration can be carried on in the other.

The windpipe, or trunk of the lungs, is composed of cartilages or cartilaginous rings, joined together by a strong and elastic membrane. The cartilaginous rings are strong and thick in the front part of the windpipe, but gradually become thinner, and terminate in thin slips, or mere membranes, which pass over each other, instead of meeting end to end. By this contrivance the windpipe will admit of being compressed considerably, by the ends passing over each other; but such is the elasticity of the cartilage, that the moment the pressure is removed, the windpipe returns to its original form. The use of the elastic membranes which unite the cartilaginous rings, is to admit of the various motions of the windpipe, especially that of its being elongated; and so great is their strength, that we never in any accident find it torn, or the cartilaginous rings separated from each other.

The windpipe, on entering the chest between the first pair of ribs separates into two parts, one going to the right, and the other to the left lung; from these divisions numerous branches, called the bronchi, proceed to every part of the lungs, dividing and subdividing, and diminishing in their course. These ramifications gradually lose their cartilaginous character, and at length terminate in an immense number of diminutive air cells.

The lungs themselves, therefore, are composed of the air cells, the bronchi connected with them, and an infinite number of arteries, veins, and absorbent vessels, the whole being connected together by cellular membrane, thus forming these light spongy,

yet important bodies, which are closely packed away in the cavity of the chest, and therefore exactly accord to it in its shape.

The upper part of the windpipe is connected with the mouth by means of a strong cartilaginous box, termed the *Larynx*, which is composed of five cartilages, the thyroid, the cricoid, the two arytenoid, and the epiglottis.* The *Thyroid* is the largest of the five, and is so called from its resembling, and acting as, a shield. It forms the front part of the larynx and great portion of its sides, and consists of two parts, the upper of which is continuous, but the sides of the lower recede so as to form a triangular space, which is occupied by a ligament.

The *Cricoid*, or ring-like cartilage, is placed below the thyroid. Its anterior portion resembles a ring of the wind-pipe, but its back part is considerably broader, so that it overlaps the first ring of the trachea, somewhat in the form of a helmet.

The two *Arytenoid*, or ewer-shaped cartilages, are much smaller than the other, and are placed at the upper part of the larynx, immediately adjoining the back part of the cricoid; thus placed, these triangular bodies leave an aperture between them, which forms the entrance to the windpipe, and their margins are covered by a membrane, which forms what is called the *Rima-glottis*.

The fifth cartilage is called the *Epiglottis*, so termed from its office, which consists of shutting down upon the glottis like the lid of a tea-pot, to which, from its heart-like shape, it is admirably adapted. Viewing this cartilage in its usual position, we find that its surface nearest the larynx is smooth and somewhat convex, whilst that portion nearest the mouth presents a concave surface.

The larynx is lined throughout its internal surface by a fine delicate membrane, which secretes a mucus for its protection. It is also abundantly supplied with nerves, by which it is rendered peculiarly sensible, and in this respect greatly differs from the membrane lining the windpipe; for whilst the latter may be scratched with impunity after the operation of tracheotomy, the slightest intrusion of a foreign body on the former produces the most immediate and violent coughing, thus expelling the intruding body.

The glottis, thus constituted, is admirably adapted for guarding the entrance to the windpipe, and, generally speaking, a cough arises from some irritation of this part.

The Nostrils. The cavity of the nostrils is very extensive in the horse, affording a large entrance for the air in breathing, and a considerable surface for the development of the organ of smell.

* A cut representing the various cartilages of the windpipe will be found in the chapter on Roaring.

It is lined throughout by a mucous membrane called the Schneiderian or pituitary membrane, on which is spread out the nerve of smell as well as one of feeling. The cavity is divided by a thick cartilage, called the septem nasi, which is fixed in front to the nasal, and behind to the maxillary bones. This cartilage is also covered by the membrane before spoken of; which, when inflamed, as in colds, becomes very red, and in glanders, is often the seat of ulcers.

The nostrils communicate with the sinuses of the head, and above with the larynx.

The entrance to the nostrils is formed by what is called the false nostrils, which is formed by the skin, and possesses considerable flexibility, particularly in well bred horses, in whom the opening to the nostrils is much larger than in coarse-bred animals. The false nostrils form a sort of cavity, which has no opening at the upper part, and this circumstance gives them their name.

The Heart

Is a strong hollow muscle, of a conical shape, with its base towards the spine, and its apex towards the left side, against which it is thrown at every contraction. It is double, having a right and a left side, the former containing black, and the latter red, blood; the right side is the thinnest and weakest, being devoted to the lesser office of the circulation of the lungs; the left, the stoutest, having to govern the general circulation of the system. Each of these halves consists of two cavities, an *auricle* and a *ventricle*: the former, which derives its name from its resemblance to a dog's ear, is considerably thinner than the latter, and is situated towards the base. The heart is formed principally of fleshy fibres, connected together by cellular tissue, whence it obtains its elasticity; and its surfaces, both internal and external, are lined by a fine transparent membrane. The blood is prevented from moving in a retrograde course by means of a number of valves: there are three in the left ventricle, the edges of which are connected by tendinous cords (*cordæ tendineæ*) to small fleshy eminences on the inside of the ventricle, called *carneæ columnæ* or fleshy columns. These tendinous cords are more numerous in the valves of the left ventricle than in the other parts, and being supposed with the valves to resemble a mitre, are named mitral valves. There are valves also in the right ventricle for a similar purpose, which are named tricuspid, or three-pointed; also in the great artery, or aorta, and in the pulmonary artery, where, having no cords, and resembling, or supposed to do so, a half moon, they are named semilunar.

The heart is enclosed in a strong membranous bag, which is

named pericardium, and this encloses also the trunks of the veins and arteries, as well as the appendages or auricles.

The heart is a muscle, but, unlike other muscles, it is involuntary, being altogether independent of the will, and is for this purpose supplied by a peculiar set of nerves. It is also furnished abundantly with blood for its support, by means of arteries which are the first that are given off, and these arteries are accompanied by veins, for the return of the blood to its proper receptacle.—ED.]

CHAP. XI.

ON THE CIRCULATION OF THE BLOOD.

[THE right side of the heart, we have said, is devoted to the pulmonary circulation; its auricle receives from a large vein, called the vena cava, the blood which has travelled throughout the system, whence it passes, by the action of the heart into the right ventricle, which, by its contraction, forces it into a large vessel, called the pulmonary artery.

Thence the blood is sent into the lungs and ramifies throughout its minute vessels, where it is exposed to the action of the inspired air, and becomes, by means we shall afterwards speak of, reddened and purified. This process being accomplished, the blood passes into minute veins, which, coalescing, become the pulmonary veins (in the horse eight in number), and through them the blood again returns to the heart. So much for the pulmonary circulation.

The left auricle, receiving the purified blood from the pulmonary veins, forces it into the left ventricle, which, contracting, sends the vital fluid into a large strong vessel, called the aorta, whence it passes into smaller arteries, to be distributed throughout the whole system. The remote divisions of the arteries are called the capillary vessels, and in them the blood, after having accomplished its purposes and conveyed nourishment to all parts, becomes black and impure, and in this state enters the capillary veins: which, conjoining and increasing in size, and diminishing in number, convey the blood again to the right auricle of the heart. Just before it enters the heart, it receives a supply of a milky fluid, called chyle, which is extracted from the food, absorbed by certain small vessels, called lacteals, and conveyed by a specific channel into the vena cava. Such, then, is the circle, or rather the double circle, which the blood takes, and by which so many important purposes are beautifully and correctly accomplished.

The circulation of the blood is accomplished by the joint

action of the heart and arteries, but principally by that of the former. Experiments have been instituted, with a view of ascertaining the amount of power possessed by the heart, and it has been computed by Dr. Hales, that the force exercised by the left ventricle alone is equal to 113 lbs. in the horse, and it is believed that the blood is projected into the aorta, with a velocity equal to twenty-one feet per minute.

The contraction of the ventricles and the auricles immediately succeed each other; as one expands to receive the blood, the other contracts to force it forward, and thus the unequal double action of the heart that we feel. These actions, however, of the different cavities, could not be correctly performed, unless some provision were made for preventing the blood, when the ventricles contract, from retrograding into the auricles. This, however, is effected by means of a valve, situated between these cavities, which is formed by a duplication of the inner membrane of the heart, thickened by fibrous substance. The floating edges of this valve in the right ventricle presents three points, and in the left two; whence the former is called the *tricuspid*, and the latter the *mitral*. The edges of each valve is joined by numerous short tendons to the fleshy columns of the heart; and whilst the blood is flowing into the ventricles, the fleshy columns are passive: but when the ventricles act, these columns also contract and draw the edges of the valve together, and thus closes the cavity in that direction, and prevents the blood re-entering the auricle.

There are also valves that guard the entrance of the aorta, and pulmonary arteries; but they are of a different description, being of less strength, because they are not called upon to oppose the powerful action of the ventricles. Accordingly, we find they consist of three folds of membrane, and are called from their shape, *semilunar*. They are so situated, that when the blood passes into the arteries they are thrown against their sides, and when the blood has passed, they are thrown up, so that their edges meet, and thus prevent the blood returning to the heart.

In fishes, the heart is single, and only serves the office of the pulmonary circulation, that of the system being accomplished by the arteries alone; in the horse, though the heart is the principal power, yet the arteries greatly assist. The *Aorta*, which receives the blood from the left ventricle, divides into two branches, called the *Anterior and Posterior Aorta*; the former conveying the blood to the head and neck, and the latter to the lower parts of the body. These arteries are strong and thick, and consist of three coats; the outer, the strongest and thickest, gives to the vessel the remarkable elasticity which it possesses; the middle coat is the fibrous, which seems to be a modification of muscular power, and enables the arteries to contract on their contents; the third coat is the serous, which lubricates the interior of the

vessel, and facilitates the passage of the blood. Thus, to these several coats, but particularly to the two former ones, do the arteries owe the remarkable property they possess, of contracting when distended with blood, and almost immediately afterwards expanding to receive a fresh supply; and which, assisted by the action of the heart, constitutes the pulse, and may be felt in every part of the body, where an artery is sufficiently near the surface of the skin to be perceptible.

The arteries, however, do not all possess an equal thickness and power; for instance, the pulmonary artery, though quite as large as the aorta, is neither so thick nor so strong; and the reason is, that the same power is not required to send the blood over the smaller circuit of the lungs as over the larger one of the whole system, and for the same reason, the right side of the heart is weaker than the left.

The arteries, as they divide and subdivide in their course, become weaker in their coats in proportion to the diminution of their size, till at length they terminate in the minute branches called the capillary vessels, which do not possess any pulsating power, and many of which do not contain red blood. Diminutive, however, as these branches may be, yet it is by them that the most important offices are performed; by them the different parts of the body are nourished, whether bone, flesh, nerve, or skin; by them the various fluids are secreted, however different in their appearance they may be; by them the most ghastly wounds are healed, and often in a remarkably short space of time; and all these various offices are performed not only by the same class of vessels, but by the same fluid, the blood.

Having accomplished these important purposes, the capillary arteries terminate in equally minute vessels, called the capillary veins, and so abundant are these diminutive vessels, that the finest point of the finest needle cannot be plunged into the body without penetrating some of them. By the time the blood reaches the veins, it becomes dark and impure, and loaded with carbon; the office of the veins, therefore, is to return it to the heart to be again purified. The circulation, however, becomes much slower, as it is further removed from the impulsive power of the heart; and the veins, which are supposed to contain two thirds of the whole blood circulating in the system, are consequently much more numerous than the arteries. They do not, however, possess the same strength in their coats as the arteries, nor have they any pulsating power. They have, however, the assistance of other agents in propelling the blood to its destination. The greater number of them possess valves, which admit the blood to pass in one direction, but effectually prevent its passing in any other. It was, indeed, from reflecting on the structure and necessary office of these valves, that led the

immortal Harvey to discover the circulation of the blood. Another circumstance peculiar to the veins is their situation, being mostly near the surface of the body, whilst the arteries are generally deep seated. The wisdom of this provision is evident: it is well known that in wounds it is readily ascertained if an artery be wounded by the jet of blood that ensues, and which, even from an artery of small size, is very considerable, and the danger of death from bleeding is often great in consequence of the force with which the blood is thrown into these vessels. Now such being the danger attending the division of arteries, it was necessary to remove them as much as possible from the risk of injury, and accordingly they are almost invariably deep seated, and when they do approach the surface it is in parts least likely to be injured. Thus round these important vessels nature throws a thick muscular covering, and protects the whole by a mantle so sensitive as to give warning to the least attack. The veins, however, do not require this care; in them the circulation is languid, and their wounds are comparatively unimportant and unattended with danger, for the blood generally stops, without assistance, from its coagulating quality. It is also of importance that the greater portion of the veins should be situated near the surface, in order to receive the influence of the atmospheric pressure, which greatly assists the motion of the blood; and it has also been found that veins possess a power of absorption in common with a particular order of vessels called the absorbents; thus these various purposes are effected by the relative position of the veins and arteries.

The structure of the veins is very different from that of the arteries; for whilst the latter are thick, elastic, and composed of three coats, the former are thin, inelastic, and composed only of two coverings. But although thin, they are yet capable of affording great resistance to pressure; for Dr. Hales found that the jugular vein of a mare required a force equal to a column of water 144 feet high to burst it.

We have seen that the blood is sent to all parts of the body by the action of the heart and arteries, but what is the cause of its return? First in importance is the law of *hydrostatics*, "that all fluids support their level." Thus the same law by which springs arise, and streams are produced, and rivers flow towards the sea, is brought to bear in the living system, and enables the blood in the arteries to support that in the veins. This effect is greatly assisted by the action of the valves in supporting the column of blood. The blood, thus supported and propelled by the arteries, assisted by atmospheric pressure, must go somewhere, as the valves prevent return: it goes, therefore, where a vacancy is afforded, and that is in the right auricle of the heart, which has just propelled its contents into the ventricle. To these

several forces may be added a power of suction the heart possesses whenever the chest is enlarged in respiration.

The manner in which the chyle is mixed up with the blood, so that its colour quickly disappears, is worthy of particular notice. It is owing, indeed, to the great agitation the blood receives, and to the irregularity of the heart's internal surface. When the auricles contract, their contents are in a great measure discharged into the ventricles, but a portion is thrown back into the veins, which constitutes what is called the venous pulse, and may sometimes be seen in the jugular veins. In like manner, when the ventricles contract, a portion of their contents is thrown back into the auricles, at any rate that part of it situated behind the valves. By these means an agitation is produced, which effectually mixes these different fluids together.

It has been ascertained that the veins possess a power of absorption in common with a numerous class of vessels called the *absorbents*, or *lymphatics*. These vessels are very minute, and are distributed throughout the whole body; they generally accompany the veins, and, like them, are furnished with valves; sometimes, as in *farcy*, they become inflamed, and greatly enlarged. In the course of these absorbent vessels there are a great number of glands, in which they appear to terminate, and others to begin, and thus their contents are passed onwards into the circulation. These glands are subject to disease occasionally, as in strangles, and it is the hardness and swelling of these glands under the jaw that gives its name to the disease called glanders. By rubbing various medicines on the skin, they are taken up by the absorbent vessels, and carried into the circulation; and any interruption in the action of these vessels produces dropsical swellings. — ED.]

CHAP. XII.

THE BLOOD — ITS NATURE AND COMPOSITION.

[THE *Blood* is by far the most important fluid in the animal machine; it stimulates the heart to contract; secretes and nourishes the various organs of the body; and supplies it with heat: and although it is the source whence other fluids are obtained, it is yet a fluid *sui generis*, differing from all others. Soon after it is drawn from the body it coagulates, and then separates into two parts, — the *Serum*, a watery colourless fluid which floats on the top, and the *Crassamentum*, which appears of a firm consistency and a red colour. The serum is a peculiar fluid, and may be separated into its constituent principles. If subjected to a

temperature of 150° a portion is converted into a substance resembling albumen, or the white of an egg; the other portion remains fluid, and is termed the serosity of the blood, and is that which constitutes the gravy in meat. The serum contains several salts in solution, the most abundant of which is soda.

The *Crassamentum* is likewise divisible into two portions, the *Cruor*, which gives to the blood its purple hue; and the *Lymph*, which is more solid in its nature, and is considered the basis of the coagulum. The latter can be separated from the former by washing, and likewise separates when the blood is a long time coagulating, in which case the red portion of the blood, being the heaviest, falls to the bottom of the vessel, leaving the lymph on the top. The cruor, or red portion of the blood, has been found, on submitting it to a microscope, to be composed of globules, which are supposed to be each about the three or four thousandth part of an inch in diameter. It is therefore to these globules that the blood owes its redness; but the intensity of the colour is subject to great variation, being darker in animals that are poorly fed; or when exposed to carbonic acid; and becoming more florid in others that are well fed; and also when exposed to oxygen, or to atmospheric air.

The other part of the *crassamentum*, the lymph, which, from its nature, is also called the *Fibrin*, is, in fact, the most important of all; for it is that which mainly supplies the different parts of the body, particularly the muscles, with nutriment, and repairs wounds and fractures in an extraordinary manner. Unlike the cruor, it exists in the blood of all animals, and in every part of the system. Some animals have entirely white blood, the cruor being absent; and in red-blooded animals there are some portions of the body, such as the white of the eye, where the vessels are so small that they do not admit the red globules.

The specific gravity of the blood rather exceeds that of water; but venous blood is somewhat heavier than arterial.

The temperature of the blood varies in different animals; in man it is 90° , but in the horse upwards of 100° . It is rather warmer in the arteries than in the veins, and is liable to variation from disease, it having been found in severe inflammations to be raised 7° in man, and in the cold fit of agues 4° lower than in a state of health: it is, however, but slightly raised or depressed by external temperature. It was not till comparatively a recent date, that the blood has been considered to possess vitality, which, however, is now generally acknowledged. The vitality and fluidity of the blood is intimately associated; in fact, its coagulation, when removed from the body, constitutes its death. The time in which this is taking place is different in different animals, and is influenced by various circumstances. In strong animals, such as the horse, it is longer than in such weak animals

as the sheep: in the former, it is often as long as fifteen minutes; and, if the body be in a state of plethora, the vital power being too highly developed, the death of the blood is much longer resisted. In these cases coagulation is delayed, and, in consequence, the red portion of the blood, being the heaviest, falls to the bottom of the vessel, and the fibrin remains at the top, constituting the buffy coat of inflammation. This separation, when arising from the above cause, takes place long before the serum is developed.

The coagulation of the blood has been endeavoured to be accounted for without success: it was held by some, that it was produced by the cessation of its motion; but it has been found that, if stirred in a vessel, it will coagulate quicker than before. It was thought that exposure to the atmosphere was the cause; but it has been known to coagulate in a vacuum, and likewise in the body when a vein has been tied.* It was next conceived that it was caused by the low temperature to which it is exposed; but it has been ascertained, that it will coagulate quicker, if the temperature is either higher or lower than natural; but if so low as to freeze the blood, it will not coagulate when afterwards thawed. These experiments show, that the blood is analogous to no other fluid, and that coagulation cannot be owing to physical causes, but can be explained only by reference to its vitality.

Although the blood will coagulate in the body if obstructed, yet there is a considerable difference between this state, and its coagulation out of the body. In the former instance coagulation is longer occurring, new vessels are thrown into its substance, and it becomes organised. So, likewise, if a part be wounded, the divided vessels throw out clots of blood, which adhere to the surface of the wound; the red particles become absorbed, the glutinous fibrin organised, and the breach is thus gradually restored. Thus we see how important it is that the blood should possess its peculiar properties, its state of fluidity, and its disposition to coagulate: if the former did not exist, the blood would be obstructed in the capillary vessels, and the vital functions could not be carried on; and, if deprived of its coagulating property, no wounds could heal, or loss of substance be restored; but the most trifling cut would be the precursor of death.

The quantity of blood contained in the body it is very difficult to ascertain; for if an animal be bled to death, a good deal will still remain in the blood vessels. It has, however, been estimated

* Mr. James Turner has instituted and published some singular experiments on the blood vessels. He invented an instrument, by means of which several inches of the carotid artery in a living horse was seized instantaneously, and the blood it contained suddenly imprisoned. It was then taken from the body, and twenty-four hours after it was found that the blood was in a florid and liquid state.

to be about one fifth the weight of the body; and of this, about three fourths is contained in the veins, and one fourth in the arteries. In young animals there is more than in old ones; as in them the body must not only be sustained, but increased in size. It is likewise more abundant in wild animals than in tame ones; and in proportion to the vigour of the animal. — ED.]

CHAP. XIII.

ON RESPIRATION, AND ITS EFFECTS.

[THE phenomenon of respiration, which is carried on from the first minute after birth to the last of existence, consists of two acts, expiration and inspiration. The former, that of inhaling the atmosphere, is accomplished mostly by the diaphragm, which, in its relaxed state, is convex towards the chest. As its fibres contract, the muscle flattens, and thus enlarges in a considerable degree the cavity of the thorax. A vacuum is thus produced, or rather a tendency towards it; for the air rushes into the lungs, and the blood into the heart; and, as the lungs are elastic and spongy in their nature, they become closely adapted to the enlargement of the chest, and prevent any vacuum from taking place between them and the sides of the thorax.

The diaphragm is thus the chief agent in the act of inspiration, although in some degree assisted by the intercostal muscles, which raise the chest; and, also, when the breathing is violently excited by those muscles that in quadrupeds attach the fore extremities to the body. This may be witnessed in horses after severe galloping, and also when labouring under inflammation of the lungs, in which disease the animal seldom or never lies down, but makes use of the fore legs as fixed points to assist in enlarging the chest. The air thus drawn into the lungs traverses throughout its internal surface, and, having fulfilled its office, is forced out by the act of expiration. This part of the process is effected chiefly by means of the elasticity of the lungs, which acts as soon as the diaphragm becomes passive, assisted, however, in some degree, by the elastic cartilages of the chest, and occasionally by the abdominal muscles. In a healthy horse, in a state of rest, there are from four to eight respirations in a minute, which, however, is increased by the slightest exercise.

Atmospheric air consists of unequal parts of two aëriform fluids; viz. 79 of nitrogen or azote, and 21 of oxygen in each 100 parts; besides which it contains other heterogeneous matters, such as odorous effluvia, aqueous exhalations, electric matter, and car-

bonic acid gas. It every where surrounds and embraces the globe, extending, in the opinion of some, a distance of forty-five miles, and in others a much greater height. Its gravity differs very much at different times and in different places, being heavier on a clear than on a close day, and also in low places than in lofty ones. The small portion of *carbonic acid gas* which the atmosphere contains, is not chemically, but mechanically, mixed with it. This gas is evolved by the fermentation of beer, and the decomposition of vegetables, and is often found in wells and deep places. It is much heavier than the atmosphere, and thus remains in these low places by its gravity. A lighted candle placed in this gas is immediately extinguished; so that it is used as a safeguard in descending into these low and foul places, for whatever will not support combustion will not support life. It is not a simple gas like oxygen, but is formed by the union of carbon and oxygen.

Nitrogen or azote is a simple gas, but its use in the atmosphere seems to be of a passive nature, being for the purpose of diluting the oxygen, and rendering it less stimulating. It will not alone support life or combustion, but is chemically mixed with the oxygen.

Oxygen is essential for the support of life and combustion; for if air be deprived of it no animal can live, nor will a candle remain lighted. It is abundantly furnished by plants and shrubs, which thus supply the diminution of it created by animals. When a flame is exposed to this gas it greatly increases in brilliancy; and when venous blood is submitted to it, it quickly becomes florid.

We have before shown, that all the blood in the body was in its turn carried from the heart to the lungs by means of the pulmonary artery, which divides and subdivides into the smallest branches, and terminates in small capillary veins, which, coalescing, become larger, and convey the blood again to the heart by the pulmonary veins. Before it reaches these veins, however, an important change takes place: the blood proceeds from the heart in a black and impure state; it returns reddened and purified: it is submitted in its course to the action of the air in the air-cells, not by actual contact, but through the membrane which forms these cells; and by this means the important change is effected.

There is, we well know, a considerable difference between the expired and the inspired air; the former is hot, the latter cold; this is healthy, that injurious; one will support combustion and life, the other is unfit for breathing and will extinguish a flame. There is but little difference in quantity between the air in its different states; but the oxygen in expired air has nearly disappeared, and carbonic acid gas is found in its stead; it also contains much aqueous vapour, which is condensed in a visible

form, at a temperature of 60° . Thus, although the carbonic acid gas is much heavier than common air, yet, partly from the aqueous vapour which the expired air contains being much lighter, but principally from its increased temperature, the expired air, notwithstanding its carbonic acid, is yet specifically lighter than the atmosphere, and consequently rises upwards, and thus, in great measure, is prevented from being respired a second time.

It has been found by experiment, with a portion of atmospheric air, containing 80 parts of nitrogen, 18 of oxygen, and 2 of carbonic acid, that on being respired, the nitrogen continued the same, but the carbonic acid was increased to 13 parts, and the oxygen reduced to 5; whence it appeared, that 11 parts of carbonic acid were substituted for 13 of oxygen, 2 parts having entirely disappeared. Thus, the disappearance of the greater portion of the oxygen, was accounted for by its being converted into carbonic acid; but there remained a small portion, whose absence could not be thus explained, more particularly as Sir H. Davy calculated, that about 32 ounces of oxygen were necessary for 24 hours' expenditure in a man; but only $26\frac{1}{2}$ ounces are requisite for the formation of even 37 ounces of carbonic acid gas, giving us an unexplained surplus of $5\frac{1}{2}$ ounces of oxygen during the above period. By some it was supposed, that this surplus oxygen unites with the hydrogen thrown off by the blood, and is thus converted into watery vapour: by others it is held, that this oxygen is absorbed by the blood, and enters the circulation.

Carbonic acid gas is exhaled from the lungs in different quantities during different periods of the day, being generated in the greatest quantity about noon, decreasing in the afternoon and night, and again increasing in the morning. It also increases in man by taking animal food.

Sir H. Davy contended, that a small portion of nitrogen is absorbed by the blood; but this has been denied by others. The chief use of nitrogen, however, is to dilute the oxygen; for if the latter is inspired pure, a sense of warmth is felt in the chest, the heat of the skin is raised, the pulse quickened, and other symptoms of excitement are produced; but if the oxygen is diminished, a sense of languor, and disposition to sleep, is produced. A given quantity of oxygen will, however, support life longer than the same quantity of atmospheric air. It has been computed that, in the course of twenty-four hours, about 2 lb. 8 oz. of oxygen is consumed by a man.

After an ordinary respiration, a considerable quantity of air still remains, perhaps five-fourths more than has been expired.

Having mentioned the changes that take place in the atmosphere, we must next consider in what manner the blood becomes so altered by its passage through the lungs.

The blood, as it traverses through the body, gradually becomes darker; it is loaded with carbon, and is rendered unfit for the circulation, and in this state it is called venous blood: if venous blood taken out of the body be exposed to oxygen, it quickly becomes red; and so it does if exposed to the atmosphere, but not so rapidly. So, likewise, if arterial blood be exposed to carbonic acid, it quickly acquires the colour and character of venous blood. In the same manner is the colour of the blood changed in the lungs; thus the principal use of respiration appears to be, to free the blood from its impurities; and this is effected, although the air and the blood do not actually come in contact. It was found, that if blood in a common bladder were exposed to the atmosphere for some time, it acquired a coating of florid blood; and thus as the membrane lining the air cells is by no means so thick as that of the bladder, there is no longer any difficulty in accounting for the change taking place.

It has been the subject of some dispute, as to where the change, or rather exchange, takes place, some contending that the carbon unites with the oxygen in the air cells, whilst others maintain that the oxygen enters the blood, and there unites with the carbon, forming carbonic acid gas, which is then exhaled into the air cells. It was found, however, that if venous blood was put within the exhausted receiver of an air pump, a quantity of carbonic acid escaped, thus proving the presence of this gas in the blood, and supporting the second theory. And as there appears to be a greater quantity of oxygen abstracted from the atmosphere than can be accounted for by the formation of carbonic acid, we must conclude that a portion mingles with the blood and enters the circulation; which theory agrees with the fact, that it has recently been discovered by correct analysis, that both venous and arterial blood contains carbonic acid, nitrogen, and oxygen, but that the latter gas is most abundant in arterial, and the former in venous blood.

Although the action of the heart is much more frequent than that of the chest in respiration, yet there is a most intimate connection between the one and the other; for besides the changes which we have spoken of in the blood, it rushes into the heart when the chest is expanded, and when from any cause respiration is delayed, the pulse becomes less frequent and more languid, in consequence of the obstruction in the current of the blood. Thus in violent fits of coughing, the chest collapses, the air is expelled, and the blood not being purified, is unfit for circulation, and the consequence is, the veins of the head become distended, and in man the person becomes red or black in the face, and sometimes a blood vessel has ruptured, and death supervened.

The Production of Animal Heat.—This important operation is

effected by means of respiration, — the chemical process carried on in the lungs.

The sensation of heat is derived from the presence of an extremely subtle fluid, called *caloric*, the particles of which have a tendency to repel each other, and unite with other substances. Thus if we touch a body whose temperature is lower than that of our hand, caloric passes from the hand to this substance, and the sensation of cold is experienced; and if, on the other hand, the temperature of the substance is higher, we feel a degree of heat from the passage of caloric into the hand. It is a singular fact, that this caloric may exist in two different states, the one in a free or sensible form, the other in a latent or combined form. Thus two substances may appear to be of the same temperature, and yet one may contain a much greater degree of caloric than the other, but so combined with the substance, that it is not sensible to the touch. If, however, the object be exposed to the influence of some chemical agent, its latent caloric may be set free or rendered sensible. For instance, if sulphuric acid and water be mixed together, although each fluid were before cold, the mixture is raised to a high temperature, and caloric is evolved. In the fermentation of malt liquors the temperature of the liquid is raised with the process, and carbonic acid is produced. And it is found that whenever this gas is evolved, that caloric is produced and rendered sensible: thus in the lungs, the oxygen of the atmosphere combines with the carbon of the blood, and carbonic acid is produced as in fermentation. What becomes then of this caloric? One portion is expired in a sensible form with the breath, which is thus rendered hotter and consequently lighter, and thereby ascends: another portion becomes sensible in the blood, and raises its temperature two degrees, but by far the greater portion of caloric is acquired by the arterial blood, and there remains in a latent form. Some substances have a much greater capacity for caloric than others; thus arterial blood has more than venous blood: this being the case, as the blood loses its arterial character in the course of circulation, it loses also its capacity for retaining caloric, and as the blood acquires carbon, it gives out caloric in a sensible form, and thereby every portion of the body is supplied with heat, with the regularity and precision of the most beautiful machinery. And thus every animal bears about with him, safely packed away in the cavity of the chest, a chemical apparatus, superior to any which the laboratory of the chemist can supply, an apparatus adapted to all climates and all temperatures, which in one moment can convert the frozen element of the northern pole into the very material of physical heat. — Ed.]

CHAP. XIV.

THE MOUTH AND THROAT, ETC.

[THE mouth of the horse is of great extent, which is necessary in order to contain a large quantity of food, and, also, to afford sockets for the large molar teeth. It is wider and deeper at the upper part towards the throat than at the lower. It is bounded in front principally by the anterior maxillary bone, by which it is separated from the nostrils, and posteriorly by the numerous muscles situated between the branches of the posterior jaw bone. It is lined at every part by a mucous membrane, which, however, is not immediately placed on the bone, there being a thick firm substance interposed.

These membranes are corrugated at the upper jaw, and between the incisor and maxillary teeth, forming what are commonly called the bars, and where horses are sometimes bled: these bars are also the seat of lampas. The gums of the mouth are also composed of these membranes, which thus afford security to the teeth.

The sides of the mouth are formed by the cheeks, which are composed of skin and membrane, sufficiently loose to admit the limited motion of the jaws; they are connected with the powerful masseter muscles, which form the greater part of the bulk of the face, and principally assist in the grinding motion of the jaws. In the skull we find the lower jaw considerably narrower than the upper, but in the living animal this does not appear, the space being occupied by the masseter muscles.

The lips greatly assist in gathering together the food, and are largely furnished with the nerves of feeling; they are composed of skin, muscle, and membrane, and possess the powers of motion and sensation in a high degree.

The mouth is abundantly supplied with a watery fluid called saliva, particularly during mastication, when it is secreted and poured in in considerable quantities. This fluid is secreted by three pairs of glands, the largest of which are the parotid, situated at the root of the ear, and from which ducts convey the fluid to the mouth, terminating opposite the second molar teeth. The submaxillary glands are situated under the jaws, and their ducts terminate in tubular eminences near the frænum or bridle of the tongue. The other salivary glands are the sublingual, situated under the tongue, and its ducts terminate rather higher up than those last described.

The mouth is principally filled with the tongue, which is muscular in its structure, and very flexible, being indeed a prin-

cial agent in mastication and swallowing. It is larger at the upper part than towards its tip, and is confined posteriorly to the muscles between the branches of the lower jaw, by a sort of fleshy bridle, and above to a singularly shaped bone, called the os hyoides. It possesses both the power of feeling and tasting, and for this purpose is well supplied with two descriptions of nerves, and is covered by both cutis and cuticle.

The cavity of the mouth is separated from that of the nostrils by the soft palate, a muscular membranous substance fastened to the semicircular border of the palate bones, and hanging down on the back of the tongue, so that in the ordinary state there is no open communication between the mouth and the throat, and thus all breathing is carried on by the nostrils, and fluids coming either from the lungs or the stomach pass into the nostrils. When, however, food is passing to the stomach, it raises this membrane, and then enters the pharynx, the membrane immediately afterwards falling down into its old situation.

The *Pharynx*, or food bag, is a muscular cavity, situated at the root of the tongue, and immediately above and adjoining the larynx. It receives the food from the mouth, and by its muscular power forces it into the œsophagus. It is this part that is affected in catarrh when there is a difficulty in swallowing.

The *Œsophagus* is a long tube, commencing at the pharynx, and ending in the stomach. It passes down the neck rather above the windpipe, and towards the left side enters the chest; it traverses its upper part, pierces the diaphragm, and ends by a sort of curvature in the cardiac orifice of the stomach. It is lined in common with the mouth and alimentary canal by a mucous membrane; but it is principally composed of two orders of muscular fibres, one circular, the other longitudinal, by which it is enabled to propel the food forward, into the stomach. In addition to this there is a white cuticular coat between the muscular and the mucous, and which also lines half the stomach.

The larynx, the pharynx, and the tongue, are connected together, and to the upper jaw bone, or rather to the bones of the head, by means of the os hyoides, so called from its resemblance to a spur. The semicircular part of the spur embraces in a manner the larynx; whilst the shaft is intimately connected with the root of the tongue: this part in the horse is much longer than in the ox, and thus confines the motion of the tongue in a great degree. The os hyoides has two long appendages, which articulate with the temporal bone. Thus situated and constituted, this bone gives great support to the soft parts connected with it, whilst, at the same time, it freely admits their extensive mobility. In the act of swallowing, therefore, this bone is greatly called into action.

Adjoining the pharynx are two large spaces, called the Eustachian cavities, situated one on each side, and communicating by means of a tube with the internal ear. Their use is not known, but they are supposed to assist in neighing; occasionally they are full of matter in strangles and other diseases of the throat. — ED.]

CHAP. XV.

THE VISCERA OF THE ABDOMEN, OR BELLY.

[THE abdomen of the horse is of large size, compared with man or with carnivorous animals; the nature of his food requires considerable volume in the intestines, and these, of course, demand a corresponding cavity for their reception. We find it almost an invariable rule, that horses with very small bellies are incapable of much or long continued exertion. The abdomen is bounded, anteriorly, by the diaphragm, which separates it from the chest; posteriorly, by the bones of the pelvis; superiorly, by the ribs and back bone, and their muscular coverings; laterally, by the ribs in front, and the abdominal muscles; and, inferiorly, by the abdominal muscles, which form their most extensive covering.

On cutting into the cavity, we perceive a smooth shining membrane, called the peritoneum, which every where lines the interior of the abdomen, and is also reflected on the viscera, so that no two organs touch each other, this membrane being interposed between them. Its use, then, is principally to prevent friction, and to enable the almost continual motion of the bowels to be executed without injury. For this purpose it secretes a watery fluid, which, in the living animal, exists in a vaporous form, and perfectly lubricates every part it approaches.

The peritoneum is composed of dense cellular membrane, is very strong, and yet extremely elastic, whereby it can accommodate itself to the ever-varying size and disposition of the abdominal contents, particularly during gestation in the female.

When the animal is in a standing posture, the lower part of the abdomen is occupied by the large intestines; the apex of the cæcum being about the centre, and the colon around it; above them are the small intestines, which, however, sometimes insinuate between the large.

The most important of the abdominal viscera is *the stomach*, which in the horse is of a peculiar structure, and considerably smaller than in any other animal of similar bulk and power. It is a strong muscular cavity, capable of considerable distention, as has been found on opening horses that have died of stomach

stagers, in which disorder it has been stretched to a most enormous extent. In one instance I have known the stomach, with the hardened undigested food it contained, weigh more than sixty pounds. Sometimes it is distended with air to a considerable degree, as in indigestion or flatulent colic; but in the healthy state it is comparatively small, and of great strength.

The stomach is situated on the left side, with its convex part against the diaphragm; it has the spleen attached to its left extremity, and its lower part is covered with the omentum or caul. When the stomach is full, its situation so close to the diaphragm will sufficiently account for the fact that, after being loaded, the horse is incapable of great exertion, and respiration becomes disturbed: the action of the diaphragm becomes indeed mechanically impeded.



This cut represents the Stomach and Liver cut open, so as to show their internal surfaces.

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| 1, The œsophagus. | 6, The pyloric orifice, opening into the duodenum. |
| 2, The cardiac orifice of the stomach, so arranged as to prevent vomiting. | 7, The red mucous membrane of the duodenum. |
| 3 3, The white, cuticular, insensible portion of the stomach. | 8 9, Orifice of the duct leading from the liver. |
| 4 4, The line separating each portion. | 10, Orifice of the duct leading from the pancreas. |
| 5, The villous, or sensible, portion. | |

The stomach possesses four coats. The first is formed by the peritoneum; the second, situated next to the first, is, like the former, white, and is composed of two sets of muscular fibres; one set running in a longitudinal direction, and the other in a circular course; the latter are stronger than the former, and are situated within them.

The third and fourth coats line the interior of the stomach.

On turning this viscus inside out, we find one half occupied by a white cuticular and almost insensible membrane, separated from the fourth coat by a waving line. It extends over the left extremity, and its elasticity enables it to accommodate itself to the varying size of the stomach. The fourth coat, called the villous or mucous, lines the larger half of the stomach. It is somewhat red or yellow in its colour, is very vascular and sensible, and exhibits numerous processes, having the appearance of velvet, which are indeed the minute ramifications of blood vessels, by which a most important fluid is secreted, called the gastric juice.

The stomach has two extremities, the right and the left; the latter of which is the larger, and terminates in a sort of pouch.

It has also two curvatures, a large and a small one: to the former the omentum and spleen are attached. It possesses two openings, one communicating with the œsophagus, the other with the small intestines. The former is called the cardiac orifice, and is situated about the middle of the small curvature. It has a sort of valve formed by the duplication of its membranes, and is kept constantly closed, except when food is passing.

The other orifice, called the pyloric, is situated at the right or small end of the stomach, and is usually open, but has the power of closing. Thus situated, these openings are not far distant from each other, and in the usual position of the animal they are situated superiorly. The œsophagus, just previous to its entering the stomach, makes an acute angle, by which means, in great measure, vomiting in the horse is almost entirely forbidden. The stomach is kept in its situation principally by the œsophagus and the duodenum; but it is also attached by means of peritoneum to the spleen, liver, colon, and diaphragm.

The stomach of the horse will usually contain about three gallons.

The intestines are usually distinguished into the small and the large. They are more bulky and longer than in the human subject, being nine times the length of the body in the horse, and only six times in man, as demonstrated by Mr. Percivall. Of these ninety feet of intestines the greater part is formed by the small guts.

They possess three coats; the peritoneal, the muscular, and the mucous: the first, as its name implies, is formed by the peritoneum; the second is composed of two orders of muscular fibres, the external of which are arranged in a longitudinal, and the internal in a vertical direction, by which means the intestine can be shortened or contracted as may be required. The internal or mucous coat is of immense extent, being greater indeed than the whole surface of the body. This coat secretes a mucous fluid for its protection, is extremely vascular, and is every where sup-



This plate represents the Intestines.

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|---|---------------------------|
| 1, The caecum. | 8, The mesocolon. |
| 2, Its apex. | 9, The duodenum. |
| 3 3, The inferior portion of the colon. | 10 10 10 10, The jejunum. |
| 4 4, Its superior portion | 11 11, The ileum. |
| 5, Its inferior and anterior curvature. | 12 12, The mesentery. |
| 6, Its superior anterior curvature. | 13, The rectum. |
| 7, Its posterior curvature. | |

plied with a set of vessels, called the lacteals, which absorb the nutritious part of the food.

The small intestines in the human subject are distinguished into three, — the *Duodenum*, the *Jejunum*, and the *Ileum*; and although these names are not applicable, and their distinctions by no means marked, they are yet still preserved in the horse. The *Duodenum* then, though twice twelve inches in length, is the first part of the small intestines; and being more closely bound by peritoneum, its motions are more confined than the others. It is connected by peritoneum to the right kidney, is larger and more vascular than the other small guts, but shorter than either; it is also redder, and takes a straighter course than the others; and about six inches from the stomach it receives the ducts or tubes of two important glands, the liver and the pancreas, which fact affords a reason for the confinement of this gut.

The *Jejunum* and the *Ileum* float loosely about the abdomen, being attached to the spine by means of the mesentery. The latter gut is considered to be longer than the former, but there is no proper distinction between the one and the other.

They are both paler and less vascular than the duodenum; and the jejunum, which joins the duodenum, is somewhat redder than the ileum. The small intestines together contain about eleven gallons of fluid, and from them the chyle is principally absorbed by the lacteals.

The large intestines are considerably more capacious than the small, though less in length, and altogether will contain nineteen gallons of fluid. They are, with much more justice than the others, distinguished into three divisions; the *Cæcum*, the *Colon*, and the *Rectum*. The small intestines terminate in a peculiar manner, by projecting at right angles into a cavity, called the blind head of the colon, at which place there is a valve which prevents the food returning. From this blind head the cæcum, which will contain about four gallons, extends downwards and forwards into a blind extremity, it having, indeed, but one opening. This gut may be considered as the principal receptacle for fluids; for it has been found that shortly after a horse has had water, it has passed the whole length of the small guts, and entered the cæcum, whilst the solid food has been left behind. The internal surface of this gut is formed into cells, by which it is considerably extended.

On examining the inside of the cæcum, the part where the ileum enters will be found closed up by the internal coat, being loose and in folds, something like the part where the œsophagus enters the stomach. This kind of structure serves as a valve, and prevents the return of the excrement into the alimentary canal. It is necessary that the reader should bear in his memory the structure of this part; for in flatulent colic, in addition to the resistance made by this valvular structure to the escape of the air which is generated in the stomach and alimentary canal, the cæcum is often so loaded with excrement as to render the escape of air impossible without the assistance of clysters, which, if *properly administered*, will completely empty the cæcum and large bowels in general.

The *Colon* is the largest gut, containing as much as twelve gallons, being more than the whole of the small intestines. This gut commences at the blind head in which the ileum terminates: it quickly assumes a great size, being larger than the stomach; it takes a course round the cæcum, becomes considerably smaller, then makes a sudden turn, after which it again enlarges. It again diminishes, makes another turn, and ends in the rectum. The first part of this intestine is formed into a number of folds, by means of three longitudinal bands, which, being shorter than the intestine, causes it to pucker up, and form internally a number of cells, by which the food is retarded in its progress. The second part of the gut has only two of these bands, and the folds are much fewer in consequence.

The *Rectum* is a straight gut, holding about three gallons. It has no cells, and is only partially covered by peritoneum; but its muscular coat is considerably stronger than the others, and enables it, with the assistance of the abdominal muscles, to expel the fæces. This gut terminates in the anus, which is kept closed by means of a circular muscle, called the sphincter ani, which is always in action, except when the dung is being expelled. The small intestines are about twenty-two yards in length, and the large about eight.

The *LIVER*, whose office it is to secrete the bile, is a gland, and the largest one in the body. It is confined to the diaphragm, and kept in its situation by strong portions of peritoneum, called its ligaments. It is divided partially into three lobes; the right, the left, and the middle, of which the former is the largest, and the latter the smallest; besides these there are two small lobes. Its figure, therefore, is very irregular, and its colour between red and brown. It is supplied with arteries for its nourishment, with their corresponding veins, together with nerves and absorbents; but, in addition to these, there are some large veins which convey to the liver black, impure blood, from which it secretes or separates the bile. The bile being thus secreted, is conveyed by means of the hepatic duct to the duodenum, which it enters about six inches from the stomach. Man and most animals possess a gall bladder for the reception of, and as a reservoir for, the bile; but the horse does not possess any, so that the bile is almost continually being poured into the bowels. The reason of this peculiarity is, that the horse in a state of nature is continually feeding; having a small stomach, it requires frequent replenishing, and, consequently, there is a continual demand for bile. The ox, on the other hand, fills his paunch, and then ceases to eat for some time; consequently, he requires a large supply of bile at particular periods, and this is afforded by means of a reservoir—the gall bladder. The bile is a yellow bitter fluid, and its chief uses appear to be those of a chemical agent, promoting the decomposition of the chyme, and, also, stimulating the secretion of mucus, and the peristaltic motion of the intestines.

The *Pancreas*, or *Sweetbread*, is also a gland which secretes a thin watery fluid, similar to saliva. It lies close to the spine, is connected with the diaphragm and the left kidney. It is of a pale red colour, and, like other glands, is furnished with arteries, veins, nerves, and absorbents. Its fluid is separated from arterial blood, and is conveyed into the intestines by means of a tube, which empties itself close to that of the liver.

The *Spleen* is a peculiar organ, loosely attached to the convex portion of the stomach. It is about three pounds in weight,

long, and larger at one end than the other. Its colour is externally blue; but, when cut into, is the same as venous blood, of which it seems filled. In its structure, it appears to consist of numerous cells. Its use has long been a subject of difficulty and dispute with physiologists; but it is now supposed to act as a reservoir for superfluous fluid. It has been removed from living animals, without subjecting them afterwards to apparent inconvenience; consequently, its purpose cannot be of vital importance. — Ed.]

CHAP. XVI.

ON DIGESTION.

[THE horse is a vegetable feeder; in a state of nature his food is confined to the grass of the field; and although in a domesticated state he largely subsists on nourishment in a more concentrated form, such as grain, yet it is impossible to make him live on animal food; his teeth, his stomach and intestines, are all adapted for the comminution and digestion of vegetables: the former are broad, for the purpose of grinding the food as in a mill; and the intestines are bulky, so as to contain a large quantity of food.

The horse at grass is almost constantly feeding; he does not, like the ox, gather together large tufts of grass, but he takes a short bite, and delights in a sweet herbage. The manner in which he gathers his food is worthy of notice: he does not bite it off with his teeth, but having closely embraced a short bite between the incisor teeth or nippers, he pulls it off by making a slight motion of the head; this is the only duty of these teeth, for the tongue immediately passes on the food to the molar teeth, between which it is ground as in a mill. The under molar teeth do not extend so wide as the upper, but by the lateral motion of the jaws a grinding process is effected. During the time the food is thus being masticated, an abundant supply of saliva is furnished by the various salivary glands, and the soft bolus is then passed into the gullet by the tongue. By the muscles of the gullet or pharynx the food is passed into the œsophagus, by the muscular coat of which it is forced into the stomach.

In swallowing liquids a vacuum is formed in the mouth, and the water is thus sucked in, the tongue forming a sort of channel for its passage. In this operation the lips are surrounded with water, and the air carefully excluded.

When grain forms the diet of the animal, the nippers have very little to do; they merely collect the food, which is transferred to

the molar teeth to be effectually ground. Mastication is, of course, much slower with this food than with grass, otherwise a portion of the food would be swallowed whole, and passed through the body without having its nutritious principle extracted; a circumstance which often happens with very greedy feeders, and likewise in old horses, from the teeth being imperfect. We have before remarked, that the stomach of the horse is very small in proportion to the size of the animal, for which fact a reason is afforded by the habits and peculiarities of the animal. The ox, we find, has no less than four stomachs: in him the process of digestion is comparatively tedious and slow, for having filled his paunch, he becomes more sluggish and disinclined for motion; he lies down, and his food undergoes a second process, that of rumination.

Carnivorous animals have a capacious stomach, which they ravenously fill with a large quantity of animal food, after which they become sluggish and lie down and sleep.

The horse, however, in a natural state, is almost constantly in motion. He eats when he can, and as often as he can, and is almost immediately afterwards prepared for flight. Having a small stomach, it does not, even when filled, press so heavily against the diaphragm as to impede respiration, as with other animals we have mentioned; and although the practice of working him on a full stomach is by no means to be recommended, yet it is surprising what exertions he is capable of even in this state.

Thus a horse, from being furnished with a small stomach, is rendered more useful for purposes of speed, or draught, and consequently more serviceable to man.

The food having entered the stomach, is there submitted to the action of a fluid secreted by the villous coat of the stomach, and termed the *gastric juice*. This fluid is very peculiar in its nature, and has the power of separating the whey from milk. It operates chemically on the food, and converts it into a soft pulpy mass, called chyme, in which state it is passed into the small intestines. To effect this purpose, the food is detained in the stomach a considerable time, during which time it is pressed upon by the muscular coat of the stomach, and moved about so as to submit every portion of it to the action of the gastric juice. The stomach of the horse differs from that of carnivorous animals, not only in the possession of its cuticular coat, but likewise in the fact of having a fundus or blind end, which serves the purpose of detaining the food, making it necessary for it to return almost to the same place where it entered the stomach before it can pass into the duodenum.

Food is detained in the stomach different periods, according to the time required for its conversion; and it is found that if both corn and grass be given a horse, that the latter will pass

into the duodenum first, although eaten some time after the former. It has been ascertained by Mr. Percivall that corn given to a condemned horse, destroyed six hours afterwards, still remained in the stomach.

The peculiar properties of the gastric juice are that of being a powerful solvent, and an antiseptic, and having a power of coagulation. It is capable of dissolving the hardest materials, such as bones; and when meat in a state of putrefaction has been given, it has quickly removed all appearance of putrescence. Its property of coagulating milk and albuminous fluids is useful in converting a fluid into a solid state, and thus detaining it in the stomach much longer than would otherwise be the case.

It is found, in the horse, that if a quantity of water be given even just after the food, it quickly passes through the stomach, and is conveyed to the cæcum, the principal office of which appears to be that of a receptacle for liquids. There is little or no difficulty in its passing through the stomach, as the two orifices are not very distant from each other; thus we discover another use of the fundus in affording a reservoir for the solids without obstructing the passage of liquids, besides the purpose of detaining the food longer in the stomach. It has been found by actual experiment that vegetables are longer digesting than animal food.

In the human subject, it has appeared that the too great use of soups, although containing a very large proportion of nutriment, was yet productive of injury, from being passed too quickly through the stomach.

I have found likewise, that when bruised oats have been given to horses without any counteractive agent, it has been productive of diarrhoea, in all probability from the circumstance of being passed too quickly through the stomach. And the vulgar way of explaining the looseness in washy horses is not altogether destitute of foundation, "that the food does not remain long enough in them to do them good." During the active process of chymification, as it is called, going on in the stomach, its orifices are in great measure closed; but after it is effected the food is gradually forced through the pyloric opening into the duodenum, where it has to undergo that further process of digestion, called chylication. The pyloric orifice is furnished with a circular band of fibres, covered by a fold of the villous or nervous coat, which appears to have, by its extreme sensibility, a power of selecting that portion of the food which has been sufficiently chymified. Not but what food frequently passes through without being acted on by the gastric juice; for we find in birds that seeds are frequently dropped with the dung in a perfect state, and in the fæces of horses we may frequently detect grain in a whole state.

The stomach is largely supplied with nervous energy, by means of an important nerve, called the par vagum, or pneumogastric; and it has been found that on dividing this nerve, the process of digestion has ceased, showing how essential this connection is between the stomach and the brain. It has, however, been found, that where galvanism has been applied to the mutilated nerves, digestion has again commenced, and been carried on for some time.

It should not be forgotten that the process of chymification is very much assisted by the high temperature of the stomach, which during the process is very much increased.

The process of chymification may be disturbed, and the functions of the stomach deranged, by various causes. We well know that in ourselves fear and anxiety will both destroy the appetite and produce dyspepsia, and in irritable horses the same effect will be produced. Cold applied to the skin will also derange the stomach, and still more frequently will disordered stomach derange the skin; so intimate is the sympathy between these parts. — ED.]

It has been remarked that cavalry horses, stationed near the sea, have rough staring coats, are hide-bound, and often otherwise diseased: this probably depends upon the bad quality of the water in such situations. M. Collaine, Professor of the Veterinary School at Milan, says, "I have remarked that in Italy many corps of cavalry, after being stationed a few months near the sea, have been strongly affected with the farcy." I have seen a large dose of infusion of tobacco cause violent shivering; and in some experiments I once made on a glandered horse, the same effect was uniformly produced by a large dose of a solution of arsenic. Many other circumstances might be adduced to show the connection or sympathy that exists between the digestive organs and the skin, or, in other words, the organ of perspiration. Many of the diseases of cattle may be traced to this source; and the common term *chill* is by no means an unfit one for many of the diseases of cattle, especially when considered in connection with the digestive organs, for on these the mischief generally falls. Sometimes, however, the organs of respiration or breathing suffer, or, in other words, the lungs; and so it is in horses, as will be shown in a future chapter.

From the above circumstances it will be seen how necessary a healthy state of the skin is to the digestive process; and we cannot expect a smooth glossy coat on a horse unless he is kept on wholesome food and water. This sympathy, or consent between the stomach and skin, must depend upon their communicating with each other through the medium or intervention of the nerves. It is obvious that the sensorium or brain must be a means of communication between all the nerves or organs of the

body; this is shown by making a wound in the skin, or by whipping the animal. This painful impression on the skin, which is the organ of feeling, is communicated with inconceivable rapidity to the sensorium or mind of the animal; and a considerable degree of muscular motion takes place in consequence. But, besides this common medium of nervous communication between the skin and the digestive organs, there is another, through which slight impressions are communicated from one to the other, that is, through the great sympathetic nerve. There is a circumstance to be kept in view with regard to the connection between the digestive organs and the skin which is of a strictly practical nature, and will be found of great use. If the horse's skin has been brought to a higher degree of sensibility than is consistent with the purposes he is wanted for by hot stables, warm clothing, and regular grooming, it may well be expected that exposure to cold and wet, especially if he has been heated and fatigued by exercise, will make such a painful or chilling impression upon the skin as will be communicated to the stomach; in consequence of which there will be a depression of appetite, if there is no food in the stomach; and if that organ has food in it, there will be an interruption to, or a suspension of, the digestive process. The bowels may be affected by the same cause; and when the chilling impression is strong, even the heart may be depressed. When this happens, the blood accumulates in the lungs, the heart, and the brain, and internal inflammation or fever may be the consequence. Another evil arising from chills is a suppression of the perspirable discharge, either wholly or in part. The excrementitious parts of the blood which would have passed off through this outlet are then thrown back upon the circulation, and cause some degree of disturbance in the body, or fever, until thrown off by the other emunctories. In horses and cattle the kidneys are considerable emunctories, and are easily excited to action; these readily carry off the excrementitious matter as well as the superfluous serum of the blood: but in chills it often falls upon the mucous membrane which lines the respiratory or air passages, causing cough, sore throat, and running from the nostrils, often attended with fever. The importance of the nervous system has not been sufficiently attended to in the treatment of horses and cattle.

It is only necessary at present to show how materially digestion is influenced by it, not only in regard to the state of the skin, or to impressions made upon its nerves, whether painful or otherwise, but likewise as it regards the animal's mind and temper. To obtain a perfect digestion, it is not sufficient to supply the horse liberally with good food and water; it is necessary also that he should be made comfortable by being kept in a suitable stable, and being properly groomed, and in every

respect treated with kindness. He should never be worked beyond his strength or condition. A horse's capacity for exertion or work depends not only upon his general strength, but upon his habits, and upon the state of his health at the time he is employed. Thus a powerful horse, from living well, and in a state of idleness, may, though looking fat and sleek, be unfit for a moderate journey; or if by living in this manner his stomach has been enlarged and weakened, his bowels loaded with excrement, and consequently stretched and weakened, his liver, and all the venous system, surcharged with blood, a moderate journey may, under such circumstances, bring on a fatal disorder. It requires but little reflection to perceive that whatever contributes to easy digestion in ourselves will do the same in horses; and every one knows that calmness and cheerfulness of mind or temper are conducive, if not absolutely necessary, to a perfect digestion. Thus it is that horses which have been accustomed to company and kind treatment pine and fall off in condition under different management. Old horses that have been accustomed to warm stables often fall off in appetite and condition when placed in such as are cold. A damp stable, or letting a current of air come upon a horse's head, especially if he is brought in sweating from exercise, will so far chill the skin, and interrupt its functions, as to cause that excrementitious matter which should have been discharged by the skin to fall upon the mucous membranes. Those of the lungs, or air passages, are generally affected, or rather most visibly affected; as is denoted by cough, dulness or watering of the eyes, and discharge from the nostrils: but the mucous membrane of the stomach and bowels seldom escapes uninjured, as is seen by the diminished appetite, imperfect digestion, and the looseness or alteration in the state of the dung which follow.

[Shortly after the food enters the duodenum it is submitted to the action of two fluids; one furnished by the pancreas, and the other by the liver. The pancreatic juice is very similar to that of saliva: its principal use, therefore, appears to be to dilute the food; but it also contains much albumen, which forms an important constituent in chyle. We can readily understand how essential it is that a watery fluid should here be supplied. In the stomach it would be unnecessary, indeed hurtful, as it would hasten the expulsion of its contents too rapidly; but in the intestines, in order that the chyle should be extracted, it is essential that the food should be liquefied.

The formation of chyle is the immediate result of the admixture of the bile, which thus has a chemical action on it.

The properties of bile have before been noticed, and its principal use is that above stated.

Chyle is a thick white fluid, resembling cream when recently

extracted, but it soon separates into a coagulum and a watery fluid: it is found to be composed of minute globules, smaller than those of the blood: its taste is both sour and sweet.

The chyme, when it enters the duodenum, has a considerable quantity of acid in its composition; but as it advances it is deprived of this acid, and alkali is found to preponderate. This change is effected by the bile, which contains a large quantity of alkali, the alkali combining with the muriatic acid of the chyme. By this combination carbonic acid is set free, which accounts for the presence of this gas in the intestines. There are other gases found in the intestinal canal, which in the stomach principally consist of oxygen and nitrogen, and, in the large intestines, of hydrogen in several combinations.

The greater part of the chyle is extracted in the small intestines by means of the lacteals; but in the large intestines also this process goes on: for it has been found that life has been supported for some time by nutritious injections.

The food having entered the large intestines, is prevented from returning by the valve at the place of entrance. The colon and the cæcum commence from the same place, so that a portion of the food enters each intestine. On examining the cæcum after death, we find that its contents are more watery than the others; and it has been found that when a horse takes a large quantity of water, it passes in the course of ten minutes into the cæcum, whose principal office may therefore be considered as a receptacle for water. The importance of such a reservoir in the horse is very evident, when we consider, on the one hand, the small size of the stomach, and on the other the large quantity of water, three or four gallons, taken at a time. A great portion of the contents of the cæcum is taken up by the absorbent vessels, and the remainder is returned to the place of entrance, and passes into the colon and mixes with its contents. The structure of the colon we have before noticed: its interior is formed into cells, it has several convolutions, and its diameter varies at different parts.

This peculiar structure eminently qualifies it for detaining its contents, so as to perfect the process of digestion; for it appears that the large intestines in the horse serve a more important service than in man or carnivorous animals, a much greater portion of nutriment being absorbed in them. From the colon the fæces pass into the rectum in the form of balls of a triangular shape, having been so modified by the latter part of the colon.

The *rectum*, as its name implies, is a straight gut acting as a reservoir for the fæces, and is furnished with a powerful muscular coat, by the contractions of which it is, from time to time,

expelled; with the assistance, however, of the diaphragm and the abdominal muscles.

The intestines, both large and small, are fastened to the spine by means of a strong membrane, which is spread out in a radiated direction, like a fan, the foci of which are of course towards the spine. That part of the membrane which is attached to the small intestines is termed the mesentery; and the other portions are termed the mesocolon and the mesorectum, according to the gut to which it is connected. This membrane, which we may as well designate as the mesentery throughout, not only serves to sustain the bowels, but also to afford a vehicle for their important vessels. Thus we have numerous arteries for the nourishment of the coats of the bowels, and to furnish their internal secretions. We have likewise the mesenteric veins, which have been found not only to return the venous blood, but also to have a power of absorbing the more fluid contents of the bowels, as well as some chemical agents which have been administered for experiment, and which the lacteals have refused. There are also a numerous supply of nerves passing to the bowels, supplying them with nervous energy, and keeping up their connection with the sensorium. These are not only nerves of sensation, but also of involuntary motion: the former are at all times the medium of common feeling, and sometimes, as in spasms or inflammation, the source of the most intense pain; the latter endow the muscular coat of the bowels with the peculiar peristaltic or vermicular action it possesses, and by which the contents are passed onwards. Lastly, the mesentery abounds with minute vessels, called the lacteals, which open into the intestines, and absorb the chyle, and convey it through a number of glands, called mesenteric glands*, to a canal denominated the receptaculum chyli, which takes its course along the spine, and terminates in a large vein, just before it reaches the heart. The lacteals are so small as to be ordinarily imperceptible to the naked eye; and they seem to possess a peculiar sensibility for the absorption of chyle, which, however, is urged onwards by means of capillary attraction.

Thus the beautiful process of digestion is carried on, whereby the grass of the field is gradually converted into the various and complicated structure of animal frames. In this process it is easy to believe how the imperfection of one part may neutralise the operation of another, and thereby materially impair the effect of the whole. Thus, loss of condition, so often met with in the horse, may arise either from deranged stomach or intestines, from diseased secretions of the glands, or from obstruction or disease of the absorbent vessels.—ED.]

* These glands sometimes become hardened and enlarged; and interrupting the course of the chyle the animal loses flesh.

CHAP. XVII.

ON THE URINARY ORGANS.

[THE urine is separated from the blood by means of the kidneys, two glands of well-known shape, lying one on each side of the spine, immediately under the lumbar vertebræ. Unlike the liver, their lower surfaces only are covered by peritoneum; and they are kept in their situation partly by cellular membrane which attaches them to the psoas muscles above, and to the neighbouring parts; partly by the fat in which they are imbedded; but still more by large and important blood vessels, which enter the gland at the notch in its centre.

On cutting into the kidney, we find that the outer part is a dark red, and the inner a lighter colour: the former is termed the cortical, and the latter the medullary part; and the substance of the former runs into the latter. The kidneys are covered by a membrane peculiar to itself. The blood enters the kidney at its notch by means of the emulgent artery, which divides into four or five branches, taking their course towards the cortical part, where they end in minute vessels. These vessels, which are exceedingly numerous, terminate in little globular bodies, by which the urine is separated. The superfluous blood is returned by the veins; but the urine is conveyed by a particular set of vessels into a reservoir, called the pelvis, situated in the medullary part of the kidney. From the pelvis of the kidney arises a long white tube, called the ureter, which leaves the kidney at its notch, and runs along the lumbar vertebræ to the pelvis of the body, where it is attached to the upper and lateral part of the bladder, on which it continues its course towards the neck of the bladder. Before it reaches the neck it disappears, by penetrating the external coats of the bladder, passes a short distance, and then terminates by piercing the internal coat in an oblique direction.

The kidneys are well supplied with nerves, which enter them with the blood vessels.

Near the kidneys are two small bodies, called the *capsulæ renales*, whose use is unknown.

The *BLADDER* is situated entirely within the cavity of the pelvis, when in an undistended state; but when full, a portion of it projects into the abdomen. It is attached to the pelvis by cellular membrane, but is chiefly kept in its situation by means of peritoneum, by which it is partially covered. It is placed at the lower part of the pelvis, having immediately above it the rectum in the male, and the vagina in the female. The bladder is

usually distinguished into three parts: the fundus, the body, and the cervix, or neck. The fundus is the round extremity, which often projects into the abdomen; the body forms the principal bulk of the bladder; and the cervix is the posterior narrow part, which, however, is thicker than the rest, and is united to the urethra.

The bladder is composed of three coats: the external, the internal, and the muscular. The former is formed by peritoneum, and covers the anterior part of the bladder only. The internal, or mucous coat, forms the principal thickness of the bladder, and secretes a mucus for its internal lubrication, and to prevent the irritating effects of the urine. This coat possesses much sensibility, and is largely supplied with nerves. The muscular coat is composed of two orders of fibres, longitudinal and circular; the former of which will diminish the length, and the latter the breadth, and the united contraction of both will lessen the cavity so as to expel the contents.

The neck of the bladder is more abundantly furnished with circular fibres than the other parts, and their office in this situation is to prevent the urine from escaping by closing the cavity. These fibres, when contracted from spasm, occasion a retention of the urine.

The urine is discharged from the body through a membranous canal, called the urethra, which, in the male, is of considerable length, extending from the bladder to the extremity of the penis. It first takes a course from the neck of the bladder backwards, and becomes increased in size, and approaches very near the skin, being, indeed, just under the anus; it then forms an acute angle, turning downwards and forwards, and is here surrounded by a muscle, called the accelerator urinæ, and continues to the extremity of the penis.

In the female the passage is considerably shorter, being about two inches backward, and slightly upward, when it opens into the pudendum, and is connected with the organs of generation.

The *Urine* is a fluid secreted or separated by the kidneys, and poured by them through specific channels, the *ureters*, into the bladder. In a state of health it is of an amber colour, and its peculiar odour is well known. It is composed chiefly of water, which contains some salts, and a peculiar substance, called *urea*, to which its properties are more particularly owing. The colour of the urine is much lighter after a large quantity of water has been drunk; and darker, and more acrid, after solid food. There is a great sympathy between the kidneys and the skin; as the secretion of the one increases, that of the other diminishes: when horses sweat much, they urinate little, and *vice versâ*. The urine is separated from the blood, which is conveyed to the kidneys by the emulgent arteries; these organs, therefore,

serve the purpose of separating the excrement from the system, and conveying it away: and it is also thought they serve an office subordinate to the skin,—that of removing the superfluous fluid that is not actually required by the skin, or cooling the body by means of perspiration.

The *Bladder* is, of course, a reservoir for the urine, preventing the great inconvenience that would result from discharging the urine as fast as it is secreted. It receives the urine by means of the ureters, and suffers it to accumulate to a certain degree, differing in different individuals: it then produces an uneasy feeling, which induces the animal to discharge it. The act of staling is therefore a voluntary act, but the inclination urging it is much affected by nervous influence; *e. g.* fear, and anxiety of mind, will repeatedly cause a disposition to urinate, both in the horse and in man.

The act of staling is more simple in the mare than in the horse; and in the former a retention of urine is much rarer, and is more easily removed, which is owing to the straightness and shortness of the canal in mares, and the great length and obliquity of the external passage in horses.

In the urinary act the horse stretches out his legs, and after a few moments' preparation, in which he inspires a greater quantum of air than common, he expels the urine by the conjoint assistance of the diaphragm, the abdominal muscles, and muscular coat of the bladder. Towards the conclusion of the act, the expulsion of the urine from the urethra is assisted by a small muscle, called the accelerator urinæ, which clears the passage from the last drop. The mare has, likewise, the power of ejecting the last portion of the urine, by inverting repeatedly the nymphæ and clitoris. — ED.]

CHAP. XVIII.

THE ORGANS OF GENERATION.

[THE *Organs of Generation* are intimately connected with the parts last mentioned; they are in both sexes very complicated; but in this place a general description must suffice.

In the *male* we find glands to secrete the prolific fluid, and an instrument to convey it to the necessary receptacle in the female; the first are called the testes, the other is the penis.

The *Testes* or *Testicles* are two glandular bodies, suspended between the thighs, and contained within a bag called the scrotum. They are of an oval shape, flattened at the sides, and

somewhat about the size of a hen's egg when full grown. To the upper and posterior part of the testicle is attached the vas deferens; and to the upper and anterior end is joined the spermatic cord, by which the gland is suspended, and retained in its situation.

The substance of the testicle is soft, and of a light brown colour. At the upper part of the testicle is found what is called the *Epididymis*, which is composed principally of a white tube containing semen, coiled up so much that when unwound it has been found several yards in length. The epididymis is larger at each extremity than in the middle. These extremities are called the *globus major* and *minor*. The former, and larger, is situated towards the front; and the smaller globe is found towards the back part of the testicle: from the larger globe, which is commonly termed the *nut*, and is indeed about the size of a small walnut, the vas deferens arises.

The *Spermatic Cord*, by which the testicle is suspended, is composed of numerous parts, although not by any means bulky in their structure. There are, in the first place, no less than four distinct coverings; one of which, called the *cremaster*, is muscular, and has the power by its contraction of drawing up the testicle. The other parts of the cord consist of arteries, veins, nerves, and the vas deferens.

The arteries are two in number; a small one, belonging to the cord; and a larger one, the spermatic, supplying the testicle itself, and from which the semen is secreted: from the latter the principal bleeding takes place in the operation of castration. The veins are large and numerous, and accompany the arteries in their course, together with the nerves, which are also numerous, although small, and the absorbent vessels, which are likewise numerous.

The *Vas Deferens*, as the duct which conveys the seminal fluid is termed, forms a part of the cord, which can readily be distinguished from the other parts, being stout, and firm to the touch. It springs from the small end of the epididymis, at the anterior part of the testicle, and consequently does not at first join the other parts; it, however, gradually approaches them, and enters the abdomen with them, when it ascends to the pelvis, and passes by the side of the bladder, about an inch posterior to which it terminates in another duct not yet described.

The *Scrotum*, or bag in which the testes are found, is composed of several coverings. We have externally the skin, which is soft and thin, and usually dark. It is equally divided by a longitudinal crease, called the *raphe*. On cutting through the skin, we find a layer or coat, supposed to be muscular, called in human anatomy the *dartos*. It is loosely connected by membrane with the skin and other parts; and a portion of it passing

upwards from the raphe, divides the scrotum into two equal parts, and thus separates the testicles from each other.

The third covering of the scrotum is formed by cellular membrane. The testicles themselves have two coats; one intimately connected with the gland itself, and the other external to this, and common to both the testicle and the cord. The latter is called tunica vaginalis, or vaginal tunic, and is formed of peritoneum, and accompanies the testicle in its descent. After enveloping the cord and the testicle, it is reflected, so as to invest them a second time, and is thence called the tunica reflexa. Between these two membranes a fluid is secreted for the lubrication of the parts, which spurts out in the operation of castration.

In performing this operation, we therefore first cut through the skin, next the fibrous coat, then the cellular covering; these membranes belonging to the scrotum. The knife next divides the tunica vaginalis, on which the fluid before spoken of spurts out, and the testicle springs from the bag through the incision. Thus, by one stroke of the knife, we sever no less than three coverings, besides the skin; but there is no occasion to cut through the reflected coat or tunica albuginea, as the white coat immediately enveloping the testicle is termed.

The testicles at birth are, like those of man, contained within the scrotum; but, after five or six months, they are drawn up between the external and internal abdominal rings, where they remain six or seven months, and then again descend to the scrotum.

The abdominal rings are two on each side, the external and the internal; the former is the opening in the transverse muscle, the latter in the fascia, or strong membrane, which immediately contains the intestines. They are not placed opposite each other, but about three inches apart, the external ring being situated at the posterior inferior part of the abdomen. The testicle itself, too, has a coat of peritoneum; and, when it leaves the abdomen, it forces that portion of the peritoneum which closes the opening with it, and carries it down to the scrotum, thus accounting for two things,—the double membrane of the testicle, and the circumstance of the open communication existing between the scrotum and the abdomen, which, indeed, is the principal source of the dangerous symptoms which sometimes supervene after the operation of castration.

The *Penis*, which serves the double office of affording a passage for the urine, and ejecting the semen, is a long fleshy body, attached to the pelvis by ligaments and muscles. It is composed of several distinct parts, besides its muscles, which are, first, a pair called the *erectors*, situated at the root of the penis, and attached to the bones of the pelvis, which assist in the erection of

the organ, by promoting the influx of blood. Then we have a small triangular muscle, situated at the root of the organ, besides the Accelerator, which envelopes the urethra, and ejects with force both the urine and the semen.

The body of the penis is formed principally of two cavernous bodies, which, by the power they possess of containing a large quantity of blood, increase almost suddenly in size, and thus cause the erection of the penis.

The extremity of the penis is called the glans, which, in its distended state, is large and rounded, and is the counterpart to the mouth of the uterus in the female, to which it is applied in the act of copulation. At the extremity of the glans is the membrane to the urethra, which, in some measure, projects beyond the glans.

At the commencement of the urethra, near the neck of the bladder, are found three small bodies, called the prostate glands, one of which is much larger than the others. These glands secrete a white fluid, or mucus, which mixes with the semen previous to its ejection.

The penis of the horse, in its flaccid state, is not usually seen, being altogether situated within its sheath, which is formed by loose folds of skin, reflected on the body of the penis, so as to permit the ready projection or retraction of the organ.

Within the sheath are situated a number of small glands, which secrete a white odorous substance, which often collects, and becomes offensive; and sometimes insinuates within the urethra, and obstructs the passage.

The *seminal fluid*, from the place of its secretion to that of its departure from the body, traverses a considerable length of passage; that of the urethra alone being nearly two feet.

It is secreted by the minute branches of the spermatic artery, whence it passes into small tubes which convey it to larger ones, which from being assembled in the form of network are called the rete: thence a still larger set of tubes, the vasa efferentia, convey it from the testicle itself to the epididymis. The epididymis, which we have before observed lies on the upper part of the testicle, receives the semen from the vas efferentia, which unite at the anterior part of the epididymis, and terminate in a single duct several yards in length when unwound, but coiled up in the small compass of the large head or nut of the epididymis. From this part the vas deferens proceeds, which, joining the cord, enters the abdomen through the ring, and traversing the pelvis, conveys the semen to about one inch posterior to the neck of the bladder.

The *Vesicula Seminalis*, oblong membranous bags, are supposed to act as reservoirs for the semen; they are situated in the space between the bladder and the rectum, and open by means of

ducts into the urethra, very near the termination of the vas deferens.

The female organs of generation are usually classed by anatomists into the external and the internal. The opening just under the anus, so much larger in brood mares, is termed the pudendum or vulva, and is formed by the labia or lips on each side, the places of junction of which above and below are termed the commissures.

The *Labia Pudendi* are covered externally with fine soft skin, generally of a dark colour, under which there is a fatty and fibrous substance, which forms their principal bulk. Within the vulva, the labia are covered by a mucous membrane, and possess some degree of muscular power, which is exemplified in mares after staling.

On separating the lips of the pudendum, we find at the lower part, the clitoris, a fleshy body, somewhat analogous to the penis, having like it a power of erection, and furnished with muscles for the purpose.

Anterior to the *clitoris* and about four inches from the vulva, we find the commencement of the passage to the bladder, the meatus urinarius. It is large enough to admit the finger, is about two inches in length, and passes downwards and forwards to the bladder; its entrance is guarded by a membrane, which lies upon it, and thus acts as a valve.

The *Internal Organs* of generation are the *vagina*, the *uterus*, the *fallopian tubes*, and *ovaria*.

The *Vagina* is a cylindrical canal of great dimensions, being eighteen inches in length, extending from the vulva to the uterus. It is situated between the rectum above, and the bladder below; is partly membranous, and partly muscular in its composition; and is lined internally by a mucous membrane, which is collected in loose folds.

The *Uterus*, or womb, in the mare, is very singular in shape, having a body, a neck, and two horns; the body is the cylindrical part, having the neck behind and the horns in front; the neck is the posterior contracted part, which projects into the vagina; it presents a wrinkled flower-like appearance, and has in its middle an opening into the vagina, called the os uteri. The horns, which are each almost as large as the body, proceed backwards from it, diverging from each other. They proceed upwards, into the abdomen, and end in round extremities, to which are connected the fallopian tubes.

The uterus possesses considerable strength, which is chiefly owing to its thick fibrous coat, which, during gestation, possesses great contractile power.

The *Fallopian Tubes* are two very small tubes, about an inch

and a half in length, leading from the horns of the uterus to the ovaria.

The *Ovaria* or *female* testicles are considerably smaller than the male organs, which in shape they resemble, being about the size of walnuts; they are situated in the abdomen, a little anterior to the kidneys, and are loosely connected to the spine by membrane. They are well supplied with blood vessels and nerves, and supply small ova or vesicles, one of which, during copulation, is conveyed through the fallopian tubes to the uterus, and being impregnated by the seminal fluid of the male, becomes the germ of a new animal.

The operation of spaying, so often performed in the pig, and sometimes on the cow and mare, consists in making an opening at the flank into the abdomen, and introducing the finger, with which the ovaria are brought out and cut off.

The *Udder* of the mare is situated at the lower and back part of the abdomen between the thighs; in the virgin state it is exceedingly small, but towards the latter period of gestation enlarges considerably, and a few days before parturition milk is secreted.

The udder is a glandular structure, well furnished with blood vessels, by which the milk is secreted, which is then poured into specific canals, which convey it to the *teats* or *dugs*, the extremities of which are pierced with three small holes, for the exit of the milk. Both udder and teats are covered by soft skin, generally of a dark colour.—Ed.]

CHAP. XIX.

ON THE FUNCTIONS OF THE GENERATIVE ORGANS, AND THE GROWTH OF THE FÆTUS.

[THE purpose of the complicated structures which we have described, both in the male and the female, is the preservation of the species. For this purpose, it is not only essential that the seminal fluid should be ejected into the uterus, but that the mare should be in a state fit to receive it. The human female is in a state fit for breeding all the year round; but in the mare this state only exists at the period of horsing, which is generally confined to the summer, and the early part of it. Mares go eleven months with foal; but they usually exhibit the disposition to copulate, which is well known by the increased heat and swelling of the parts of generation, and the emission of a white fluid, about nine or ten days after gestation, and at intervals afterwards of a few days at first, and then about three weeks from this time; the brood mare is consequently enabled to breed

a colt per annum, for several successive years. The stallion being highly fed, although he impregnates a great many mares in the course of the season, is yet very soon excited to the act by the presence of the salacious female. The testicles are drawn up and the penis is quickly erected by the sudden accumulation of blood in its cavernous substance and glans, which by the angle formed at the root of the penis is prevented returning. In this state, the leap having been taken, the penis enters the female parts, and the glans, by successive efforts, is pushed against the os uteri, to which it exactly corresponds. The friction of the parts produces exquisite pleasure to both sexes, at the climax of which the semen is ejected into the uterus with considerable force. This done, the act is completed on the part of the male, the penis becomes flaccid, and is withdrawn, and the feeling of lassitude succeeds the intensity of pleasure.

The female often rejects the semen shortly afterwards, to prevent which, it is sometimes customary to throw cold water over the loins to diminish the excitement of the parts, and thus cause them to retain the prolific fluid. Bleeding has been sometimes practised with the same view, and, it is stated, with success.

When the mare is impregnated, the os uteri is closed, and there is no longer a disposition for the horse; this rule, however, is not without exceptions.

The phenomena which supervene in the female uterus after a successful impregnation have been the subject of much dispute, and are still surrounded with mystery. The *Ovaria* are found to be composed of vesicles, or sacs, which contain a fluid, within which are small bodies called ovula, and which are, indeed, the germs of young animals. Whether the seminal fluid is conveyed by the fallopian tubes to the ovaria, and there impregnates an ovulum, as is supposed, or whether the vesicle bursts independently of the copulative act, and is then conveyed to the uterus there to be impregnated, or not, we cannot determine.

The ovulum, being impregnated, is termed the ovum, and on departing from the ovarium leaves a scar behind, which is called a *corpus luteum*.

The impregnated ovum, soon after its arrival in the uterus, becomes firmly attached to this body, prior to which a quantity of blood is determined to the uterus, by which a substance resembling lymph is secreted, which furnishes not only a lining membrane for the uterus, but also for the ovum itself. The former is termed the deciduous, and the latter the reflected coat; and each of them soon becoming abundantly furnished with blood vessels, they together are called the *Placenta*, and the *fœtus* is thereby supplied with nourishment. The vessels of the mother, and those of the *fœtus*, do not communicate with each other by any direct channel; but it is supposed that the foetal vessels

derive nourishment and purification by a sort of imbibition from the mother's blood.

The ovum, on leaving the ovaries, is furnished with a membrane, called the *Amnios*, which afterwards increases in size, and furnishes a liquid in which the foetus floats, comparatively free from danger, and in all the ease and luxury of an hydraulic bed. It is supported in its situation by the umbilical cord, or navel string, which is nearly three feet in length, and is composed of the blood vessels, and a canal communicating with the bladder, and proceeding from the navel of the foetus, and passing to the deciduous membranes of the mare. This canal is called the *urachus*, and serves to convey away the superfluous water that the foetal bladder would be incapable of containing.

The circulation of the blood in the foetus, it is evident, must be very different from that after birth. Nourishment is not afforded by the stomach, bile is not secreted by the liver, nor is the blood purified by the lungs: these organs are only supplied with nourishment sufficient for their own support and increase. The arteries belonging to the maternal portion of the placenta terminate partly in veins, and partly in exhalent surfaces: from these exhalent surfaces, the minute branches of the umbilical veins of the foetus absorb blood in a comparatively red and purified state: they convey this blood into the foetal circulation through the vein, which, in the animal after birth, is wholly engaged in supplying the liver. It will thus be seen that the umbilical veins convey red blood, and the umbilical arteries black blood, contrary to the usual custom. The blood from the umbilical veins, as well as the lower part of the body, enters both sides of the heart at once, and a small portion is thence sent into the lungs from the right ventricle, whilst the largest portion is distributed to the system from the left ventricle.

There is a communication, too, between the aorta and the pulmonary artery, by which the blood not required by the lungs is sent into the system through the aorta. It will thus be seen that the heart of the foetus, though double in its construction, is single in its office; and, in this respect, is very analogous to the single heart of some cold-blooded animals. No sooner, however, does the animal breathe, than the right side of the heart has an independent office to perform, and the communications before spoken of are closed up. — ED.]

CHAP. XX.

ON THE PRINCIPLES AND PRACTICE OF BREEDING.

[THE comparative influence of the male and female in the formation of the offspring has been the subject of much dispute amongst physiologists, and is a matter on which there is still much difference of opinion. Some contend, that the influence of the male is every thing, and that the female only affords the soil for the nourishment of the fœtus. Others argue, that the seed is afforded by the female, who has therefore the greatest influence over the future offspring, and that the male only excites this seed into the action necessary for the production of the young animal. The question, however, is not to be decided by anatomy, or physiology, but only by the evidence of a number of practical results. The germ of the future offspring is certainly supplied by the female; but still the form and qualities may be the effect of the male, just as the ductile wax receives whatever impression the stamp may be calculated to produce, whether the head of a prince or that of a peasant. We must therefore look only to facts, to decide the point. It is a matter of some importance in the breeding of animals to have as correct views as possible on this subject, for it is too frequently the case that either one parent or the other is entirely disregarded in the choice, and the result is a weakly, mongrel, or bad-shaped animal. In crossing the breed of animals, I think it will be found that the offspring turns mostly after the sire both in shape and in size. The common mule begotten by the male ass out of the mare certainly discovers a much stronger affinity in shape and size, and in disposition too, to his plebeian sire, than to his more aristocratic dam. The lengthy ears, the narrow foot, the coarse head, the light and wiry limbs, the comparatively insensible skin, are all derived from the ass, and even his size is more accordant to the sire than to the dam. It must be borne in mind, that the large Spanish mules that we occasionally see are begotten by asses of great size. In the breeding of sheep, it is found that the qualities of the ram preponderate over those of the ewe, a fact which is well illustrated by the cross between the South Down ewe and the Cotswold or Leicester ram, in which the progeny very nearly approaches the Cotswold both in size, length of wool, and general appearance. In horses it is surprising what large animals pony mares will breed when covered by horses much larger than themselves, and it is rarely the case that a large roomy mare will produce a colt that will reach her own size, if put to a small stallion.

There are of course exceptions, but such is the general rule.

From these facts, I think we are justified in concluding that the influence of the mare is superior to that of the horse, and that the offspring, in shape, size, and general qualities, turn more after the father than the mother.

This fact, however, will by no means justify that total indifference as to the qualities of the mare, so generally pursued, particularly by farmers. When a mare is unfit for every other purpose, she is generally considered worth something for breeding, whereas, in many cases, it would be more prudent and economical to destroy the poor brute, than suffer her faults and misfortunes to become hereditary. For, although the influence of the horse may be greater than that of the mare, yet the bad qualities of the latter are just as likely to be hereditary as those of the sire; and indeed any constitutional defects, such as a scrofulous disposition, are more likely to be derived from the mare than the horse, inasmuch as the intimate connection between the maternal and foetal system is considerable before birth, and is kept up afterwards by means of the milk. It must not be forgotten, too, that amongst mares and horses kept for breeding the proportion of bad mares is greater than of bad horses. A horse is rarely preserved entire, and used generally as a stallion, unless he has some excellences; whilst, as before observed, it is very frequently the case that the only claims a mare has to the embraces of a horse are her unfitness for every other purpose.*

A bad mare will scarcely ever produce a good colt, however excellent the horse may be; and although a very superior stallion may be introduced in a country where the qualities of the horses are bad, and the benefit may be immediately perceptible, yet it takes some years and several generations before the character of the stock is materially changed.

The Arabs of the desert, we are told, prize their mares infinitely beyond their horses, and while they part from the latter freely, yet nothing can induce them to give up their favourite mares. To this scrupulous attention to the female is doubtless chiefly owing the fact of their preserving their race of horses free from degeneracy, and in such great perfection for so many years. While they preserve good mares they cannot have bad horses, whereas had they allowed degeneracy to creep in amongst their mares, the qualities of their horses could not have supplied the deficiency.

It is a question, however, whether they would not have improved their race of horses still more, if they had bestowed more of that scrupulous attention on the sire which they pay so exclusively to the dam. And although, from the impossibility of

* Strange reasons are sometimes given for breeding. On asking a friend why he put a little *plain*, though fast mare, to the horse, he replied she was very poor, and he thought it would do her good.

getting the choicest Arab mares, we cannot reduce their powers to a fair comparison with our own, yet, from the great ease with which our second-rate horses have beat the Arabs, some of them perhaps the own brothers of their favourite mares, I am inclined to think that if even their choicest mares were entered for those of our stakes confined to the feminine sex alone, we should find that the pride of the desert would be unable to wrest the laurels from our Crucifixes or Black Besses, and that the winner of the Oaks would still remain of English blood.

Breeding horses is generally considered an unprofitable branch of a farmer's business, but this, I take it, is in great measure owing to the want of judgment displayed; for, certainly, keeping an animal till he is four or five years old, taking all the risks to which young stock are exposed, and then realising a price ranging between 20*l.* and 30*l.*, will most assuredly leave a balance on the unfavourable side of the profit and loss account. I am here not alluding to those large breeders who make it their principal business, having extensive pastures applicable for no other purpose, but to those agriculturalists who cannot keep their colts for less than three or four shillings per week. To this description of farmers breeding cart horses is more profitable than hacks, as the colts come into work at two and three years old, and thus earn their keep at this early age, and if they are large and promising often realise high prices by the time they are five years old. Although more judgment has been displayed in this stock than in that of a better breed, yet there is still much room for judicious improvement. By using a horse as a stallion better bred than those generally used, many advantages are secured, without any proportionate drawbacks.

The advantages are, by slightly reducing the weight we gain an improvement in the action, so much so that a pace of four miles an hour will be easier executed than three miles an hour by the heavier horse. By getting more breed a greater degree of nervous energy is obtained, and the horse is less likely to tire, and will consequently do more work.

For common agricultural purposes, there is no horse so handy as one about 15 hands or a little more; and where the land is not particularly heavy, and the principal object of the farmer is to get useful horses for his own use, he cannot do better than breed these little active animals, which, by a judicious attention to the qualities of the sire, and the dam, he may obtain with such a degree of speed in the walk as to do half as much work again as the heavy, hairy-legged sort.

When, however, the farmer intends selling off his stock after working them two years, so as to realise large prices for the London market, it is then essential that a much greater size should be attained, viz. from 16 to 17 hands, together with a

disposition to carry plenty of flesh, for the Londoners will not buy unless a horse is fat.

These purposes, however, may still be effected without losing sight of the principle we have advocated, that of improving the breed; for, by selecting large, active, good-shaped cart mares, and by putting them to a powerful half-bred stallion (better bred than he looks), we may secure size and shape, at the same time have substance and flesh enough to please the metropolitan eye, and to obtain as high prices as any that are sent to the London markets. I have myself seen many of this breed whom no one would condemn as too light for any purposes of draught. I do not like the plan, however, of putting a cart mare to a thoroughbred horse, as, generally speaking, these extremes are not equally mixed in the offspring, but are harshly conjoined; for we often see them with the legs of the sire, and the carcass of the dam, the two extremes *meeting*, but not *mingling*, in the young animal.

In breeding half-bred horses, so as to realise a profit, the principle to be kept in view is to produce an animal that will at four or five years old realise 50*l.* or 60*l.*; to do which no greater expense is incurred than in breeding an animal of one half this value.

In the first place, then, we have to inquire what sort of animal it is that realises this high price. They are principally of two kinds, hunters and carriage horses. By hunters, however, we do not mean any animal that can gallop fast over a light country; but one that can carry a heavy weight in deep ground, well up to hounds when the scent is good, and the pace proportionate. For this purpose we require breed and substance in the highest degree the two qualities can be combined together. The horse should be as nearly as possible 16 hands, with a deep chest and barrel; not too short in the back, but with strong loins and quarters; good fore-arm and legs; light head and neck, but the latter not too short. These qualities are more easily obtained in a smaller horse, but this will not do if a good price is expected; there must be a large frame to carry weight, and this can be obtained if the breeder will get the right sort of mare, which can be done by not sparing a few pounds.

The mare then should be half-bred, and as near as possible 16 hands; not under 15½ nor over 16½, unless, in the latter case, the other qualities are very excellent. She must not be blind or half blind, unless from an accident, as the diseases of the eye are very hereditary. If she is lame, we must assure ourselves that it has not been produced by natural defect. We must take care that she is not too long and oblique, or too short and upright, in the pasterns; or knuckling at the knees or fetlocks, or small under the knee.

If she be washy or light carcassed, although as fleet as the

wind, we had better shoot her than breed from her. Her paces should be good, at any rate, not bad; and if she has been a good hunter, so much the better.

And now what sort of a horse should such a mare be put to? A thorough-bred, by all means, but not any one that may offer. He should have good fore-legs, and a large frame, and his performances should have been sufficient to show that his large frame was no hindrance to him. It is by no means essential that he should have won the Derby or St. Leger; better far that he should have been in the tail at these great races, and have run honest and well afterwards, than that he should have come in first, and never raced again. It is essential that his constitution should be good, and there is no better proof of this than his capability of standing training, without being ever and anon *amiss*, and his *frequent* appearance at the starting post and *fair* position at the winning post. If he has won a few Queen's plates, and particularly if he has raced for them too (not merely walked over), he is the sort of horse for getting valuable hunters.

By selecting such a sire and dam as these just mentioned, there is every probability of breeding animals of value; but I am not asserting that such a mare as I have stated, and no other, should be used for breeding. The breeder may possess a mare nearly, or quite thorough-bred, and such a one may prove valuable for breeding. In this case the danger is in getting the stock too small or too light; and, generally speaking, it will not be prudent to use a thorough-bred stallion for such a mare. He may be three parts bred, but with great substance; and if he has been signalled in the annals of hunting or steeple-chasing, so much the better. If the mare be small and thorough-bred, the horse should be of still greater size and substance, and may be only half-bred, providing his action is good.

I have known some very clever animals bred in this way; whereas if a thorough-bred horse had been used, the chances would have been that the offspring would be small, weedy, and valueless.

In breeding carriage horses an equal degree of care must be employed, as in breeding hunters. And indeed more scrupulous attention must be paid, so as to avoid those defects that offend the eye, which in hunters may be looked over or atoned for by the possession of other first-rate qualities: for instance, if a carriage horse has a short neck, however excellent his other qualities may be, he will not realise a high price. Some years since, tall leggy Cleveland bay horses, 17 hands high, were all the rage; but at the present day the public taste is improved, and preference is now given to an animal of less height, but of greater strength and symmetry, ranging between 15½ to 16½ hands. Such an animal must be lengthy without being light

carcassed; the shoulders oblique, and not loaded, but with high withers; the neck must be long and arched, and the head carried high. He should be well ribbed up, without being short, and he must not be goose-rumped, or ragged-hipped. His action must be good, neither too high nor too low, but rather tending towards the former than the latter extreme.

There must be little or no white about the legs, and the best colour is bay; next to this brown, unless a grey can be obtained, which is as good, or better than either.

To obtain such an animal, we must take care that neither the sire nor the dam possess any of those defects that we would avoid in the offspring. The mare should be a good carriage mare, and if rather heavy, the horse may be thorough-bred, but not the one we would select for getting hunters, but one more lengthy. If the mare is well bred, the horse must not be thorough-bred, but as near as may be consistent with plenty of substance.

The two descriptions of horses which I have mentioned are those to which the attention of the breeder should be principally directed with a view to realising good prices, but there are other sorts of mares that may be bred from with great advantage, such as clever hacks and cobs, and handsome ponies. Indeed whenever a mare has superior qualities without striking defects, she may be advantageously used for breeding, providing the right sort of horse is selected as sire. A little three-parts-bred mare, however, should not be put to a thorough-bred horse, as the produce would probably be weedy, and of little value, whereas a stallion of more substance and less breed would probably get a clever hack. Superior cobs are very saleable; and if quick, strong, and handsome, will often realise large prices, being in demand for elderly gentlemen. It is necessary that they should be good walkers and trotters; unless, therefore, the mare is good in these paces, we should not breed from her; nor should we if she shies, as this vice is generally incurable and hereditary. If the mare be a very strong cob, we may put her to a thorough-bred horse, but as compact a one as can be found; but if the mare is light, we must select a *cock-tail* for a stallion, but one well bred, and compact. Some of these cobs are remarkable trotters; and this quality may be readily produced in the offspring, by taking care that both sire and dam excel in this pace. Ponies are susceptible of considerable improvement; in the forests where they run wild for several years, a thorough-bred horse would greatly improve the race by infusing more blood into the stock; taking care not to allow very faulty mares to breed.

In endeavouring to breed superior stock, the chance of realising large prices is such as to compensate for every attention paid to the colt, which should be well fed for several years, and indeed

should have a little corn daily, which will increase the size, and produce a greater developement of muscle, and tend to prevent the disposition to the growth of the head, which a confinement to scanty pasturage induces. This coarseness about the head is particularly observable in horses and ponies that are bred in the forest, where, from the pooriness of the pasturage, they are obliged to be continually feeding, and the head is consequently kept in a depending position; the immediate effect of which is a determination of a greater quantity of blood to the head, producing a greater amount of bone and flesh at that part.

The great superiority of our race horses, and the perfection which, in many respects, they have reached, is owing to several circumstances, but to none more than to the nutritious diet which they get from their earliest years. The effect of this nutritious feeding is to produce a considerable developement of muscle, and it must be apparent to every observer how early the thorough-bred horse becomes furnished; as much so, indeed, at two years old, as a grass-fed horse at four. It is, in my opinion, owing to being thus corn-fed so early, that they are enabled to surpass in speed and bottom the descendants of their parent breed.

In breeding horses for the turf, the principle kept in view is to put the fastest mare to the fastest horse; thus it is only the winners of the great stakes that are afterwards used for getting racing stock. This principle is no doubt pretty correct; only it must be observed, that in selecting the particular horse for a favourite mare, there are other circumstances to be borne in mind, that should often induce us to give the preference to one horse, that might have proved himself slightly inferior in speed to his rival. The circumstances to be chiefly regarded are, first, the possession of qualities in the horse of which the mare may be deficient; secondly, the advantage of a good constitution; and thirdly, the possession of good fore legs. The first is so apparent as scarcely to need any remark; for as it must be the case that a mare that has proved her excellence for racing will be sure to be employed for breeding, whatever other defects she may possess, the only way to alleviate or remove these defects in the offspring is to select a horse that may excel in those points in which the mare is deficient. We are not sure of succeeding by this plan, but shall in many cases.

2ndly. The attention to the constitution in the horse is a matter of great importance, not only because it is the surest means of imparting a good constitution to the offspring, but also because the possession of this soundness of constitution enables the horse the better to impart his speed and bottom to the foal. How often do we find that the progeny of a first-rate horse have proved altogether inferior, though produced by superior

mares! In these cases, it is generally found that the horses have only appeared on the turf one, or at most two years, and their running has generally been very uncertain; whilst the sires of numerous winners have, generally speaking, proved not only their superior speed, but also the strength of their constitution, by the truth and honesty of their running, and the number of their races.

3rdly. The possession of good legs in the sire is a matter to which less attention is generally paid, than to either of the other points mentioned, and yet it is one of great importance, even in a pecuniary point of view; for although the speed of the animal does not depend on the goodness of the fore legs, yet the power of enduring training does, for in nine cases out of ten, when a colt becomes lame in training, it is from disease of the fore legs. We cannot wonder at this, when we consider that the fore legs have to sustain the whole weight of the animal increased by the momentum derived by speed, and connect this fact with the early age at which these exertions are demanded, and the consequently weak and unfit state of the parts. How essential it is, then, that these parts should be as strong as nature can make them, and yet how common it is for them to be altogether disregarded! If greater attention were paid to the state of the fore legs, it is reasonable to expect that there would not be so many horses fail, either in training or in their early races, as there are at present, and consequently there would be a great saving of that fruitless expense which is now frequently incurred in training horses that break down before they become winners. — ED.]

PART III.

DISEASES OF THE HORSE.

CHAP. XXI.

ON INFLAMMATION.

[INFLAMMATION is usually considered as a disorder of the blood-vessels, but we can best understand its nature by considering the phenomena with which it is connected. If, then, any external part of the body present the symptoms of *swelling, redness, and pain*, we may justly consider it in a state of inflammation. The swelling is to be attributed in the first place to the fulness of the vessels of the parts, but after a while an effusion takes place from the surfaces of these vessels, and thus keeps up or increases the enlargement. The redness is owing partly to the greater quantity of blood in the arteries of an inflamed part; but principally to the fact that the small capillary vessels, which in a state of health may not contain red blood, are now enlarged, so as to admit the red particles. The *pain* of an inflamed part is owing to the pressure of the enlarged vessels on the nerves of sensation, but this symptom is not always present—only indeed where the distention is sufficient to produce severe pressure, or where the part is more largely furnished with nervous fibres.

A part in a state of inflammation is therefore more abundantly supplied with blood than in a state of health, and after a time the vessels themselves become enlarged, and in many cases new vessels are formed in a short space of time; as was proved by the celebrated Mr. Hunter, who froze the ear of a rabbit, and then suddenly thawed it, so as to produce great inflammation, when it was found that the ordinary vessels were enlarged, new ones formed, and the substance of the ear thickened.

The capillary vessels in an inflamed part become distended often beyond the power of contraction, and are partially obstructed, which may be noticed when the conjunctiva of the eye is inflamed; vessels which were not perceptible become visible, and are loaded with red blood, which they did not contain before. And after the inflammatory action has subsided, many of the small vessels continue for some time full of red blood, from being in a state of debility, and unable to contract on their contents, which they are assisted in doing by the use of external stimulants.

Inflammation may be either external or internal, local or diffused. The skin, or the muscles, or sinews, may be affected unattended with danger; or the important internal viscera, such as the lungs, the bowels, or the brain, may become the seat of inflammation, and may threaten the destruction of these parts, and the life of the animal itself.

The inflammation may be confined to a small locality, such as a sinew or a joint, or it may extend to various parts, and indeed involve the whole system. Strictly speaking, however, inflammation is always local. One or more parts bear the principal brunt of the disease, although from the local inflammation general irritation is produced, and the circulation is disturbed and hurried. These latter symptoms are denominated Fever, and may exist either with local inflammation, or without it; but this we must consider presently.

Inflammation may thus be confined to a particular part, and produce no constitutional disturbance, or it may produce a general fever through the system.

These effects depend partly on the degree of inflammation existing, and partly on the irritability of the part affected. A sinew or joint moderately inflamed, produces no constitutional irritation, but when severely affected the symptoms of general fever are excited. This effect takes place more easily in horses of an irritable temperament than in others, and is produced through the medium of the nervous system. The nerves of the inflamed part are painfully affected; this irritation is conveyed to the brain, whence it is diffused throughout the system, affecting some parts, however, more than others, and producing different effects in different animals. The heart is quickly affected by this nervous irritation, and it becomes excited to quicker and more forcible action, and thus we have the quick, hard, inflammatory pulse. The stomach is generally (not always) affected, and we have consequently nausea or want of appetite, one of the most important symptoms we have to assist us in the treatment of disease in the horse. When the action of the heart is thus injuriously excited, the circulation becomes disturbed, and we have a redundancy of blood in some parts, and a diminution in others, and thus we frequently find the extremities cold, and the mouth hot.

In this way local inflammation may, and frequently does, produce general fever, and it is also the fact that general fever sometimes excites local inflammation.

Inflammation, although generally regarded as a disease, and correctly too, is yet an effort of nature to relieve herself from some irritating substance, and is a much greater benefit than bane to the animal system. For instance, a severe wound is inflicted in the flesh of an animal, to repair which a quantity of

material is required, which cannot be produced without inflammation, as we shall presently see.

The *Causes* of inflammation are various, and yet they all act by violently exciting particular parts. Thus an external blow or a sudden alternation of temperature may produce inflammation in different parts, but, in both cases, the immediate effect is great excitement of the injured part: in one instance, we may have an external abscess, and in the other inflammation of the throat or lungs.

Inflammations near the surface of the body are generally produced either by violence from without, as in wounds, bruises, and falls, or from over-exertion, as in strains.

Internal inflammations may proceed from various causes. Over-exertion of any organ, as of the lungs, in breathing, or the bowels from physic. The exposure to cold, particularly for some time, or the alternation from cold to heat, may produce inflammation of the throat and windpipe, or the lungs. The circulation of the exposed part is first lessened, then by re-action greatly increased, so as to produce inflammation; great exertion may produce inflammation either of the lungs or the bowels (both parts being thereby greatly excited), according to the susceptibility of the part. This susceptibility is called *pre-disposition*. All organs are rarely equally perfect; one part is generally weaker than another, and therefore more predisposed to disease; and thus the same cause may produce different diseases in different horses, verifying the old proverb, "The weakest goes to the wall." One fertile cause of inflammation is a redundancy of blood in the system; but this cause may produce in one horse inflammation of the lungs, in another inflammation of the liver, in a third that of the brain, according to the susceptibility of the particular viscus in each horse. Inflammation of the lungs is, however, more likely to occur from this cause, inasmuch as all the blood in the body passes through these organs, and only a portion of it through other parts.

The *season of the year*, too, has much to do in the production of different inflammatory complaints: thus, diseases of the liver, and the bowels, are more frequent in hot weather; and those of the air passages, when the atmosphere is damp, cold, or changeable. This is owing to the prevalence, at these seasons of the year, of the particular causes of these different diseases. In the human subject, inflammation is considered of two kinds, the phlegmonous, and the erysipelatous. In the horse, our attention is principally confined to the former; we can scarcely say that he is liable to erysipelas, at any rate only to that eruptive affection of the skin, denominated Erythema. Inflammation has various terminations, such as *Resolution*, *Adhesion*, *Suppuration*, and *Ulceration*, all of which are often the natural processes of nature to repair the effects of an injury. The three last

effects sometimes succeed each other in the same case, and often in the order in which they are here mentioned.

Resolution is when, either with treatment or without it, inflammation subsides or terminates in health, without the supervention of the other sequelæ; and it is that termination which we are generally desirous of effecting by our treatment.

Adhesion is the deposition of the fibrine or adhesive principle of the blood on the surface of a diseased part, and may be exemplified by the healing of a wound by the first intention, and the formation of new substance, or the union of old substances, in the chest or abdomen, after inflammation in those parts.

Circumscribed cavities, such as the chest and abdomen, have a disposition to *adhesion* in preference to *suppuration*; but when both these sequelæ occur in the same part, adhesion usually precedes suppuration.

An effusion of serous fluid is also a frequent termination of inflammation of the membrane of the chest or abdomen.

Suppuration, or the secretion of pus or matter, is a termination of inflammation to which internal canals, such as the bowels, urethra, or windpipe, are particularly disposed. In these parts, when both suppuration and adhesion takes place, the former always precedes the latter, contrary to the course which takes place in circumscribed cavities, and likewise in external wounds.

The best illustration of suppuration is the formation of an abscess. An injury is received, inflammation follows, and blood and serum is effused, and is succeeded by the deposition of matter under the skin, or amongst the muscles; the abscess bursts, or is opened, the matter is evacuated, and the vacant space is healed by the adhesive process.

The *adipose* membrane is particularly disposed to take on the suppurative process, whilst the *cellular* membrane has a greater disposition to adhesion.

Ulceration is a sequel of inflammation that may occur with suppuration, or independently of it. It consists in the absorption or removal of substance. Ulceration always occurs in abscesses before they burst; the substance between the matter and the surface is gradually removed by ulceration, at the place where the abscess points. Thus it is a useful process of nature, though often a troublesome disease. An ulcer is a running sore, which may be healthy, and have a disposition to heal; or unhealthy, and be disposed to enlarge and extend.

The cavities of joints, when exceedingly inflamed, have a tendency to both ulceration and adhesion, either together or separately, an illustration of which is often afforded by the navicular joint disease.

Besides the terminations we have mentioned, inflammation may end in gangrene, or the death of the part.

Parts in which the circulation is inactive, such as bone and cartilage, are more disposed to this process than other parts. A severe injury is received on a bone, and in the course of time a portion of the bone sloughs off, or exfoliates, as it is called, that is, deprived of nourishment, dies and separates. Gangrene, as a termination of internal inflammatory diseases, is less frequent in the horse than in man. Inflammations in the former are usually more violent, run their course quicker, and are often succeeded by death, before gangrene has time to supervene.

The Pulse affords us the best criterion of the presence and degree of internal inflammation, and its character is the surest guide we can follow as to treatment. It denotes the action of the heart, and may be felt in any superficial artery as well as at the region of the heart. The most convenient vessel for examination, however, is the sub-maxillary artery, which passes over the under jaw-bone.

The ordinary pulsation in the horse is about 32 to 36 in a minute. In inflammatory diseases, it is often greatly increased, sometimes exceeding 100. Besides the increase in its frequency, there is an alteration in its character, which is of still greater importance. Some horses have naturally a much stronger pulse than others, which it would be useful to ascertain, if possible; but this is rarely the case.

The principal varieties in the kind of pulse are a soft, hard, strong, weak, full, oppressed, and intermittent pulse. A horse may have naturally either a strong or weak pulse, according, in a great measure, to the vigour of his constitution. Under disease we may have the above varieties in the pulse differently combined. A full pulse denotes an abundance of blood in the system, a strong pulse a vigorous action of the heart, and if with these states we have also a quickened action, copious blood-letting is demanded. A hard pulse is considered characteristic of inflammation: we then bleed, in order to produce a soft pulse. When the vessels are exceedingly full there is sometimes an oppressed pulse, which demands copious bleeding. A weak state of the pulse forbids bleeding, and often requires stimulants; this state of the pulse is often present in influenza, being, at the same time, greatly quickened. It is also the case towards the fatal termination of inflammatory diseases. An intermittent pulse is, in a few cases, natural to some horses; it also attends some diseases of the heart, and is by no means a desirable symptom, for it is often attended by a fatal result. We can often produce an intermittent pulse, by the administration of digitalis in inflammation of the lungs. In this case it is rather a favourable symptom, as it exhibits a diminution in the action of the heart.

As the intermission is regular, being at every fourth,

sixth, or tenth pulsation, at others very irregular, the intermission varying continually. An intermittent pulse rarely calls for blood-letting.

The effect of bleeding on the pulse is, at first, to quicken its action as well as to diminish its force, and, if carried to some extent, to render it imperceptible, and to cause syncope or fainting, which is temporary cessation of the flow of blood to the head.

The *Treatment of Inflammation* will mainly depend on the object we have in view, whether to seek for resolution, or any of the other terminations we have mentioned. In inflammatory affections of vital parts, our treatment should be such as to bring about the restoration of the organs to their normal state: in fact, resolution. For this purpose large blood-lettings are generally had recourse to, and with great advantage. By general bleeding we subtract blood from the system, and consequently there is less blood sent to the inflamed part, the capillary vessels of which may thus have time to relieve themselves.

The benefit of general bleeding is much assisted by abstracting blood rapidly, and from a large orifice; a sudden check is thus put upon the circulation, which, though of short duration, is yet of great service in acute inflammation. In cases of active inflammation, the best guide as to the quantity of blood to be abstracted is obtained by observing its effect on the pulse, and on the mouth. We should bleed until the latter feels considerably cooler, and the former becomes altered in its character, becoming softer and weaker, though generally quicker.

The state of the blood is a very uncertain criterion, and should have but little influence over our treatment. This, however, may be observed, that when it presents a buffy coat, there is usually a capability for bearing bleeding, and the contrary when the blood is very black, supposing it is drawn from a large orifice. Local bleeding for internal inflammations can seldom be practised in the horse.

Although bleeding is the sheet-anchor in acute inflammation, other remedies are of importance.

Purging, though useful in some inflammations, is to be condemned when the chest is affected; as, by sympathy between the lungs and the bowels, the irritation of the latter by purgation has a very injurious effect on the lungs, besides lowering the system to a great extent. It is, however, desirable to obtain a moderately relaxed state of the bowels.

Diuresis is of much greater benefit: by determining a greater quantity of blood to the kidneys, a portion is diverted from an inflamed part, and the system is also unloaded by the increased secretion of urine. Medicines are often administered having a tendency to produce nausea on the stomach, the effect of which

is to lessen the action of the heart, and others are given to have a direct effect in lowering the heart's action.

It is desirable to keep up the circulation in the extremities and the surface of the body by clothing and bandaging, as we thereby draw to the surface a portion of the blood which has a tendency to concentrate within. This principle is still further carried out by counter-irritation — by creating artificially an inflammation, and, consequently, a determination of blood to an external part.

These are the leading principles by which we are to treat internal inflammations, regulated, of course, by the peculiar features of each individual case.

In *external inflammations* we have a greater number of means for our employment; for instance, local bleeding, warm and cold fomentation, besides external stimulants. The benefit to be obtained from the first mentioned is very considerable; we thereby abstract blood either from the inflamed part itself, or its immediate vicinity, and thus deprive it of the very food whereby inflammation is kept up. Where, however, the case is severe, as in fever in the feet, or the part of much importance, as in ophthalmia, local venesection will have much greater effect if preceded or assisted by general bleeding.

Warm fomentations are of much importance in the early stages of local inflammation; they act by relieving the inflamed vessels by means of perspiration, or the escape of fluid externally through the pores of the skin.

The human surgeon has a great advantage over us, in being enabled to determine blood to the skin by means of the warm bath, which is of great utility in many internal inflammatory diseases. But, from the large size of our patients, and their being covered with hair, it is next to impossible to make use of it: the warm vapour bath has, however, been used with benefit, although attended with much trouble and inconvenience. In inflammatory affections of the bowels, we may employ a local warm bath with great advantage.

In employing warm water as a topical remedy, it is necessary to continue its use for a long time, otherwise the reaction by which it is succeeded will produce more inconvenience than otherwise. Poultices are extremely useful in affording a means of employing fomentations for a long time: it is therefore essential to saturate them frequently with warm water. When inflammation has a tendency to suppuration, the process is greatly assisted by warm applications.

Cold applications relieve local inflammation, by encouraging evaporation. Caloric, the principle of heat, is thereby abstracted from the part affected.

If we wish to prevent the formation of matter in an external

part, we apply cold lotions; but, if our object be to encourage suppuration, we have recourse to warm poultices and fomentations.

In severe strains, warm fomentations are often employed first with advantage, and are succeeded by cold applications; we thereby relieve the inflamed part, first by means of perspiration, and afterwards by evaporation.

Counter-irritants, such as blisters and setons, are employed after the inflammation has abated; their beneficial effect is produced by withdrawing the blood from the inflamed part to another and a healthy locality. If employed, however, in too early a stage, they often increase the inflammation they are intended to abate. — Ed.]

CHAP. XXII.

ON FEVER.

[HAVING largely noticed the subject of Inflammation, we shall have but little to say on that of Fever. It is, however, usually considered of two kinds—*Symptomatic*, or *Inflammatory Fever*; and *Simple continued Fever*, or *Synochus*.

The former we have already alluded to, under the head of Inflammation. In an inflammatory disease, when the pulse is full and frequent, the mouth hot, and the membrane of the nostril injected, we say, there is much fever; and the presence of these symptoms usually guides us in the abstraction of blood.

In such cases, generally, though by no means invariably, the blood presents a buffy coat, which is usually considered, and often with justice, an evidence of the propriety of blood-letting. Where there is much general fever, accompanied by local inflammation, such as from an open joint, or external injury, there is a greater proportion of fibrine in the blood than in a state of health; and so, likewise, in acute rheumatic affections.

Simple continued fever is a well recognised disease in man; but, in the horse, its existence has been often denied. It is, however, the fact, that we have occasional cases of fever in the horse, without any symptoms of local inflammation, and, in such cases, we rarely find a buffy coat presented by the blood, and there is, generally, an inability for bearing large venesections. Such cases are often ushered in by shivering fits, and which sometimes recur during the progress of the complaint. In some epidemic diseases, particularly in the influenza, so prevalent in 1836 and 1840, the symptoms of fever were strongly marked, and often without any local inflammation. In other cases, local

inflammation would afterwards supervene; in which cases, the partial flame was lighted up, as it were, by general fever. The importance of this disease, however, will demand a separate consideration; but, under the head of fever, we may consider an affection which is by no means unfrequent, particularly during the autumnal season, when the system is debilitated by moulting.

A horse will appear dull on his journey, particularly towards the latter part, and, on reaching his stable, is much fatigued. He refuses his food—hangs his head in the manger—breaks out in a cold sweat—his mouth is hot, and pulse quick, but weak; but his breathing, after a while, is in its natural state.

In such cases, bleeding is generally forbidden; and we find the best treatment consists in the administration of febrifuge, sudorific, and tonic medicine, such as the following, which will often prove successful in immediately checking the disease:—

Spirit of Nitrous Ether.....	1½ oz.
Camphor.....	1 dr.
Nitre.....	4 dr.
Gentian.....	2 dr.

In a pint of warm water. — Ed.]

CHAP. XXIII.

DISEASES OF THE BRAIN AND NERVES.

Inflammation of the Brain (Phrenitis or Mad Staggers), Epilepsy, Megrims, Rabies, Palsy, Kumree, Tetanus or Locked Jaw, String-halt.

PHRENITIS, or inflammation of the brain, is generally occasioned by overfeeding and too little exercise.

The first *symptoms*, and these often escape notice, are—heaviness, redness of the membranes under the eyelids, want of appetite, and disinclination to motion; but the symptom most commonly first observed is delirium, or madness. The horse becomes violent, plunges about the stall, endeavours to bite those who approach him, or the horses that happen to be near him. A horse has been known to leap out of a small window when affected with this disorder; and he is sometimes so violent as to drive every one out of the stable. Sometimes he falls down exhausted, and after lying for a time, gets up suddenly and becomes as violent as ever.

The *treatment* is immediate and copious bleeding; that is, bleed until the animal is perfectly free from delirium, and this seldom

happens until from two to three gallons of blood are taken off. I have known four gallons taken off at one time, and the horse recovered in consequence. If the fit should return, he must be bled again, until the disorder ceases. As soon as the horse becomes quiet, a dose of physic and clysters should be given. After the horse is recovered, he should be kept to a spare diet for some time: grass is the best. The jugular veins are the vessels from which blood should be drawn in this disorder, and if both are opened it will be better. After the veins have been opened it is usual to tie a cord round the neck, by which the bleeding will be kept up without the necessity of standing near the horse. There is no occasion for measuring the blood.

Bleeding from both of the temporal arteries at once has been practised in preference to the jugular or neck veins, and I have recommended the practice.

Stomach staggers, though not a primary affection of the brain, like phrenitis, or mad staggers, and apoplexy, not only requires bleeding, but copious bleeding, and that too as early as possible. Still, however, in stomach staggers, the stomach must be a principal object of attention; for, unless the hardened undigested food be removed from it, it will lose its vitality, and the animal will die.

I have seen cases where the abstraction of arterial blood has afforded relief, after bleeding from the jugular vein had failed; and it is probable, that when there is considerable delirium, *arteriotomy*, as bleeding from arteries is termed, would be found the most effectual practice. The temporal arteries may be felt about two inches from the outer corner of the eye: by placing, or rather pressing, the fingers upon this part, they may be distinguished by their pulsation or throbbing. Into this part a lancet is to be plunged freely and without fear.

Frenzy generally happens to young vigorous horses, whilst old horses are generally the subjects of apoplexy and stomach staggers. The early age, however, at which horses are often worked, and the immoderate degree in which they are worked, often makes them old in constitution when young in years, so that even young horses may become the subjects of apoplexy.

Megrims, Vertigo, Epilepsy, Convulsions, Hydrocephalus, Dropsy of the Brain.

These various names arise from the various appearances produced either by fulness of the blood-vessels of the brain, perhaps with weakness of that important organ, or by water in its ventricles or cavities. Water in the ventricle of the brain may produce a variety of effects, from that of giddiness or vertigo, to that of

rearing up suddenly and falling backwards, hanging back suddenly upon the halter, and falling back with violence against the wall, or dropping suddenly while at work, as if shot with a pistol, lying motionless some time, then getting up again and appearing quite well. Sometimes when ridden hard, the animal tries to stop suddenly, rambles or staggers, appears confused and lost, and often falls down. Blindness in one eye is a common symptom of this disorder, and always in the eye opposite to the affected ventricle.* Horses with this complaint, when their stomachs are loaded, and their bowels full of excrement, by eating immoderately of hay, have the symptoms much increased, and not unfrequently are attacked with mad staggers from this cause, or, what is not less frequent, the stomach staggers; for when the stomach has been much distended with hay, and the practice is continued, the organ itself at length becomes paralysed, which is what may properly be named stomach staggers. Dropsy of the brain sometimes assumes a violent form, producing epileptic fits. The horse falls down, and sometimes remains motionless, at others he struggles violently, and after a time gets up again and becomes violently delirious. Copious bleeding often affords relief for a time, but the disorder sooner or later terminates fatally.

When a horse is attacked with symptoms which come under the name of megrims, giddiness, or vertigo, it indicates either the existence of water in the ventricle of the brain, or an accu-

* Megrim is a sudden determination of blood to the head, producing giddiness, and often insensibility. Old horses are more subject to this disease than young ones; and after several attacks there is usually a predisposition formed to receive other attacks.

The horse is nearly always affected in his work, and more frequently in harness than otherwise. He first shakes his head, and suddenly stops; and sometimes, if allowed to remain quiet, the symptoms go off, but if not, he staggers, and falls down, and continues struggling for some time in a state of unconsciousness; the eyes roll, the nostrils are dilated, and the whole frame appears convulsed. The fit may last from five to fifteen minutes.

The causes are a redundancy of blood in the system, induced by good feeding and little exercise: thus it usually occurs in fat subjects, though sometimes in the converse. There is therefore in the animal a predisposition for the blood to fly to the head, and perhaps a weakness of the cephalic vessels. It occurs most frequently in the spring or early summer months, when there is a plethoric state of the system. It may be immediately excited by great exertion, the heat of the sun, or the pressure of a tight collar preventing the free return of blood from the head. It has been connected with, if not caused by, worms.

The treatment must consist in bleeding freely, and if the horse is in good condition a dose of physic will be useful.

Sometimes a small blood-vessel in the head is ruptured in this disease, which, if at the base of the brain, generally produces death.

In cases of very frequent recurrence, where the slightest cause will produce a fit, there is probably some organic disease of the brain, probably, as observed by the author, water in the ventricles.—ED.

mulation of blood in the vessels of the brain. A slight degree of hydrocephalus, or rather a small quantity of water in the ventricle, may exist without producing any visible effect upon the horse; but if he is ridden hard, if his stomach and bowels are loaded, or if by high feeding and want of regular exercise he becomes plethoric or too full of blood, the disorder will then be aggravated, and the symptoms I have described will be produced. From this view of the subject, it will appear that hydrocephalus may be relieved by avoiding those circumstances by which it may be aggravated and heightened into a visible disorder: and if that disorder does take place in any degree whatever, bleed according to the urgency of the case, and unload the stomach and bowels by physic and clysters. Green food is the best diet for such horses, and if that cannot be had, bran mash. Very little hay should be allowed. Hanging down the head at grass may favour the accumulation of blood in the vessels of the brain; when this seems to be the case, the horse should be kept loose in a cool box. I have known distension of the stomach and bowels alone produce a serious attack of vertigo or megrims; in such a degree, indeed, that a horse rambled and fell down while the owner was riding him. This horse, from being fed moderately and having his bowels emptied with a dose of physic, never had a return of the disorder, and lived many years afterwards.

Rabies, or Hydrophobia.

[Rabies, or Hydrophobia, is a disease of the nervous system, somewhat resembling phrenitis in its symptoms, but differing from it in the great disposition to mischief evinced in rabies: "there is method in the madness." It is invariably produced in the horse by the bite of a rabid animal, generally a dog, and it may manifest itself at various periods, from one month to several after the bite. Mr. Youatt observes in his lectures, Vet. vol. x., "The earliest, and perhaps the most decisive, symptom of the near approach of rabies in the horse, is a spasmodic movement of the upper lips, particularly of the angles of the lip."

Close following on this, or contemporaneous with it, is the depressed and anxious countenance, and enquiring gaze, suddenly however lighted up and becoming fierce and menacing, from some unknown cause, or at the approach of a stranger. From time to time different parts of the frame, the eyes, the jaws, particular limbs, will be convulsed; the eye will occasionally wander after some imaginary object, and the horse will rear again and again at that which has no real existence. Then will come the irrepressible desire to bite the attendants and the animals within its reach; to this will succeed the demolition of

the rack, the manger, the whole furniture of the stable, accompanied by the peculiar dread of water. Towards the close of the affair there is generally paralysis, principally of, or generally confined to, the loins and the hinder extremities, or involving those organs which derive their nervous influence from this portion of the spinal cord; hence the distressing tenesmus which is occasionally seen." This disease invariably proves fatal in the course of three to six days.

Treatment, when once the complaint has manifested itself, is perfectly useless: the animal should therefore be shot.

Preventive treatment, however, may be employed with success, if we can find out the bitten part. It should as soon as possible be excised completely with the knife, or the lunar caustic freely applied to the wound and repeated. I have operated with the caustic on various horses bitten by rabid dogs, and none of them have become mad. The last case was a pony bitten rather extensively. A child bitten by the same dog, but in whom proper treatment was neglected by the surgeon, died in about two months after the bite.

"The *post-mortem* appearances," says Mr. Youatt, "of rabies in the horse are, to a considerable degree, uncertain. Nothing unusual may be found in the membranes or substance of the brain; the stomach may be slightly or doubtfully inflamed, the lungs and the heart may be sound, but at least in every case that I have seen, the pharynx, the fauces, and the epiglottis have been considerably affected." — ED.]

Palsy.

[This disease is, as its name implies, a loss of power of the nervous system. It is never found complete in the horse, though partial paralysis frequently occurs. There are two descriptions of this affection, hemiplegia and paraplegia. The former is a paralysis of one side of the body, the latter of the hind extremities. The former is extremely rare in the horse, and there are not above one or two cases on record. One case is related by Mr. Bull in vol. v. of the Veterinarian. The symptoms came on without any visible cause; and, though very severe, disappeared in a few days. The treatment employed was, friction on the affected side, laxative and febrifuge medicine, followed by tonics.

Paraplegia, or loss of power of the hind extremities, is much more frequent, and generally arises from some sudden injury of the spinal cord, produced by keeping back a loaded waggon, or slipping up, or a severe strain in leaping. It may also be produced by some tumour pressing on the nerves which supply the hind extremities, and is then gradual in its approach. When this injury is produced by an accident, the vertebræ of the loins

are sometimes completely fractured, and a portion of bone pressing on the spinal cord not only destroys the power of motion, but produces the most acute suffering, under which the animal dies in a few days. In other cases of somewhat less severity, there is a partial dislocation of the vertebræ, so that the cord is pressed on, or quite as frequently some vessels are ruptured, and the blood presses on the cord. If the upper roots of the nerves are materially injured, there is loss of feeling, as well as of motion; but this is rare. When there is much pressure on the spinal cord, the horse is rarely of much service afterwards, although he may get considerably better; there is generally a weakness left, which incapacitates him for bearing burdens or for heavy draught: he may afterwards, however, work lightly. These accidents are comparatively frequent in the army, where they arise from bringing young horses suddenly on their haunches: horses in this state are said to be chinked in the back.

The treatment in severe cases should consist of copious venesection, laxative and febrifuge medicine, and the application of warm sheep skins at first to the loins, and succeeded by setons, blisters, or a blistering charge.

There is a disease in India very similar to this, called *Kumree*. It is described by Mr. Hughes in the *Veterinarian*, who says, "I am of opinion, that the kumree is a weakness in the hind extremities, produced by pressure on the nerves going to these parts; or it is a symptom, or rather a termination, of inflammation of the brain, or its membranes, which, in the human subject, would produce hydrocephalus; but probably from the structure of the horse, the accumulation of the effused fluids is prevented, and they pass down within the thecæ of the medulla spinalis. This inflammation of the brain is of a mild or subdued form; were it greater, it would induce phrenitis. The causes of it are heat, sudden changes from heat to cold, and from cold to heat, and plethora. Severe blows on the head may also occasion it."

Mr. Twining, in a paper presented to the Calcutta Medical Society, and copied into the *Veterinarian*, attributes the kumree to animalculæ, either about the vertebræ or the cellular texture connected with them: and Captain Wyatt says, that he has often been present during the dissection of horses that had died of kumree, and that he has seen these worms. The statement of Mr. Gill, however, does not confirm these statements. "I have," he observes, "almost invariably found in the stomach and intestines, worms similar to those in the eye, and also in tumours in the stomach, but never in any other part of the body, or the cellular membrane of any part, or in the spinal canal. In most of the *post-mortem* examinations which I have seen made, there has been either effusion of blood between the membranes covering the lumbar region of the spinal cord, or ankylosis of the lumbar

vertebræ, or exostosis in the great foramen. In other cases I could see nothing to cause it, except that the spinal marrow appeared somewhat softer than usual.

“In nearly all the instances that have come under my observation, I could trace the origin of the disease to wrenches, falls, or blows; and I have little doubt that the hardness of the ground, and the manner in which the horses are picketed, together with the falls they get, owing to the carelessness of the native grooms in forcing them in and out of the ferry-boats, in their way from one station to another, are fertile sources of the disease. The frequent occurrence of fractured ilia, in that country, can only be attributed to the same causes.

“I cannot, however, consider the difficulty of going up and down hills any proof of fluid in the spinal sheath; but I attribute it to the want of energy in the hind quarters—the propelling influence being mainly in the hind quarters when going up hill, and there being a necessity for extending them more under the body in going down hill.

“With respect to the remedial means had recourse to, I believe them to be nothing worth, not even as palliatives. I have seen counter-irritants in the form of deep firing, blisters, setons, sheep skins, &c., employed; but they have been of no avail. I cannot, therefore, advocate any of them.” — ED.

Tetanus.

This dangerous, and often fatal, disorder, may be either *Symptomatic*, or *Idiopathic*; the former when it proceeds from an external injury, the latter when otherwise occasioned. The former, also called *Traumatic*, is most commonly caused by punctured wounds of the foot, such as pricks in shoeing, or stepping on a nail in the streets. Sometimes it happens after docking, nicking, or gelding; but seldom till two or three weeks after the operation. So likewise when it is caused by punctured wounds, which are generally in a healing state, or nearly well, before the locked jaw takes place. *Idiopathic tetanus* may be produced by exposure to wet and cold, and is often complicated with inflammation of the liver, the lungs, stomach, and bowels; which, indeed, is one cause of its great fatality. According to Gibson, it is sometimes caused by bots in the stomach. I have seen two cases which appeared to be caused by the irritation of worms in the bowels. It may be produced by violent exertion; and I have seen a case where it took place in consequence of severe punishment in the riding-school. In the latter stage of stomach staggers the jaws are sometimes locked, and the disease sometimes comes on when no cause can be assigned for it.

The *symptoms* are spasm or cramp of the muscles of the jaw,

which prevents the horse from opening his mouth, or if he is able to open it a little, it is not sufficient to enable him to feed or masticate, though he sometimes appears to have a good appetite. Occasionally there is a considerable flow of saliva from the mouth, and the tongue has been found diseased. The disease gradually increases, and the spasm or cramp extends to the muscles of the neck, back, and limbs, so that when the animal is made to walk, he appears as if all his joints were stiffened; his nose is poked out, his ears and tail erect, and sometimes his eyes are distorted. The nostrils are generally expanded, and the breathing often disturbed. On the first appearance of the disorder the horse often seems to ail little, but neighs upon any one entering the stable, and seems eager for his food; in the latter stages, however, the cramp is so general and so painful, that it is distressing to look at the animal. The affected muscles feel exceedingly hard, and the animal moves as if he was a single piece: the least motion is painful, and agitation produces the greatest distress. Sometimes the disease is entirely confined to the head and neck, and then it is more likely to be curable than when the spasm becomes general. This local affection is called by surgeons *Trismus*, whilst the other is designated *Tetanus*. Opium and camphor are generally considered the most effectual remedies for locked jaw, and when the mouth is so close, or the power of swallowing so diminished, that medicine cannot be introduced into the stomach, it is thrown up as a clyster.

A late writer, Mr. Wilkinson, has published an account of twenty-eight cases of locked jaw, twenty-four of which he cured; but in all the successful cases, the jaws were sufficiently open to admit of medicine being given, though with difficulty, while, in the four fatal cases, they were so close as to prevent any medicine from being introduced. Mr. Wilkinson first gives a purgative and an emollient clyster; he does not bleed unless the pulse points out the propriety of that evacuation. He directs the jaws, and all other parts affected with spasm or cramp, to be well embrocated with a mixture of oil of turpentine, olive oil, liquid ammonia and mustard, and afterwards covered with fresh sheep skins, the flesh side inwards; which must be continued and changed as often as is necessary, so as to keep up a constant perspiration from the parts. After the operation of the purgative he gives a drench, composed of opium, camphor, and assafoetida, one drachm of each or more, according to the occasion, and throws up a clyster composed of the same ingredients, with a decoction of rue. If the disease continue, and the horse become costive, the purgative and emollient clyster are repeated, and the opium, &c. discontinued until the effect of the purgative has ceased. Mr. Wilkinson appears to have been very diligent and patient in the treatment of this disorder, and not discouraged, as

we too often are, by the difficulties that occurred. It was generally found necessary to continue the treatment three, four, or even five weeks, before the disease was subdued. As a further encouragement to future patience and perseverance in the treatment of this dangerous disorder, I shall notice a case related by Gibson, from which it appears that not only medicine, but nourishment also, may be administered in the form of clysters. "The horse was seized rather suddenly with this kind of convulsion (locked jaw), which was first observed as he was leading out to water in the afternoon. He came reeling along with his nose turned out, his eyes fixed and immovable, with all the other signs that usually attend this disorder; and when he came to the trough could not reach the water because of the cramp and stiffness in his neck, and when it was held to him in a pail he could not drink, though he showed an eagerness for it; his mouth being shut up so close that it was scarce possible to put a knife between his teeth. We found it impracticable to administer any kind of medicine, till, by rubbing his cheeks, jaws, temples, and his whole neck for a considerable time, we made a shift, with great difficulty, to thrust down part of a calomel ball on the end of a small stick, and then to pour into his nostrils a very small portion of a strong cephalic drink; thinking by that means to convey the ball downward into his stomach, which, however, had but little effect, any further than this, that he had not such sudden fits and agitations as I have seen in others in the like circumstances, but continued more quiet; neither did his fever increase, as usually happens when the disorder is gaining ground. But all this while his mouth continued so much shut that he could neither eat nor drink for three weeks, only by continually rubbing his jaws and neck, he would sometimes make a shift to suck about a handful of scalded bran, or sometimes a little oatmeal moistened with warm water, but in so small a quantity that it is possible he might have starved, had not other methods been taken to keep him alive. I have often observed that the forcing the jaws open by violent means puts a horse into such agonies that it rather increases than abates the symptoms, and therefore I contrived to give him both his food and physic by the fundament, through a pipe fourteen inches long; by which he seemed to receive great benefit, for we could perceive the symptoms abate daily. His flanks grew more quiet, he stood more still, and free from sudden fits and startings, all which symptoms are usual in the increase and continuance of this disorder.

"The clyster was repeated once a day for a fortnight; and, by way of diet, three or four quarts of milk boiled with oatmeal and water was given every day, a bag with a long pipe being left in the stable for that purpose only. He retained every thing that was administered that way, which the guts appeared to suck

up, their natural motion being inverted for the purpose: and as he scarcely ate more in three weeks than was sufficient to support him one day, there can be no doubt that he derived much nourishment from these clysters. He had two men constantly to look after him, who had orders to rub his whole body often, which greatly helped to relax his skin and remove the crampiness of his muscles: and although he had not for the first fortnight recovered the use of his jaws, yet we observed him daily to move with less stiffness, and often to lick the manger as if he craved for food. He also breathed with less difficulty, and had several other good signs. I now determined to try the effect of an opium clyster; therefore I dissolved half an ounce of crude opium in one of his clysters, which was followed with these circumstances—that the horse soon lay down, he began to point his ears backwards and forwards, and could move his neck pretty freely, and his mouth was so far at liberty that he took his drinks with little or no difficulty, and could eat hay and bran sufficient to sustain him. He likewise moved his whole body so readily that we could walk him an hour every day. That I might follow up this good effect of the opium clyster, I gave him some days after 1 oz. of Matthew's pill, which contains about two drachms of opium, and the same quantity of assafœtida. This was given by the mouth, in a ball, and repeated the following day. He now recovered daily, and took his drinks only twice a week; and as soon as he recovered his flesh was gently purged, after which he got perfectly well."

Gibson attributes this disorder to the irritation of bots, or other worms in the stomach. He disapproves of purgatives (either as drenches or as clysters) and bleeding. Modern practitioners do not reckon bots among the causes of locked jaw, which is most commonly brought on by the causes before noticed. The great benefit derived from the opium clyster should be carefully recollected. Mr. Wilkinson examined four horses that died under his care, and found the pia mater of the spinal marrow inflamed, and the marrow itself of a dark colour. The pia mater of the brain was likewise inflamed in a slight degree. When locked jaw comes on after docking or nicking, he applies fomentations to the tail, and afterwards dresses the wound with digestive ointment. I cured one case of locked jaw by blistering the back from the withers to the tail, and giving opium and camphor—which we found great difficulty in giving. Every now and then a little gruel was given. By persevering in this treatment the jaws gradually relaxed, and in twenty-four hours the horse was able to eat hay.

[Mr. W. Percivall relates a successful case of *Traumatic tetanus*, treated by bleeding, physic, opium injections, and blisters.

Mr. Saunders relates two successful cases of *Idiopathic tetanus*.

Treatment:—large blood-lettings, purgatives, digitalis, camphor, and blistering the loins.

Mr. W. Henderson relates in the 5th vol. of the *Veterinarian* two successful cases of tetanus, one idiopathic, the other symptomatic. The treatment consisted of purgatives, injections, and opiates, and blisters and setons to the spine.

Mr. Youatt relates a successful case, which he treated with copious and repeated bleeding, croton seed, and digitalis.

Mr. Karkeek, in a valuable communication to the *Veterinarian*, vol. viii., considers the brain and spinal marrow to be principally the seat of the disease; but he has found in idiopathic tetanus that the stomach and bowels, and sympathetic nerve in the neighbourhood, have been considerably diseased—a fact which can be borne out by the present writer. Mr. Karkeek, therefore, recommends blistering the abdomen extensively, to produce a counter-action in the system. He goes so far as to consider that a diseased state of the digestive organs is invariably the primary cause in idiopathic tetanus.

Mr. Karkeek relates four successful cases treated by large and repeated bleeding, purgatives, opium and camphor injections, and blisters in some cases to the spine, in others to the abdomen.

Mr. Karkeek considers the disease to be very frequent in the west of Cornwall, owing to its being almost surrounded by the sea; and believes idiopathic much more curable than traumatic tetanus.—Ed.]

String Halt.

This disease is characterised by the sudden and spasmodic manner in which the hock is bent, the leg at the same time being carried very high. It is not a lameness, for there is no dropping on the other leg, and it cannot be felt by the rider like hock lameness; but it is an unequal action of the muscles, arising, most probably, from some affection of the nerves. In some cases it is said the stifle joint has been found diseased, and in others the spine itself has been affected. But a few years ago I had the pleasure of spending a day with the late Dr. Jenner at Berkley, when he informed me that string halt depended upon a disease of the spine, and showed me several vertebræ, which afforded a proof of it.

[Mr. C. Spooner, the talented assistant professor at the Veterinary College, has clearly shown that in the majority of cases it is owing to disease of the great sciatic nerve, which supplies the muscles of the hind extremity. Nervous energy is thus imperfectly supplied, and, consequently, the most powerful muscles act the most. It is often connected with disease of the hock, and is sometimes preceded by it. Treatment is useless.—Ed.]

CHAP. XXIV.

DISEASES OF THE CHEST AND AIR-PASSAGES.

Inflammation of the Lungs. — Pneumonia.

[SOME years since, when the earlier editions of this work were printed, it was customary to class all the diseases of the chest under one head—inflamed lungs; and the same treatment was prescribed for all. Later research, however, has considerably altered this opinion; and although it is an undeniable fact that inflammatory affections of the different contents of the chest are often extremely complicated with each other, yet in numerous instances the symptoms of the different affections are so distinctly marked, that it would be absurd to deny their separate and distinct existence. Thus, without making any distinctions but what are warranted by observation and experience, and are necessary for the judicious employment of remedial measures, we shall have to consider—

Pneumonia, or inflammation of the substance of the lungs.

Pleuritis, or inflammation of the membrane covering the lungs and lining the chest.

Bronchitis and *Trachitis*, or inflammation of the mucous membrane lining the bronchial tubes and the trachea; besides *Catarrh*, or inflammation of the membrane lining the nostrils and the throat.—Ed.]

Pneumonia, or Peripneumony.

[Even this disease often presents itself in different forms; sometimes running its course and ending fatally in less than twenty-four hours, and in others extending to four or five days. In the former variety the lungs after death appear black, in fact gorged with blood; and this used to be considered as a state of mortification, and it was common to say of such a horse, that “his lights were rotten as a pear;” and if the horse had recently been purchased of a dealer, and an action were brought for the recovery of the value of the horse, the black appearance of the lungs was generally considered as a sufficient proof that the animal was rotten and unsound, and the dealer was cast in consequence; whereas the congested appearance of the lungs ought to have been considered, in the absence of any appearance to the contrary, as a proof of the recent production and rapid nature of the disease.

Such appearance of the lungs is generally afforded when a horse dies after over-exertion in the chase, or from being violently driven when not in proper condition.

The *Symptoms* of this form of inflammation of the lungs are strongly marked, and at once point out the suffering organ. The breathing is greatly affected; quick, short, distressed, and often as many as sixty or seventy respirations in a minute. The pulse, too, is very quick; seventy, eighty, or ninety a minute, and often small and almost imperceptible. The legs and ears are, or soon become, icy cold; the mouth usually hot; the membrane of the nostrils intensely red, or of a livid colour. The horse prefers a standing posture, with the fore legs stretched apart, so that the muscles external to the chest may assist in respiration; the appetite is altogether lost, and he eagerly thrusts his head towards the door, or the coolest place in the stable. If relief be not very soon obtained, the severity of the symptoms increase; the air cells become choked with blood; and the horse dies, as it were, from suffocation, in the course of twelve to twenty-four hours. Mr. Percivall distinguishes this disease from pneumonia, and designates it *congestion of the lungs*.

When blood is abstracted, it is almost invariably found of a very dark colour, which is owing to the gorged state of the lungs preventing the purification of the blood from taking place.

True Inflammation of the Lungs, when its symptoms are unsubdued, usually terminates fatally in the course of four or five days; though sometimes it gets into a sub-acute state, and lingers on for several weeks.

Its first symptom is usually a diminution or loss of appetite, but in some cases a troublesome cough may precede this want of appetite for several days.

The pulse and respiration are soon affected, both becoming exceedingly quick; the pulse from sixty to one hundred in a minute, and the breathing either almost as fast, or otherwise laborious and difficult.

The pulse may be either full, and strong or hard, or otherwise weak and almost imperceptible; in the latter case our prognosis is more unfavourable than in the former. The legs and ears are usually cold and the mouth hot, and the membrane of the nostrils and eyelids intensely red. In some cases there is a cough, in others none whatever; and often when there has been a cough before, it ceases as the inflammation becomes more intense.

The bowels are generally inclined to be costive, and after the disease has existed for some time, the dung is coated with mucus.

Some insight into the nature and extent of the disease may be obtained by what is called *auscultation*.

On applying the ear to the sides of the chest, when the animal is in a healthy state, we notice a murmuring sound, difficult to be described, but readily heard. This sound is produced by the

air rushing into the air cells, and is much greater in the young than in the old subject. When the lungs are partially indurated, the cells being filled up, there is at that part an absence of the usual murmur, and an increase of it elsewhere. This result sometimes attends the presence of fluid in the chest. After exercise the murmur is increased; and if in a state of rest the sound at one part is increased, and not at another, the latter part is probably in a state of disease.

The principal indication of a diseased state of the lungs is derived from a sound called *bronchial respiration*, and somewhat resembles the sound made in sawing wood. It is occasioned by the air rushing in and out of the large bronchial tubes, there being some impediment to its passage. This sound is heard in peripneumony and in acute pleurisy, and more particularly when both diseases are combined.

There are various other alterations of sound noticed, but they are of minor importance, and less readily detected; they may, however, be found described in Mr. Percivall's work on the Diseases of the Chest, &c., where the essay of M. Delafond on the subject is translated.

The employment of auscultation is much assisted by percussion. On tapping the chest sharply with the knuckles, the sound elicited, if the lungs are indurated, or there is water in the chest, will be much more dead than in a healthy state; whilst, on the other hand, when the lungs are emphysematous, as in broken wind, the sound will be augmented.

The *Treatment* of this disease must depend on the particular stage in which we may find it, and must be modified by the peculiar symptoms that may be present. In the first place, let us suppose a horse is blown in hunting; ridden till nature is exhausted, and the animal can go no further. In such case the lungs are in a congested state, and the proper changes in the blood cannot take place; the breathing is of course accelerated to the greatest degree, and the pulse quick and weak, and probably imperceptible. If the vein be opened, the blood flows with difficulty, and is exceedingly dark and thick. In such case it is of little use to abstract blood until the pulse becomes perceptible, and our best plan is at once to administer a stimulant. A bottle of wine, administered in the hunting field, has in many a case proved of essential service, and in some instances saved the animal. Two ounces of spirit of nitrous ether, administered in a pint of warm ale or water, is still better: its effect will be to equalize in some degree the circulation, and to rouse the nervous system; and soon after its administration we shall probably find the pulse becoming fuller and more perceptible. In this state we should abstract blood—as much as we can obtain without producing fainting. The same method of treatment

may be pursued whenever the lungs are in this congested state, though arising from other causes than over-exertion; if, indeed, in inflamed lungs, the pulse is at the onset particularly weak or imperceptible, a stimulant may be employed with advantage, though it is not desirable to continue it.

Bloodletting is, however, our sheet-anchor in the treatment of inflamed lungs; and unless we are enabled to abstract a large quantity, our chance of recovery is but slight. It is, however, useless to prescribe the abstraction of any particular quantity of blood; its effect on the pulse should be our guide. A large orifice should be made in the jugular, and the bleeding continued until the mouth becomes considerably cooler, and the pulse altered in its character; if before hard or full, till it is soft and scarcely to be felt. The quantity of blood abstracted before this effect is obtained may vary from eight pounds to sixteen, according to the state of the pulse and the peculiarities of the animal. The bleeding may, if necessary, be repeated in diminished quantities once or twice, with intervals of six or twelve hours; but it is the first bloodletting on which we must principally depend. The appearance of the blood must not be allowed to have much influence over our treatment. It is not, however, to be altogether despised, but is chiefly useful in assisting our prognosis as to the termination of the case. If the blood flows tardily, is very black, and forms a very weak coagulum, the chances are altogether unfavourable: if, however, it presents a thick buffy coat, and very firm coagulum, we may conclude that the horse is in a state not only to demand but to bear extensive bleeding, and we shall generally find beneficial effects succeed its employment. Indeed, in cases of inflammation, it is better to find the blood presenting a buffy coat than otherwise; unless it should be likewise of a thick muddy aspect, which is a bad sign.

Medicines.—Although bleeding must be our principal remedy, yet we must not despise other assistance. Although it is desirable in some degree to unload the bowels, we must take care not to purge, for if we do so, death will probably follow; and from sympathy between the bowels and other parts, a much smaller dose will act on them than in a state of health. If, therefore, the bowels are not costive, no aperient will be required; but if otherwise, we should administer an injection, after backraking, and give from one to two drachms of aloes, or, what is still better, about a pint of linseed oil; to this mild aperient, which should not be repeated, we may add a drachm of tartarized antimony, three drachms of nitre, and one of digitalis. It is a dangerous practice to administer small doses of aloes until the bowels are acted on, as by this time a sufficient quantity may accumulate in the system to do irreparable mischief. The nitre, digitalis, and

antimony may be repeated three times the first day, and twice the second.

Mr. Percivall recommends half a drachm of white hellebore twice a day instead of the digitalis. It is a powerful medicine, and lowers the pulse by producing nausea. It requires to be given with caution, under the eye of the practitioner, and its effects carefully watched. Mr. Mavor advises two drachms of extract of belladonna as a sedative. I have employed both these medicines, and can speak to their good effects.

Counter-irritation.—After the urgency of the symptoms have been in some measure relieved by bloodletting, counter-irritation may be very serviceable in preventing change of structure from taking place. A blister is to be preferred, and should be applied, as recommended by Mr. Percivall, to the breast, in preference to the sides, as it is much more likely to act in the former muscular situation than in the latter. In fatal cases, a blister will scarcely ever produce any effect; and this symptom is therefore justly regarded as one of the most unfavourable that can possibly occur. If the case be protracted, or takes on a sub-acute form, rowels and setons may be useful, as well as blisters.

The diet in inflammation of the lungs should consist of bran mashes, hay, carrots, or green food; and care should be taken that the horse is not restored to his usual diet until the inflammatory symptoms have entirely ceased.

The body should be kept tolerably warm by clothing, and the legs encased in flannel bandages; their warmth having been previously restored by hand-rubbing, assisted by the application of a liniment, composed of four parts of oil, one of spirits of turpentine, and one of hartshorn, which should be rubbed in as often as they become cold.

It is of great importance that the horse should be allowed to breathe the purest and the coolest air; for which purpose he should be turned into a loose box, well ventilated, and in the summer he may be turned into a paddock with advantage. — ED.]

Sub-acute Pneumonia.

[When inflammation of the lungs takes on a sub-acute form, either from the beginning or after an acute attack, our treatment, though conducted on the same principles as that before mentioned, must be less active in its nature. The symptoms are more obscure, and demand more tact and discrimination: the breathing is less disturbed, the pulse not so quick, the appetite not so much impaired; and yet fatal mischief may be going on under this insidious form, and, if not checked, may end in death.

The bleeding should be less extensive, but more frequent than

in the acute attack; and we must still more have recourse to counter-irritation, setons or rowels being called for, as well as blisters.

The *Terminations* of inflamed lungs are various: in the first place we may have resolution, in which the inflammatory action is quickly checked, and the lungs are restored to a normal state; but more frequently we have some alteration of structure. This, however, after a while, may be restored to a healthy state; but often a portion of the lungs becomes indurated or hepatized; the air cells are filled up, and sometimes the bronchial tubes, so that the part frequently becomes so heavy that it would sink if placed in water, and it is no longer able to perform its function; the animal becomes thick-winded, being obliged to breathe, so to speak, with *diminished* lungs. In some cases abscesses may form in various parts of the lungs; and the case, though flattering for a while, will become fatal at last.—ED.]

Pleuritis.—Pleurisy.

[It was formerly the custom to class this disease with that before described; but although, in many complicated cases, they may both exist at the same time in the same subject, yet there are others in which the symptoms of pleuritis are distinctly marked, and in which the *post mortem* appearances have proved the nature of the disease.

For first pointing out the distinction of these diseases, as well as for some valuable knowledge on the treatment of pleuritis, we are indebted to the late Mr. John Field, who thus describes the symptoms:—

“A depressed appearance; hard, full, strong pulse, from 42 to 54; painful and limited respiration; inspiration quick and interrupted; expiration slow and prolonged; *pressure on the sides painful*, occasioning a peculiar grunt; twitchings of the skin; faint suppressed cough or sneeze; the *membrane of the nostrils of a natural colour*, and the tongue moist and clean.

“As the disease proceeds, the pulse becomes more frequent, small, and wiry; respiration accelerated; full inspiration; difficult and painful expiration; tongue furred; patches of sweat; restlessness, delirium, and death.

“The symptoms of the first stage continue from three to seven days, when the disease terminates fatally, or symptoms of the second stage commence.

“In favourable cases the quickness of pulse gradually diminishes, the appetite returns, the horse lies down; and in three or four weeks may be considered well, though unfit for work.”

Mr. Field thus distinguishes the symptoms of pneumonia from those of pleurisy:—The oppressed pulse of the former, the hard

febrile pulse of the latter; the difficult convulsive expiration of the one, the peculiar respiration of the other; the intensely red hue of the eyelids and nostrils in pneumonia, the absence of this in pleuritis; the freedom from pain on pressure in the former, and its exhibition in the latter; the coldness of the extremities in the one, the variable temperature in the other; the obstinate standing in the one, and the frequent lying down and getting up in the other.

The *post mortem* appearances are sometimes merely inflammation of the pleura, with patches of lymph, but more frequently a considerable collection of fluid, pale or yellow, or reddish or bloody, in all three cavities, with adhesion of the lungs to the sides of the chest, and other morbid changes; sometimes the pleura appears in a state of gangrene.

Treatment.—Mr. Field recommends the immediate abstraction of blood, to the quantity of from ten to twenty pounds, to be repeated as the case seems to require. The bowels to be moderately relaxed by a small dose of aloes, assisted by injections; and he was then in the habit of giving white hellebore, in doses from one scruple to half a drachm, combined with spirit of nitrous ether, nitre, and tartarized antimony.

A blister on the thorax and sides, and a rowel in the brisket.

When the inflammatory symptoms evidently abated, vegetable tonics, as gentian and ginger, were advised; and to which, when the possibility of hydrothorax was suspected, mild diuretics were added.

When effusion had evidently taken place, he recommended the operation of *paracentesis*, or tapping.—Ed.]

[*Hydrothorax*,

As the deposition of water in the chest is termed, although an effort of nature to relieve inflammation, is yet generally attended with a fatal termination.

The only chance of relief is afforded by an operation called *paracentesis*, or tapping, which consists in plunging an instrument called a trochar between the ribs into the cavity of the chest, and leaving the canula, or tube which encases the trochar, and withdrawing the latter, by which an exit is afforded to the fluid contained within the chest through the canula.

The best situation for the operation is between the eighth and ninth ribs, and near the cartilages; and the skin should be previously drawn tightly forwards, by which means the opening will be closed after the operation. It should be performed on both sides of the chest, and may be repeated several times, and diuretic and tonic medicine should be given at the same time.

Although the majority of cases in which this operation has

been practised have ended fatally, yet there are several successful cases on record, — sufficient to justify its adoption when there is a reasonable presumption of the presence of water in the chest.

This is denoted by the sudden cessation of the violence of the symptoms at first, and an amendment of the appetite; but as the water increases, the respiration becomes still more embarrassed, and very frequently a spontaneous purging ensues. On applying the ear to the chest the natural respiratory sound is lost; and on striking the chest it no longer sounds hollow, but dead.

The *Symptoms* of hydrothorax, however, are by no means always the same—they principally depend on the cause. It may succeed intense inflammation of the lungs and the pleura, or sub-acute or chronic inflammation of these parts. The symptoms may either nearly subside as the water is secreted, and the case present altogether a flattering appearance, or otherwise unfavourable appearances, though modified, may still exist.—Ed.]

[*Complicated Cases.* Although we have spoken of pneumonia and pleurisy as two distinct diseases, and although the symptoms of each are distinctly marked, yet it is still the fact that they are very frequently combined together; and then the symptoms may either denote the preponderance of the one disease over the other, or otherwise they may be so nearly balanced as to render the symptoms altogether obscure.

The *Treatment* of these complicated cases must be conducted on the same principles as before detailed; modified, however, by the leading symptoms.

It may, however, be observed that these complicated cases are more frequently fatal than simple affections either of the pleura or the substance of the lungs. They rarely present the same activity in the symptoms, but are usually more protracted in their progress, and more deceitful in their character.—Ed.]

CHAP. XXV.

BRONCHITIS.—TRACHITIS.—INFLAMMATION OF THE BRONCHIAL PASSAGES AND WINDPIPE.

[THE membrane which lines the bronchial tubes, as the air passages of the lungs are termed, as well as that which affords an internal covering for the larynx and trachea, is termed a mucous membrane, and is very liable to inflammation. When thus inflamed, the disease is termed Bronchitis, Trachitis, and Laryngitis, according as the bronchiæ, the trachea, or the larynx bears the brunt of the attack. These parts are sometimes separately

diseased; but more frequently they are affected simultaneously, though not perhaps in the same degree, or to the same extent.

There are two forms of this disease, each distinctly marked, the acute and the sub-acute; the latter being perhaps the more frequent.

The former is an extremely dangerous disease, and very frequently proves fatal. This is owing partly to the great extent of membrane diseased, and the difficulty of affecting it by our treatment, and partly to the obscurity of its symptoms, and the insidious nature of its approach, whereby it has often existed to a great extent before attention has been called to it.

It may be produced by exposure to cold or sudden changes of temperature, there being a predisposition in the part to become affected.

It more frequently occurs in the autumnal and winter seasons, but particularly in the former, and during the prevalence of wet weather.

The *Symptoms* are at first very obscure: a cough, a staring coat, and slight impairment of the appetite, and a discharge of mucus from the nostrils. The case perhaps is regarded as a common cold; suddenly the appetite is lost, the pulse is remarkably quick and weak, and the membrane of the nostrils intensely reddened. In very severe cases there is a suppression of all nasal discharge, and often a disappearance of the cough. In fatal cases the symptoms increase in intensity for several days.

There is a total loathing of all food; the nasal membranes change from a red to a purple hue; the extremities are cold; the pulse becomes quicker, weaker, and more imperceptible; the respiration is for some time not quickened, but deeper than natural; at length it becomes quicker, and the horse obstinately prefers a standing posture.

Thus the symptoms continue getting gradually more aggravated, until death closes the scene in the course of a week, more or less.

An inspection after death shows the mucous membrane of the bronchiæ and trachea, instead of being white, its natural colour, absolutely purple or dark green, from inflammation and gangrene.

This, however, is bronchitis in its most severe and dangerous form; but it is fortunately not so frequent as when it assumes a milder appearance. In severe cases, there is often a considerable discharge from the nostrils, and a distressing cough; the pulse is quick, from 50 to 70; the respiration is disturbed, but not much quickened; the extremities preserve their temperature; and the appetite, though considerably diminished, is not totally lost.

This form of bronchitis is more frequent than the former; and though severe, and attended with danger, is yet not so fatal as

that before described. In the latter kind the inflammatory action in great measure expends itself in the increased secretion of mucus; whilst in the former description the intensity of the inflammation suppresses all secretion, and quickly passes on to a more malignant and fatal termination.

Besides the two forms of bronchitis just described, we have often a milder description, termed sub-acute, in which the symptoms of the latter kind are present, but altogether in a milder form; the pulse is less frequent, the cough less severe, the appetite not so impaired; and yet these symptoms may insidiously creep on, until many of the bronchial tubes and air cells are destroyed by a change of structure, the capacity of the lungs impaired, and the animal becomes thick-winded.

This alteration of structure may result from bronchitis, either in its acute or sub-acute form.

Occasionally bronchitis degenerates into what is called a *chronic* state; that is, the inflammation nearly or quite ceases, but the discharge and cough continue, particularly the former.

Bronchitis is very apt to be mistaken for inflammation of the lungs; and although the part attacked is a portion of these organs, and the diseases are often present at the same time, yet the distinction is important, inasmuch as in one case a mucous membrane is diseased, in the other the cellular structure of the lungs: the symptoms of these affections are not only different, but the treatment too requires modification. Bronchitis very frequently assumes the form of an epizootic, attacking a number of horses at the same time. When this is the case the discharge from the nostrils is exceedingly profuse, and is often of a yellowish and sometimes of a greenish hue.

This disease is generally longer running its course than pneumonia; and when its progress is unfavourable, it terminates in death in the course of from five to ten days.

The *Treatment* of bronchitis must depend on the form which it assumes. We must have recourse to bleeding in the acute disease, but not to the same extent as in pneumonia. From three to five quarts of blood will generally be a sufficient abstraction, but this must be regulated by the state of the pulse during the operation; as soon as it fails under the finger the bleeding should cease. It is sometimes, though rarely, requisite to bleed again the same day, but more frequently on the following day; and sometimes three or four venesections are required, which of course must be regulated by the symptoms. The later bloodlettings, however, must be in diminished quantities. When bronchitis assumes an epidemic form, we must be still more moderate in our venesections, and likewise when it appears in a sub-acute state.

The bowels are very frequently in a costive state, and should be unloaded by raking and injections; but the greatest caution

must be observed in the administration of aperients, for purging, which is so dangerous in pneumonia, is still more injurious in bronchitis. It is found that when one mucous membrane is diseased, other membranes of the same nature are from sympathy in a very irritable state. Thus, though it is desirable in this disease to unload the bowels, it is injurious to do so by irritating their internal coats.

We may, however, venture on giving from one to two drachms of aloes, or five drops of croton oil; or, what is still better, a pint or nearly so of linseed oil. This aperient, however, should rarely be repeated. It will be desirable to give likewise, in the form of a ball, digitalis half a drachm, tartarized antimony one drachm, nitre three drachms; to be repeated twice a day.

Mr. Percivall recommends white hellebore instead of the digitalis, in the same doses: this medicine, however, requires cautious watching. Extract of belladonna is also employed with advantage.

Counter-irritation is of great importance in this disease. In the course of six or twelve hours after the first bleeding, the course of the windpipe should be blistered as well as the breast; or setons should be inserted in the course of the windpipe, and a rowel in the brisket. Blisters have the advantage of exciting a quicker action, and rowels and setons a more lengthened effect. In the sub-acute or chronic forms of the disease, the latter may be preferable, but in the more severe cases the speedier action of the blister is demanded; and it is often desirable to employ both methods of counter-irritation.

The proper action of the blister or the seton leads us to form a favourable prognosis, but not to the same extent as in pneumonia; for in the latter disease the case scarcely ever becomes fatal after the blisters or setons have produced a proper effect, whilst in bronchitis it occasionally does. This is owing to the circumstance that in pneumonia the circulation is more languid on the surface of the body, and the blood more inwardly determined than in the other disease.—ED.]

CHAP. XXVI.

CATARRH, COLD, SORE THROAT, ETC.

[CATARRH, or cold, as it is commonly called, is an inflammation of the membrane lining the nostrils and the throat, and neighbouring parts. It may attack the whole of these parts, or be confined to one only. It may be so slight as to pass away without treatment, or so severe as to threaten suffocation and en-

danger life. The symptoms depend very much on the particular part attacked: if the inflammation be confined to the nostrils, there is sneezing, redness of the membrane, and an increased secretion, at first often watery, and afterwards of a mucous character: if the pharynx is affected, there is a difficulty of swallowing; and if the larynx is involved, there is a cough. In some cases abscesses form about these parts; in others the throat may become ulcerated. In very slight cases there is no constitutional disturbance; in others there are feverish symptoms—a hot mouth, an impaired appetite, and a pulse quickened to from 40 to 50. Very frequently the attack commences in the chambers of the nostrils, and afterwards extends itself to the throat.

This disease has been termed a cold, from the supposition that it was produced by cold; but it is more frequently occasioned by the alternation from cold to heat, for few horses get cold from being turned to grass from a warm stable; whilst nothing is more common than for horses to be affected with catarrh on being taken from grass into a warm stable. Exposure to cold will, however, produce the disease; but it is then rather owing to the reaction which follows than to the cold itself.

Catarrhs are much more frequent during the moulting season than at any other period; and particularly in the autumn, and during the prevalence of wet weather.

This disease frequently appears as an epizootic, when the symptoms are usually more urgent, the discharge more profuse, and the debility greater. In this form it is very common amongst the young stock in racing stables, where it is termed the distemper; and sometimes the symptoms of catarrh appear in other diseases, as in influenza, an account of which will be separately given.

The duration of an attack of catarrh is very uncertain; it may last only a few days, or as many weeks. This is owing partly to the violence of the attack, and partly to the idiosyncrasy of the animal. Some horses are so susceptible as to take cold from the slightest cause, and are frequently suffering from the disease; others are rarely, if ever, so affected, however much exposed.

The *Termination* of catarrh may be, as it generally is, *resolution* or restoration to health; or *ulceration* of the throat, or roaring, or glanders; besides which, the inflammation may extend itself down the windpipe, and the lungs may become affected, and death may ensue.

The *Treatment* must depend on the severity of the attack. In some slight cases a few bran mashes, and a little nitre, six drachms, perhaps, two days successively, may be all that is necessary. In other cases, in which there are the symptoms of

fever, together with a cough, it will be prudent to abstract from 5 to 10 lbs. of blood, and to administer from 2 to 3 drachms of aloes, so as mildly to relax the bowels; and to follow this with the following ball, given several days successively:—

Nitre	3 dr.
Camphor	1 dr.
Tartarized Antimony	1 dr.
Digitalis.....	$\frac{1}{2}$ dr.

Made into a ball with treacle.

When there is a difficulty in swallowing, or a cough, it will be advisable to stimulate the throat externally by rubbing on a mild liquid blister, or in severe cases inserting a seton.

When there is a considerable discharge from the nostrils, it is a good plan to steam them, by suspending a nose-bag containing bran infused in boiling water. *

When the inflammation appears to be extending down the windpipe, it is necessary to apply a blister, or insert setons in its course.

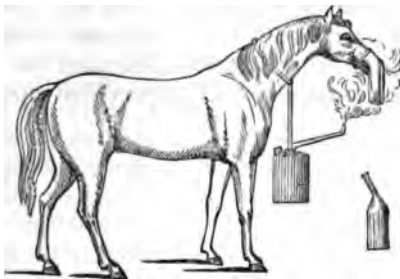
The diet during a severe catarrh should consist principally of mashes, and of succulent food, such as carrots in the winter, and grass in the summer.

If the case becomes chronic, the nasal gleet continuing, and the animal becoming poor, it will be desirable to administer tonics, such as the following:—

Sulphate of Iron	2 dr.
Ginger.....	1 dr.
Gentian	2 dr.

To be made into a ball with treacle, and administered once a day for several days.—ED.]

* By means of Read's patent medicated Vapour Inhaler (represented below), the nostrils can be conveniently steamed, either with hot water or a medicated fumigation. The water may be kept heated by a small lamp, or an iron heater similar to those used for tea-urns, &c.



Scarlatina.

[This disease is very rare in the horse, there being but a few cases on record.

Mr. Percivall treats of it in his late work, and thus describes its nature, symptoms, and treatment:—

“ Febrile catarrh, speedily succeeded by the appearance of scarlet spots upon the Schneiderian membrane and surface of the skin, attended with anasarca, and in some cases dyspnœa.

“ *Symptoms.*—For two or three days at the commencement it will probably be mistaken for catarrh; about this time, however, its veritable nature becomes manifested by the appearance of numerous scarlet spots or blotches upon the membrane lining the nose, possessing the hue of arterial blood, irregular in size and figure, and visible as high up as the membrane can be inspected. These appearances mostly assume the character of petechiæ, though I have seen them running in streaks. They look like so many patches of extravasated blood; but if one of them is wounded, blood instantly trickles down the nose, and assures us that, partially and singularly distributed as it is, it is still fluid, and still contained within its vessels.

“ In passing our finger over the red spots, nothing like pimple or pustular elevation of surface is discoverable. The skin is every where similarly bespotted; at least, I infer so from the results of my examination of the body of one horse that died of the disorder. A mucous defluxion proceeds from the nose. Anasarca is a common attendant; the legs, sheath, and belly being on occasions considerably tumefied. The respiration is quickened, but in such a manner as rather to indicate pain than embarrassment. The pulse is likewise accelerated, and beats with force. There exists great disinclination to move about. The appetite is either quite lost, or very much impaired.

“ *Treatment.*—In two cases, early venesection, closely followed up by the exhibition of purgative and diuretic medicine, with walking exercise, proved completely successful. Another case, however, had a fatal termination: it was not altogether in my own hands, and I attributed the unfortunate issue in some measure to excess of walking exercise, practised for the purpose of keeping down the anasarca which supervened upon the primary attack.” — ED.]

CHAP. XXVII.

STRANGLES.

[THIS disease probably derives its name from a symptom which is occasionally present, in which the animal is threatened with suffocation.

It is a disorder peculiar to young horses, and attacks them most frequently between the third and fifth year, though not unfrequently before this period, and sometimes after it, and now and then we even meet with it in old horses.

It used to be supposed that every horse becomes affected with it at some period of his life, and that it was necessary for the constitution, and a means of carrying off impurities. From the number of hands into which horses usually pass, it is difficult to ascertain whether they invariably become subject to this disease or not; and therefore this antiquated assertion is rather difficult to disprove. My own opinion is, that not only is the complaint not invariable, but that a moiety of horses altogether escape, which I think will be borne out by observation amongst agricultural horses, that are both bred and worked on the same farm.

The disease sometimes occurs at grass, when the animal is under two or three years of age, and sometimes the symptoms are so mild that no treatment is required, at others so severe as almost to threaten suffocation; and it then becomes imperative to take up the colt, and have recourse to the most judicious treatment.

The *symptoms* of strangles are a swelling and abscess between the lower jaw bones, accompanied frequently by sore throat, and other catarrhal symptoms. There is often a considerable degree of fever present, together with an indisposition for food, as well as an inability to swallow it; liquids being swallowed with greater difficulty than solids.

The swelling under the jaw, slight at first, gradually increases, the other symptoms increasing in severity at the same time. When matter has formed, it usually points, as it is termed, externally; and if not opened, the abscess bursts, and the symptoms are afterwards much relieved.

Sometimes an abscess bursts internally, and the matter is discharged through the nostrils.* Occasionally the neighbourhood of the parotid glands is affected, and the swelling is so considerable as to threaten suffocation, and demand the performance of the operation of trachæotomy.

Sometimes the enlargement of the gland becomes hard and

* In a few instances the Eustachian cavities have been filled with matter.

sluggish; and the symptoms, though mild, are obstinate. The disease is then termed the bastard strangles.

When the glands thus become indurated, some ointment of hydriodate of potash should be rubbed in every day.

Treatment.—The object to be kept in view is to bring the abscess to suppuration as quickly as possible, and to moderate the fever at the same time.

Unless the symptoms of fever are particularly severe, and inflammation of the windpipe and the lungs are threatened, it is better to avoid bloodletting; but if employed, it should be with moderation. The bowels should be moderately relaxed, for which purpose two or three drachms of aloes may be given in a ball, but rarely, if ever, repeated. Two drachms of nitre and one of tartarized antimony may be given twice a day, in a mash. We should avoid drenching as much as possible, in consequence of the soreness of the throat. A stimulating liniment should be rubbed on the swelling, and a warm linseed meal poultice applied, and changed twice a day.

If this cannot be conveniently done, the hair should be cut off and the part blistered. When matter can be readily felt, a large opening should be made with a lancet, and the matter pressed out. After this a poultice may be applied for one night. Sometimes there are several smaller abscesses, which, however, must be treated in the same manner.

The diet should consist of bran mashes, green food, and carrots, with a little hay, and thin gruel may be given to drink.

If the colt is much reduced, a little tonic medicine may be afterwards given, but this is rarely necessary.

In our treatment of strangles, it is necessary to be on our guard, as other diseases may supervene, particularly inflammations of the windpipe and the chest. It is desirable, therefore, unless the case be slight, to rub a blistering liniment in the course of the windpipe.

The symptoms of strangles sometimes occur even in very old horses; and when the parotid glands are alone attacked, the disease used to be called the *vives*, or *ives*, and is sometimes very troublesome, but should be treated as we have recommended for strangles.

If the swelling continues hard, some ointment of hydriodate of potash may be rubbed in daily.

The consequences of strangles are sometimes very severe, and even fatal. In some cases large abscesses have been found to arise in different parts of the body, sometimes on the surface, at others internally, and so occasioning death. These cases are supposed to arise from the absorption of pus, and are more likely to occur when the sub-maxillary abscess has been imperfectly developed.

In some cases of disease somewhat similar to strangles, Mr. Carlisle found the Eustachian cavities full of pus, and he had recourse to an operation, by which he evacuated them with success; and he relates the cases in the *Veterinarian* for September, 1841.—Ed.]

CHAP. XXVIII.

CHRONIC DISEASES OF THE AIR-PASSAGES.

Chronic Cough.

[We have spoken of cough as a symptom of catarrh, or rather of inflammation of the larynx; and although we have now to consider it under a distinct designation, it is yet in all cases a symptom of diseased action, rather than a disease itself.

There are various descriptions of cough, such as hard, soft, dry, short, strong, weak, and convulsive cough. These numerous distinctions will, however, answer no useful purpose. It will be sufficient for us to distinguish the *short dry cough* of broken wind, which is familiar to all practised ears; the dry, or *cough without discharge*; and the cough attended by an *increased secretion of mucus*.

Cough, indeed, denotes the presence of some irritation, and is in fact the noise made by the forcible endeavour to expel this cause of irritation; for instance, in catarrh there may be a great increase in the secretion of mucus, so much so that if not removed it will threaten suffocation. The entrance to the windpipe is lined by a membrane endowed by means of nerves with the most delicate sensibility. The presence of mucus on this part produces irritation. The sensation is instantaneously sent to the brain, and thence, by means of the nerves of motion, an impression is conveyed to the diaphragm and abdominal muscles, by which these parts are thrown into violent action; air is rapidly expelled from the lungs through the windpipe, carrying with it most probably the offending object; and thus a cough is produced. The same effect is occasioned when any foreign body enters or endeavours to enter the larynx, and likewise from simple irritation of the part without any increased secretion of mucus, as well as from too great dryness of the part, and probably also from sympathy with another part. Cough is, indeed, but an effort of nature to ward off mischief, and in endeavouring to cure it we should strive to remove the cause by which it is produced. Too much regard should not be paid to the sort of cough that may be present; for we may have in catarrh, and even in the same

case, various coughs, according to the stage of the disease, and the severity of the symptoms. Many profess to distinguish by the sound of the cough whether it is chronic or otherwise; such profession, however, is altogether without foundation. We may indeed easily tell the cough of broken wind; but we cannot distinguish that of catarrh, or sore throat, from a chronic cough. By chronic cough, then, we understand a cough either trifling or severe, that has existed for a long time without being attended by any active inflammatory appearances. Such a cough may either be so excessive as to be exceedingly annoying to the owner, or so slight as scarcely to engage attention.

Sometimes a day or two may elapse without its being heard, at other times the paroxysms may be frequent and severe. Some horses cough in the stable, and never out of it; others are only heard in their work and never in the stable. Generally speaking, however, a horse with a chronic cough is heard chiefly during the first mile of his working, and more when ridden than in harness. In many cases the disease can be traced back to an attack of sore throat, which most probably has been protracted, and has left behind some alteration of structure, either a thickening or an irritated state of the membrane lining the larynx. Horses with chronic cough are generally (not always) subject to frequent attacks of sore throat, each attack probably making the cough worse.

It is considered that the affection is sometimes produced by the presence of worms in the stomach or intestines, or by a disordered state of the digestive organs.

Treatment.— We may often materially benefit a chronic cough, although we can rarely achieve a perfect cure; and as in many cases we cannot be sure that the case has become chronic, it is therefore desirable to attempt relief whenever the animal is valuable.

It will be proper to take a few quarts of blood to relieve the local inflammation; to administer (if the horse can be spared) a mild laxative, so as to get the digestive organs into a healthy state; to stimulate the throat externally by means of a mild liquid blister frequently repeated, and to administer the following ball several nights successively:—

Camphor.....	1 dr.
Tartarized antimony.....	1 dr.
Digitalis.....	$\frac{1}{2}$ dr.
Powdered squill.....	1 dr.

To be made into a ball with treacle.

The diet during this time should principally consist of mashes and succulent food, and the hay and corn should be free from dust, and wetted before given. — Ed.]

Broken Wind.

[Horses with broken wind are usually called *pipers* by horse dealers.

The symptoms of a badly broken-winded horse are readily perceptible; the peculiar catching of the flanks is seen by the common observer. There is in fact a double expiration to a single inspiration; the horse readily draws in his breath, but has a difficulty in forcing it out, and the abdominal muscles are called on to assist the operation in a much greater degree than in a state of health.

The respiration is also quicker than natural, and there is generally a peculiar short cough. This cough in mild cases may be slight, but in bad cases it is extremely distressing, continuing perhaps almost incessantly for half an hour together.

The symptoms may rapidly get worse, until a horse is unfitted for any thing but slow work; or they may continue in the same state for years, during which the animal is capable of doing a good deal of work.

It is very common for the symptoms in draught horses to appear suddenly, particularly if the animal is worked severely on a full stomach.

We find this affection more frequently in cart horses than in any others.

On the dissection of broken-winded horses, we notice the lungs to be considerably larger than in a healthy state, and much whiter on the surface. On cutting into them, we find that their increased volume is owing to air extravasated under the membrane which covers them. The air cells are supposed to have been ruptured, so as to have admitted the escape of the inspired air, which is thus easily drawn into the lungs, but has much greater difficulty in escaping.

The membrane lining the bronchial passages is also generally found in an unnatural state, being much thicker than in a state of health, and this circumstance is considered to account for the cough that attends the disease.

The symptoms of broken wind have been suddenly manifested by some horses, and on dying soon afterwards, it has appeared that the diaphragm has been ruptured. Any thing, therefore, that will materially embarrass the action of this muscle is likely to occasion these symptoms.

Broken-winded horses rarely carry much flesh, which is owing to the disordered state of the stomach and bowels; a greater quantity of wind is formed in the bowels than common, which is frequently expelled from the anus. There is no way of account-

ing for this disordered state of the digestive organs, except from the sympathy.

The immediate *cause* of broken wind is obviously the circumstance of sudden exertion on a full stomach. In proportion to the indigestible nature of food is the disease likely to occur. Thus, fusty and damaged hay is a very frequent cause; and this hay being frequently given to agricultural horses, accounts in great measure for the disease being more frequent with them than with any others. Nimrod, the celebrated sporting writer, says the disease is extremely rare in France, where he now resides; and this he attributes to the fact of sweet straw being generally used instead of hay, particularly amongst farm-horses.

Treatment.—Although a perfect cure for this disease cannot be attained, yet we can do very much towards alleviating it, and rendering the animal useful. Nothing, indeed, is more common than for broken-winded horses to get considerably better after being worked for some time in a coach. This improvement is owing to the alteration in their diet: instead of hay forming the principal part of the food, it is given only in small quantities, but in its place plenty of sweet corn is allowed. This, then, is the plan to be adopted; viz. to give the greatest quantity of nourishment in the smallest bulk, by which two objects are accomplished: the condition and strength of the animal are improved, and he is capable of making greater exertion with the same amount of breathing as before; and, in the second place, the stomach never being so distended as before, no longer presses so much against the diaphragm, and respiration is thus rendered less difficult.

Little or no hay should therefore be allowed, except in the form of chaff; but in the winter carrots may be given, and in the summer vetches; but both in moderate quantities.

The digestive organs should be kept in as healthy a state as possible, and care should be taken that the horse is fed some hours before he is worked.—ED.]

I have several times so far succeeded as to cure the disease for a time; and in one case, a horse of my own, the disease was so completely removed, that I kept the animal in constant work for more than a year afterwards.

This horse was as badly broken winded as a horse could be. He was kept on bran and oats and a moderate quantity of good hay. In the spring he had some vetches and grass in the stable, which was cool, and well ventilated. He was ridden at first very moderately; but after two or three months he was ridden at a full trot, and sometimes galloped without inconvenience. I have seen another case of complete broken wind apparently cured by turning the animal, in dry summer weather, into a field where there was no water. This mare had been purchased as a subject

for some experiments relative to glanders, being so bad as to be thought fit for nothing else. After the experiments were finished I thought it right to kill her, when I found the lungs, and all the parts connected with them, perfectly sound, and at the time she was killed not a symptom of broken wind could be discovered. I have seen other broken-winded horses treated in a similar manner, and with the same result; and I have seen broken-winded horses apparently cured by being kept at grass a short time, but get as bad as ever a little time after they had been taken back into the stable.

If the cough be troublesome, the ball advised for chronic cough may be administered occasionally.

Thick Wind.

[This disease is very different from broken wind, although they are often confounded together. It is characterised, not by a double, but a quickened respiration, it being frequently treble or quadruple its natural state. It is, indeed, more serious than broken wind, inasmuch as it has usually been preceded by an inflammatory attack, which may again recur.

The lungs of thick-winded horses have their capacity for air diminished—the structure of the lungs is changed—a part becomes heavy, indurated—the air cells and bronchial passages become filled up, so that the lungs no longer afford the same room for the reception of the atmospheric air, and, in consequence, the horse is obliged to breathe double or treble as quick as in a state of health.

This disease is usually the effect of an inflammation of the lungs; but sometimes thick wind comes on without any acute inflammatory attack. In such cases there has usually been chronic bronchitis, which has probably been mistaken for a cold, and has not left the horse until it has sadly altered the structure of the lungs.

The *symptoms* of thick wind are more obscure than those of broken wind; as the quickness of respiration after exercise is so much affected by the condition of the animal, a horse weak and out of condition will often, under severe exertion, breathe quicker than a thick-winded horse in good condition. This fact must be borne in mind and allowed for, when passing an opinion on the case.

It is astonishing what great alteration of the structure of the lungs may exist, and the horse be still able to perform his accustomed work. I remember a horse that for some months worked in a fast coach, doing a stage of twelve miles daily in about one hour and a quarter. He was seized with inflammation of the lungs, and died in the course of sixteen hours. On examining the

body after death, it appeared that one half the lungs for a long time past must have been perfectly useless for the purpose of respiration, being so completely hepatized as to be heavier than water.

Little can be done by way of remedy for thick wind; but we may alleviate the symptoms by attention to the general health, and by the treatment recommended for broken wind. — ED.]

CHAP. XXIX.

ROARING.

[THIS disease receives its denomination from the nature of the noise made by the horse affected when his respiration is quickened by exercise. It arises in fact from a diminution of the calibre of the windpipe, or the larynx, or some portion of the air passages. There are various names used in horse phraseology to express this disease, or rather different degrees of it, such as grunter, whistler, wheezer, highblower, trumpeter, &c. The first denotes the noise made by a roarer when suddenly frightened. All roarers do not make this noise, but when it is present the roaring is generally severe and confirmed.

A *whistler* is a very bad roarer, inasmuch as the shrill noise of whistling is a sign of there being a smaller passage than when the graver sound of roaring is heard. This was put to the proof by Mr. Percivall, who tied a ligature round the windpipe of a horse moderately tight, and then, trotting the animal, found that he roared; but on drawing the ligature tighter, so as to lessen the calibre of the windpipe one half, a whistling noise was heard.

A *wheezer* makes a noise somewhat like its designation, being less loud than that of roaring. It arises of course from obstructed respiration, either in the larynx or windpipe, or the bronchial passages; such obstruction, however, not being so great as in roaring.

Wheezing is frequently present in thick wind, and indeed is generally owing to obstruction in the lungs themselves.

A *trumpeter* is merely a fancied distinction; but a *highblower* is usually no roarer at all, the noise he makes being a sort of snort, arising from the peculiar action of the false nostrils which many horses possess. This sound is frequently mistaken for roaring, but may be readily distinguished by galloping the horse, when it will be found that the noise is greatest at first, lessens as he proceeds, and goes off as the speed increases; an effect precisely contrary to that attending roaring. A case of this kind lately came under my notice, in which the noise made by the

horse somewhat resembled a steam engine at work, so considerable was it. This noise commenced immediately the horse was excited; but after several trials I found, by causing the horse to gallop without exciting him, no noise was produced. Various parties learned in horse matters pronounced him a roarer, but I gave a contrary opinion; the truth of which was proved by his carrying a heavy weight in capital style through the following season, the noise going off as the pace improved. It is, I think, very probable that the case of the celebrated Eclipse was one of this description.

The noise of roaring, and its modifications, is produced by various diseased structures which morbid anatomy has brought to light. Thickening of the membrane of the larynx is a very frequent cause of roaring, and is generally produced by sore throat or bronchitis. Sometimes bands are thrown across the windpipe, which is the effect likewise of inflammation. It is impossible to ascertain when they exist, or where, otherwise it would be no difficult task to open the windpipe and divide them. This was once done with success, but attempted hundreds of times and failed. Ossification of the cartilages of the larynx is another cause of roaring, and is produced by previous inflammation. Ulceration of the membrane of the glottis is likewise another cause of roaring; and it is supposed by Mr. Field that when this is the case, the irritation experienced in breathing induces the animal to partially shut the glottis, and thus occasion the noise of roaring.—ED.]

I found two cases of very bad roaring occasioned by ulceration within the larynx; in one of them the ulcer was very small, and close to the chink. One of these horses had been affected for some time with the mild or chronic glanders, and belonged to Mr. Russel's glandered team. He was in good condition, and breathed freely until put into motion. It rendered him, however, so useless that he was destroyed. The other horse was attacked in the stable with violent coughing, and soon after with roaring, probably from an oat or some of his food getting into the larynx. He was turned to grass, and soon became so distressed, his breathing being heard at a considerable distance, that it was thought right to destroy him. The only morbid appearance, found upon a careful examination, was a small ulcer on one side of the chink of the glottis.

[Roaring is frequent with carriage horses, in whom it is generally produced by tight reining, so as to make the neck more arched; by this unnatural position the windpipe is distorted so as to cause an impediment to respiration, and thus produce roaring. In some cases, although they are not numerous, the cause of roaring has appeared to be in the lungs; but when this is the case thick wind is also present.



Fig. 1. represents the healthy larynx and trachæa.

- a the thyroid cartilages.
- b the arytenoid.
- cc the cricoid.
- d the epiglottis.
- e the trachæa or windpipe.

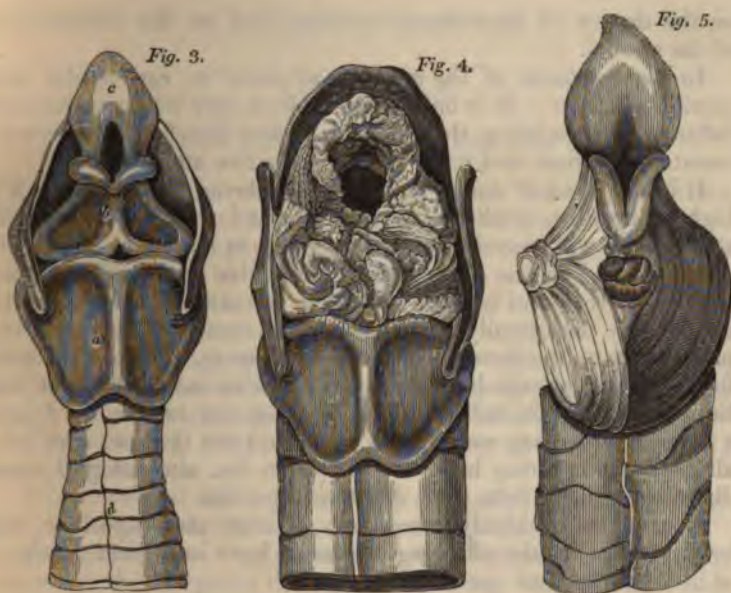


Fig. 2. represents a curvature of the windpipe producing roaring, caused by tight reining.

Mr. James Turner has found that roaring has been produced by enlargement of the turbinated bones of the nostrils, but we imagine it is not a frequent cause.

It has been found also that roaring has been produced by a diseased affection of the recurrent nerves; and we not unfrequently find, on dissecting the windpipe of roarers, that the muscles that assist in opening the glottis present the appearance represented in one of the plates, the muscles on one side being powerless, and almost absorbed. It is, however, a matter of dispute whether in these cases this appearance of the muscles is a cause or a consequence of roaring. Some contend that the roaring arises from an affection of the nerves, before alluded to, by which the muscles are thrown out of action, and therefore become absorbed. To this opinion I am disposed to incline.

Such are the various diseases which produce roaring in the horse; and to them may be added tumours pressing on the windpipe, polypi in the nostrils, and indeed any thing either temporary or not that becomes an impediment to respiration.



These figures are taken from three cases of roaring. The upper and posterior part of the larynx is shown in each.

In fig. 3. the roaring is produced by contraction of the windpipe, which may be seen by comparing it with the others: this is not a frequent cause of roaring.

a the cricoid cartilage.

b the arytenoid.

c the epiglottis.

d the windpipe.

Fig. 4. A case of roaring from inflammation and ulceration of the glottis and epiglottis. This case is not unfrequent, though it seldom exists in such a formidable extent: it proceeds from repeated sore throats,

and is generally attended with a cough.

Fig. 5. shows a case of roaring from absorption and want of power in the muscles which open the glottis on one side (here the left), so that there is an obstruction to the passage of the air. Instances of this description are not unfrequent; they are usually not very severe, and often manifested only when the horse makes great exertion: there is no cough.

It is now supposed that the attenuation of the muscles is an effect and not a cause, being thrown out of use from an affection of the nerves which supply the part.

The usual method pursued by dealers to detect roaring is to strike the horse in the flank with a stick, or pretend to do so; when, if a roarer, he generally makes a grunting noise. This method, however, will very frequently fail, and sometimes a horse will grunt when he is not a roarer: the better plan is to ride the horse, if fit for the saddle, or if a draught horse put him in harness. On galloping the horse, so as to accelerate the respiration considerably, he will not fail, if a roarer, to exhibit its symptoms. Some horses will roar in the trot, some not till they canter, and others only when they gallop, depending of course

on the degree of impediment existing, and on the exhaustion of the animal.

In the *treatment* of the majority of cases we can render no service whatever. It is only when there is sore throat or actual inflammation existing, that we can bestow benefit by external counter-irritation, and other treatment before advised.

It is an object of much importance to bring the horse to the highest possible condition, so that his wind shall be in a good state, as he will then be much less likely to roar than if out of condition. For the same reason the rules recommended for broken wind should also be observed in roaring; for although the wind is not usually impaired, yet the noise will be great in proportion to the demand made on the lungs. Thus we often find that a thorough-bred horse will roar in racing, but not in hunting; a hunter will do so in hunting, but not in harness; a harness horse may roar in fast work, and not in slow; and yet all these horses may have the defect in the same degree, the difference arising from their different capacities.

Roaring is decidedly hereditary, at least the disposition to become so is, for the offspring of roarers have in a great number of instances become roarers themselves.

When the roaring is so severe as to render the horse quite useless the operation of tracheotomy is to be recommended, a tube made for the purpose being kept in the opening made in the windpipe, out of which the horse will breathe. By taking great care that the tube remains in its place, the animal may be able to do moderate work.— Ed.]

I once saved a horse's life that appeared to have an oat or some of his food in the larynx, by the operation named bronchotomy. I found the horse in the most distressing situation. He was scarcely able to breathe, and his breathing was so loud as to be heard at a distance of many yards; and there was a discharge of bloody mucus from the nostril. Attempts had been made to wash down what appeared to be sticking in his throat, and to force it down with a probang. I made an opening in the front of the windpipe about 6 inches below the throat, and then thrust a probang upwards through the larynx, and immediately withdrew it again. The horse was relieved, and got quite well. He worked as a post-horse for several years after, and was named by the post-boys *Cut-throat*.

[If the roaring is recent, and produced by tight reining, we may effect considerable benefit by leaving off the bearing rein, and elevating the head and muzzle for some hours daily in the stable, in a contrary position to that produced by tight reining.— Ed.]

CHAP. XXX.

DISEASES OF THE DIAPHRAGM AND THE HEART.

[THE diaphragm or muscle which separates the chest from the abdomen is liable to two diseases, spasm and rupture.

Spasm of the diaphragm, of which there are several cases on record, is denoted by a loud thumping, sometimes perceptible several yards off, and felt at various parts of the body, but particularly at the region of the diaphragm; the heart, at the same time, being, though quick, yet very weak in its action, and the pulse at the jaws almost imperceptible. The respiration is usually quick and laborious, and is sometimes attended by shivering.

The cause of these symptoms is over-exertion, particularly on a full stomach.

The *treatment* which is generally successful consists of bleeding, followed by aperient medicine, and opiates.

Rupture of the diaphragm is to be attributed to the same causes as the foregoing disease, — any thing, indeed, which suddenly demands a powerful respiration; and in several instances it has been known to occur to broken-winded horses.

The exertions used in parturition have sometimes ruptured the diaphragm, and so likewise have the struggles of colic.

This disease, although always attended eventually with a fatal termination, has yet been known to exhibit for some time the symptoms of broken wind. In such cases the diaphragm has been only moderately ruptured, and a portion of the intestine insinuated through the fissure. — Ed.]

Diseases of the Heart.

[Amongst all the diseases to which the horse is liable, there are none more obscure in their symptoms, or more fatal in their terminations, than affections of the heart.

They rarely, however, occur, but as connected with other diseases, the obscurity and danger of which they greatly increase.

Dropsy of the heart, or water in the pericardium, often accompanies hydrothorax, and sometimes occurs in inflammation of the lungs and pleura; the water being occasionally so great in quantity as absolutely to choke the action of the heart. We sometimes find lymph floating in the water, or streaks of lymph adhering to the pericardium.

This disease often accompanies enlargement of the heart itself, which sometimes weighs double what it ought to weigh.

Hypertrophy.—With an increased size we may have either a dilatation or a diminution of the cavities of the heart.

The heart is sometimes found not only greatly increased in size, but quite altered in its appearance, presenting an irregular fungous mass. In a case of this sort that I met with a few years since, the beating of the heart was particularly loud, hollow, and thumping, though not greatly increased in number. The seat of disease was pointed out by the apparently laborious action of the heart.

“Mr. Pritchard, who has communicated several interesting cases of disease of the heart, observes, in the 6th vol. of the *Veterinarian*, on the subject of hypertrophy, or enlargement of the heart:—“It has always struck me forcibly that over-exertion is the principal exciting cause of hypertrophy, and of dilatation; and I may add, the possibility that the original structure of the heart may, in some subjects, be unequal in power to the office it is designed to perform.

“This opinion is strongly supported. Horses, particularly those employed in quick draught, are commonly called on to perform arduous tasks with full stomachs, by which the free action of the lungs is considerably impeded; thus, obstruction being given to the circulation through the pulmonary vessels, corresponding increase of force in the action of the heart is the consequence.

“The first inconvenience felt by the animal during exertion is in the respiratory organs, and this more especially when the stomach is distended, as then the cavity of the chest is diminished: the lungs are not inflated with ease to the extent required for the blood to flow uninterruptedly through them.

“Hypertrophy of the right side of the heart is liable to be confounded with pneumonia, as the lungs are readily affected in this case; but there is this obvious difference,—the breathing, although quickened and laborious, is less frequent than in pneumonia; the pulse, notwithstanding it is quick and intermittent, is not so much oppressed; the sub-maxillary artery is more dilated, the flow of blood through the jugular is more current; the membranes of the eye and nostrils are less injected; the surface of the body and extremities is of a moderate warmth, and these last symptoms are present when the respiration is exceedingly difficult and laborious. Copious bleeding does not cause that change in the character of the pulse, nor afford comparative relief to the respiration.”

There are one or two cases on record of ossification of the substance of the heart. Ossification of the valves is still more frequent, though by no means so common as in the human
ect.

Carditis, or inflammation of the heart, is exceedingly rare in the horse, and is always connected with other disease.

The heart, in a few instances, has been ruptured; in one case from severe exertion, and in another from previous ulceration.

Aneurism of the aorta and other arteries has been discovered in the horse, but is by no means so frequent as in the human subject.

Little can be stated by the way of *treatment* for the foregoing diseases. They have generally existed some time previous to the requisition for medical assistance, and there is generally an inability for bearing extensive bloodletting. The treatment, however, must be altogether adapted to the symptoms that may present themselves, and regulated by the principles before mentioned.—Ed.]

CHAP. XXXI.

DISEASES OF THE STOMACH AND BOWELS.

Inflammation of the Stomach, Gastritis.

ACUTE inflammation seldom takes place in the stomach but from swallowing poisons, or some powerful stimulant, at a time when this important organ is already in a morbid or irritable state. Mr. James Clarke relates a case where a horse was destroyed by inflammation of the stomach, in consequence of being drenched with a pint of vinegar; and another in which the same fatal effect was produced by a drench which contained half an ounce of spirit of hartshorn. It is probable that neither of these drenches would have had any injurious effect had the stomach been in a healthy state. I have known a horse quickly destroyed by being drenched with a quart of beer in which one or two ounces of tobacco had been infused, and have seen other horses take much larger doses without any ill effect. I have also known a drench which contained two ounces of ether destroy a horse by inflaming his stomach; and in one instance four ounces of oil of turpentine produced a similar effect, but this horse was under the effect of a moderate purgative at the time the turpentine was given. Whenever a medicine produces an injurious effect upon the stomach, I think it is generally indicated by the shivering, shaking, or trembling which immediately follows. I have seen a strong infusion of tobacco produce this effect; also a solution of arsenic. I gave several doses of arsenical solution to a glandered horse, and it was invariably followed by shivering; it was a large dose, from two to four ounces of Fowler's solution.

The shivering went off in about an hour. At first I gave the horse a little warm beer, with some ginger in it, to stop the shivering, but afterwards I suffered it to go off of its own accord. It is worthy of remark, that although this horse did not appear to be injured by the arsenic, but continued in good condition, and in good spirits, yet some time after, when it was necessary to destroy him, upon examining the body after death the stomach appeared in a morbid state, and the spleen considerably enlarged. From these and many other circumstances of a similar kind, it appears that although acute inflammation does not often take place in the stomach, yet a chronic kind of inflammation, or some other morbid state, is by no means an unfrequent occurrence. I am inclined to think that botts disorder the stomach in this way more frequently than is generally suspected. The symptoms of acute inflammation of the stomach are, a very quick and weak pulse, great depression of spirits, quick breathing, and coldness of the ears and legs. I have seen all these symptoms brought on by giving four ounces of nitre at one dose. I have seen it produced also by large doses of sublimate, arsenic, and blue vitriol.

[Acute inflammation of the stomach, is, as the author observes, extremely rare, unless produced by poison; but in a well-marked fatal case that occurred to the editor a few years since, the symptoms presented were, an exceedingly dull and stupified appearance—eyes suffused with tears—eyelids swollen, and nearly closed—mouth hot—fæces hard, and coated with mucus—abdomen enlarged—pulse 55, and oppressed. The mare had been ill several days before I saw her. On the second day the dull and heavy appearance was entirely gone, but the pulse 68. The third day the mare appeared in the same dull state as on the first day, the pulse 60. On the fourth day she appeared worse, the pulse 94; but the heavy appearance of the head had again disappeared. The mare died during the night; and on examining her the stomach was found excessively inflamed, and a thick deposit of coagulated blood between its coats, affecting more particularly the cuticular portion. The bowels were inflamed in a minor degree, as well as the lungs and liver. The mare had been taken from grass and fed with dry and stimulating food, without any physic or other preparation.

The *treatment* in such cases, where we have reason to believe that the stomach is the seat of active inflammation, should consist in extensive bloodletting; relaxing the bowels by medicine least likely to injure the coats of the stomach, such as linseed oil, assisted by the frequent administration of injections, and blistering the side opposite the stomach. An infusion of linseed should be given voluntarily, if the horse will take it; if not, by occasionally drenching him.

The most frequent cause of inflammation of the stomach is the administration of poison, either wilfully or by mistake; but as the effects of poison are different, not always acting by inflaming the stomach, we shall best do justice to the subject by considering it under the head of Poisons, in that part of the work devoted to the *Materia Medica*.

Cancer of the stomach is a disease of extremely rare occurrence in the horse. I have, however, met with one or two cases, the chief symptom of which, in one instance, was an emaciated appearance which resisted all medical treatment, as well as the richest food. The animal was, in consequence, destroyed; and the coats of the stomach were found considerably thickened, and in a schirrous and cancerous state.—ED.]

Loss of Appetite.

Want of appetite is more frequently complained of in horses than an excessive or craving appetite; this, indeed, so far from being complained of, is generally considered a desirable qualification in the animal; but, as I have before observed, more diseases arise from this cause than from want of appetite. A distinction, however, must be made, between an excessive or voracious appetite, and a hearty and healthy appetite. The latter is denoted by the horse being ready for, or desirous of food, as soon as he comes in from a journey, and eating his allowance with an evident relish. The former, by an almost constant craving for food and water, without any regard to the quality of either. In weakness of appetite, a horse is rather indifferent about food when he comes in from a journey, and will only eat such as is of good quality. He feeds slowly, and languidly, especially if he has been ridden at all hard. In this case, he often refuses his food for some time; and if any cold water is given him is attacked with shivering, and sometimes with looseness and colic. Delicacy, or weakness of appetite, is often constitutional, and the effect of being kept hard when a colt, or of being kept in cold wet situations; it may be also hereditary. Sometimes it is brought on by too early and immoderate work, and inattention in regard to feeding. In all these cases, the horse's work, especially with regard to the pace he is ridden at, the quality of his food, the temperature of his water, and all those attentions which constitute good grooming, must be constantly observed. When such a horse happens to be worked harder than usual, the extra labour must be compensated for by extra attention: his water should have the chill taken off; and if a handful of fine wheat flour were stirred into it, it would be still better, especially if the bowels are rather loose. A cordial ball may be useful on such occasions, or a moderate dose of warm ale,

Young horses, however, seldom derive that benefit from cordials and ale that older horses do, and particularly those which are accustomed to such treatment. The most effectual, and the most innocent restorative, is rest; for which, in summer, a field is the best situation: but if, during the time of rest, the horse be kept in a stable, his diet must be carefully attended to. This should be rather opening, and such as the horse appears to relish: vetches, or other green food, are perhaps the best. Good sweet bran is an excellent thing to keep the bowels cool and open, and may be rendered nutritious in almost any degree by the addition of good fresh bruised oats, or malt. A small quantity of good sweet and clean oats, thrown into the manger now and then, will often induce a horse to feed, when there is want of appetite; and a very small quantity of the sweetest hay, given occasionally, is generally eaten with great relish.

Young horses often fall off in their appetites during the time of cutting teeth. At this period there is often a soreness of the mouth, in which the mucous membrane of the stomach and bowels seems to participate. In such cases the want of appetite is generally attributed to the lampas, or a swelling or fulness in the roof of the mouth, adjoining the front teeth; because the horse is sometimes observed to mangle his hay, as it is termed, that is, he pulls it out of the rack, and after chewing it a little while throws it out again. The common remedy, if such it may be called, is the application of a red-hot iron to the part, and burning out the prominent part, or lampas; but this is never necessary. All young horses have that fulness in the roof of the mouth which is named lampas, and it never interferes with their appetite, or the chewing or gathering of their food. There may, however, be some degree of tenderness about the gums at the time of teething, when soft food, such as bran mash, should be given for a few days; and as the stomach and bowels are sometimes affected also, a little nitre may be given in the mashes, and an emollient clyster thrown up. When there is costiveness, or slimy dung, a laxative drench may be given also, composed of 4 oz. Epsom salt; 2 drachms of carbonate of soda; 1 pint of warm water; and 4 oz. of castor oil.

If the mouth appears very tender, or sore, it may be washed or syringed with a lotion, composed of alum, honey, and water. Keeping a horse on new oats, or new hay, is often followed by some derangement of the stomach and bowels, indicated by looseness and want of appetite; and sometimes by excessive staling also, with considerable thirst, and a staring coat. A change of diet is, in such cases, the most essential thing; but it is often necessary, also, to give some tonic medicine, or a warm laxative, such as three or four drachms of aloes, three drachms of soap, and a drachm or two of ginger, with a few drops of oil of

caraway. Horses sometimes fall off in appetite merely from loading their bowels, or from staying idle in the stable too long. In this case, an abstemious diet, principally of bran mashes, or grass, and a clyster, are necessary; and if that fail, a mild dose of physic should be given.

Voracious and Depraved Appetite.

These are different degrees of the same morbid condition, and the origin of many diseases. The distinction pointed out in the foregoing article, between a strong healthy appetite and an inordinate or craving appetite, must be still kept in view. I have there stated, that a strong healthy appetite is denoted by a horse being always ready for his food as soon as he comes in from his work, even if it be rather harder than usual. But there are other circumstances connected with such an appetite, which must now be considered. A good feeder, as such horses are termed, does his work well, and with spirit. He is seldom craving for water, if properly supplied with corn; he eats only moderately of hay; he carries a good carcass, as it is termed, and is not drawn up towards the flanks, or let down in the belly like a cow; his dung is solid, and not slimy, soft, and stinking; he does not break wind much, or stale very largely, and his urine is not foul and stinking. But a horse with a voracious and depraved appetite has, frequently, all these defects: he does his work languidly, and unwillingly; and is eager for water whenever he sees a pond, however filthy it may be.

This disease, for such it really is, is not always curable; yet the state of the stomach, and consequently of the whole body, may always be greatly improved, and the horse's life and services considerably prolonged. There is more difficulty in accomplishing this when the disease is of long standing, or acquired by hard keep when a colt, or derived from the sire or dam. Bran is an excellent diet for such horses, with a moderate quantity of *good* hay. A small quantity of oats may be given now and then, according to the horse's work. When only a small quantity of oats is thrown into the manger, they are eaten with greater relish, and are more perfectly digested. A mild dose of physic is often useful, and afterwards a few tonic balls. In summer, a run at grass will do good; but the horse must not be turned at first into good pasture, where he would be able to fill his stomach quickly; short sweet grass should be chosen. When a considerable reduction is suddenly made in a horse's diet, he may feel at first dispirited and weak; therefore it should be done gradually.

Professor Coleman is of opinion that a mail-coach horse, which is allowed two pecks of corn a day, requires only five pounds of hay. I once was employed to examine some mail-coach horses,

and found that nine horses were consuming nine hundred of hay a week, with an allowance of two pecks of corn a day each; that is, nearly sixteen pounds a day for each horse. In another coach concern, whose horses I examined, the allowance was seven hundred of hay a week for eight horses, and the same quantity of corn. In this establishment a very useful rule was uniformly adopted, which was, to keep the horses without food two hours before they started. This the owners had been taught by the loss of three or four horses, in consequence of working them with too much food in their stomachs, and too much dung in the large bowels. I do not think, however, that a horse in regular mail work, which eats two pecks of oats a day, is capable of eating sixteen pounds of hay, and that there must have been a great deal wasted. I remarked, when four of them were taken out to put to the coach, that there were some oats left in the manger, perhaps from a quarter to half a peck; so that it was evident that the allowance both of hay and oats was more than they could make use of: and if we suppose that six pounds of hay per day might have been taken from each horse, for the benefit of his health, it would have saved the proprietor three hundred of hay a week, or nearly eight tons a year.

As coach proprietors purchase horses of all ages, and, consequently, of various habits and appetites, also with stomachs and bowels of various capacities, and greatly diversified with regard to condition, or nervous and muscular power, they would find great advantage from attending to a horse's feeding, until they are perfectly acquainted with the state of his appetite, and, consequently, of his stomach and digestive organs generally. This would enable them to keep their horses in the best condition, as they would soon discover an inordinate or depraved appetite, and be enabled to correct it. This, however, is scarcely ever done. The general opinion among persons concerned with horses is, that they cannot eat too much. Bad feeders, or horses with weak appetites, are sure to be found out, because they soon become unable to perform the work that is expected of them; but the effects of over-feeding are almost always attributed to other causes; and physic, cordials, bleeding, diuretics, in short, every thing, except the most simple, economical, and effectual remedy, is employed for their removal. When a horse therefore is observed to eat a great deal of hay, and to devour his litter if there be no hay before him, and especially when he is found to be dull and sluggish, or thick-winded, he should be prevented from eating so much hay. This can be done at first by weighing out a certain quantity daily, and dividing it into three portions. If after eating his allowance he is found to eat his litter, he should be still further restrained by a muzzle. A horse belonging to the Oak-hill Brewery being found languid and weak

in his work, was left in the stables for two or three days' rest. On the second day he was attacked with violent colic, which terminated fatally in a few hours. On opening the body, the stomach was found loaded with undigested food, and the bowels distended with excrement and air, and highly inflamed. It was evident, then, that what was intended for the horse's benefit was the cause of his death; that is, leaving him in the stable to eat and drink as much as he liked. This horse laboured under another disadvantage besides that of an immoderate appetite; there were sharp edges on his grinding teeth, which rendered mastication rather painful, and caused him to swallow some of his corn and beans unchewed.

I once examined a horse that died of the fret or colic, and found his bowels so enormously loaded (and his stomach also pretty full) that I was induced to inquire how the horse had been fed. The man who had the care of him informed me that the night before the horse was taken ill he put, as near as he could judge, three quarters of a hundred of hay in the rack for two cart horses, and that he had given this horse, in addition to a share of this allowance, about half a peck of barley: this appeared to be the usual allowance for the two horses. Horses that eat so much acquire a permanent enlargement of stomach and bowels, and a constant craving for water as well as food, generally preferring dirty or muddy water, and seldom refusing the most filthy. I know now a team of cart horses, at Wells, that are allowed to eat as much hay and drink as much water as they like. The pond at which they drink is formed by the rain which flows from the roof of the stable, and from the court, where there is a large dung-heap constantly kept, the drain of which flows into the pond. The water is always of a dark or dung colour, like an infusion of horse dung, and would be found, I should think, excellent manure. Mr. Garrod, the proprietor, assured me that his waggoner had repeatedly tried to make them drink at a running stream about a mile from Wells, when they were returning from a journey and thirsty, but they always refused; yet as soon as they got home, and were permitted to go to this filthy pond, they drank with the greatest avidity.

CHAP. XXXII.

STOMACH STAGGERS.—PALSY OF THE STOMACH.

THIS disease appears to consist in a palsy of the stomach, generally arising from over-distention, by taking too large a

quantity of food of an indigestible nature. It is seldom observed until the symptoms are fully established, for the animal is induced to continue feeding as long as the stomach is capable of holding its food, and fermentation is thereby prevented. What that peculiar condition is, nobody can tell; it does exist, and produces the effect I have described, and that is all that appears to be known of it. It happens at grass as well as in the stable, but generally occurs in low wet situations, where the grass is coarse and abundant, and most frequently in the fall of the year, or October. There is rarely any symptom of acute pain as in flatulent colic, or of violent delirium as in inflammation of the brain; and, what is remarkable, the pulse is seldom altered in any degree whatever, nor is respiration or breathing much affected. But when the disorder has proceeded to some length, both the pulse and the breathing become affected, and I have known it terminate, in one case, in inflammation of the lungs. Sometimes it inflames the stomach and bowels; but most commonly the fatal termination depends upon the torpor of the stomach itself, or upon apoplexy.

The *Symptoms* of this disorder are, great heaviness and drowsiness, resting the nose in the manger, or inclining the head, and resting the cheek, or bearing against the wall. The head is forced against the manger, or rack, or the nose between the rack staves. In this way the eyes and face are often much bruised and swollen. The horse stands with his fore leg much under him, appearing to give way every now and then, as if he would fall. There is an appearance of convulsive twitching of the muscles of the neck and chest. There is, too, a great degree of yellowness, approaching to orange-colour, of the membranes of the eyes, and often a yellowness of the mouth also. Urine scarcely any, and high-coloured; sometimes none is voided, and occasionally it is discharged by a convulsive effort. Sometimes the disorder is attended with locked jaw, ending in paralysis and death. In the early stage of the disorder the horse is often suddenly roused by opening the stable door: he lifts up his head, and sometimes neighs; but this is only a momentary effort. When the disease happens at grass, the animal is generally found forcing his head against the hedge, or a gate, or moving about in a state of stupor and apparent insensibility. Sometimes he is found struggling in a ditch, and in that situation he often dies. In the low country, in the neighbourhood of Glastonbury and Wedmoor, the disorder was very prevalent before the enclosures were made, and the land drained. It generally, or always, ended fatally; but the horses lived sometimes a month or two under the symptoms of the disorder, but in a less degree. It is probable the disease was thus slow in its progress, from the stomach not being so loaded as in the cases which commonly

occur. The horses generally at length fell into a ditch, and died. The disorder was attributed by the proprietors of the country to the plant named ragwort, which cattle were observed to eat freely, and were said to die in consequence, in a similar manner to horses. The truth, however, appears to be, that the disorder was brought on by the coldness of the situation, and the poor keep or very bad hay that is generally given to horses and cattle in that country; for it was observed that sheep ate greedily of ragwort, and never suffered from it: but they would eat the plant during the first year only of its growth, when it is tender and succulent, while cattle and horses were observed to eat it in the second year of its growth, when the stalks become large, and of course difficult of digestion. If horses had but little else to eat, and were thus compelled to eat such indigestible food, the disease might have been so produced; but the hay in that country is generally bad, and the country low, open, cold, and damp, and the horses and cattle of course unhealthy.

Since the land has been drained the grass and hay have been improved, and the staggers seldom occur. Some time since I received a letter from a gentleman of Swansea, in which he says that a disease has many times occurred among the horses that work in the mines, resembling stomach staggers, but in a more violent form. It has been so destructive at times, that one proprietor lost more than a hundred horses by it. It uniformly proved fatal; and though it was carefully investigated, no satisfactory account could be given of it.*

* The following is a copy of the letter alluded to:—

“ Sir, — Permit me, though a stranger, to address some observations to you on a disease which you have described under the name of Stomach Staggers in your first volume, or Compendium of the Veterinary Art. I have never seen any mention of it in any other treatise before, though I have seen it rage with the most destructive violence in the neighbourhood of Swansea, in Glamorganshire, where it is called the distemper. For a long series of years it has been the object of inquiry; but it has never been investigated on the spot by any one having a scientific knowledge of the diseases of horses, except Mr. Rickwood, of Brighton, who was sent down some years ago, when the disease raged most violently, by a gentleman who owned a very large number of horses; but he was not successful. Permit me now to say, that I do not think you have seen the disease raging with the violence, or to the extent, it has frequently done near Swansea. Its commencement is dreaded like the plague. The symptoms you mention are exactly such as occur; and the distinction you point out between the brain staggers and stomach staggers is correct; for though the yellowness of the eyes and mouth has generally escaped observation, I have a memorandum particularly noticing that a man, in giving a ball to a horse in this disorder, had his hand tinged quite yellow, and I have no doubt it generally occurs. But besides the symptoms you mention, the animal is subjected to a general convulsive affection; frequently attempts to stale, and discharges a little urine at a time, by shoots, as if convulsed, and most commonly the animal's jaw is locked some time previous to his death.

“ Having now stated the immediate symptoms, I will give a succinct history

After considering carefully all the circumstances connected with this disorder, I still feel at a loss to account for it. As the

of the disorder as it appeared, or rather raged, near Swansen. The earliest account I have of any particulars begins about the year 1782, but I know it has at times visited the neighbourhood ever since the year 1760. It generally begins to rage between July and the end of September; the cold weather in winter has generally stopped it; but the last visit it made us it continued two entire years. In one year a neighbour of ours lost more than a hundred horses by it, and the next year we lost about thirty. It attacks both sexes, and every age indiscriminately; but animals at grass, in high condition, and at easy or no work, appear to be most subject to it, and to have it with more violence. Till the time it visited us, animals kept in a stable were considered as protected from it. Horses kept in the mines under ground had never had it. I made a stable in one of our under-ground works, to remove all our horses, but before I carried this plan into effect the disease began to decline. At the height of the disorder horses seldom or never recover. When an animal does recover it is considered as a favourable prognostic, and we look for a delivery from this plague. The animals at grass are most liable to it; but such as are kept in a stable, under the best management, are also subject to the disorder. In the year 1801, when it last raged with us, I lost a valuable horse that was perfectly well groomed; but I shall have to make some observations on his case when I mention the dissections, and the apprehensions I have of the disorder being contagious, which I shall now proceed to do. The appearance and state of the stomach are, generally, such as you have described; but in the valuable horse before mentioned, and a few others which died of this disorder, this was not the case. I beg here to observe, that I had been very strict in my stable regimen, and particularly in the quantity, quality, and time of giving food and water; and I attribute the emptiness of the stomach to this cause. Though I did not prevent the disease by this precaution, it made all the symptoms milder. I am not a surgeon, or a scientific man; but in examining the bodies of horses after death, I have been assisted by a surgeon, and have generally found, with the exception of the loaded stomach, and a slight inflammation for a small length, below the pylorus, and sometimes a little repletion of the vessels of the brain, every part free from disease. I could not, for a long time, believe that the disease was contagious, but now fear it is highly so; yet do not think this circumstance has been proved. When the disorder last began, a neighbour who had lost a great many horses by it sent a parcel of their skins to a neighbouring town to be sold. The horses that drew the waggon in which they were conveyed were the next—and that in a short space of time—which fell victims to the disorder. Horses that had been in the stables where the disorder raged were sent to work under ground: there, also, the disorder soon after made its appearance, for the first time. Our neighbours firmly believe it is contagious. They took every precaution to prevent contagion, and the disease left them. I was incredulous, and at that time we had not suffered. A horse from their neighbourhood came to graze in some fields through which some of our horses passed; he died of this disorder, and was left unburied. From this moment the distemper began with us; but not knowing the circumstance of the horse remaining unburied, I took no precaution to prevent contagion. The valuable horse before mentioned was taken ill the next day, and soon died. He had been at a neighbouring fair, and was left with a man to hold while I did my business. I do not know that he had any communication with other horses, but suppose he must. The common farmer's horses in this neighbourhood are all badly managed; yet I have known those who take proper care of their horses, who do not overwork them, and even those who keep them at grass, lose all their horses, when their less careful neighbours lose none. I have

stomach was in almost every instance found loaded with dry undigested food, I have considered that as the immediate cause of

known a man lose his whole stock twice in one year. When I began to fear contagion, every horse that died of the distemper was buried without being skinned. We have had no return these five years."

According to the observations of a surgeon, who had many opportunities of seeing the disease at Swansea, and examining the bodies of horses that died of it, the symptoms of stomach staggers at that place are, heaviness, stupor, laziness at work, swinging the head from side to side, or pushing it forward, or resting it in the manger, but never turning it round, or drawing it backwards; often standing for hours motionless, then slight twitches of the limbs and other parts of the body; they seem weak too, and afraid of falling. There is a heaving of the flanks, the ears are cold, the eyes glassy: some grow immediately stiff, and the jaw is frequently locked; some beat their heads about, and kick out at every thing, but are never observed to kick their bellies, as in gripes. The first symptoms, beating the head against the ground, or manger, increase: they often force the nose through the bars of the hay-racks; the jaw becomes closely locked; they fall; the twitching increases; violent perspiration breaks out in some; in others the skin is dry and tight, and the eyes open and staring, yet the horse appears to be blind. He makes water frequently, which is forced out as if by a general spasm.

Fatal Symptoms.—The coldness and stiffness of the whole body increase; the loins become extremely pinched in; the eyes very glassy; the jaws closely locked; and the dung very hard and dry.

Symptoms of Recovery.—Very few recovered; in these the coldness of the ears and body lessened; the jaws became relaxed; convulsions abated; the eye appeared more lively; staling less frequent, and without appearance of spasm. They attempted to eat and drink; and the dung became moister and of a light colour. Out of fourscore only four were supposed to have recovered; and one of these, on being turned out, ran round the field several times, then fell and died. Another seemed to have been relieved by *profuse bleeding*.

The disease is not discovered till the case is become desperate, and then it usually kills in twenty or thirty hours. Almost every remedy has been tried; viz. *bleeding* (query, to what extent? was it copious or otherwise?), hot baths, calomel, purging medicine, salts, opium, camphor, James's powder, and assa-fœtida; none of them appeared to be of service.

Six horses that died of this distemper were examined by this gentleman. "In four of them the stomach was loaded and much distended. In one the stomach was nearly empty; but the large bowels were much loaded. In the sixth the large intestines were loaded, and the rectum was full of hard dung; but the stomach was not much distended with food. In all of them the lower part of the stomach was more or less inflamed; and in some the intestines also, as well as the membrane which covers them, and by which they are connected together."

From the foregoing observations, it is evident that the Swansea distemper is the stomach staggers in a more severe form than I have generally seen it; and this probably depended on the horses being kept in good condition and full of blood. It seems to have occurred most commonly at grass, when the pasture was abundant and very nutritious: for though in one year, 1800, the summer was remarkably dry, yet in meadows that had been well watered the little grass there was, or even the roots, were exceedingly nutritious, which is evident from horses getting so fat as they are found to do in such pastures, and at such seasons.

In 1786, the first time any accurate account has been kept of this occurrence, though the disease had been traced back to the year 1760, the summer

the disease ; but the difficulty lies in accounting for the appetite which leads the animal to cram his stomach in such a manner.

was wet, and it then began in June, and continued during July, August, and September. In 1787 it began in July, and continued during August, September, and great part of October. In this year the spring was wet, but the summer warm, and there was a very luxuriant crop of after-grass. In 1800 the summer was unusually dry and hot ; great crops of hay, but no after-grass.

It should be observed, that "animals at grass, in high condition, and at easy or no work, appear to be most subject to it, and to have it with more violence ;" that "it generally rages between July and the end of September ;" and that "the cold weather has generally stopped it." The same writer says also, in another letter, "I have mentioned our horses being attacked the year following our neighbour's great loss, and when they were free from it : now most of our horses were purposely kept in the stable, and I have some idea they were fed upon hay of the same year that our neighbour's horses were fed upon the preceding year : could this be ascertained, it might lead to a discovery of the real cause of the distemper." I perfectly agree with my intelligent correspondent in this opinion ; and if the hay was made in the fine dry summer of 1800, when the crops are stated to have been so luxuriant, the cause appears to me very evident. With regard to the opinion of its being contagious, it is not so easy to determine ; but it is always advisable on such occasions to act as if it really were so. The conclusion of the gentleman's letter is sufficient to show the propriety of this advice. "When I began to fear contagion," he says, "every horse that died of the distemper was buried without being skinned, and we have had no return these five years."

Whether the poison which produces this disease be contagious effluvia, or arises from luxurious feeding, it is evident from dissection that the stomach was the injured organ ; and that if, by the unusual strength of the stomach, or by the medicine which was given, the load was removed from that organ, the great bowels were found loaded ; "and sometimes there was a little repletion in the vessels of the brain." One was relieved (recovered) by *profuse bleeding*. Now, though bleeding is mentioned as one of the remedies employed, it is not said in what manner they were bled—probably it was in the common way ; that is, about two or three quarts were taken off : whereas, by profuse bleeding, I should suppose two gallons at least. I have known more than four gallons of blood taken from a horse in about an hour, with success. Mr. Rogers, of Exeter, informed me that he took five gallons from a horse in brain staggers or phrenzy in the course of two or three hours, and the horse recovered. Mr. Coleman states, in his Lectures, that 44 lbs. have been taken at one time. It appears to me that the Swansea distemper depended upon repletion of the blood-vessels, as well as of the stomach and bowels, and should have been treated with *copious* bleeding, stimulating clysters of salt and water, and stimulating purgative drenches. A disorder very similar to the Swansea distemper has occurred among cattle at times in some rich meadow farms in Somersetshire ; about which I have been consulted. The proprietors have the same opinion with regard to its origin and nature as the Swansea people have ; that is, they think it contagious, and imagine it originates in some poisonous herbs growing in the pastures, which flourish at some seasons and in some situations in a greater degree than at others.

The first occurrence of this disorder, or more probably the first time it attracted notice, was in the remarkably hot and dry summer of 1819, in the beginning of which a cow died on one of the farms, and was thrown into an adjoining river. The animal was washed a little way down the stream, and was left on the opposite side, which belonged to another farm. Here it became putrid and very offensive ; and from this period the distemper began, and has been occurring at different periods ever since. The occupier of the farm

In one case that occurred near Exeter, I had an opportunity of weighing the stomach with its contents, and it amounted to rather

where the putrid carcass was washed lost a considerable number of cattle ; and, considering the putrid carcass as the cause, brought an action against the farmer who threw the dead cow into the river. A verdict, however, was found for the defendant ; some eminent physicians and surgeons who were subpoenaed on the occasion, as well as Mr. Barrett, veterinary surgeon, and myself, being of opinion that the loss did not originate from the putrid carcass. At present, however, I have some doubt upon this point ; and at all events would advise every one to bury animals immediately, skin and all, when they die of highly inflammatory disorders, as these *certainly* were, especially in summer. Only one of the animals attacked with this distemper recovered, and he was bled profusely, that is, to faintness. It is worthy of remark, that in every animal that has died of this disorder (for sheep, and pigs, and one horse, have died of it, besides a great number of cattle), and they appear to have examined a great number if not all that have died, the spleen or milt has been found greatly enlarged and distended, or even bursting with dark fluid blood. According to the account of those people, this was the only morbid appearance. This, however, I have reason to believe is an error, owing to their incompetency to examine or judge of the state of the internal parts ; for since that time, I have been sent for to examine three cows that lay dead of the disorder. In all of them I found the spleen as they described ; that is, enlarged to about four times its natural size, and nearly bursting with dark-coloured fluid blood : a great deal appeared to have oozed through its investing membrane into the abdomen, and to have tinged and even penetrated into the texture of some of the neighbouring parts. But this was not the only morbid appearance ; there was a considerable accumulation of blood in the brain, especially in two of them, and some of the small vessels had burst. One of them, being rather fat, was stuck a short time before the fatal symptoms came on, and in this the spleen and the brain were the organs chiefly affected ; but in the others the heart and lungs were much affected, or rather distended with blood ; and in one of these the heart and the liver were very tender, and easily broken with the finger. Whether this enlargement of the spleen is a singular or peculiar occurrence or not, is at present uncertain ; for it is an organ to which so little importance has been attached in veterinary examinations, that I can easily conceive that a considerable enlargement of it may have escaped notice ; or, not being thought worthy of notice or recollection, may have been entirely forgotten. I cannot find a similar disease of the spleen described in any English or French veterinary book. It appears to me that one important use of the spleen is pointed out by these cases, especially when we consider how spongy and dilatable it is, and how little sensibility it possesses. It seems to serve as a receptacle for superfluous blood, when the sanguiferous system is in a state of repletion, and there happens to be a retrocession of blood from the surface of the body in consequence of the chilling impressions of a cold foggy atmosphere ; for I should have observed, that the stomachs of the cattle I examined were loaded with food, and that a river ran through the meadows in which they were kept ; in which situation the night fogs are often very cold, and particularly apt to chill animals when the stomach is loaded with food, and the sanguiferous system with blood. An animal dying in this state, or "in the blood," as it is commonly termed, soon becomes putrid, and may be a source of contagion.

I am indebted to the late Mr. Poole, an intelligent farrier, who practised extensively at Pansborough, near Wells, in the Moors or Moor Country, as it is termed, for some valuable information on this subject. He says, "that before the moors in the district where he resided were enclosed and drained, staggers or lethargy frequently happened, and destroyed more horses than any

more than 64 lbs. The disorder which appeared at Swansea was generally supposed to be contagious; and from so many horses being seized with it about the same time, it seems rather

other disorder; but that since they have been enclosed it scarcely ever happens. The following are the symptoms:—standing in one place three or four hours while others were feeding; gaping several times without intermission; resting the chin on a gate, stile, or manger, or pushing the head against a tree or post; the urine and dung in small quantity, the latter often with slime or mucus on its surface; at length rambling about, catching here and there a mouthful of grass, till at last they terminate their life in a ditch, pond, or river." Bleeding in the usual quantity, he says, was sure to prove fatal. The disease was generally considered incurable; but he cured one horse with beer and ginger, and another with snake-root, mustard, saffron, compound spirit of lavender, and ginger. They attributed the disorder to the animal's eating the plant ragwort (*Senecio jacobæa*) or staggerwort. In the next parish moor, where this herb abounded, and where many cattle were kept, cows were seized with this disorder, and died in the same manner. He never heard of one being cured. The disease was much slower in its progress than any cases of staggers I have met with. In some instances it continued nearly two months. Mr. Poole did not examine the body of any animal that died of this disorder.

From the foregoing accounts, it is evident that there are different degrees of stomach staggers, both in horses and cattle, and that all of them are incurable, unless seasonably attended to. In the first, or acute degree, early and copious bleeding seems to be an essential remedy. Afterwards raking the animal, that is, drawing out the hard dung with the hand, and afterwards throwing up a clyster of salt and water every two or three hours; then giving the following drench or ball, and afterwards three or four drachms of compound spirit of ammonia in a pint of warm water every two hours, and a quart of warm water every hour, in order to soften the contents of the stomach and bowels. In the second stage, that is, in the cases I have generally met with, copious bleeding is not so essential as in the first stage: still bleeding is generally necessary. As to the extent of the bleeding, we must be guided by circumstances. I have seen the most copious bleeding avail nothing; but then probably the vital power of the stomach was irrecoverably lost before the disease was observed. In the first kind, there is a repletion of the blood-vessels as well as of the stomach, and the relief of the former is often the primary object; but in the second kind, which occurs generally among small farmers' horses, which are badly or indifferently fed, and worked hard, probably kept out in some cold wet situation, the horses are generally suffering from poverty of blood and a deficiency of vital power. Here without early assistance the stomach soon becomes paralysed, and the relief of this important organ is generally the primary indication. In the third kind, or moor staggers, bleeding "was sure to prove fatal;" and the remedies employed for the two horses which Mr. Poole cured were powerful stimulants and cordials. In the second kind, I have sometimes succeeded by giving warm stimulating purgatives, and clystering the horse frequently, until a discharge was obtained from the bowels. I have bled according to circumstances,—sometimes from the temporal arteries; but am inclined to believe that bleeding from the jugular veins is preferable, as it is the veins of the brain that are loaded in such cases, and these empty themselves into the jugular veins. A horse affected with stomach staggers requires constant attention. The contents of the stomach and bowels are generally in a dry state; therefore he should be frequently drenched with warm water, with two or three tea-spoonfuls of compound spirit of ammonia mixed with it. I am inclined to think the carbonate of soda would greatly assist the warm water in softening the contents of the stomach, and thereby facilitate their discharge.

probable that it was either contagious, or caused, like other epidemic diseases, by some peculiar state of the air with which we are unacquainted.

Gibson relates a case of stomach staggers which occurred at grass. "On opening the body," he says, "I was greatly surprised to find his stomach and all his guts, both large and small, filled and crammed to such a degree that it would have been impossible, by any means in the world, to have procured the least vent; for all the aliment that was in the stomach, and the dung in the bowels, from one end to the other, was entirely dry and without moisture, and, before they were opened, appeared as hard and as full crammed as a Bologna sausage, without the least softness or yielding in any part. The matter contained in them was no less extraordinary, the stomach being filled with acorns, sloes, oak-leaves, and such other things as he could pick up about the hedges; some green and some withered. The contents of the guts were chiefly leaves, neither well-chewed nor digested, with a mixture of grass. But there was little or no grass in his stomach, but chiefly acorn cups and leaves. This horse had been turned into a very rank after-marsh, and had probably acquired a depraved appetite, which led him to eat indigestible and astringent food."

The horses which I have seen in this complaint have generally been farmers' horses that have been kept hard, and worked hard, and in whom the stomach has been gradually weakened, and at length brought to that ultimate degree of weakness which is named palsy. In several that I examined, the vessels of the brain were not loaded in a remarkable degree; the stomach only was affected, and evidently paralysed. The disease is scarcely ever noticed in this class of horses, until it is absolutely incurable. Many of those horses were attacked at grass, and almost always in low wet situations, where the grass was rank and abundant. It is not unlikely that in such situations the cold night air and fogs contribute something to the increase, if not to the production of the disorder. In the neighbourhood of Exeter the disease has at times been very common, especially in low, open, wet situations, as in the parish of Stoke, Exminster, and Dawlish. I have cured several cases; but in these the disorder was taken rather early, and the horses were in tolerable condition, and had been kept in a stable on good food. In none has a cure been effected without a considerable discharge from the bowels of excrement that appeared to have been pent up in them for some time.

In establishments where horses are worked fairly and properly fed, I have scarcely ever known this disorder happen. Not a single case occurred in the Royal Dragoons during the time I was veterinary surgeon to the regiment; nor in Mr. Russell's establishment in Exeter, whose horses I attended for many years.

I am inclined to think the disease is not so prevalent as it was twenty years since; and this may be owing to an improvement in the method of keeping and feeding horses. Probably, too, the great progress that has been made in the cultivation and draining of low marshy land may have contributed to the decrease of the disorder.

As soon as stomach staggers are observed, the horse should be bled in order to relieve the head in some degree; but the principal object is to enable the stomach to get rid of the load which oppresses it. Various remedies have been proposed for this purpose. The best, I believe, are purgatives joined with cordials and stimulants, and small quantities of warm water frequently, in order to soften the contents of the stomach. Clysters of salt and water are useful also, and should be thrown up several times a day. The disease is often incurable, probably from a want of early attention.

When medicines cannot be readily procured, two or three table-spoonfuls of flour of mustard, and three or four ounces of common salt may be tried. On whatever cause stomach staggers may depend, I think it a useful precaution, as soon as the disease has made its appearance, to remove other horses from the situation; and if there is the slightest ground for supposing that the manner of feeding the horses has contributed to it, that likewise should be changed. I would advise, also, a dose of warm or stomachic physic being given to the other horses, to improve the state or condition of the digestive system. Some relief may be afforded in stomach staggers by placing a cask with a little straw upon it, for the horse to rest his head upon.

Drench for the Staggers.

No. 1.

Barbadoes aloes.....	6 dr. to 1 oz.
Calomel.....	2 dr.
Oil of peppermint.....	20 drops.
Warm water.....	1 pint.
Tincture of cardamoms.....	2 oz.

Mix for one dose.

No. 2.

Common salt.....	4 oz.
Ginger.....	2 dr. or 2 tea-spoonfuls.
Carbonate of soda.....	1 oz.
Water.....	1 quart.

Mix for one dose.

About a quart of water may be given every now and then with a horn; and if a tea-spoonful or two of compound spirit of ammonia (sal volatile) be added to it, the effect will be promoted.

A table-spoonful or two of common salt may also be added three or four times a day. The horse should be drenched and clystered during the night as well as the day; in short, without unremitting attention success must not be expected.

[This disease has become considerably less frequent than when the previous account was written by the author, although then he states it was not so common as formerly. The cause of this must be attributed to the better system adopted in feeding horses at the present day. Formerly it was customary for agricultural horses to go from six in the morning till four in the afternoon without either food or water, and then to be allowed a large quantity of food without water. Now their daily work is either divided into two periods, or otherwise they are allowed a little food in the middle of the day. Thus their stomachs never being so empty, they no longer gorge themselves to the same extent, and the disease is therefore much less frequent. When the disease occurs at grass, and particularly if a number are attacked together, it is owing, in my opinion, to some poisonous vegetable.

In a farm in Hampshire, about two years since, in the course of some months, three or four horses died of a disease, somewhat similar to that described in the account from Swansea.

There was great drowsiness and lethargy manifested, the horses were weak and staggered in their walk, and the membrane of the nostrils and eyelids was pale.

The next case that occurred was sent to me, and it slowly recovered after a fortnight's treatment, consisting chiefly of tonics and stimulants in order to rouse the system into greater action.

This horse had for some time past been feeding on spring vetches, which contained an immense quantity of weeds.

Whether this was the cause, I cannot say; but at any rate it appeared highly probable that the disease was owing to some poisonous substance calculated to depress the vital powers.

With regard to the *Treatment* of stomach staggers when proceeding from distention with food, in addition to that recommended by Mr. White, it would be advisable to pour liquids into the stomach by means of Read's patent syringe, so as to dilute its contents, and if possible to evacuate a portion of it by these means. Instead of aloes, it would be advisable to administer croton oil in doses of from twenty to forty drops, not only because this medicine is so much smaller in bulk, but also because its action is quicker and more immediate on the stomach and small intestines. — ED.]

CHAP. XXXIII.

DISEASES OF THE BOWELS.

Inflammation of the Bowels, Enteritis, Peritonitis, &c.

[THERE are three varieties of inflammation of the bowels: enteritis, or inflammation of the muscular coat; peritonitis, or inflammation of the peritoneal coat; and dysentery, or inflammation of the mucous or internal coat.

The two first are generally connected together, at least one coat is rarely affected without in some measure involving the other.

Cases of *Enteritis*, however, are far more frequent than those of *Peritonitis*. The instances in which the latter exists as a primary disease are cases following castration, when the inflammation spreads along the course of the cord to the peritoneal membrane in the abdomen.

The *symptoms* of peritonitis are somewhat similar, though by no means so acute as in enteritis, and the treatment should be pretty much the same.

Enteritis may come on suddenly, and may at once exhibit the most violent and intense character; or it may be preceded by milder symptoms, which may exist either for several hours or for several days. When it is slow in coming on, the first symptoms are dulness, want of appetite, and uneasiness; the pulse somewhat quickened, and the horse occasionally pawing his litter. When relief is not obtained in this stage of the disease, the symptoms become aggravated, the pain greater; the horse lying down, stretching himself out, and struggling violently. The pulse usually at first distinct, although quick, becomes quicker and weaker, and almost imperceptible. The bowels are constipated, and the dung coated with mucus. The legs and ears are cold, the mouth hot, the membrane of the eyelids highly injected, and the breathing greatly accelerated. This stage of the disease rarely lasts long: unless relief be obtained, death usually closes the scene in the course of six to eighteen hours. When such is the case, the symptoms become more distressing, the horse lying down, and rarely rising, but struggling almost in a frantic state, though with diminished strength; at length cold sweats break out, and the mouth feels cold, and death soon follows. In some instances I have known the animal continue his struggles till within a few minutes of his death, and in others the violence of the symptoms has disappeared for some hours before the fatal termination. In these latter cases the attendants

usually imagine the horse to be considerably better, and expect his recovery; but the practitioner finds that the pulse is imperceptible, the extremities obstinately cold, and anticipates what he surely finds, dissolution in the course of a few hours.

The *symptoms* of enteritis somewhat resemble colic, and indeed the disease is termed by farriers the red colic.

It is, however, of great importance to distinguish the two diseases, for the treatment of colic would be highly injurious in a case of enteritis. It has been stated that a horse will not roll on his back in inflammation of the bowels; but this is erroneous. The chief distinctions are these,—in enteritis the pain is constant, though not at all times equally severe; whilst in colic the pain, though more violent than in enteritis during the paroxysms, yet disappears, or nearly so, between them. There is, too, an important difference in the pulse, which in enteritis is constantly quick; whilst in colic it is but little increased, except during a paroxysm, after which it subsides.

The causes of enteritis are (in addition to natural weakness of the part affected which induces one horse to receive the disease more readily than another, though exposed to the same exciting cause), over-exertion, exposure to cold, particularly standing in water, or passing through streams in a state of perspiration, and standing still afterwards. To which may be added drinking largely of cold water when heated, and subsisting on unwholesome food.

Treatment.—Having properly examined the case, we should immediately have recourse to bleeding, and that as extensively as possible: for this purpose a large opening should be made in the jugular vein, or one on each side, and from six to eight quarts taken as quickly as possible, continuing the bleeding till the pulse becomes almost imperceptible. The bowels being costive, the dung should be removed by back-raking, and a copious injection thrown up. A pint and a half of linseed oil and one drachm of powdered opium may next be given, and a half pint of the oil, with half a drachm of opium, may be repeated every six hours, till the bowels are relaxed; the injections being also frequently repeated.

The abdomen should be fomented with very hot water, which should be continued for some time; and it will afterwards be very useful to apply hot sheep-skins, just removed from the dead animal, to the abdomen, the woolly side outermost. If these cannot be procured, the fomentations should be repeated, or the abdomen may be stimulated by a blistering application.* The

* Mr. Mavor has introduced some apparatus, whereby the steam from hot water may be applied to the abdomen for an hour together, and which is likely to prove of great service in cases of enteritis in particular, as well as in inflammation of the chest.—*Veterinarian*, vol. xii. p. 198.; *Vet. Med. Ass.*

legs must be kept warm by flannel bandages, assisted, if necessary, by rubbing in a stimulating liniment, composed of oil and spirits of turpentine. During the continuance of pain the horse will, of course, take no food, nor is any desirable. He will most probably be disposed to drink, of which circumstance advantage should be taken, by offering him oatmeal gruel, or linseed tea, as often as he will take it.

If relief be not obtained in the course of six hours, our prognosis will be unfavourable, particularly if, on again resorting to bleeding, we find the blood very dark and thick, and with difficulty obtained.

A second, and even a third bleeding, should be tried, though in less quantity than at first. If the pain ceases, or greatly diminishes, the pulse becoming more distinct and moderate, we may then augur a favourable result, which opinion will be greatly strengthened by the bowels becoming gradually relaxed. If a favourable result should attend, great caution is necessary for some little time as to the diet, and soft food should be given for several days.

When death occurs, we find on examination the muscular coat, particularly of the large intestines, quite black from inflammation, and the other coats likewise involved in a secondary degree. — ED.]

Diarrhœa. — Dysentery, Molten Grease.

[Inflammation of the mucous coat of the intestines has been considered as of two kinds, which have been distinguished as *Diarrhœa* and *Dysentery*; the former supposed to affect more particularly the small, the latter the large intestines.

This distinction, however, can rarely be applied to the horse; for we find that when a horse dies from superpurgation, the large intestines are inflamed as much as the small. The two diseases, however, are often confounded together. — ED.]

Diarrhœa.

[The principal symptom of *diarrhœa* is frequent evacuation of the fœces in a liquid state. This may simply arise from *irritation* of the mucous and muscular coats; there may be no actual inflammation, and but little constitutional disturbance; but if the horse is worked in this state, or improperly treated, inflammation will quickly supervene, and the symptoms become greatly aggravated.

Inflammation of the mucous membrane may, however, occur from the beginning, and then the pulse is exceedingly quick and weak, the extremities cold, and lumps of slimy mucus mingled with the fœces, which are sometimes dark, offensive, and tinged with blood.

The causes of diarrhœa are, over-exertion, exposure to cold, drinking very freely of cold water, and, still more frequently, an over-dose of physic. Horses with short ribs and light carcasses, usually called washy horses, are predisposed to this disease, and in them anything which disturbs the system generally is almost sure to affect the bowels. Some years since, when it was the custom to administer eight and ten drachms of aloes as a common purgative, superpurgation was extremely frequent, and hundreds of horses died in physic, as it was termed.

Treatment.—If purgation is the only symptom, and there is no active inflammation present, the mischief is readily stopped by the administration of the following medicine, in thick gruel made from wheat flour:—

Powdered opium.....	1 dr.
Powdered catechu.....	2 dr.
Prepared chalk.....	1 oz.

Even if inflammation is present, we had better administer the same medicine, either in gruel or in boiled starch, and repeat it every four hours until the purging ceases; half an ounce of powdered gum arabic may be added to the medicine, or after a while substituted for the catechu. The body should be kept warm by plenty of clothing, and the legs encased in flannel bandages. The abdomen should be fomented with warm water, or sheepskins applied, as in enteritis. Gruel, starch, or arrow-root should be administered frequently; and if there is any appetite, a little sweet hay should be given, but bran avoided. Bleeding in this disease is rarely prudent.—Ed.]

Dysentery, Molten Grease.

[The mucous coat of the bowels is liable to another disease, which, though more frequently existing as a symptom of other inflammations, such as that of the lungs and the liver, or of influenza, yet sometimes appears as an independent disease.

The *Symptoms* are,—costiveness, the fœces being small and buttony, and encased in mucus, with large flakes and lumps of this diseased secretion amongst the dung. There is no active pain present, but a dull heavy appearance, quick pulse, very hot mouth, and other febrile symptoms; and when the hand is passed up the rectum, it is found much hotter than common.

The mucous membrane of the alimentary canal is evidently affected. In diarrhœa the muscular coat of the intestines is affected, as well as the mucous, and there is consequently increased peristaltic action. In dysentery, the mucous coat only is affected, though not in the same manner as in diarrhœa. It is in a highly febrile, rather than in an inflammatory stage; but its action is

not increased, although greatly deranged. The appetite is greatly diminished, if not totally gone, and the disease is attended with much danger.

The *Treatment* must consist in bleeding largely, if the pulse be strong and full, and moderately if weak; back-raking and the frequent administration of copious injections; oily purgatives moderately repeated, till attended with a proper effect, taking care that the linseed oil does not altogether exceed three or four pints: two or three drachms of nitre may be given with the oil, taking care not to exceed two ounces altogether; and four drachms of cream of tartar may also be added. Plenty of linseed tea, or thin gruel, should be given, and bran mashes and carrots in the winter, or tares and clover in the summer, should be allowed; but when the horse eats pretty freely of green food, considerably less oil will be required.—ED.]

CHAP. XXXIV.

COLIC.—RUPTURE OF THE STOMACH AND INTESTINES.—CALCULI IN THE BOWELS.—STRANGULATION OF THE INTESTINES.—CRIB-BITING.

Colic, Fret, or Gripes.

[THERE has been much difference of opinion as to the nature and cause of the affections recognised under the above names; some considering them as one disease, others separating them into numerous divisions. But without entering into these disputes, or making more distinctions than are absolutely necessary, I consider there are three varieties of the disease, which it is important to distinguish, — spasmodic colic, flatulent colic, and colic arising from the obstruction of the food.

The *Symptoms* of the first and second variety are very similar. The horse is very uneasy, paws his litter, looks round to his flanks, sometimes endeavours to kick his belly, gathers up his hind legs, and falls down rather suddenly, rolls upon his back, suddenly gets up again, and appears in extreme pain. The pulse is in its natural state, and the inner surface of the eyelids is not unusually red. The disorder comes on suddenly, the animal being previously in good health. The horse is sometimes costive, but not often, and in some cases the dung is rather loose.

In flatulent colic there is a considerable distention of the abdomen, from the production of gas in the intestines, which, in spasmodic colic, is not found to exist. In the former the large in-

testines and the stomach* are usually the seat of disease; in the latter, its situation is more frequently confined to the small intestines.

The symptoms of these diseases are subject to great variety as to their severity, being sometimes so slight as to disappear without any treatment, and at other times so violent as to render the horse almost frantic. I was called to a horse some time since, that had been taken with the fret during the night; and before I reached the stable he had, in the violence of his struggles, knocked out several of his front teeth, and disfigured himself dreadfully, his eyes being nearly closed from the effect of the bruises.

Flatulent colic is produced by the distention of the intestines from gas; it is accordingly very frequent in the summer season with horses that are fed on green food, and it may also be produced by the indigestion of any description of food. It is probably the most frequent variety.

The pain of spasmodic colic is immediately caused by the violent contraction of the muscular coat of the intestines, just as the spasmodic contraction of an external muscle produces cramp.

It is frequently occasioned by a draught of cold water, particularly if it be of a hard quality, having sulphate of lime in it. It may also be produced by unwholesome food, and any thing that disorders the stomach or intestines.

Some horses are particularly liable to colic; and in them it is often produced by causes that would have no effect with other horses. This predisposition generally increases as the animals get older, and in them the disease usually proves fatal at last.

That variety of colic produced by the obstruction of food is characterised by symptoms more moderate than the other varieties, though they are longer continued and usually more obstinate. The horse lies down, but does not rise again quickly, nor struggle so violently; and the pain is more continued than in the varieties before mentioned.

The symptoms are more like inflammation of the bowels, but there is little or no increase of pulse. There may or may not be costiveness, according to the previous nature of the food.

Treatment.—Our best plan, in the first place, is to administer a powerful antispasmodic. A great number of medicines are recommended for this disease, and most of them are effectual in most cases. It is, however, desirable to give the preference to those not only most effectual, but least likely to prove injurious should inflammation supervene. If no medicines are at hand,

* In one fatal case in which I was requested to examine the body, I found the stomach distended with gas to two or three times its ordinary size. The horse had been taken ill on a journey, and died shortly after reaching the stable.—Ed.

or can be quickly procured, the following will frequently be found effectual:—a quarter of a pint of gin, a tea-spoonful of powdered ginger, and a pint of warm beer. This domestic remedy is, however, by no means so successful as many others.

Spirit of turpentine, in doses of four ounces, is recommended at the Veterinary College. It is a powerful remedy, but liable to produce inflammation: it should always be given with linseed or olive oil, otherwise it is likely to make the mouth and throat sore.

Some practitioners administer an ounce of hartshorn, and the same quantity of tincture of myrrh, with a pint of warm water. This is very effectual, but I have found the hartshorn inflame the mouth and throat very much; and it is the more apt to do so in consequence of the disinclination to swallow so frequently evinced in the complaint. The medicine is thus detained in the throat, and the spirituous portion of it separating from the water, sadly excoriates the parts; and some of it perhaps may even enter the windpipe, and produce dreadful and fatal inflammation.

Opium, in some form or other, affords us the most effectual and the safest remedy in this disease. In the former editions of this work the following formula is given, and will be found generally successful:—

Anodyne Carminative Tincture.

No. 1.

Turkey opium	1 oz.
Cloves, bruised	2 oz.
Ginger, ditto	3 oz.
Brandy, rum, or gin	1 quart.

No. 2.

Turkey opium, cloves, and ginger, of each ...	1 oz.
The best old brandy, rum, or gin	1 quart.

Let them be digested together in a well-corked bottle, and shaken several times a day for three or four weeks. It is then to be strained through blotting paper, and is fit for use. The medium dose is two ounces, which may be given in a little mild ale, or an infusion of some aromatic herb, such as peppermint, pennyroyal, camomile, &c. Mr. Bracey Clark recommends a tincture made with allspice, bruised, half a pound; brandy, gin, or rum, two quarts.

When there is much flatulency exhibited, and the abdomen appears distended with gas, nothing will prove of greater efficacy than a full dose of sulphuric ether, which, if conjoined with

tincture of opium, and an equal quantity of tincture of valerian, or ginger, or allspice, and given with about three fourths of a pint of warm or boiled water, will be found to afford often immediate relief when other remedies have been exhibited unsuccessfully, and more particularly if it be a case of flatulent colic. Thus, it appears, we have a great variety of medicines for this disease, and it is much better to conjoin several together than to administer one alone; because not only is the compound dose likely to prove more successful, but if it becomes necessary to repeat it several times, it is less likely to produce inflammation than one kind of medicine given in the powerful dose required.

If the horse be not relieved in the course of ten minutes after the exhibition of the medicine, it will be desirable to bleed, not only in order to guard against inflammation, but because blood-letting is itself a powerful antispasmodic, and often affords immediate relief.

In the course of half an hour to an hour, if relief be not obtained, it will be desirable to repeat the medicine; and again in the course of one or two hours afterwards, should the symptoms continue or return; and unless the bowels are relaxed it will be desirable to administer aperient medicine with the second or third antispasmodic draught. Three ounces of Barbadoes aloes powdered may be dissolved in hot water, and given with a pint of linseed oil; adding to or subtracting from this dose, according to the strength and condition of the animal. If relief be not obtained after the third dose, the case becomes very dangerous, and we must be cautious as to the further administration of stimulants. The pulse must be watched, and the bleeding repeated; and with regard to medicine, it will be better to trust to opium alone, a drachm of which may be infused in water, and given every two hours. By pursuing this plan of treatment we may often accomplish a cure in the most dangerous and protracted cases. I met with a case some time since, in which I found it necessary to administer three doses of the stimulating antispasmodic before advised, to bleed largely twice, to give repeated injections, to foment the abdomen, and afterwards to administer the above dose of opium every two hours. By which persevering, yet cautious method, the symptoms were eventually removed, and the horse recovered.

Unless the horse recover from the first dose, injections of warm water and salt should be frequently and copiously administered; and if inflammation be threatened, the abdomen should be fomented and stimulated, and indeed the same means used as for inflammation of the bowels.

When a horse is attacked with the colic, many persons obstinately prevent him from lying down, under an idea that rolling about is likely to cause a twisting of the intestines. This, how-

ever, is not the fact, and it is contrary to nature, and therefore injurious to prevent a horse from lying down; for he thereby obtains some relief, and of course selects the position easiest to himself.

In the third species of colic, viz. that arising from obstruction of the food, the treatment must be different from that before recommended. Instead of giving very powerful stimulants at first, we should administer a purgative, with a moderate antispasmodic. Six drachms of Barbadoes aloes in a watery infusion, with an ounce of tincture of opium and four drachms of ginger, should be given at once. The horse should be bled, and in about two hours afterwards from half an ounce to an ounce of tincture of opium and one drachm of ginger should be given, with a half pint of linseed oil, which may be repeated every two or three hours, until the bowels are relaxed or the pain is removed. Copious injections should be administered every two hours, and other measures employed to ward off inflammation. Relief is seldom obtained in these cases in less than twelve hours.

As the pain ceases, the horse usually evinces a disposition for food; but the only kind that should be allowed, for the first twelve or twenty-four hours, is bran mashes, so as to insure a relaxed state of the bowels, and to prevent the irritation that would be likely to follow the giving hard dry food in the sore state in which the bowels are after an attack of colic. Plenty of warm water should be given the animal to drink, both during the attack and afterwards.

When a horse dies from the colic, which is rarely the case when judicious treatment is employed, we generally find the appearance of intense inflammation, but confined to some particular portion of the intestines, and not generally diffused. At this spot there is usually an effusion of blood from the surface of the mucous coat, as well as between the coats; and often spots of ecchymosis in different places.* Sometimes there is considerable stricture of the intestines, so as to obstruct the passage. The disease is generally found confined to the small intestines.—Ed.]

Intimately connected with the colic are the following diseases.

[*Ruptures of the Stomach and Bowels*

Are sometimes the effect of colic, or more frequently the cause that induces its symptoms. A rupture of the coats of the

* We rarely have an opportunity of witnessing the morbid effect of colic, until inflammation has existed sufficiently to destroy life; but, in a case that came under my attention some time since, a horse was attacked with colic and recovered, but died in a day or two of another disease. There was no inflammation of the bowels, but a vast number of small spots of ecchymosis between the muscular and peritoneal coats.

stomach is more frequent than that of the intestines. It is produced by overloading this viscus with indigestible food, such as dry bran, or the hulls of wheat and barley. In two cases that occurred to myself not long since one was a miller's horse, and had fed ravenously in the morning from dry bran, was taken ill on a journey with the fret, as was supposed, came home, and died an hour or two afterwards. When I saw him he was sitting on his haunches, and vomiting profusely from his nostrils a fluid, the sour smell of which assured me at once that it proceeded from the stomach. There was found a rupture extending throughout a great portion of the large curvature of the stomach, and through which an immense quantity of undigested bran had escaped into the cavity of the abdomen. In the stomach of the other horse, there was found a rupture, though not so extensive as the other, through which a portion of the food had escaped; but the greater part still remained in the stomach, and consisted of a prodigious mass of hay, corn, and wheat hulls.

There are several cases on record of rupture of the intestines, particularly of the colon. The last case that occurred under my own observation was a rent of the ileum, at that portion to which the mesentery is attached. The rupture extended about nine inches in length, and the mesentery was split with it for a considerable extent into two membranes, so as to prevent the food from getting into the abdominal cavity.

A symptom that usually attends the rupture of the bowels, or the stomach, is the spasmodic action of the muscles of the tail.—Ed.]

[*Stones in the Intestines*

Are not unfrequently found in horses: they are usually discovered in the large guts; but sometimes, though rarely, in the stomach. They are generally found to consist of stony and earthy particles mixed with the food, and having some hard object, such as a pebble or nail head, in its centre. These calculous concretions are more frequent with millers' horses than with others, which is owing to the fact of their being fed extensively on bran. Numerous minute particles of millstone adhere to the bran, and having, perhaps, some accidental nucleus, as before stated, they gradually collect around it, the food assisting in the formation. The shape of these calculi depends very much on the seat of their abode; one in my possession, taken from the stomach, is extremely irregular, and consists of stony substance within, and a softer spongy surface externally, formed chiefly by the food. The surface, though irregular, like a mulberry, is covered by a black coat smoothly polished.

Another calculus in my possession is as round as a cricket ball, and weighs upwards of six pounds. It was found in the colon, and had acquired its globular form from rolling about in this large intestine. The horse had belonged to a miller, and had been accustomed to live mostly on bran; he had for several years been subject to the fret, but had generally relieved himself by rolling about. These symptoms were no doubt produced by the calculus becoming wedged in the smaller parts of the colon, and which, by the struggles of the animal, again became displaced, and then relief was afforded. At length it was so firmly impacted that it could not be moved. A total stoppage took place, and nothing passed by the rectum for several days, during which the animal evinced much pain, lying down and rolling; but the position in which he appeared most relieved was that of sitting on his haunches. From these various symptoms, I felt convinced that a stone was the cause; and the animal being destroyed, the large calculus was found firmly impacted in the second curvature of the colon, whence it could get neither backwards nor forwards. On dividing it with a saw, a pebble was found to be its nucleus, and it consisted of a vast number of rough and smooth layers alternately arranged, the external one being rough.

In some instances, a vast number of stony substances have been found loose in the intestines, their weight, though not their size, preventing their passing onwards.

Some horses have a depraved appetite, and take great quantities of earth when they have the opportunity, which certainly must conduce greatly to the formation of these concretions. — ED.]

Strangulation of the Bowels.

[On the inspection of the bodies of horses that are supposed to die from colic, we sometimes find the small intestines strangulated by being formed into a knot, so as to produce the most intense pain, and a complete interruption to all passage. Sometimes a most perfect knot is formed by one portion of the intestine being insinuated between a sort of noose formed by another portion. Another time we find that a noose is formed by a slip of the mesentery; which, by some means, has got separated from the rest.

Another variety is called intro-susception, and consists of one portion of the intestine insinuating itself within the cavity of another. Sometimes the stricture is caused by a fatty tumour attached to the mesentery, or an enlargement of the mesenteric gland; as related by Mr. W. Percival in the *Veterinarian*, vol. i. p. 326.

Another variety is a strangulation from simple twisting of the gut; as shown by Mr. C. Percival, *Veterinarian*, vol. i. p. 326.

Besides these, there may be a stricture without any twisting or entanglement: this generally occurs in the duodenum.

No. 1. represents the first variety of strangulation of one or two portions of the ileum, being insinuated into a noose formed by another portion. It occurred to the Editor of this work, and is taken from the *Veterinarian*, vol. vi. p. 12.



No. 1. *Strangulation of the small Intestines.* No. 2. *Strangulation of the Rectum.*

No. 2. represents the second variety. It is a strangulation of the rectum; and was related by Mr. Fuller in the *Veterinarian*, vol. vi. p. 256.

No. 3. is a case, related by Mr. Bull, of strangulation of both



No. 3. *Strangulation of the Ileum and Colon.*

a, The ileum.

b, Protrusion of the ileum.

c, Ligamentous band.

d, The cæcum.

e, Commencement of the colon.

the ileum and the cæcum by a ligamentous band. Mr. Bull states that he had relieved the mare from abdominal pains several times before the case proved fatal. (*Veterinarian*, vol. ix. p. 42.) This, I think, is the most frequent kind of strangulation: I have myself met with several instances.

No. 4. is a singular case related by Mr. Cupiss.—*Veterinarian*, vol. ix. p. 562.



No. 4. *Intus-susception in the Horse.*

This fig. represents the cæcum cut open, and the intus-susception lying within it.

A A, The intus-susception.
B, A portion of the ileum.
C, The valvula coli.

D D, Small portions of the mesentery
and base of the cæcum.
E, The apex of the cæcum.
F F, The interior of the cæcum.

No. 5. is a case related by Mr. W. Percivall.—*Veterinarian*, vol. i. p. 326.

We cannot tell with certainty that strangulation has taken place; but we may expect such to be the case, when we find that symptoms of colic continue without remission in spite of all our treatment. The pulse in these cases is not quick at first, nor for several hours afterwards; but the pain continues to increase, and at length inflammation supervenes, and the horse continues in the greatest agony for ten or twelve hours, when the intensity of the pain seems to disappear, but the animal dies a few hours afterwards.



No. 5. 1, The tumour.
2 2, The mesentery.
3, The mesenteric cord.

It is a disputed subject whether intervagination is more frequently the consequence of the spasmodic action and commotion of the bowels in colic, or otherwise the twisting of the intestines occurs previously, and is itself the cause of even the earliest symptoms that are manifested. We have no means of demon-

strating which theory is correct; but I am inclined to consider that although intervagination may be sometimes the effect of colic, it more frequently arises from one gut getting accidentally entangled in the other when in an empty state, and producing for some time no inconvenience, until food enters and distends it, and is prevented passing onwards by the knot. This, at any rate, must be the case whenever the noose is formed by adventitious substance, or by a portion of the mesentery; which often exhibits the appearance of having been formed for a length of time.

Intro-susception is more likely to be of recent origin, produced probably by the spasmodic action of the bowels in colic; and so likewise when it is simply a case of twisting of the intestines. It appears that in the greater number of instances on record, the ileum is the gut most frequently entangled; which may be accounted for by the fact of this intestine being less confined than any other. Next to the ileum is the rectum; and the duodenum is most liable to stricture.

The Treatment.— It is impossible to ascertain positively the existence of entanglement of the bowels; and if we could do so, in the majority of cases our treatment would be useless. Where, however, we have reason to expect the existence of such morbid formation, the treatment indicated would be copious venesection, frequent injections of warm water or tobacco smoke, and strong doses of opium, so as to quiet the system as much as possible; and to avoid all food and purgative medicines. By adopting this plan, nature may perhaps right herself, and the spasms being quieted the gut may be released; which, in a case of simple twisting, is indeed very likely to occur.—ED.]

Crib-biting.

This, though only a trick or habit which a horse gets, and which he may teach another that stands next him, especially a young horse, may be considered as a disorder, because it renders him very liable to indigestion and flatulent colic. There is no doubt that in crib-biting a horse swallows air; and I have seen a horse distend his stomach and bowels with it in an enormous degree, and he would thereby often get the flatulent colic, and sometimes swell himself so that he could scarcely move. The only convenient method of preventing crib-biting is to put a leather strap round the neck close to the jaws, which prevents him from laying hold of the manger: it may impede his feeding, however, and this must be attended to. A muzzle sometimes answers the purpose. [There are now muzzles invented that admit of feeding, and yet prevent the horse opening his mouth sufficiently to seize the manger with his teeth. In many cases they prove very useful, though in some they altogether fail.—ED.]

CHAP. XXXV.

WORMS.

WORMS are most commonly found in the bowels and stomach; but they are sometimes met with also in almost every part of the body. I have found them in the windpipe, in the mesenteric artery, in an abscess, in the substance of the abdominal muscles; and, according to Lafosse, they have been found also in the pancreatic and salivary ducts. The worms commonly found in the stomach are named botts. They are generally attached to the cuticular or insensible coat of the stomach; but sometimes clusters of them are found at the pylorus, and even in the beginning of the first intestine, named duodenum. In one case they were so numerous in this last situation as to obstruct the passage completely, and cause the animal's death. Botts are short, thick, reddish worms, surrounded with short prickles, which are arranged in circular bands all over the body. They attach themselves firmly by two hooks, which they appear to have the power of straightening and retracting, of projecting and curvating. They are extremely tenacious of life, and difficult to be expelled from the stomach, except about the month of September, or when a horse is first taken up from grass. At this period they may generally be got rid of by brine, or a solution of common salt and water, in a dose of from four to five ounces of salt to a quart of water. The horse should be kept fasting the night before it is given; and about five minutes before the drench with salt is given, let the horse be drenched with about a pint of warm milk, sweetened with honey or treacle.

It has been supposed that botts are not only innocent, but even beneficial, from their being so frequently found in the horse's stomach after death, when during the animal's life no inconvenience was observed to arise from them. That they are sometimes injurious, however, and fatally so, has been clearly demonstrated by several cases that have come under my observation. They have been known to ulcerate and make holes in the stomach. Gibson, a most respectable veterinary author, considers them as sometimes the cause of locked jaw; and Mr. James Clarke, of Edinburgh, has recorded one case in which they had made an opening through the horse's stomach into the abdomen.

Mr. Bracey Clark, in his Treatise on the Botts of Horses, considers that there are four species; and he says, "that the parent fly of the *æstrus equi* deposits its ova on the hairs of such parts of the horse as are within the reach of his mouth

l nose, as the shoulders, within the fore legs, &c.; to do which the fly is seen to hold her body upright when preparing egg: she rests for a moment on the horse, and fixes it to hair by means of a viscid gluten; after which she again desists, and prepares another, until some hundreds are so deposited. These ova, or egg botts, form the little yellow nules so commonly observed adhering to the hairs of horses at grass in the summer." The *œstrus hemorrhoidalis*, informs us, deposits her eggs on the nose of the horse; while the methods of the *veterinus* and *salutiferus* are not at present understood. These ova having become hatched are, by various accidents, as by the horse licking himself, or nabbing his nose, carried into the stomach, where they instinctively attach themselves to the cuticular portion, very few ever reaching the muscular or sensible part, — to which we must, in a great measure, attribute their innocuous character. To enable these worms to resist the effects of alimentary friction, they are furnished with two tentaculæ, or hooks, of extraordinary tenacity, between which is situated their mouth, by which they suck up the gastric secretions. Entering their abdominal habitation in the summer, the botts soon gain their full size, and continue within the horse until the following spring, when, instinctively loosening their hold, they are passed along the intestinal canal and ejected with the dung, preparatory to their change from *larvæ* into *chrysalides*, and from thence into parent flies.

Mr. Feron observes, that "common oil, given in large quantities, has sometimes succeeded in detaching botts from the stomach; and, indeed, it is the only remedy that seems to have any effect in making them loose their hold from the stomach, on account of its having, as may reasonably be supposed, a poisonous quality to that insect."

The next kind of worm to be described is that named *terres-tribricus*, or round worm. It is found in the small intestines, and sometimes, though seldom, in the stomach. In the last case which I found these worms in the stomach, the horse had been long subject to flatulent colic, or gripes, of which at last he died. He generally had an attack of this disorder two or three times a week. I once saw this horse labouring under an attack of gripes. He had taken a dose of the anodyne carminative tincture without being relieved. I prescribed four ounces of oil of turpentine, which cured him in a short time. I had no suspicion of the horse being troubled with worms: had that circumstance been known, and another dose of turpentine given, after keeping the horse chiefly on bran mashes for one day, and fasting him one night, it is probable, I think, that all of them would have been swept off. These worms are white, and from six to ten inches length.

There is another kind of worm found in the small intestines, and sometimes in the large intestines also, which have seldom been noticed by veterinary writers. These worms are flat, about the eighth of an inch in width, and from one to three inches in length. They have transverse ribs or lines, something like the leech-worm, and adhere to the bowels by one of their extremities.

A fourth kind of worm is found both in the small and large intestines: they are round, like the teres, but slender, and about one or two inches in length. They have been named, from their form, the whip-worm.

The fifth and last kind of worms are named ascarides. They are found in the large intestines; are very slender, or like needles, and about one inch in length. Worms similar to these have been found in the mesenteric artery, and in the windpipe.

The *Symptoms* of worms are, a rough staring harsh coat; irregular, or sometimes a craving appetite; and often the appearance of a white shining substance at the anus; and when ascarides are present there is often an itching of the anus, and a disposition to rub the tail.

The latter description is, I think, more injurious than any others; they are often found in immense numbers, firmly adhering to the mucous coat of the large intestines, where they produce considerable irritation; and when they are known to be present it is necessary to be cautious in the administration of powerful stimulants or strong physic with a view to their removal, as fatal inflammation has, in many cases, been thereby produced.

The *Treatment* most commonly adopted for the removal of worms is to give one or two drachms of calomel, with a dose of physic, or the calomel at night and a dose of physic in the morning. Others prefer giving a drachm of calomel for three successive nights previous to the physic. Oil of turpentine has, within a few years, been much used as a remedy for worms, and appears to be the most powerful vermifuge we are acquainted with. I have known it, however, in one instance cause the death of the horse, by bringing on inflammation of the stomach. This horse, however, had taken a dose of physic the day before, which was operating at the time the oil of turpentine was given. In two other horses oil of turpentine caused alarming symptoms; but they soon got well again. Mr. B. Clark gave four ounces of oil of turpentine to a horse that was intended for the dogs, and which appeared to have worms. He says it caused considerable uneasiness, the horse appearing as if he were griped. The next morning only two or three worms were voided; and as no other effect was observed at the end of forty-eight hours, he was destroyed. Living worms, he says, were found both in the large and small intestines, and the mucous surface of the stomach was found inflamed, and in some parts blistered; an

appearance he never before met with. These are the only cases that have come within my knowledge in which oil of turpentine has done mischief; but, on the other hand, I have seen, and have been informed of a great number of cases, in which it has proved an efficacious remedy for worms. It has been frequently given in a dose of 4 oz. as a remedy for the flatulent colic, or gripes; and I have known it given even in a dose of 8 oz. without doing any injury. Its efficacy, as a vermifuge, was first communicated to me by a medical gentleman of Bridport, who had given it himself, and had known it employed by some farriers in his neighbourhood with the most striking effect. His method was to give the horse the day before about 3 drachms of aloes, in order to relax the bowels a little. He was kept fasting during the night, and early in the morning took 4 oz. of oil of turpentine in a pint of gruel. He was kept fasting for two or three hours afterwards, and then fed sparingly with bran mashes and warm water during the day. This previous fasting appears to me necessary to the success of the medicines; for, in this case, it seems probable that some part of the turpentine is absorbed from the empty stomach and bowels, so that the worms are attacked both in the bowels and through the medium of the blood. The celebrated remedy of M. Chabert for worms is said to consist principally of empyreumatic animal oil. A mixture of olive oil, tar, and oil of turpentine has been found advantageous in the rot in sheep; a disease occasioned by worms in the liver, named *flukes*.

From the experiments of Professors Tiedemann and Gmelin, lately published, it appears probable that this mixture, which is to be given after a night's fasting, is absorbed from the empty stomach and bowels, and conveyed immediately to the ducts of the liver, where it quickly destroys the flukes. It is not unlikely, I think, that a similar mixture would be found a good vermifuge in horses.

[The great error in the exhibition of vermifuge medicine is in not continuing its use for a sufficient length of time. When we consider the vast amount of surface afforded by the intestines, and that worms may be attached to a great portion of it, it may readily be conceived that a few doses of medicine must completely fail in eradicating the greater portion of them. Another error consists in not sufficiently attending to the restoration of the coats of the intestines and the system generally to a healthy state; and thus, though some worms may be removed, yet the system is left in a favourable state for the production of more.

The following medicines have been found by the Editor exceedingly useful, not only in destroying the worms, but in restoring the condition of the animal:—

White arsenic	5 to 8 gr.
Cantharides, finely powdered	6 to 10 gr.
Sulphate of iron, ditto.....	1 to 2 dr.
Pimento or ginger, powdered.....	1 dr.
Tartarised antimony	1 dr.

This powder should be mixed together, and then carefully mingled with a handful of bran, to which it will adhere, which should be then mixed with a feed of corn, and given every evening for the space of a fortnight or three weeks. A dose of physic may be given after two thirds of the medicine has been administered; which, as soon as it sets, should be followed by the remainder. Linseed oil is, perhaps, the best purgative in such cases.—Ed.]

CHAP. XXXVI.

DISEASES OF THE LIVER.

THIS organ is not so often diseased in the horse as in the human body. I have, however, in examining horses after death, seen it diseased in a considerable degree. From the comparative simplicity of its structure, and the absence of a gall-bladder, it is seldom affected with jaundice. The liver itself, however, is sometimes found condensed, thickened, or hardened; but more frequently distended, tender, and easily broken. So tender, or rotten, as it is commonly termed, does it become, that it sometimes bursts, or is ruptured, and the horse dies by an effusion of blood into the cavity of the abdomen.

[Diseases of the liver are much more frequent in the summer than in the winter, and particularly in very hot weather. At this season, inflammation of the liver has often been connected with the epidemic influenza, which it has rendered far more obstinate and dangerous.

The causes of these diseases are, in addition to the predisposition of the animal to have the liver affected in preference to other parts, a redundancy of blood in the system, by which too much blood is sent to the liver; too nutritious feeding; want of exercise; over-exertion when the horse is in this unfit state; and long continuance of an unhealthy state of the excretions, and want of proper physic.

The diseases of the liver in the horse are, perhaps, more obscure than those of any other part. It is here that we require in a peculiar manner the assistance of the patient to tell us the nature and precise seat of pain, together with other feelings

and symptoms, for want of knowing which the disease is surrounded with difficulty and obscurity. Diseases of the liver not only exist as primary and independent affections, but they are still more frequently connected with other complaints, the symptoms of which are thereby rendered more obscure, and the cases far more dangerous. The liver is subject to inflammation of two kinds, acute and chronic.

The *symptoms* of the former, at first, are mild, as well as obscure, and some days usually transpire before any treatment is put in practice. The symptoms, however, soon afterwards become intense, the mouth feels hot, the extremities cold, the membrane of the eyelids is highly injected, and often appears of a deep orange colour. At first the pulse is not so rapid as the other symptoms are severe; but it gradually increases, becoming seventy or eighty in a minute, and is often soft and vacillating. The horse refuses his food, looks round at his sides, lies down and gets up frequently. The respiration is somewhat disturbed; but this symptom cannot be depended on, for sometimes it is tranquil, at others greatly accelerated; there is usually a tenderness evinced on pressing the sides, particularly the right side, but care must be taken to distinguish this from the usual flinching evinced when the skin is pressed against the borders of the ribs. The *fæces* are hard, evacuated in small quantities, frequently of a dark colour, and sometimes covered with mucus. Occasionally they are fetid, and sometimes there is diarrhoea. In some cases there is a stiffness in moving, particularly of the hind quarters.

The *Treatment* must not be so active as that in pneumonia, and bleeding, in particular, must be cautious and moderate; for very severe bloodlettings are prejudicial in this disease. From three to five quarts of blood may be taken, according to the size and condition of the animal, and again when the pulse appears to indicate its repetition. Mr. Cupiss, who has written a very useful essay on the diseases of the liver*, recommends the following medicine:—Aloes 1 to 2 drs., and carbonate of potash 2 drs., dissolved in hot water, and then well agitated with 12 ounces of castor or linseed oil; to be repeated every twelve hours until the bowels are moderately relieved, back-raking and clystering being likewise practised. This effect obtained, he advises the following to be administered every twenty-four hours:—carbonate of potash 3 drs., powdered resin 6 drs., with linseed meal sufficient to suspend the resin in warm water. The sides and abdomen should be extensively blistered, and fresh sheepskins applied over the body. Although the plan pursued by Mr. Cupiss is, in many respects, very judicious, it

* *Abstract of the Vet. Med. Association*, page 31. *Vet.* vol. xii.

may, I think, be improved by the use of calomel and opium, which medicines will be found particularly useful in the following disease. The doses may be one drachm to one and a half of the former, and one to two scruples of the latter. Mr. S. Brown, in an excellent essay on the subject, recommends, when there are symptoms of pain, tincture of opium in moderate doses, with an alkali and linseed oil, in order to allay the irritation of the mucous coat of the bowels; after which he administers calomel and opium, two thirds of the former, and one of the latter; the latter to retain the former in the system. When purging is present, a greater quantity of opium should be given. In the latter stages, when great debility exists, he gives tonics and stimulants, with small doses of nitre and tartarised antimony.

Chronic inflammation of the liver may either follow or precede an acute attack, or it may exist independent of it. The symptoms are, — pulse somewhat quickened, loss of appetite, hide-bound, and staring coat, and dull and dispirited appearance. The fæces hard, and of a pale colour. The treatment must be similar in its nature to that recommended for the acute attack, the dose, however, being more moderate. Bleeding is to be avoided in the majority of cases, unless, indeed, the symptoms urgently demand it.

Mr. Cupiss observes, “In post-mortem examinations, the liver is sometimes found to be attached to the surrounding parts, and is generally interspersed more or less thickly with white scirrhus patches. After acute hepatitis, I have found the liver quite yellow, and weak in its texture.”

Mr. Cupiss describes three other affections of the liver, which he terms *unnatural enlargement*, *decayed structure*, and *unhealthy secretion*; and, without acknowledging the entire correctness of his divisions, believing that decayed structure is very frequently the consequence of an inflammatory action, yet, as his observations are full of practical utility, we cannot do better than quote them at length: —

“Unnatural enlargement of the liver sometimes takes place. It is swollen to two or three times its natural size. It presents an appearance of general congestion; it becomes gradually filled with a black bloody fluid. The progress of this variety of liver disease is uncertain, generally slow, and almost invariably fatal.”

The symptoms are, an enlarged and tense abdomen; the bowels sometimes constipated, at other times relaxed; there is sometimes considerable thirst; the pulse is accelerated to 100 or more, loud and thumping, and easily mistaken for a primary affection of the heart.

The most effectual treatment will consist in a cautious administration of laxatives, accompanied by diuretics and

counter-irritants. To this tonics may succeed. In my opinion, the ioduret of iron, in doses of half a drachm, two or three times every day, would be preferable to any other medicine.

One post-mortem examination presented the liver about three times its natural size, and consisting of a mass of coagulated blood.

Decayed Structure is a variety of diseased liver particularly deserving attention, not on account of its immediate destructiveness to the animal economy, but by reason of its frequent occurrence. It is too often the forerunner of dangerous complaints of other organs, and it is a sad obstacle to their cure. In inflammation of the lungs it often checks the practitioner in the decisive treatment which that disease requires; for after the animal has been copiously bled, and there is reason to hope that he is doing well, the pulse becomes quickened, and feeble and fluttering, the breathing is hurried, general and extreme exhaustion ensues, and the patient dies. In the same disease, also, a previous altered state of the liver produces violent purging from the administration of the smallest doses of nauseating cathartics, and which speedily terminates in the death of the animal.* I have attributed some obstinate cases of ophthalmia, and particularly some cuticular diseases, to this affection of the liver; for after having failed in the more useful methods of cure, I have succeeded on turning my attention to this viscus.

This form of the disease, like the disordered liver of the drunken man, is occasioned by a continuance of highly stimulating food (only it is a solid instead of a fluid which is here the deleterious agent); by irregular exercise, and a sudden transition from a cool and healthy stable to one that is hot, close, and fœtid; hence it is that hunters and carriage horses, and almost every where waggon horses, are so subject to it.

At first there are few or very obscure indications of internal

* Some time since a striking proof of this occurred under the observation of the editor. A horse received some slight injury, for which he had a mild dose of physic; no attention was called or directed to any internal disease. The following day the physic operated severely. The third day the animal appeared very ill; pulse ninety, small and weak; extremities cold; the membrane of the eyelids and the nostrils of a deep yellow colour; purging, but in no acute pain. The fourth day the horse died; and on opening the body the liver was found of a yellow brown colour, and its texture readily broken down; the windpipe and lungs showed appearances of disease, but of a more recent character; the bowels slightly inflamed. In this case, though the liver must have been diseased for some time, yet the horse fed well and carried plenty of flesh. The dose of physic, though mild, yet served to light up diseased action, and assist in producing a fatal result. The case serves to show under what deceptive appearances this disease of the liver may exist, and how essential it is, when discovered or suspected, to avoid purgation as well as blood-letting.

disease; but there is affection of the eyes, loss of appetite, surfeit, hidebound, inability to maintain long and violent exertion, faintness and the frequent evacuation of pultaceous fæces, in which fragments of indigested food are discoverable. The surest indication is a yellowness about the conjunctiva and the inner coat of the mouth and the nostrils. This is an occasional attendant on the three foregoing varieties of the disease; but there is no instance of diseased structure without it. It is not probable that in the horse this yellowness should arise from the absorption of any accumulated or concrete bile, as in the human subject, on account of the direct communication between the liver and the duodenum by means of the bile duct; and although it is possible to be caused by the enlarged liver pressing upon the duct or the contraction of the duct itself, yet I am more disposed to attribute it to an inability to secrete good bile or effect a perfect separation of it from the venous blood, or properly to dispose of that which is secreted. A mass of imperfectly formed biliary fluid is therefore carried along in the circulatory stream, and the discoloration is spread over every part of the system. At the same time, in default of a sufficient portion of effective bile, the food passes along, and escapes from the intestinal canal very imperfectly digested.

The treatment of this variety of diseased liver demands much caution. In no instance have I found a rapid cure practicable. Experience, therefore, dictates the employment of effective but mild alteratives. The lancet is on no account to be used.

The best alternative that I know, and which has always been, to a greater or less degree, useful, or I may say, effective for a time, is composed of aloes 1 to 2 drachms, calomel 1 drachm, resin 6 drachms, made into a ball with treacle or syrup. This should be given every third or fourth day; and on each of the intervening days, the patient should have sulphate of potash 3 drachms, carbonate of potash 2 drachms, and ginger 1 drachm, with linseed meal and syrup sufficient for a ball of proper size and consistence.

The exercise should be regular, the food good, and not less stimulating than the patient has been accustomed to. Ground corn, pollard, green food, and thick gruel, will afford a pleasant and sufficient variety. In the course of a fortnight or three weeks, the patient usually becomes convalescent, or, at least, has considerably improved. Tonics may then be administered, and the horse is apparently restored to health. All this, however, is too often delusive. From unusual exertion or irregularity of feeding, or some unknown cause, the horse relapses. The former mode of treatment will again restore him; and, perhaps, a third time; but ultimately he dies.

In the post-mortem examination the practitioner will at first

be surprised at the absence of those morbid lesions which are usually found at the termination of fatal affections of the abdominal viscera, there being no congestion, no suppuration, no mortification. Traces of disease are observable in the liver alone, which has entirely lost its natural hue, and has acquired a yellow-brown colour. Sometimes it is diminished in size, and the vessels appear as if they had been emptied of their contents, or become impervious. At other times the organisation of the liver is almost destroyed, and there remains nothing but a soft pulpy mass from which the peritoneum is easily separated.

The last variety of diseased liver which I have to mention is an *unhealthy secretion*, generally produced by circumstances favourable to increased action in this gland, as the heat of summer, and also sudden cold; by means of which the blood is disproportionately thrown on the internal organs. The drinking of unusual cold water at this season of the year will produce the same effect. Another cause is the venous blood circulated through the liver being impregnated with an excess of carbon, in consequence of which the bile becomes an acid and irritating substance both to the liver and the bowels.

This affection considerably resembles the English cholera of the human subject, and is characterised by violent purging, the evacuations being both frequent and copious, of a dark colour, and a fetid odour. There is a continual rumbling of the intestines, the breathing is excessively short and hurried, the debility is very great, exceeding that produced by the severest race, the pulse 100 or more, and in the worst cases, counted with difficulty; the nostrils expanded, the countenance anxious, and the extremities cold, and the body covered with a clammy sweat.

With such excessive action as this going on in the horse, which under no circumstances can endure excessive purgation, the first indication of cure is to check the inordinate discharge, and to support the constitution. I have been accustomed to administer the following drink every four or six hours: starch $\frac{1}{2}$ lb., port wine 1 pint, laudanum 2 ounces. In most cases, three of these will be sufficient to resist the purging.

Having in some measure quieted the system, I have cautiously given oil and aloes, combined with an opiate, until the excretions assumed a more healthy character, after which I have had recourse to the treatment recommended under the last variety of the disease.

In the *post-mortem* appearances there is the same absence of any considerable lesion in the whole of the intestinal canal. The liver is of a darker colour than in the last variety, the vessels are less empty, a greater or less quantity of dark bile is found in the

duct and small intestines, the inner coat of which is slightly flushed."

Besides the morbid affections of the liver mentioned by Mr. Cupiss, there is another which he has not noticed, and that is, *hepatirrhæa*, or rupture of the coats of the liver and hæmorrhage from it.

It generally occurs in old or middle-aged horses, and is preceded by structural disorganisation, which though existing for some time generally escapes notice.

Its symptoms, observed the late excellent and lamented Mr. John Field, "vary in degree according to the profuseness or rapidity of the hæmorrhages: if the peritoneal investment remain entire, the effusion of blood is more gradual and in less quantity; but should this coat be ruptured by its great distention, or by the collision of the body against the ground, from fainting or other causes, the bleeding being unrestrained, continues into the cavity of the belly, the most urgent symptoms present themselves, and the horse dies, in some cases, within an hour after the first manifestation of illness, previously exhibiting the whole or the major part of the following: pawing, shifting of the posture, frequent, feeble pulse, sometimes distinct, at others scarcely distinguishable, fulness of the belly (pouting of the nose, curling of the upper lip, sighing, sometimes very frequently and deep, partial or general sweating): succeeding to these are great anxiety, accelerated respiration, restlessness, tossing up the head, tottering gait, extreme debility, fainting, death. On opening the abdomen we observe the intestines deluged with dark venous blood, in a fluid state, the quantity sometimes exceeding ten gallons; the peritoneum and intestines of a faint yellow colour or quite blanched. The liver presents a tumid appearance; some portions of the peritoneal coat appear opaque, and four or five times the natural thickness; elsewhere one or more rents in the part of the peritoneal coat, which is of the usual tenuity, are observed, through which the extravasated blood has escaped from the ramifications of the *vena portarum*. Beneath the peritoneal membrane, on each side of the fissures, there is generally some dark coagulated blood. The colour of the liver is various, being either fawn, light yellow, or brown; its substance is exceedingly brittle, can easily be torn by the finger, and is in some places broken down; the weight of the liver and extravasated coagula in some cases exceeds sixty pounds. The hepatic duct always contains bile.

"This increased size of the liver is occasioned by the extravasation of blood into the substance, and under the peritoneal coat, not by an increase of the natural substance of the organ. If the hæmorrhage be not very profuse, the symptoms are less marked, and occasionally doubtful; but in most instances one or more of

the characteristics of the complaint are present, or the obscurity that first existed is gradually dissipated by the aggravation of the symptoms, which generally assume the severe form in a few days.

“ Diminished appetite, swelling of the hind legs, faintness in work, apparent fulness of abdomen, slight uneasiness, sometimes looking back, or lying down, but without rolling, have been the deviations from health first noticed. After this period the pulse may be scarcely altered, but soon becomes frequent and feeble; the buccal and schneiderian membranes appear, at first, of their natural colour, afterward paler, or pale yellow, lastly, blanched. There is, occasionally, sighing, the size of the abdomen increases, the tongue becomes furred and disagreeable, the ears are clammy, the bulk of the body reduces, owing to the absorption of the fatty parts, the horse gets weaker, the pupil of one or both eyes gradually dilates, from the diminished sensibility of the retina to light, until the eyes become completely amaurotic. It is a remarkable fact that, notwithstanding the patient may rally for a time from the disease, regain his strength and condition, and return to work, I have never seen nor heard of a single instance of the recovery of sight; although, in one case, the horse worked for twelve months afterwards. Amaurosis more commonly occurs after the second or third attack.

“ If the hæmorrhage be beneath the peritoneal investment, or in the substance of the liver, or under the peritoneum, and ceases, the symptoms consequent upon the loss of blood diminish; and about the third day of such improvement, the previously blanched conjunctiva and buccal membranes are tinged with a yellow colour, which gradually deepens, and, after a few days, red vessels are seen ramifying on the bile-coloured membranes, and the natural hue is soon restored. At the same time, corresponding improvement takes place in the other symptoms, the pulse becomes fuller, and less frequent, the sighing ceases, the size of the belly diminishes, the horse begins to feed, and lies down; he has, however, undergone a most extraordinary reduction in the size of his body: if fat prior to the attack, the reduction is more sudden, and manifestly greater in this than in any other disease with which the horse is affected.

“ The urine and feces during the attack remain unaltered; but, in the animal's approach to convalescence, the urine has been observed, in some cases, of a deep brown, or nearly black colour. From what has been premised, it is evident that the existence of this disease is only known when the whole or part of the liver is irreparably destroyed, and, therefore, but little can be expected from the aid of the veterinary art, save the preventing the abuse of those depletive measures, particularly venesection.

tion, to which non-veterinary persons are so apt to have recourse in all kinds of ailments, and by which patients of this class have been a little sooner hurried off. Still, however, those styptic and astringent medicaments may be employed, which are regarded as in some degree remedial in less severe forms of hemorrhage; such as the preparation of turpentine, alum, sulphuric acid, and balsam of copaiba, in doses of one ounce." — Ed.]

CHAP. XXXVII.

DISEASES OF THE KIDNEYS. — INFLAMMATION OF THE KIDNEYS, OR NEPHRITIS.—HEMATURIA, OR BLOODY URINE.

Inflammation of the Kidneys (Nephritis).

Is generally caused by riding or driving a horse immoderately, by straining the loins, in making him draw heavy loads, or carry heavy burdens; by exposure to cold and wet, particularly if applied to the loins, and the employment of powerful diuretic medicine.

The *symptoms* of the disorder are, a constant desire to make water, without being able to void any, or scarcely any; and the little that is discharged is dark-coloured or bloody; occasionally quite black. Sometimes there is considerable pain manifested, the horse lying down and getting up frequently, as in colic, and looking round at his flanks. On pressing the loins he evinces considerable tenderness. The pulse is generally hard and full, and often as many as 70 or 80 in a minute. There is great stiffness of the hind parts, generally more observable in one leg than the other. The horse often stands straddling, or wide, as if in want to make water, and every now and then straining, or making painful and ineffectual efforts to stale. This appearance often leads the groom to think that it is a stoppage of water, and that a diuretic is necessary; but the fact is, that the dark-coloured, or bloody urine, is so stimulating or acrimonious, that the bladder contracts violently, in order to force out the smallest quantity that gets into it. I have examined horses that have died of this disorder, and found the bladder healthy, while the kidneys have been highly inflamed.

[The *treatment* should consist of copious bleeding, until, indeed, the pulse shrinks under the finger, and becomes almost imperceptible. A stimulating liniment, composed of hartshorn and oil, should be rubbed on the loins, which should then be covered by a fresh sheep-skin, the flesh side under. The skin should, if possible, be renewed in twelve or eighteen hours. No diuretic

medicine should be administered, either internally or externally; therefore blisters must be avoided, as they contain cantharides, which medicine has considerable diuretic properties. The effect of the sheep-skin will be to produce a most profuse perspiration, which may occasionally be scraped off. If sheep-skins cannot be procured, the liniment should be repeated with the addition of half a drachm of croton oil, or a mustard poultice may be applied to the loins.

A draught should next be given composed of 4 drachms of aloes, and a pint of linseed oil.

The horse should be allowed plenty of thin linseed tea and warm bran mashes, if he will eat them.

Copious injections should be frequently thrown up, both to remove the costiveness, and to act as a fomentation.

If the urgency of the symptoms are not materially abated in the course of six hours, the blood-letting should be repeated, and a scruple of white hellebore, administered twice a day, with a few drachms of gum arabic.

When the horse gets better, the pain is considerably diminished, as well as the tenderness of the loins, and the urine becomes gradually of a lighter colour.

Care must be taken that the horse is not worked too soon, particularly with heavy draughts or burdens. — ED.]

Hæmaturia.

[Bloody urine is sometimes discharged without any appearance of inflammation or constitutional affection; it is then called *Hæmaturia*, and often arises from sudden exertions or strains, when perhaps some small blood vessel becomes ruptured.

The horse should be rested, bled, and physicked; and if the symptoms are very severe, the same treatment should be employed, as in inflammation of the kidneys. — ED.]

It sometimes happens, however, that the urine becomes foul and stimulating from high or unwholesome feeding. In this case the bladder will contract upon a small quantity of urine, and the urine may be rather high-coloured like beer, or turbid like whey, and the horse may appear to strain a little in voiding it; but this is very different from those distressing symptoms which attend inflammation of the kidneys, nor is it accompanied with loss of appetite, or any degree of fever, which is always present in inflammation of the kidneys. When the urine becomes thus stimulating, some cold mashes, with a little nitre, may be given, or what is still better, perhaps, some grass, vetches, or lucerne. If the horse is at all costive, a clyster should be thrown up. An infusion of linseed is a good drink for a horse when the urine is in this state. There are other diseases of the

kidneys by which their functions are interrupted, at first partially, and with considerable intermissions or remissions, but after a time wholly and permanently. One of these diseases is a gradual decay of the kidney; another is a gradual enlargement and obliteration of its structure as a secreting organ; and a third is a collection of earthy matter or gravel. I have seen a stone that was found in a horse's kidney which weighed five ounces. Gibson relates a case of decayed kidneys in a miller's horse, caused, as he thought, by carrying heavy burdens. "This horse," he says, "was often subject to suppression of urine, and though he was always relieved by timely applications, yet these attacks became more frequent as he grew old, till the last attack, when he continued three days without staling, or showing the least disposition to stale. During this time he never stood wide or straddling, as in inflammation of the kidneys, but moved his hind legs with ease till the day before his death, when his legs and whole body swelled, and broke out into great blotches. On opening the body after death the left kidney was found very large, in some places spongy, in others scirrhus, and so mangled that nothing of its original structure appeared. Nothing remained of the right kidney but a small hard substance, about the size of a pullet's egg, almost ossified, and of no regular shape." In examining glandered horses that have taken sublimate or calomel for some time, I have generally found one or both kidneys considerably enlarged; but instead of looking red and inflamed, they were generally pale, flabby, and tender. All the preparations of mercury, when continued for some time, act powerfully as diuretics; from which it may be inferred that an improper use of any diuretic medicine is likely to injure the kidneys. Calculous concretions, or gravel, are sometimes found in the kidneys both of horses and cattle, and as long as they remain there appear to produce but little irritation. Stones are much more frequently found in the kidneys than in the bladder, contrary to the fact in the human subject; this is owing to the erect position of man favouring the descent of the calculus, and the horizontal posture of the horse tending to prevent it.

CHAP. XXXVIII.

DISEASES OF THE BLADDER.

Inflammation of the Bladder (Cystitis).

[THIS disease is rarely met with, although it now and then occurs sometimes connected with other diseases, and sometimes as an

independent affection. It is, I think, more frequent in the mare than the horse, and it has been produced by injecting acrid substances into the bladder with a view to promote the disposition to copulate. Some cases of this kind were related by the late Professor Coleman. It may also be produced by irritating medicines, such as cantharides given in the usual way.

The *symptoms* of this disease are easily recognised. There is considerable fever and quickness of pulse, and a great deal of pain exhibited, the animal looking round to his quarters, and lying down and getting up frequently. Attention is directed to the seat of disease by the unremitting attempts at staling evinced: no sooner do a few drops of urine enter the bladder than it is forcibly ejected with a spasmodic effort. The organs of generation, if a mare, are exceedingly red and inflamed. This disease is more dangerous than inflammation of the kidneys, and unless relief be obtained, death supervenes in a few days.

A *post-mortem* examination exhibits the mucous membrane of the bladder intensely inflamed, and some portion of it frequently in a state of ulceration.

The *treatment* consists of copious venesection, repeated in six or eight hours if required. Backraking and the frequent administration of injections, and mucilaginous fluids, such as linseed tea or infusion of gum arabic, should be carefully and slowly injected into the bladder; and it would be serviceable if a watery infusion of opium were injected at the same time. A drachm of powdered opium infused in half a pint of hot water, and afterwards strained, will serve for several applications. Oily laxatives should be given so as to relax the bowels without purging them; and half a drachm of opium, with one drachm of tartarised antimony, may be given three times a day. Plenty of linseed tea should be given voluntarily, if possible; but if not, by means of the horn. Diuretics of all sorts must be carefully avoided. Warm sheep-skins should be applied to the loins.—
ED.]

[Retention of Urine

More frequently occurs as a troublesome attendant on other diseases than as an independent affection. In those general and complicated inflammatory diseases, understood under the term *chill*, a retention of urine is frequently present. In colic, too, there is frequently an inability to stale, notwithstanding frequent efforts to do so, but this is owing to sympathy with the spasm of the bowels; for when the latter are relieved, the horse stales without difficulty. From seeing these abortive attempts at staling, grooms almost invariably say, in cases of colic, that there is a stoppage in the water. Retention of urine is generally

owing to the spasmodic action of the sphincter muscle, whose office it is to prevent the urine from escaping. It is generally produced by driving or riding long distances without allowing the animal to urinate.

The *symptoms* are frequent, though not violent, attempts at staling, which are ineffectual, or perhaps a few drops only may issue from the yard. The horse does not betray the severe pain of colic, but is rather unwilling to move, and rarely lies down. He stretches himself out from time to time, renews the attempt, and then returns to his former posture. On passing the hand up the rectum we find the bladder very much distended with urine, which assures us of the nature of the disease, which the mere frequent attempts at staling would alone be insufficient to decide.

Treatment. — If the patient be a mare we should, without hesitation, evacuate the bladder by means of a flexible tube, called a catheter. The method of doing this, however, requires a little tact. The instrument should be introduced at the lower part of the *vulva*, under the fore-finger of the right hand, which serves as its guide. A few inches within the entrance the fold of membrane is felt which covers the passage to the bladder; this membrane, being raised by the back of the fore-finger, the tube is readily pushed onwards into the bladder.

If, however, the patient be a male, we must first endeavour to assist nature by backraking and clystering, and perhaps fomenting the abdomen, and occasionally pressing the hand on the bladder. If, however, we do not succeed in the course of half an hour, and the bladder is very full, we should proceed to pass the catheter, which is a hollow flexible tube, about a yard in length, having a whalebone stilet within, which can be withdrawn, as we please, from its cavity.

An opportunity should be embraced when the penis is protruded from the sheath, otherwise it may be exceedingly difficult to reach and retain it. It should be then firmly grasped with the left hand, drawn out to its full extent, and with the right hand the tube, well oiled, should be carefully forced up the urethra until it enters the bladder. It may readily be felt in its course, at the perineum, just under the anus. Having entered the bladder, the whalebone stilet should be withdrawn, and the urine will then flow.

After the operation the symptoms usually disappear, and the animal feeds. If there is much general irritation, it is well to bleed either before or after the operation; and if any other symptoms appear, the case must be treated accordingly.

If relief be not thus obtained, the urgency of the symptoms will increase, and the bladder may burst, and death, of course, ensue.

Sometimes, though very rarely, a hole is found in the bladder which permits the urine to flow into the abdomen, and thus produces fatal inflammation of the peritoneum. One case of this kind occurred in my practice some years since, and is related in the *Veterinarian*, vol. iii. The case was complicated with pneumonia, and the symptoms were thus rendered obscure. The mare died on the ninth day, and, on examining the body and opening the abdomen, a large quantity of fluid escaped, of a brown colour and muddy appearance. The bladder was much diminished in size, and a large hole was perceived near its fundus. The edges of the orifice were smooth, and it appeared to have been occasioned by ulceration; the coats were thickened, but the bladder itself did not appear to be much inflamed, except immediately round the orifice. Every time the mare staled a portion of the urine must have been discharged through the orifice into the cavity of the abdomen.

We may suspect the existence of such lesion when we find a frequent disposition to stale, but very little urine appearing, and this of the usual colour, the bladder at the same time being by no means distended. — Ed.]

Calculi in the Bladder,

Compared with the human subject, is exceedingly rare, for many years may elapse before a case comes under the notice of a veterinary surgeon. From being a vegetable feeder, and having water as his only article of drink, there is but little disposition to produce these urinary concretions. Then, again, when formed, from the horizontal position of the animal, they more frequently remain in the kidneys. A few years since, on examining the body of a horse that was discharged on account of being a bad roarer, a stone, weighing several ounces, was found in one of the kidneys. There had not been any symptoms, during life, to denote its presence.

There is, in the Museum of the Veterinary College, a stone, as large as a man's hat, found in the bladder of a horse which, during life, for some length of time, had been accustomed to stale every ten minutes, and was known round the country by the name of the Pissing Horse.

On analysing vesical calculi, they have nearly always been found to contain the same component parts, principally carbonate of lime. They are readily dissolved by acids when taken from the body; but, although many attempts have been made to accomplish this effect, in the living subject, by administering vinegar and muriatic acid internally, and by injection, yet the result has not been satisfactory: recourse must generally be had to the operation of lithotomy, in order to remove a calculus from the bladder.

There are several successful cases on record, both English and foreign, one of the earliest having been performed and related by La Fosse. He says, "The horse was about fourteen years old, and was often observed to have pain and difficulty in staling, voiding only a small quantity, which was sometimes bloody. Upon introducing the hand into the gut the stone was distinctly felt; and after a few days' preparation, by bleeding and opening medicine, with a spare diet, the horse was placed on his back, and an opening made in the urethra, near the anus, in the manner I shall soon describe. Through this opening the forefinger was introduced into the bladder, while an assistant had his hand in the gut to press up the stone that it might be felt by the operator, who then introduced an instrument, guided by his finger, with which two incisions were made in the neck of the bladder, one on each side. The forceps were now introduced and the stone laid hold of, but it broke into small pieces, which were all extracted, and found to weigh five ounces. No dressing was applied to the wound, but some linseed infusion was injected into the bladder. The horse got up without assistance, was bled three times the same day, and not allowed any solid food. His drink was white water (bran tea); the bowels were kept open by clysters. On the fourth day he was allowed a small bran mash and some straw. This allowance was gradually increased. There was scarcely any fever; the wound suppurated, and looked healthy. During some days part of the urine passed through the wound, and about the 22d day it was perfectly healed." A short time since I received a letter from Mr. W. Mogford, some years ago my pupil and assistant, to inform me that he had extracted a stone from a horse's bladder, which weighed more than five ounces. He says, also, that he is convinced that a stone of eight ounces might be extracted by the means he adopted on this occasion; that is, without wounding the neck of the bladder, as La Fosse did, and without the aid of forceps. When the horse was brought to Mr. M. he observed a peculiar stiffness in the hind parts, a frequent desire to stale, and a dribbling of urine from the penis for some time afterward. By bleeding, embrocating the loins, emollient clysters, and rest, these symptoms disappeared, and the horse was sent to grass. He soon broke out of the field, and, crossing the country, returned to a pasture in which he had some time before been kept. This exertion caused a return of the above symptoms, and he was again brought to Mr. M., who now passed his hand up the fundament, in order to feel, through the rectum or gut, what urine there was in the bladder, when he distinctly felt a stone in it. He communicated the circumstance to a surgeon, who could not believe it until he had examined the horse himself, when he also felt a stone in the bladder

very distinctly. Mr. M. now proceeded to the operation, and having cut down upon the whalebone rod which had been passed up through the penis, he continued the incision, by means of a conductor and a probe-pointed bistoury, to the neck of the bladder. Through this opening he introduced the first and second finger of his left hand into the bladder, and with his right hand in the rectum he forced the stone towards them, and by these means the stone was conducted to the neck of the bladder, and by a stronger pressure forced out through the opening that had been made in the urethra. The wound soon healed, except a small orifice through which a little of the urine continued to pass, but the horse had been working regularly without feeling any inconvenience from it.

[Professor Girard, of the French school, has written an able memoir on the subject of vesical calculi. He advises the operation to be performed with the patient, whether male or female, in a standing posture, and properly secured, and directs the incision in the male to be made in an oblique direction. "In the female," he says, "the stone may be extracted by the dilation of the urethra by mechanical means, aided by relaxing injections and fomentations; cystotomy is only to be resorted to when these fail." In this case, lithotomy consists simply in laying open the urethra along its median line and from behind forwards: it is to be performed with a bistoury directed by one of the fingers of the left hand. In this manner, M. Dufils, V. S., at Bourdeaux, in 1821, extracted a stone from a mare, which was lodged in part in the meatus urinarius, whereby she, who was before the subject of frequent colics, became at once restored to ease, and speedily afterwards to health. In the centre of the stone was found an almond, forming its nucleus. At the time it was shown to us, M. Dufils assured us that it had lost much of its weight and volume, proving thereby that these calculi contain a large proportion of fluid, the evaporation of which evidently brings on this diminution.

Professor Sewell, a few years since, performed the operation successfully, and thus relates it:—

"The horse is twelve years of age, and has been hunted regularly the last seven years, up to the period of admission (February 14.). He had for several months evacuated very high-coloured turbid urine, often mixed with blood, expressing great pain, with continued attempt to expel more. The symptoms were increased with a fall into a ditch, by which he was supposed to have injured the kidneys, as it was followed by more frequent evacuations, and at the conclusion by pure blood. By the treatment pursued, these violent symptoms were alleviated, but always returned after exertion. After his admission the symptoms continued, but were relieved by aperients or light diet.

The pulse was kept up by irritation to 38 per minute, the healthy average being 32.

"Suspecting calculus might be the cause, I examined the bladder, by introducing my hand and arm up the rectum, and distinctly felt a firm, roundish substance at the neck of the bladder, which was empty, and firmly contracted upon it. The symptoms were rather increased; and on a subsequent day I renewed the examination, when the bladder was nearly full, and I could move the stone very readily.

"On the 26th, the animal appeared to be in a favourable state for the operation of lithotomy, which was performed by securing him upon his back, with the hind legs drawn forwards to the shoulders. The penis being drawn out, a three foot whalebone staff was introduced as far as the perineum, and the urethra opened by an incision about three inches in length; a grooved sound was then passed straight into the bladder, and the stone was most distinctly felt, and heard on being struck. It was attempted to be extricated without cutting open the pelvic portion of the urethra and neck of the bladder, being readily grasped with the forceps, assisted by pressure made upon the calculus by the left hand introduced into the rectum; but being too large, these parts were laid open by a lateral incision made with a strong, curved, and probe-pointed bistoury. It was then, by the same means, but with considerable force, brought gradually forward to the perineum, when it was forcibly contracted upon, and a further extension of the external incision was necessarily made to effect its removal. The hæmorrhage was not very great or alarming, but it was thought best to secure a perineal vessel with a ligature.

"The calculus is of the mulberry kind, very rough, of a depressed oval form, weighing nearly three ounces: it has no distinct nucleus. Dr. Prout, having obligingly undertaken to analyse it, found it composed principally of the carbonate of lime, some phosphate of lime, and a little phosphate of magnesia.

"The horse, immediately after the operation, became tranquil and cheerful, and the pulse fell by evening to the healthy standard, to 32 per minute, and so continued until noon, the following day, when, being rather agitated by numerous visitors, it rose to 38, and by night to 45. Four quarts of blood were taken from the jugular vein, a mild purgative given, and frequent clysters.

"February 28. — Pulse 40; in the evening, 44; bowels relaxed.

"March 1. — Pulse 44; purgative and clysters repeated.

"March 2. — Pulse 42; and so continued until the 8th, when it declined to 38, and subsequently to 32, at which it continued this day (the 18th), three weeks since the operation; the bowels

having been kept open by aperient doses of aloes and by clysters. The urine was evacuated partly by the orifice until this time; but the wound is now healed, and it flows through the whole length of the urethra without the least impediment. The horse is exercised daily, and is fit to be discharged." — ED.]

Diabetes

Consists in an excessive discharge of urine, attended with great thirst, and sometimes with a gradual loss of flesh and great debility. The urine is sometimes limpid and transparent like water; at others high-coloured, and of a very offensive smell.

It is generally produced by improper provender, such as oats that have been bleached and greatly kiln dried, by new oats and mowburnt or new hay.

This disease has frequently appeared amongst cavalry horses when on foreign service, and subjected to bad and rotten forage.

The following ball should be given:—

Opium	from $\frac{1}{2}$ drachm to 1 drachm.
Catechu	2 drachms.
Sulphate of iron	2 drachms.
Ginger	1 drachm.
Gentian	2 drachms.

To be made into a ball with treacle, and given once a day for three or four days; then leaving off for a day or two, and continuing as before, if necessary.

The body should be warmly clothed, and gruel made with flour should be given to drink instead of water. A moderate portion of beans should be given, and the oats diminished in proportion, which, together with the hay, must be of the best quality.

CHAP. XXXIX.

DISEASES OF THE MOUTH.

[IN a state of nature, and with grass for the only diet, the parts concerned in mastication and deglutition would be rarely if ever diseased. But when the horse is brought into the stable, and forced to subsist on hay and corn, subjected to irregularities in feeding, and the mouth exposed to the pressure of the iron bit, we find it subjected to various injuries and diseases, some serious, others trivial, though inconvenient. — ED.]

Lampas, Bags, Ulcers in the Mouth, lacerated Tongue, Quidding, Obstructions in the Œsophagus.

This disease consists in a swelling of the roof of the mouth, near the front teeth, and is sometimes higher than the teeth. It happens generally between the third and fifth year, and is supposed to prevent a colt from gathering his food with ease, so that on that account he falls off in feeding, and consequently in flesh or condition. The usual remedy is to scoop out the part next the teeth, with a red hot iron formed for the purpose, or sear it with a flat piece of iron made hot. These remedies are still generally practised, even in the army: nor is it possible, I believe, for veterinary surgeons to prevent its being done. The lampas, however, is not the cause of the colt's ceasing to feed well, and falling off in flesh, it depends upon his cutting the grinding teeth at this time; and if, instead of burning out the lampas, as they term it, they would keep him entirely on bran mashes for about a week, he would be able to eat his hay and corn with avidity: for the stomach, which always sympathises with the mouth in the painful periods of dentition, is quickly restored when the power of mastication returns. We often find when the lampas is present that the membrane of the mouth, just within the corners of the lips, is so swollen, as to get between the grinders, thus preventing the animal from feeding. When this is the case, it is commonly called the *bags* or *washes*, and may be removed by cutting off a portion with scissors. This disease is often occasioned by the bearing rein being too tight, and also by gagging.

The teeth may be imperfect, and often are so; the grinders wear in a different manner from that in which they would, were the animals in a state of nature; consequently sharp edges are sometimes formed on the outside of the higher grinders, and on the inside of the lower grinders; and the inside of the cheeks and the tongue, with the skin or membrane connected with it, are thereby wounded, which prevents the horse from masticating, without considerable pain, and induces him to swallow his food imperfectly chewed: this is more especially the case with hay; and when hay is swallowed in this state, it does harm, being difficult of digestion, as then its nutritive matter is not easily extracted by the gastric power: hence arise indigestion, flatulency, and numerous disorders. I have seen at the kennel the jaw of a horse, which died literally from starvation, in consequence of a disease of the grinding teeth, which appeared to have been brought on by feeding on coarse woody hay, containing the stalks of thistles, docks, &c. This animal was what dealers term a *quidder*, for the muscles of deglutition were at last so affected, that he was incapable of swallowing; and after

fruitless attempts to chew his food, it was thrown out into the manger in a ball or quid, and a great deal of imperfectly chewed hay had been forced into the cavities, formed at the roots of some of the grinding teeth. The remedy in these cases is to file off the sharp edges of the teeth by means of an instrument called the tooth-rasp, and which is made for the purpose. The same plan should be adopted in cases where one of the molar teeth is found much higher than the others, — a case by no means very unfrequent, and which causes an inability to masticate the food. Mastication may be impeded or prevented by that state of the mouth which generally attends teething: it may also be affected by an injudicious use of the bit, as is well known in regiments of cavalry, where it is too common.

During the time that horses are breaking, more particularly, they are often hurt in the mouth by the pressure of the bit: especially in that part where it bears when they are put upon the bit, as it is termed; that is, when their noses are reined in towards the chest. The bit then bears on the under jaw between the tush and the first grinder. The bone in this part being thinly covered with gum, is often bruised and inflamed; and being neglected, or rather the pressure being still continued, it becomes carious, and a troublesome sore or sinus is the consequence, and occasionally a portion of the bone is deprived of nourishment and exfoliates. This sore, in feeding, becomes filled with masticated hay, which, being discovered, is supposed to be the cause of the sore; and as common hay cannot be supposed to be capable of such an effect, it is attributed to what the grooms term squirrel-tail grass, that is, wild barley. This severe biting, though not always necessary, is the most effectual method of subduing the temper of a stubborn horse that can be adopted. It will more effectually cure restiveness than any punishment that can be devised, and if properly conducted, will make a mouth, or rather a temper, whatever the rider wishes it to be; for what is called softening or making the mouth is in fact softening or making the temper. There is great danger, however, of attempting to make the mouth at the time of riding, by means of a running rein; for if he is a stubborn or runaway horse, there is great danger of throwing him down, and in the most dangerous manner that can be. For, if he is determined to run away, and the rider endeavours to prevent him by a running rein, in drawing his nose down to his chest, he so restrains the muscles of the shoulder that he must of necessity pull him down topsy-turvy. Since the body being propelled by the muscles of the hind parts, the restraint thus imposed upon the extensor muscles of the fore-leg, prevents their being thrown to the extent required, and he comes down with the most dangerous violence. I have known this accident happen with

horses that have had upright shoulders and very well-formed hind parts; I have also known very safe horses, that have contracted a habit of going with their noses poked out, become very unsafe, and soon get broken knees by endeavouring to improve their carriage by a martingale or running rein. When this injury is observed in the mouth, the horse should be kept on bran mashes, and if the bone is not injured, the sore may be dressed with a little alum, honey, and water. Most commonly, however, when the sore is carefully examined with a probe, the bare bone may be distinctly felt: some openings also may sometimes be felt in the bone. In either case the diseased bone — for when bare it is always diseased — must be exposed completely, and freely scraped with a rougine or drawing knife. It should then be dressed daily with tincture of myrrh. When there is reason to apprehend exfoliation, the best plan is to hasten the separation of the bone by the application of caustic, such as diluted muriatic acid on a little tow. After the separation of the dead bone, the part will soon get well. It may afterwards be dressed with tincture of myrrh.

If the horse is used during the progress of the cure, a snaffle should, if possible, be substituted for the curb.

I have known a similar ulcer form under the tongue, accompanied with considerable inflammation and swelling of the mouth, so as to prevent feeding for several days. A portion of the lower jaw-bone exfoliated, after which the part soon got well.

Sometimes, during dentition or teething, the whole mouth becomes inflamed and sore, and this state generally extends to the stomach, causing loss of appetite. In such cases the excretory ducts of the sublingual glands being rather swollen, have been mistaken for a disease, and cut off. The only thing necessary in such cases is to keep the horse on bran mashes a short time. No medicine is necessary, and bleeding is rendered unnecessary by the loss of appetite.

In giving balls improperly, the under part of the tongue is often lacerated, which renders feeding painful, and makes the horse slaver and froth at the mouth. This may be cured by a solution of alum, which should be thrown in with a syringe. We sometimes find the first grinder so unequally worn, as to leave one part much longer than the rest. This often proves an impediment to mastication, and should be struck off with a blunt chisel, and afterwards filed smooth. This was formerly termed the wolf's tooth; but the wolf's tooth of the present time, which is still foolishly supposed to be a cause of ophthalmia or inflamed eyes, is a denticule or very small tooth, which sometimes appears close to the first grinder. This, of course, does no harm, and should therefore never be removed.

The practice of tying a horse's tongue to prevent him from run-

ning away may not be frequent, but I have known it done, and the loss of the tongue was the consequence. Three cases of this kind I have met with: one I was told of by the person who did it, and who cut off the swollen part of the tongue to relieve the animal from his intolerable sufferings, the ligature being buried in the enormous swelling that had taken place. Two others I have heard of, in which the tongue was literally drawn out by the roots. The most common manner in which the tongue is wounded is, by the horse hanging back when he is tied up with a coil of the halter in his mouth and over the tongue; or, as it is vulgarly termed, with a *chew* or *chaw* in his mouth.* The organs of swallowing may be injured by the practice of giving balls, especially when they are large or hard. A morbid state of the pharynx is thereby induced, which renders deglutition difficult, and sometimes impossible, the lower part of the pharynx acquiring a morbid irritability, which causes it to contract upon the approach of the food, and return it into the nostrils, or into the mouth, where it is often re-masticated, and at length thrown out into the manger like a quid of tobacco.† Such horses have been named *quidders* by dealers, and are considered of little or no value: such cases are often incurable, and sometimes so because not understood. Were the horse, in the early stage of the disease, kept a few weeks on gruel and bran-mashes, and then turned to grass, the muscles of deglutition would sometimes gradually recover their lost power.

I have lately met with a case, in a mare, where both swallowing and breathing were impeded by ulceration of the pharynx, or upper part of the œsophagus or gullet, produced probably by her having swallowed hastily some hard or sharp substance, such as a stub of wood, or the unchewed stalk of a dock, thistle, fern, or bramble. The pain and irritation which swallowing occasioned caused coughing, and some of the food to be thrown into the nostrils, and some into the larynx, where it produced a great deal of pain and difficulty in breathing, so much so that they were about to destroy the animal. But I afforded great relief by making an opening in the windpipe, and passing a surgeon's probang into the opening, and up through the larynx, and then quickly withdrawing it. I then passed it up again, and withdrew it a second time, in order to remove completely,

* The Editor has met with many cases in which the tongue has been divided in this manner, and a good portion of it cut off; but though the horses for some time were unable to take their accustomed food, yet the remaining portion of the tongue gradually accommodated itself to the mouth, becoming flatter and flexible, and at length capable of gathering up the food as well as before.

† Sometimes there is a partial palsy of the muscles employed in deglutition, by which the animal has been gradually starved.

or as far as could be, whatever might be lodged in the larynx. I put two stitches in the skin over the opening in the windpipe, and did nothing more. The mare was greatly relieved, and brought up a colt she had. When the colt was fit for weaning, the mare being of little value, was destroyed, and then the ulceration in the pharynx was discovered. I saw the animal just before she was killed, and found her breathing freely and looking tolerably well (considering she had been kept at grass, and on a common), and with a good udder of milk. But the owner informed me that she appeared sometimes much distressed, and coughed a great deal, probably by some food still getting into the larynx.

Obstructions in the Œsophagus

Are produced by pieces of carrots or turnips, or by balls given as medicine. When carrots or turnips are used as articles of diet, they should be cut into thin slices; but they are too frequently chopped into junks, one of which is sometimes bolted and sticks in the gullet. The obstruction may also be produced by balls given as medicine. Cases of this kind ought never to occur; for balls, when properly made and skilfully given, will pass into the stomach with certainty and ease. Balls may also stick in the pharynx, and then they may be drawn out with the hand. Such cases occur more frequently than the former; and from not being understood, the ball generally remains until gradually dissolved, or till it is thrown into the nostrils, where it causes considerable inflammation, and such a discharge of matter as has been mistaken for the glanders.

I have known balls stick in the œsophagus or gullet, and so low down in the passage as to be out of sight and not suspected. I have known three horses destroyed in this way. In two of them the ball was wrapped in brown paper; and in one the ball was as hard as stone, and had destroyed the internal membrane of the œsophagus. These cases prove the necessity of giving balls when recently made, and not too hard or large. To avoid this evil, in giving a ball we should never be satisfied until we see it pass down the greater part of the œsophagus.

[If the obstruction lie in the throat, it may often be removed by the hand; but if it cannot be reached, an instrument called a probang, consisting of a long piece of whalebone, with a handle at one end and a ball of wood at the other, should be carefully passed down the œsophagus, so as to force into the stomach the obstructing body. This probang has been lately improved by Mr. Simonds, who has invented an instrument to extract the object by the mouth, which, in some cases, is preferable, and indeed the only method practicable.

If the object cannot be removed by this method, we must then have recourse to the operation of œsophagotomy.

The horse's head being elevated, a careful incision is made through the skin and the coats of the œsophagus, sufficiently large to permit the removal of the obstructing body. The skin should afterwards be united by stitches, and the wound kept clean. No food should be allowed for some hours afterwards, and should be then given in a soft state. — Ed.]

Horses sometimes, when feeding on very dry oats mixed with bran, will have their throats so irritated as to cough; in doing which a small portion of the food, during the violent inspiration that is made, may get into the larynx and stick in the rima or chink of the glottis, and cause the most dreadful irritation, and in a short time suffocation, unless the small portion of food — perhaps a single oat, or one particle of bran — which occasions it is removed. When this happens, an opening is to be made in the windpipe, and a surgeon's probang passed up through the chink and quickly withdrawn. After the operation, one stitch should be put in the skin, and nothing more done.

CHAP. XL.

ACUTE AND CHRONIC RHEUMATISM.

Acute Rheumatism (A Chill).

[THIS disease is by no means unfrequent. It appears to consist principally of an inflammation of the muscles of the shoulder, or of the loins and hind quarters (the former most frequently), and sometimes complicated with severe inflammation of the chest and its contents. Sometimes the joints are principally affected; and I have met with cases in which the disease has gone from one joint to another, almost throughout the body. In a late case that came under my notice, severe lameness affected each leg, one after the other, until the animal could not stand; pleurisy supervened, and the animal died after six weeks' illness. I found, as I expected, adhesions of the pleura; water in the heart-bag; considerable disease of the muscles, tendons, and joints; besides which the liver was thickened and diseased, and an abscess formed in the lungs.—Ed.]

The manner in which this disease sometimes appears to be produced is the cause of its having been named a chill; for it often happens, when a horse has been violently exercised, that he is suffered to stand in a current of air to cool, or left there through negligence or drunkenness, and sometimes until he is

scarcely able to move. But a more common method, and, unfortunately, one too often authorised by the inn-keeper, or coach-master, — for theirs are the horses most commonly so treated, — is that of plunging them into the pond; and, not satisfied with a short immersion, they are generally kept there for the purpose of washing the carriage also. The apology for this practice is, that the horses are thereby refreshed; but the inducement really is, I believe, that it saves trouble. The injury this does is not always immediate, nor is it always perceptible; but one thing post-masters may rest assured of, it always occasions some degree of muscular debility. It must not be supposed, however, that immersion in cold water will alone do this mischief; on the contrary, in summer, when they have no work, but are merely exercised, they are greatly refreshed and benefited by it: the mischief arises in consequence of previous exhaustion by excessive exertion.

[The *symptoms* of this disease usually appear somewhat suddenly, and are, great stiffness, and inability to move; severe pain; considerable fever; quick, strong, and full pulse, 70 or 80 in a minute; the respiration is very quick; the dung generally hard, and covered with mucus; but the skin and legs are warm, and the horse prefers a standing posture, unless the joints are severely affected. The blood, when drawn, is almost invariably covered with a thick buffy coat.

The disease generally is not attended with a fatal termination, however severe may be the symptoms, unless the internal viscera are much affected, and then it is usually fatal.

The appetite is not diminished in proportion to the severity of the other symptoms. There is in this complaint a great disposition to *metastasis*. The disease flies from one part to another, and very frequently to the feet.

Treatment. — The horse must be bled very copiously, until, indeed, the pulse becomes almost imperceptible; and this should be repeated as often as the pulse becomes hard and strong. Back-raking and clystering must next follow, and the latter be frequently repeated. The following draught should then be given: —

Aloes, dissolved in warm water.....	2 dr.
Linseed oil	1 pint.
Tartarised antimony	1 dr.
Nitre	3 dr.
Spirit of nitrous ether	1 oz.

Mix.

If the lungs appear to be inflamed, the aloes should be omitted, and also if the dung is not hard.

If the loins are at all affected, a warm sheep-skin should be

laid on; and this, indeed, is the best application for the shoulders too. If it cannot be procured, a stimulating liniment should be applied instead.

The following draught should be given every twelve hours:—

Nitre	2 dr.
Tartarised antimony	1 dr.
Camphor, powdered	1 dr.
Spirit of nitrous ether	1 oz.
Warm water	12 oz.

If the kidneys appear to be affected, the nitre must be omitted.

As there is great danger of fever in the feet taking place, which may partly arise from the horse standing so constantly in one position, this should be guarded against by removing the shoes, and poulticing the feet.

The treatment may be continued for several days, modified, however, according to the symptoms. If the lungs appear to be affected, the treatment recommended for its diseases must, in some measure, be resorted to. — Ed.]

[*Chronic Rheumatism*

Is a disease of similar nature to that before mentioned; but of less severity, though of greater obstinacy. It affects the muscular and tendinous fibres, the ligaments, the joints, and even the bones themselves. It often flies from part to part, and exists for weeks and months, and sometimes proves incurable. In the joints it is sometimes attended with swelling, heat, and tenderness; and, in some cases of rheumatic lameness, there is no swelling or other appearance to indicate its situation; and we can only infer that it is rheumatic by its going off after a little exercise, and being sometimes permanently cured by a dose of physic. Whenever lameness occurs, *and, after a careful examination and inquiry, no cause can be found for it*, and it goes off again after a little exercise, we may conclude that it is rheumatic.

I have met with cases of rheumatism in which a mild dose of physic has operated with great violence; so much so, that it was necessary to give some arrow-root gruel to restrain the purging.

The *Treatment* should consist of bleeding, laxatives, and stimulants to the parts affected. Opium may also be given with advantage.

There is a disease, somewhat of the nature of rheumatism, that occasionally attacks the sucking foal, and is often fatal. It is not noticed by English writers, but has lately been described

by foreign authorities; M. Lecoq* having written an elaborate paper on the disease, and M. Delwort of Brussels described it more briefly. The latter says, "Colts, while at the teat, are subject to inflammation of the tissues concerned in the formation of the joints. It is first announced by an unwillingness to move, and the indication of slight pain when the articulations are pressed upon. The articulations that are generally attacked are the knees, the hocks, and the fetlocks. In proportion as the disease gains ground, the colt loses his spirits; he seldom goes to the udder, and he sucks with difficulty. The articulations become more tender and painful; the surrounding cellular tissue is infiltrated with a serous fluid, and an œdematous enlargement is formed. The disease assumes a more aggravated form; the little subject can scarcely raise himself from the ground, and he can stand but a little while. He is only able to suck by being held up to the udder. As soon as he is no longer able to rise, he refuses every kind of food; he is generally constipated, although there is sometimes diarrhœa, and death occurs in from six to ten days.

"The principal lesions that are observed are found in the region of the joints. The tissues are infiltrated with a yellow serosity; the quantity of synovia is increased, and the articulations are more or less enlarged. Sometimes there are spots of inflammation on both the small and large intestines.

"So far as our observations have extended, we have traced its principal causes to the state of the mother; whether her food has been of too exciting a nature, or she has been placed in moist or ill-ventilated situations.

"The remedy consists in submitting the mare to an antiphlogistic treatment, and giving gruel and straw, or but a small portion of hay. The little patient should be placed on fresh litter, and friction with camphorated spirits of turpentine or ammonia applied to his limbs. If the animal cannot get up without much difficulty or pain, it must be brought many times in the day to the mother, and held to the teat as long as it will suck. If these measures appear to have little effect, vesication must be applied to the diseased parts. Costiveness must be obviated by emollient injections. If it will not suck, or has not learned to suck, the milk should be drawn from the mother, and he should be plentifully supplied with it."—ED.]

* Vet. vol. xiii.

CHAP. XLI.

EPIZOOTIC OR EPIDEMIC DISEASES.*

[FROM time to time, in all ages of the world, diseases of an epidemic, or rather epizootic character, have appeared, and destroyed vast numbers of horses and cattle.

It will be unnecessary to go back to times of remote antiquity, although numerous are the instances that might be adduced from classical authors of the most severe epizootics having extensively prevailed; and in all probability, from the absence of draining, and the marshy and unhealthy situations of many parts of the then civilised world, these maladies were more virulent in their nature, and more fatal in their consequences, than those which have prevailed in modern times.

“In 1714,” says Mr. Youatt in his Lectures, “a malignant epidemic was imported from the Continent, and in the course of a few months destroyed 70,000 head of cattle. In horses, the disease was almost uniformly ushered in by inflammation of the mucous membrane of the respiratory passage, but soon involving other portions; and then ensued diarrhœa, which no art could arrest. The fever, acute at first, soon passed over, and was succeeded by great prostration of strength. The inflammation now spread to the cellular texture, and there was a peculiar disposition to the formation of phlegmonous tumours; sometimes there were pustular eruptions, but oftener deep-seated tumours, rapidly proceeding to suppuration. Connected with this was a strong tendency to mortification; and unless the animal was relieved by some critical flux or evacuation, malignant typhus was established, and the horse speedily sunk.”

Our next account refers to two epidemics related by Gibson, one in 1732, the other two years subsequent; the first occurring towards the fall of the year, the second towards the spring or summer. The former appears to have been precisely similar to our epidemic catarrh, and attended with considerable nasal discharge, and unaccompanied with danger; whilst the latter disease was more fatal in its effects, was accompanied with a burning fever, soreness of the skin, loss of appetite, costive bowels, and followed by swelled legs. We recognise in the last nearly all the symptoms of *influenza*, particularly as it presents itself to our notice in warm weather. Gibson treated both these diseases by

* Epidemic literally signifies a disease attacking numbers of men; while epizootic refers to cattle, and is therefore more correct in this place. They are each derived from two Greek words.

bleeding at first, and the latter with aperients also; and he says his treatment was successful.

We next avail ourselves of Mr. Youatt's admirable Lectures, in quoting an account of an epidemic that prevailed on the Continent in 1783. We scarcely know, however, whether we are correct in styling it an epidemic, as it seems rather to have been *endemic*, having been confined to particular localities, and to have had reference to a poisonous and improper diet. Its symptoms were low and malignant, its progress rapid, and termination usually fatal. In 1795, we find that a disease raged in Paris and its vicinity, attended, as, indeed, almost all these Continental epizootics appear to have been, with low typhoid symptoms. Treatment was in general nugatory, and blood-letting decidedly injurious; the evacuations were foetid, the debility great, and death usually closed the scene. In 1815, and again in 1823, we appear to have had a fatal epizootic in this country, attended with swellings and ulcerations in various parts, but we regret that no authentic account of these diseases has been furnished.

We next come to the pages of the *Veterinarian*, and find, in the first volume, a paper from Mr. Brown, describing the epidemic as it came under his notice in the early part of the year 1828. In some measure it resembled, in other respects it greatly differed from the influenza of 1836. It was accompanied by complicated inflammation, diarrhoea, and considerable debility. Mr. Brown found that an antiphlogistic mode of treatment altogether failed, but a tonic and supporting system proved generally successful.

Mr. Gloag gives an account of an epizootic which made its appearance in the regiment of huzzars under his care, and proved exceedingly fatal. It does not appear to have been influenza, but a disease of typhoid character, presenting from its outset the greatest debility; forbidding the slightest depletion, but requiring a supporting system of treatment. The latter cases proved successful; but they were by no means attended with such malignant symptoms as characterised the earlier ones. In diseases presenting such analogy of typhus as this appears to have done, it would be proper to consider it infectious, and to avail ourselves of the fumigating powers of nitric acid gas, which has proved so available in fevers of the human subject. — Ed.]

Influenza.

[For several years past a disease has most extensively prevailed amongst horses through nearly every part of the kingdom. Though not, perhaps, entirely a new complaint, as some have supposed, it is yet singular as regards its attack, sparing neither

the young nor the old, the strong nor the feeble, regardless alike of the season of the year or the situation of the spot in which it might appear; sometimes appearing under a mild and harmless aspect, at other times accompanied with the most severe internal inflammations, and leaving in its train the ravages of death. By universal consent this malady has been recognised by the term influenza, and, perhaps, no other word can better express its tendency to spread; though at the same time it must be confessed that this very term is likely, from analogy, to deceive the ignorant, and to lull many persons into a false security with regard to the frequent severity and danger of the complaint. For although, perhaps, in all cases of influenza there are certain uniform general symptoms, yet cases can be cited where the most essential difference prevails, both with regard to its symptoms and the danger attending it, and thus it is that we find such very different ideas are entertained in the minds of the public with regard to this disease.

This disease prevailed most extensively in 1836, throughout all parts of the kingdom. Numerous accounts of it may be found in the *Veterinarian* for that and the following year, and the whole is embodied and analysed in a historical and critical treatise on the disease published by the editor of this work in 1837, and whence the previous account of epizootic diseases is abstracted.

In the autumn of last year, the influenza, which for nearly four years had disappeared, again made its appearance, and proved exceedingly prevalent in various parts of the country.

The following comprises the greater portion of an essay written by myself, and read before the members of the Veterinary Medical Association in London. It will serve to show the symptoms, nature, and treatment of the disease.

“The influenza made its appearance in this locality during the month of September, and has continued up to the present time. My first cases were few and isolated, but they gradually became more numerous and more accumulative. The symptoms were very similar to those of the epizootic of 1836, at any rate sufficiently so to justify me in denominating it the same disease.

“*Symptoms.* — The first symptom that awakened attention was the sudden failure of the appetite, which was either total or partial; the horse, perhaps, might have appeared perfectly well in the morning, and at noon he refused his feed. If I was called in at this stage, I usually found the mouth hot, and the pulse quickened, varying, however, from 42 to 80, being sometimes full and strong, but more frequently soft and weak. There was, generally, a somewhat dull appearance of the animal at first, although nothing to what afterwards supervened; the coat was

often staring, and when so, the attack usually became more severe. This symptom, however, was far from being universal. The extremities were rarely cold. In the course of six or twelve hours, the symptoms became more aggravated, the pulse increased in frequency, and the appetite more diminished, and probably the legs and eyelids were considerably swollen. In some cases the respiration became quickened, and in others there was cough and sore throat, but in the majority of my patients there was no bronchial affection whatever.

“In a few instances, the disease quickly reached its acmé, but, generally, the symptoms increased in severity for two or three days, when, supposing judicious treatment had been employed, they gradually declined, and at length totally disappeared, the animal slowly regaining his former health and spirits.

“The bowels, generally speaking, were not apparently much deranged, but their mucous coat was particularly susceptible to the action of aperient medicines; and the fæces were frequently enveloped in thin slimy mucus, and often softer than in a state of health.

“In some cases the affection of the eyes was so violent as to occasion temporary blindness; and in others pneumonia was present, but more frequently severe bronchitis. In many patients the œdematous swelling of the legs was enormous, and continued obstinate when the other symptoms had abated; but, commonly, in proportion as the legs and eyes were much affected, the internal viscera were free from disease, and *vice versâ*. This rule, however, was by no means universal, for in several patients severe cephalic and thoracic symptoms were present in the same subject, and at the same time.

“When an animal had been previously suffering from some chronic disease, such as broken wind or hepatized lungs, the influenza was nearly sure to light up afresh the embers of the former fire, and this local disease generally proved troublesome and obstinate. So, likewise, when, from the idiosyncrasy of the animal, an organ was in a weak and susceptible state, inflammation in that part was quickly excited by the general fever present in the system.

“The only cases that I have lost were two, with previously diseased lungs. One was an extremely old broken-winded pony that sunk rapidly in the course of two or three days, apparently more from the weakness induced by old age and broken wind than from the amount of new disease, which was by no means great. The other case exhibited, during life, very obscure symptoms, which were in some measure explained by the most complicated inflammatory appearances after death. The lungs, the windpipe, the pleura, the pericardium, and the heart itself, as well as the liver, exhibited the ravages of the most intense

inflammation, approaching to gangrene. The lungs, as far as could be judged, appeared to have been antecedently disorganised. This animal lived about fifteen days. In the earlier stage the pulse was strong and full, and he was bled largely, more so than any of my other patients.

“*Treatment.* — Whenever the pulse was full and strong, I abstracted blood, and always, I imagine, with the best effect. In such instances I observed the blood slow in coagulating, and invariably presenting a buffy coat. I took great care, however, not to abstract too large a quantity; and I found I could produce the desired influence by half the quantity which, in ordinary inflammatory affections, it would be necessary to take away. The amount of blood withdrawn was always determined by its effect on the pulse, taking care, as soon as its character was materially altered, and becoming softer and less perceptible, to pin up the orifice. This alteration was sometimes produced by the loss of 4 lbs. of blood, oftener by 6 lbs., occasionally by 8 lbs., and in a few instances by 10 lbs. In two or three cases where there appeared to be severe internal inflammation, I repeated the blood-letting on the following day, and in one case in the same day; but, as a general rule, even in cases where the pulse had on the following day regained its strength and fulness, I abstained from a second bleeding, trusting to medicine and the progress of the disease to soften the pulse, which I found to take place commonly on the second or third day.

“I had recourse to local venesection still more frequently than to general bleeding; indeed, whenever the eyes were much inflamed, or the lids swollen, I scarified the latter with a lancet, and opened the angular veins, which course of procedure I found attended with the best results; for the local inflammation generally subsided in the course of twelve or twenty-four hours, whether I had bled generally before or not.

“On referring to about fifty cases, I find that in twenty-three I employed general bleeding, in the remainder I did not; but in twenty-five cases I bled locally, either from the eyelids and veins, or the bars of the mouth. The majority of these were cases in which I had not bled previously, and the minority belonged to those in which I had before employed venesection. More than one half of the horses that were bled generally were from the same stable, principally young cart horses that had been recently purchased, and afterwards worked very hard. They had also been allowed a considerable quantity of beans, a diet to which they had not previously been accustomed.

“Among these horses I found my severest cases often complicated with pneumonia, bronchitis, and other visceral derangement. In them, too, the blood presented a thick buffy coat, and the pulse was strong and full.

“ My usual treatment in the way of medicines consisted in administering the following : —

Croton oil 5 drops.
 Nitre 4 to 6 dr.
 Tartarised antimony 1 dr.
 Spirit of nitrous ether 4 to 8 dr.
 Spirit of mindererus 2 to 4 oz.
 Warm water sufficient to form a draught.

“ Sometimes 4 drachms of bi-tartrate of potash were added to the above ; and when the head appeared much affected, 1 drachm of camphor. This draught was administered generally once, but sometimes twice a day, the croton oil being omitted after the first dose. After the first day, in by far the greater number of cases, 2 drachms of gentian were added to the draught ; and after the second or third day a ball was substituted for the draught, consisting of —

Nitre 3 dr.
 Tartarised antimony 1 dr.
 Gentian 2 dr.
 Pimento 1 dr.

“ In one case the above draught produced profuse perspiration immediately after, and each time it was administered. Although this effect may be principally ascribed to the idiosyncrasy of the animal, yet it proves the diaphoretic properties of the medicine, although this may not generally be distinctly perceptible.

“ *Counter Irritation.* — In by far the greater number of cases there was no inflammation of the air passages ; but whenever it was denoted, I blistered the throat, the course of the windpipe, and the breast, or inserted setons or rowels, as the particular case appeared to demand.

“ Such is a brief, but I trust a succinct account, of the treatment I have found successful, not only in conquering the disease, but in restoring the health and strength in a short space of time. Although the majority of cases were not dangerous, yet many of them were so ; and it is notoriously the fact, that a great number of horses have died from the disease in various places. Indeed, in the establishment to which I have referred, three horses died from it under the care of another person, not a member of the College ; and in several instances where horses have been treated by the owners, although the case was not dangerous, they recovered but slowly, and with great loss of condition.

“ **GENERAL REMARKS.**—I have found in the present epidemic a greater disposition to œdematous swelling of the extremities and sheath than in that of 1836 ; and so obstinate, occasionally, were these enlargements, that they were reduced with much

difficulty, and only after the frequent and continued employment of diuretics, and the insertion of setons in the thighs. There likewise appeared to be throughout the attack a capability of taking large and repeated doses of diuretic agents without exciting the kidneys in any great degree. At least double the quantity could be given, and with no greater action than half the quantity in a state of health.

“ In one place where I attended, the prevailing epizootic was raging amongst sheep, and at another place amongst cattle; but the owners required no professional assistance, as they informed me they readily cured the affection, both of the feet and the mouth, by the application of salt and tar. Are these diseases to be attributed to the same cause as that producing influenza in horses? And is it not probable that the influenza will appear amongst mankind during the approaching winter or spring, as it succeeded the disease in horses in the year 1836? *

“ As I find at this, the eleventh hour, that it is impossible to be personally present when this paper is submitted to the consideration of the members of the Association, I think that I cannot do better than atone for my absence by instituting a few questions naturally springing out of the foregoing account; not, however, with the expectation of being enabled satisfactorily to solve them, but in order to provoke profitable discussion, and afford, as it were, some useful pegs which may serve the purpose of suspending many valuable facts and observations on. For my part, I shall be contented to act as the humble pioneer, leaving to you the mightier task of clearing away all impeding doubts and difficulties.

“ 1st. *To what cause must we attribute the influenza?*

„ On this point I must refer to the theory of your esteemed patron. I can go so far with him as to believe that, in common with the epizootic amongst cattle, it is derived from some peculiar atmospheric poison, the nature and the source of which I do not profess to know. I am not inclined to consider that it can be assigned to the influence or fluctuation of the weather, although I believe that these changes will considerably modify the symptoms; for it is a fact worthy of especial attention, that the disease made its appearance, and continued to prevail, in this neighbourhood, during the prevalence of remarkably fine and genial weather.

“ 2dly. *Is the blood the seat of the disease?*

“ In my opinion, certainly not; for I have found it in two very opposite conditions, — one slow in coagulating, and presenting a thick and firm buffy coat; the other dark-coloured, quick in

* This supposition was verified by the appearance of the human influenza in the following spring.

coagulating, and with no buffy surface. The former appearance I have invariably found connected with a strong and full pulse, the latter attended by a weak soft pulse; but quick in both instances. Under the last-mentioned circumstances, I bled in very few instances, and then only in small quantities; but I have no doubt the appearance of the blood would have been the same in every case in which I abstained from general bleeding. The appearance of the blood, and the state of the pulse, are, probably, rather to be attributed to the idiosyncrasy of the patient, and the diet to which he had been accustomed, than to the effect of the disease. I coincide with your president's opinion, that the state of the blood ought to have little or no influence over our treatment of disease; but I cannot go so far as to discard it altogether from consideration. I must confess that I almost always examine its appearance after venesection, which, however, can be ascertained as well in a few minutes as in as many hours; and in an inflammatory disease I am always pleased to find a buffy coat, for it assures me that, at any rate, my patient can endure bloodletting. In a case in which I may be in doubt as to the propriety of repeating the withdrawal of blood—being, perhaps, influenced, *pro* and *con*, by equally weighty reasons—I should incline to the performance of the act if the blood, at the previous abstraction, had presented a fibrous coat. This, however, is a digression for which I must apologise, and return to another query.

“3dly. *Where, then, is the seat of the disease? or in what does it consist?*”

“Surely not in the presence of any symptoms that, however frequent, are yet in some cases wanting. And it is a curious fact, respecting the quick pulse, the tumefaction of the extremities and the eyelids, the loss of appetite, the affection of the throat or the lungs, that however frequent these appearances may be, yet there are some instances in which one or more of them are absent. The only symptoms universally present are fever and prostration of strength. We must, therefore, regard it as a fever *sui generis*, in which the mucous membranes are considerably affected, and the nervous system greatly deranged. It will run its course. There is no knocking it down. All that we can do is to regulate its progress, to moderate its fury, and to assist Nature in her own operations. We may, indeed, conquer by a siege, but not by an assault.

“4thly. *Is bleeding desirable in this complaint?*”

“On this question I do not expect your members to fight over again the well-contested battles of 1836-7; but it will, perhaps, be interesting again to canvass the opinions of many of those who then fought in the foremost ranks, and to ascertain whether any, and if any, what alteration, has taken place in their opinions

from ruminating over the cud of reflection during four years. My own opinion is shown by my practice. I cannot say that it has undergone any change, or, if there be any, it slightly leans towards the side (without, however, entering the ranks) of the opponents of venesection. I take it for granted that the chief art in treating the disease is to know when to bleed, and when to abstain; being guided in this matter chiefly by the state of the pulse. Where, however, I have not bled generally, I have witnessed the very best effects from local bleeding. It has, in a few hours, relieved the tumefaction of the eyelids, and the heaviness of the head, to a great extent. One thing is most clear,—we can produce a very great effect on the system by moderate bleeding.

“ 5thly. *Is aperient medicine judicious?*

“ This, too, is an old disputed point. I am myself in favour of a very moderate dose at the commencement, but against its repetition. I have most commonly administered five drops of croton oil, which has generally produced a sufficiently laxative effect. The addition of a few drops more I have known produce purgation. I am inclined to believe that a very moderate action on the intestines will hasten the recovery of the patient.

“ I have been required to attend several cases of superpurgation from the administration of full doses of physic in this disease by empirical practitioners.

“ In one instance I was called to see an animal which one of these savans had previously visited, and for which he had immediately put in practice the whole list of his remedies—a mild dose of physic, a rowel in the brisket, a blister on the throat (there was no affection of the air passages), and he was just going to take away six quarts of blood; but this the employer would not permit until he had consulted me. I attended a few hours afterwards, and, from the pulse, I deemed it prudent to abstract about five or six pounds of blood, which proved buffy. The next morning I found the pulse much softer, and not increased in quickness, the fever less, and the general symptoms more favourable; but, notwithstanding this, the man had been there before me, and, finding the physic had not yet operated, he wished to give another dose, and to take away six quarts more of blood. The owner fortunately declined his further assistance, or he would certainly have destroyed the horse; for, as it was, in the succeeding night severe purgation ensued, anticipating which I had left some medicine to counteract it. The appetite, which a few hours previously had been improved, was now totally gone, and the animal appeared in the greatest debility. His recovery was, in consequence, very much protracted.

“ 6thly. *Is the influenza infectious?*

“ This question will admit of no absolute demonstration. We

must content ourselves with reasoning on the facts that may come before us, and be satisfied with approaching the confines of probability. After a few scattered cases, I was called to attend a pony at some livery stables. A few days afterwards I had another, and, in all, nine cases in these mews. At this time there were no other cases in the neighbourhood of these stables, but six weeks afterwards I attended a case at another mews not more than 100 yards distant from the former, and here I had, one after another, five cases.

“In the establishment where I had the greatest number of cases, there was a young horse that indicated the approach of strangles. He was removed to the hospital stable, in which were several horses with influenza. He remained there eight or ten days, getting on pretty well, when he suddenly showed the symptoms of influenza, in addition to those he had before, and his pulse rapidly rose from 46 to 80. This certainly looks like infection. On the whole, I am disposed to regard the disease as infectious, believing, at the same time, that the greater number of cases are produced from the same unknown atmospheric cause.”

There are several other useful communications on the subject of influenza in the *Veterinarian*, together with an interesting debate. — ED.]

CHAP. XLII.

GLANDERS AND FARCY.

Glanders.

THIS is a contagious disorder, and one that is generally thought incurable.

[Its *symptoms* are a discharge of matter from one or both nostrils, and enlargement of one or both submaxillary glands. When one nostril is affected only, the corresponding gland is almost invariably found enlarged. The membrane of the nostril, called the Schneiderian membrane, is generally of a pale or leaden hue; and sometimes ulcerations are visible on its surface. The discharge usually sticks to the nostrils, and is sometimes white and thick, but oftener of a greyish aspect. The late Professor Coleman divided the disease into two kinds, which he termed the acute and the chronic; the former being cases in which ulcers were visible, and the latter in which none could be seen. This definition, however, though sometimes correct, is too arbitrary for general admittance; for there are

cases of acute glanders occurring without any ulcers being within sight. It is still, however, convenient to observe the terms acute and chronic, to denote different varieties of the disease. A discharge from the nostrils, and the appearance of ulceration, is not alone sufficient to establish the presence of the disease; for these ulcerations are sometimes produced by the acrid nature of the discharge from catarrh. If the discharge is accompanied, from the first, by an offensive smell, the probability is that the case is not glanders, but ozena. — ED.]

The great number of horses that have been destroyed by glanders, especially in the army, and in establishments where great numbers of horses are kept, has excited particular attention to the subject, especially in France and Italy, where many attempts were made, in the beginning of the last century, to discover a remedy for it. The reader may form some idea of the extent of such losses, when informed that large innkeepers have been nearly ruined by them. I had occasion to condemn eight horses at one time, in one establishment, which, added to those already lost, amounted in value to 500*l*. In one regiment, 50 glandered horses were shot in one day. The 23d French dragoons, when quartered in Italy, in March, 1809, had 76 horses at one time affected with glanders and farcy, or suspected of being so affected. Lafosse, an eminent French veterinarian, considered it as a local disease, and thought he had discovered a successful mode of treating it, which consisted in perforating the bones which cover the frontal and nasal sinuses, and injecting through the openings astringent and other liquids. After this opinion had been published, some English farriers made trial of it, and by others detergent lotions were poured into the nostrils; the nose being drawn up for the purpose by means of a pulley. Attempts were also made to cure it by arsenical fumigations, and by burning out the swollen glands under the jaws, or sloughing them out by caustics. The various preparations of mercury, copper, iron, and arsenic, have likewise been tried, and after all, the general opinion is that the glanders is incurable.

From the circumstance of horses having sometimes escaped the disorder, though they have been standing in the same stall or stable, or drinking out of the same bucket or trough with a glandered horse, many have been led to doubt its being contagious; and the little care that some large proprietors have taken to prevent the spreading of the disorder, in consequence of such opinions having been held, has been the cause of very serious losses; many instances of which have come within my personal knowledge. That the glanders is contagious has been clearly and indisputably proved by numerous experiments; and the manner in which it is propagated has likewise been satis-

factorily demonstrated. At the same time, it is generally believed that the glanders takes place also independent of contagion; but from what causes or circumstances it is then produced, no author has attempted to state precisely.

It has been said, in a general way, that close unwholesome stables, hard work, and bad provender, sudden changes from cold and wet weather to hot close stables, hard work, and insufficient keep, and, in short, any thing that will weaken the animal considerably, is likely to produce glanders or farcy.

There will be no danger in admitting this opinion if, at the same time, we keep in view the contagious nature of the disorder, in whatever manner it may be produced. For if such cruel and foolish treatment of horses does not produce glanders and farcy, it produces other disorders which are often more speedily fatal than glanders; and if it does not actually produce a disorder, it weakens the constitution to such a degree that the animal is rendered more susceptible of the contagion of glanders, as well as of other diseases. It is from this cause that glanders spreads so rapidly among post and stage coach horses, while among horses of a different description, its progress is generally slow. Mr. Russel, of Exeter, had, for many years, some glandered teams of horses constantly working from Plymouth to Exeter. But they were worked with moderation, well fed, and taken great care of. I attended these teams for several years; the horses generally looked well, and in excellent condition. Many of them lasted four or five years; some fell off after a few months. As they dropped off, the teams were reinforced by horses that happened to become glandered on another line of road belonging to the same proprietor, or by horses free from glanders that did not suit other teams, or were not supposed good enough for them. Such horses would sometimes escape the contagion, at others they would become glandered in a few weeks.

After some time, the person who had the care of the teams from which these reinforcements used to be drawn, became convinced, by experiments, of the contagious nature of glanders, and therefore diligently employed every precaution that could be thought of to prevent the disorder from occurring. In consequence of this, and the great care that was taken on the line of road where the glandered horses were worked, the number gradually diminished; and the last time I heard, there was not one left. About the same time, I attended the horses of Messrs. Sweet and Co., common carriers, of Exeter, who had also a team of glandered horses. Here the work was harder, and somewhat irregular. The feeding did not appear to be so carefully attended to, nor was the general management of those horses in any respect so good as that of Mr. Russel's. In con-

sequence of this, the horses did not last so long, and much loss was sustained, so much so, that the two concerns afforded a striking proof of the truth of a former observation, that it is decidedly the interest of all horse proprietors to work those useful animals with moderation, and feed them properly.

It has been said that glanders has often been produced in the cavalry by putting the horses, immediately after coming from camp, where they are constantly exposed to the weather, into warm stables, and giving them the full allowance of oats. This, it is true, has often brought on inflammatory disorders, which were very destructive, and sometimes of the catarrhal kind: in which case, they were accompanied with a discharge from the nostrils. The acrimony of the matter would sometimes even ulcerate the nostrils, and the disease would then be considered as a decided case of glanders. I have known the distemper, or epidemic catarrh, produce this effect.

In the distemper that prevailed in the summer of 1799, several horses in the Scotch Greys were said to have become glandered from the violence of the distemper, and were accordingly destroyed. Such cases may have been of a different nature from glanders, though resembling the disease in one symptom, which is generally considered decisive of its being so, that is, in the ulceration within the nostrils.

[Later researches have fully proved that glanders may be produced, not only by contagion and the causes before enumerated, but also by catarrh, either in its common or epidemic forms, by strangles, and by inflammation of the lungs. In such cases these diseases are said to degenerate into glanders. In the last three cases that came under my attention, one was preceded by strangles, another by bronchitis, and the third by catarrh. That form of the disease called bastard strangles, in which the glandular swelling does not suppurate kindly, but becomes hard and scirrhous, is very apt to degenerate into glanders. — Ed.]

In 1784, a law was enacted by the French government to prevent any one from keeping a glandered horse, under a penalty of 500 livres. Every animal suspected of glanders had the words "suspected animal" impressed in green wax, on his forehead; and the penalty for selling such an animal, or offering him for sale, was 500 livres.

Persons having suspected animals were to report the same immediately to the mayor, syndics of villages, or other proper authorities, under a penalty of 500 livres. Such horses were then inspected by experienced veterinarians, or other competent judges, appointed by the mayor or other officer, and if found glandered were destroyed. If only suspicious, or suspected, they were marked in the forehead as before described. At the same time, a pamphlet on the glanders was published by order

of the government, drawn up by two eminent veterinarians, viz. MM. Chabert and Huzard. This pamphlet, which was republished in the fifth year of the French Revolution, viz. 1797, contained instructions for the veterinary surgeons employed to examine suspected horses, pointing out the steps they were to take with regard to the constituted authorities, and the proprietors of such horses.

Glanders has been divided into two stages, the acute and the chronic, or the first and second stage. The acute glanders is generally attended with acute farcy, such as chancrous ulceration about the lips, face, or neck, with considerable and painful swellings on different parts, some of the swelling appearing as a corded vein. Ulceration and swelling of the hind leg or sheath, or testicles, and sometimes of the fore leg, with corded veins, and farcy buds on the inside of the limb. The acute glanders often spreads rapidly, and either destroys the animal, or renders him such a pitiable and hopeless object, that the proprietor is generally induced to have him knocked on the head.

Chronic glanders is generally very mild in the first stage of the disorder, and does not affect the appetite, or the general health and appearance of the animal. Such horses, when properly fed and taken care of, and worked with moderation, will often continue in regular work for several years.

I have been in the habit of attending several teams of glandered horses since I left the army, and have known them last four or five years. Sometimes, however, they would go off in a few months; and whenever a glandered horse fell off much, and became unequal to his work, he was destroyed. Many glandered horses have been known to get rid of the disorder while working in these teams; and sound horses that have been put in occasionally to fill up the teams, especially old horses, have escaped the disorder. It is this circumstance, as I have before stated, that has led many to believe that the glanders is not contagious.

The second stage of glanders is marked by ulceration within the nostrils, or an appearance in the matter which indicates ulceration, though sometimes too high up to be seen. The matter is in larger quantity, more glutinous, sticking about the margin of the nostril and upper lips, and sometimes obstructing the passage of air, so that the horse makes a snuffling noise in breathing. The matter is sometimes streaked with blood; and the horse sometimes bleeds from the nostrils in working. When this happens in the first stage of the disorder, however early it may be, it indicates the approach of the second stage. The matter begins to have an offensive smell, which it scarcely ever has in the first stage, though an offensive smell is by many supposed to be a decisive mark of glanders. In the second stage, the matter generally runs from both nostrils; the glands under the

jaw become larger, harder, and fixed more closely to the jaw bone. They are also generally more tender than in the first stage; the inner corners of the eyes are mattery. The horse loses flesh and strength, stales more than usual, coughs, and at length dies in a miserable condition, generally farcied as well as glandered.* In the pamphlet before noticed, by Chabert and

* Although the disease is here divided into the first and second stage, it is not essential that in each case the former should precede the latter, for sometimes the acute only is present, and the horse speedily dies if not destroyed. In other instances, the acute stage may be succeeded by the sub-acute. It may, however, be observed that the first stage never ends in death, but always in the second stage, before the disease proves fatal. Besides these stages, glanders sometimes assume a still more insidious appearance, in which the discharge is so slight, and the enlarged gland so trivial, as not only to deceive the ignorant, but often to mislead the well-instructed practitioner. The discharge is thin, and appears no more than a slight increase of the natural discharge, and the sub-maxillary swelling is no larger than a bean, though hard and indurated. Such cases as these have proved of irreparable injury to many horse proprietors, from the symptoms not being sufficiently urgent as to excite alarm; and when a veterinary surgeon has given his opinion that such case was one of glanders, there have not been wanting plenty of farriers and others who have altogether contemned such an opinion, and for a time, at least, have exulted over their own superior sagacity. Mr. James Turner relates a striking instance of this, in which his advice was disregarded, and a horse, with these insidious appearances, was allowed to mix with other horses, to several of which he communicated the disease in the course of a few months. Several instances of a similar nature have occurred in my own practice. One in which, after attending a horse with a suspicious gleet, I pronounced him glandered; and to be still more certain, inoculated a donkey with the matter, which communicated the disease in a few days. By some underhand means the donkey was smuggled away contrary to the wishes of the owner, and destroyed without affording me the opportunity of examining the body. The horse was shortly afterwards sold for 5*l.*, and then a neighbouring farrier offered to cure him, which, according to the report which he circulated, he accomplished in a few weeks, stating that the horse had never been glandered. Shortly afterwards the horse was sold by the owner, a low dealer (rather too low for the shafts of the law to affect him), for 20*l.* He was turned with other horses, to whom he communicated the disease, and I was requested, some months afterwards, to give a certificate as to the state the horse was in whilst under my care. Another case occurred within a few months of the other, in which the symptoms were not so strongly marked, and therefore more insidious. A young carriage horse belonging to a nobleman now deceased, was ill with a severe catarrh in the early part of 1839, and was for some time under the care of a veterinary surgeon of Bath. He got considerably better, but the discharge from the nostril continued. A few months afterwards the establishment coming, according to custom, into my neighbourhood, I saw the horse, and recommended that he should, by all means, be separated from the other horses, which was accordingly done, and he was placed under my care. The symptoms, at this time, were a rather considerable discharge of white healthy looking matter from the near nostril, and enlargement of the corresponding submaxillary gland, which felt hard, and was about the size of an egg; no ulceration could be perceived, and the animal looked in other respects healthy and well. The horse was valuable, having recently cost 70*l.* The treatment was pursued for several weeks, and consisted of blisters and setons to the throat and glands, and vegetable and mineral tonics internally. Under this treatment the horse got considerably better;

Hazard, they divide the disease into three stages or degrees. "In the first there is a discharge from one nostril only, of a whitish humour, which is inconsiderable, except when the horse has been exercised for some time. There is an increased redness of the membrane within the nostrils. The swelling of the glands under the jaw is on the same side as the affected nostril. There is a healthy appearance of the horse's coat, and he seems in good health and condition. The urine is crude and transparent.

"The symptoms of glanders arising from communication with a glandered horse are different from those of glanders produced by bad provender, excessive exertion, &c. In the former the discharge is from one nostril only, or much more from one than from the other; and there is no cough or other symptom of catarrh or cold, or any other disorder. In the latter, on the contrary, there is cough, either dry or moist; and it is preceded by loss of appetite, or falling off in appetite, and depression of spirits.

"The symptoms of the second degree are the altered appearance of the running from the nose, which has become more glutinous, and adheres to the edges of the nostril with a contraction and partial closing of the nostril, an increased tenderness of the swelling under the jaw, which begins to adhere more closely to the jaw-bone. In the third degree, the running from the nose becomes of a darker colour, sometimes streaked with blood, and of an offensive smell. There is sometimes a bleeding from the nostril. The running is from both nostrils. There is a slight tumefaction of the under eyelid, a swelling, or elevation of the bones of the nose or forehead. Loss of appetite, debility, cough, and swelling of the legs and sheath, or testicles, if a stallion; also lameness without any apparent cause. Chancres or ulceration within the nostrils, great tenderness of the glands under the jaw, which now stick close to the bone. A small discharge of matter

the swelling very much diminished, as well as the nasal discharge. After five or six weeks, however, I felt no hesitation in pronouncing the case to be one of glanders, but that I had no doubt the symptoms might still be amended. Soon after this the owner made a present of the horse to a relative (with all his faults), and I heard nothing more of the case for two months, when I was told that the horse was entirely well, and a neighbouring farrier (whose only treatment of the case I afterwards found consisted in applying a blister to the gland) industriously reported that he had cured the disease that had baffled me, but that it was never one of glanders. The owner, not quite satisfied with the case, consulted Mr. Field, and by his desire the horse was sent to town by railroad. The discharge from the nostrils was very slight, but sufficient to enable Mr. Field to inoculate with it a donkey, which shortly afterwards became glandered. The horse was now ordered to be destroyed, and being examined by Mr. Field, the evidence of the disease was decisive, and the lungs were found in a tuberculated state. — ED.

from the inner corner of the eye on the same side as the affected nostril, or in both eyes, when the running is from both nostrils. When these symptoms appear the disease soon proceeds to a fatal termination. The above symptoms are not *all* peculiar to glanders, but may take place also in strangles, bastard strangles, peripneumony, distemper (*morfondure*) and pleurisy. The discharge of a glutinous matter from the nose, the swelling of the glands under the jaw, and the ulceration within the nostrils are symptoms which occur in the above diseases as well as in glanders, but with this essential difference. In the latter, the three symptoms just noticed generally occur about the same time, which is not the case in glanders; and are, in the first instance, acute and inflammatory, and such as to excite apprehension of immediate danger. They go through their course in a short time, the running from the nose gradually diminishes, the blood is depurated, and a perfect recovery takes place. Glanders, on the contrary, is extremely slow in its progress: the first degree often continuing a considerable time; and it is only towards the end of the second degree, or the beginning of the third, that the symptoms appear to indicate an alteration, or disease of the internal organs. This slow progress of glanders, and especially its continuing for some time without any apparent injury to the animal's health and condition, the state and progress of the swelling under the jaws, and the ulceration within the nostril, furnish such clear marks of distinction between those diseases and glanders, that they cannot well be mistaken for each other."

It is a remarkable circumstance that glanders cannot be communicated by applying the matter which is discharged from the nose of a glandered horse to the nostrils of a sound horse, unless there be an open wound or sore, ever though a piece of lint soaked in the matter be put up the nostrils, and kept in contact with the pituitary membrane for a short time; or even if the matter be thrown up the nostrils with a syringe. But, if the smallest quantity of matter be applied in the way of inoculation, either to the membrane of the nostrils, or to any part of the body, a glanderous ulcer will be produced, from which farcy buds and corded lymphatics will proceed. After a few weeks the poison will get into the circulation, and the horse will be completely glandered. The circumstance of glanders not being communicated by applying matter to the nostril, enables us to account for a horse escaping the disorder, as he sometimes does, after being put into a glandered stable, or standing by the side of a glandered horse. I believe, however, that glanders is frequently communicated by (accidental) inoculation; and that there is only one other way in which it can be communicated, that is, by swallowing the matter which flows from the nose of a

glandered horse. M. St. Bel, the first professor of our Veterinary College, mixed some glanderous matter with flour, and formed it into balls. These balls were given daily to three horses for one week. The youngest of the horses became glandered in about a month; the others were not affected till some time after.* Glanders cannot be communicated through the air by effluvia issuing from the glandered horse, in the way that putrid fever is communicated; for I have kept a horse badly glandered in a stable with other horses, but with such a separation as would effectually prevent the sound horses from swallowing or touching any of the matter: yet they were living in the same air, there being a free communication with respect to any effluvia there may have been between the sound and the glandered horses. This trial was continued for some time, and several horses were at different times placed in this situation. Glanderous matter has been rubbed on a sore place, or ulcer, that had a healthy appearance in a sound horse: it altered the appearance of the sore for a time; but, after a few days, the healing process went on again, and the sore soon got well. From this it appears that, to communicate the glanders, the matter must be applied to a scratch or wound fresh made, and not to a sore on which matter has formed. A sound horse has been inoculated with glanderous matter that had been mixed with ten times its weight of water. This produced some degree of inflammation, and a small ulcer of a suspicious appearance; but after two or three days, it got quite well. This shows that glanderous matter may be so far weakened by dilution with water, saliva, or the watery secretion from the lower part of a glandered horse's nostrils, when he has the disease in a very slight degree only, as to render it incapable of communicating the disease. On the other hand, when a large opening is made in the skin of a sound horse, and a piece of tow or lint, soaked in glanderous matter, put into it, in the manner that rowels are inserted, the disorder is communicated in so violent a degree that the animal is generally destroyed by it in a few days. The same effect is produced when glanderous matter, mixed with a little warm water, is injected into the jugular vein of a sound horse.

A horse affected with glanders may inoculate himself, and thereby produce the farcy. I have known this happen to a horse while at grass. The horse had an itching in his hind leg, which led him to rub and bite the part, and, at the same time, rub on it the glanderous matter which flowed from his nostril. The possibility of this circumstance taking place may be easily proved by inoculating a glandered horse, in any part of his body, with some of his own matter. There are many ways in which a

* It is said this experiment has been repeated, but not with the same result.

sound horse may be accidentally inoculated with the matter of glanders, for the slightest scratch in any part of the body is sufficient. Horses that are cleaned with a curry comb are very liable to be scratched in those parts where the bones are prominent, such as the inside of the hock and knee, the shank bones and the head. To such scratches glanderous matter may be applied by the hands of the groom after he has been examining the nose of a glandered horse, or wiping off the matter from his nostrils; or by the horse himself transferring glanderous matter from the nose of a diseased horse, or from the manger, or other part where any matter has been deposited, for horses are very fond of rubbing their noses against the manger or stall, and a glandered horse will generally try to rub off the matter from his nose against the manger, the rack, the stall, or against another horse; and, if a sound horse happened to stand by one that is glandered, they will often be seen nabbing or gently biting each other, or rubbing noses. In short, having proved that glanders is thus communicated, we can conceive a variety of ways in which a horse may be accidentally inoculated. When a horse has been twitched, he generally rubs his nose and lips with considerable force against the manger, and may thus easily inoculate himself with a glandered splinter. Now, the parts where the local farcy first appears are those most likely to be accidentally inoculated, that is, the inside of the hocks and knees, the shanks, the lips, the under jaw, where grooms are often trimming off the long hair with sharp-pointed scissors, or singeing them with a candle, and often causing an itching, which makes the horse rub the part against the manger. In this way the heels also are often wounded. Horses that are too highly fed and little worked are liable to itching humours, which make them nab or bite their skin, and scratch the hind leg with the opposite foot; and we may often see them bite, rub with the nose, and scratch with the hind foot, alternately, the other leg.

.If we take all the foregoing circumstances into consideration, and recollect that in M. St. Bel's experiment a month elapsed before the first horse became glandered, and that, from numerous experiments and observations made with regard to accidental and intentional inoculation with glanderous matter, some days will elapse before any ulcer or chancre is produced, a week or two before farcy buds or corded lymphatics appear, and, probably, a month or two before the running from the nostril comes on (except when an ass is the subject of experiment), — if we reflect upon all these circumstances, there will be no difficulty, I think, in admitting the following positions, or rather inferences or conclusions, with respect to glanders, viz. that glanders is a contagious disorder, which is communicated by inoculation, and by swallowing the matter, and not by effluvia

proceeding from a glandered horse, or a stable in which a glandered horse is, or has been kept; secondly, that the degree in which the glanders takes place depends on two circumstances, chiefly on the quantity of matter applied, and next, upon the state or health of the animal that receives it. This is more strictly the case with regard to glanderous inoculation, it having been proved that by introducing a considerable quantity of matter, the horse is speedily destroyed. The same rule will probably be found to hold good, in a certain degree, when glanderous matter is swallowed; but the horse's stomach possesses a wonderful power of resisting the impression of poisonous matter, as has been proved by the large doses of arsenic, corrosive sublimate, sugar of lead, &c., that have at different times been given, by way of experiment, to glandered horses. A horse, therefore, may possibly swallow one large dose of glanderous matter without being injured by it, while a repetition of smaller doses will readily produce the disorder. M. St. Bel gave it daily for a week; and the same method has been pursued in other experiments.

I am inclined to believe that the disorder is more readily caught by eating the glanderous matter mixed with oats or hay, than by drinking it with water, as in the former case it is so intimately mixed with the food by mastication. M. St. Bel placed two sound horses by a glandered horse, drinking out of the same pail and eating out of the same manger. One of the sound horses was six years old, and just taken from grass; the other nine years old, and taken from regular work. The first showed evident signs of glanders at the expiration of thirty-four days; it fully declared itself in the second at the end of six weeks. Two horses in good health, the one seven, the other eleven, years old, both just taken from work, were placed by a horse that had the glanders. The former caught the disease in fifty-two days, the other in three months. A horse thirteen years old, very lean, was made to drink the same water out of the same pail with a horse that had the glanders, and continued so to do for two months: he did not catch the disorder. A horse nine years old, in tolerable condition, was placed by a horse that had the glanders in the last stage of the disorder: he caught it at the end of forty-three days. M. St. Bel's trials by inoculation were attended with a different result, which I am at a loss to account for; as I have clearly proved, by numerous experiments, that glanders may be communicated almost with certainty by inoculation, especially to young asses. Old horses appear to offer the greatest resistance to it, both by the way of inoculation and by swallowing the matter. M. St. Bel inoculated three old horses with glanderous matter, and they all escaped. He adds, this experiment was repeated on various horses of all ages,

without producing any effect. It was also performed on an ox, a sheep, and a dog, without impairing in the least the health of these animals. I have known a horse, fifteen years old, stand by the side of a glandered horse, constantly feeding, drinking, and working with him for many months, without catching the disorder; and I had occasion to inoculate another old horse several times before I could produce the disease, and at last it was about three months before the glanders took place in him. In younger horses, and especially in asses, the disease is produced with great certainty by inoculation. In doubtful cases, that is, when there is much difficulty in determining whether the discharge from a horse's nostril is glanderous or not, and such cases often occur, I have for some time made use of a young ass, which costs only a few shillings, in order to decide the point beyond all possibility of mistake. If the matter is really glanderous, a peculiar kind of sore or chancre will be produced by inoculating the young ass with it in any part of the body. From this ulcer, corded lymphatics or veins, as they are termed, will proceed, and farcy buds or small tumours will take place. After a week or two the animal will begin to run at the nose; and then, in a short time, he will be completely glandered. The disease in this animal is almost always quickly fatal. If the matter is not glanderous, no effect whatever will be produced by it. In the army, and in establishments where many horses are kept, this will be found a valuable test for determining with certainty the nature of a discharge from the nostril. However mild the glanders may be, though no kind of ulceration can be seen within the nostril, and the quantity of matter discharged is but small, and the animal in good health and condition, the ass will be as certainly infected by the matter as if the disease were in the last stage, or in the most virulent degree.

The following is the method of performing the inoculation:— Cut off a little hair from the side of the neck or any other part of the body, for about the space of half-a-crown; then take a lancet and pass it under the cuticle or scarf-skin, for about a quarter of an inch: it should not wound the skin much, but be sufficiently deep to tinge the lancet with blood, or make one or two drops of blood appear. The matter may be introduced into this opening (first wiping off the blood) by means of a thin slip of wood, of the form of a lancet. If the matter is glanderous, the part will become sore in two or three days, and a scab will form on it, which in a few days will be thrown off, leaving a peculiar kind of ulcer, which will often spread rapidly, causing a painful swelling of the adjacent parts, with corded lymphatics and farcy buds. In about a fortnight, sometimes less, the glanders will appear. No other matter will produce this effect. There is only one kind of matter, besides that of glanders,

which, according to my experience, will produce *any* effect, and that is the matter of virulent or chronic *grease*; when the discharge from the heels is of a dark colour, something like dirty kennel-water, and of a peculiarly offensive smell. (See *Grease*.) When a horse is inoculated with this matter, a small but very painful tumour will arise in the part. After a few days the skin covering the tumour will become of a dark colour, and in a few days more the dark-coloured skin will slough off, and leave a healthy granulating sore, which will soon get well of its own accord. A horse who had been thus inoculated, was inoculated also with glanderous matter; and it is worthy of remark, that while the *grease* sore was going on, the glanderous inoculation had no effect.

The Nature of Glanders.— [There is still much difference of opinion as to the real nature of glanders. Professor Coleman considered that it was a specific inflammation of the membrane of the nostrils, produced by a poison in the blood, and on transfusing the blood of a glandered horse into the veins of an ass, it quickly communicated the disease, clearly proving that the blood was affected. Mr. Dupuy, who has written an elaborate treatise on the disease, considers it to be of a tuberculous nature, and that it is always preceded by tubercles in the lungs, that is, small white grey bodies, which are principally composed of carbonate of lime, but which, in time, are converted into pus. These tubercles were, likewise, he asserts, found on the nasal membrane. He considers that they may exist for several years before the development of glanders, and that ere this they increase in number and coalesce, and at length are changed into pus and occasion ulcers both in the lungs and the nasal membrane.

Professor Sewell in some measure coincides with these views, and has found that on inoculating a healthy donkey with glanderous matter, it has produced tubercles in the lungs in a very short space of time.

These views are deserving of great weight, but we cannot altogether coincide with them; for, although perhaps in the majority of cases tubercles are found in the lungs of glandered horses, yet there are other instances in which there are none to be found there or elsewhere. The particular seat of glanders is certainly the membrane lining the nostrils and chambers of the head, although in a great number of cases the lungs are likewise involved. We cannot say whether in all cases the constitution is affected, or whether in some instances the disease is entirely local; but in the subject chosen by Professor Coleman for experiment, it was clearly proved that the blood was infected. There is evidently a much greater predisposition in some horses to receive the disease, either from infection or otherwise.

Horses with narrow chests, long legs, and light carcasses, are more liable to take the disease than others; and some consider that colour has something to do with the matter. Some years since, during my pupillage at the Veterinary College, having to read a paper on glanders to the Veterinary Society, I examined the record of cases kept there for many years, and I found that the number of chesnut glandered horses was greater than of any other colour.

Next to that of curing this disease, it is desirable to be able to decide in difficult and obscure cases as to its actual presence; and on this matter the opinion of veterinary surgeons is frequently demanded. Grooms and farriers more frequently give a wrong than a right opinion, imagining when the symptoms are very mild, that the disease cannot be glanders, and often pronouncing a horse to be glandered when he has only the strangles or catarrh. The first mistake, however, is the most frequent.

In examining a suspected case, if we find a discharge of matter from one nostril, and a portion of it sticking to the entrance with a hard and fixed enlargement of the submaxillary gland, although the enlargement may be slight, and the discharge inconsiderable, yet, if these symptoms have existed for two or three months or upwards, we may safely decide the case to be one of glanders, even if there be no ulceration within sight. When these symptoms exist, but there is no means of ascertaining the history of the case, we may justly consider that the probability is in favour of its being one of glanders; and this opinion will be greatly strengthened if there are any mysterious or suspicious circumstances connected with it, such as the horse having been sold at a very low rate. If, however, we cannot trace the history of the case, and the animal is of any value, it will be desirable either to keep it for some weeks, or otherwise to inoculate an ass with the suspected matter.

If both nostrils are affected, and the symptoms are but slight, the case is not so decided as if one only is affected.

If there be a cough, and the other symptoms are *slight*, the chances are, that it is *not* a case of glanders, for although cough is sometimes present in glanders, yet it denotes some pulmonary affection, in which case the symptoms of glanders are usually *severe*. The absence of a cough, therefore, and the presence of the other symptoms, is very suspicious. The existence of ulcers in the nostrils, together with a discharge, is not alone sufficient proofs of glanders being present, for these symptoms are sometimes produced by catarrh, the previous existence of which it is desirable to ascertain. If the discharge from the nose be very offensive when it first appears, the probability is, that it is not a case of glanders, although ulcers may be seen. These symptoms

are called ozena, and are sometimes produced by the influenza. Some time since, I met with a case of this sort; it was preceded by swellings of the extremities. There was considerable ulceration in both nostrils, together with a discharge so horribly offensive, that it could be discovered thirty yards off. The horse was young and valuable, and being separated from other horses, he was submitted to treatment which consisted of vegetable and mineral tonics internally, and the nostrils were daily injected with a weak solution of chloride of lime.

The diet was liberal, and the horse was worked moderately by himself in the course of a month, and about six weeks afterwards the symptoms disappeared, and he has been regularly at work for the last two years.

By an attention to these rules, assisted by experience, the veterinary surgeon will generally be enabled to decide correctly as to the presence of glanders, and the owner himself to form a pretty shrewd opinion respecting it. — ED.]

According to MM. Chabert and Huzard, the following morbid appearances are observable on opening glandered horses: — 1st. "Tumours are generally found on the lungs, such as hydatids, tubercles, and obstructions. The bronchial glands are enlarged, and sometimes contain matter, and this sometimes is the only morbid appearance observable in the lungs. The membrane which lines the windpipe and its branches is often inflamed and ulcerated, and the latter are often filled with matter similar to that discharged by the nostrils. The internal surface of the bones, which form the nose and the cartilaginous partition between the nostrils, are often carious and covered with matter. The spleen, the liver, and the kidneys, are often diseased, sometimes in a considerable degree. When these last organs are injured, it may be known by the pus discharged with the urine. 2d. On opening the skull, the brain is found softer and more flaccid than in the healthy horse, and there is generally more or less water in the ventricles. The plexus choroides appears gorged, the crystalline humour of the eye dull, and without consistence, or, as if it were decomposed. It is not to be supposed that all these morbid appearances will be found in the same horse, or that they are all necessary to enable us to declare that the horse was glandered; it is sufficient if some of them are found, provided the external symptoms during the horse's life were such as we have before described as characteristic of glanders."*

As I have demonstrated the manner in which glanders is

* In some cases, when horses are destroyed on account of chronic glanders in a mild form, the *post mortem* appearances are very slight; a paleness or leaden hue of the nasal membrane, with very diminutive specks of ulceration, are all that can be discovered. — ED.

communicated, it is needless to say any thing of the mode of prevention, except briefly observing, that it can be accomplished only by preventing any glanderous matter from coming near a horse, or mixing with his food or water; and that the only method of purifying an infected stable, is to remove every thing on which glanderous matter may have fallen, and to wash and scrape the fixtures, such as the rack and manger, thoroughly. I have, in a former edition, advised a fumigation with the gas which arises from a mixture of common salt, manganese, and oil of vitriol, because I have found that glanderous matter which has been exposed to this gas is rendered quite innocent, though an ass be inoculated with it; and I have directed the stable to be first thoroughly cleansed, because, if any dry hard glanderous matter should remain, the water employed in cleansing the stable will have moistened it, and thereby enable the fumigation to mix with it, and destroy its poisonous quality.

[Some persons fancy that it is necessary to pull down and remove the racks and mangers of a glandered stable. This, however, is altogether unnecessary. The following plan will be found at once effectual, convenient, and economical: — Let the whole of the stable, or at least every part to which the diseased animals could possibly have had access, be washed with a solution of chloride of lime, and the following day well scrubbed with soap and water, and as soon as it is dry again, washed with the chloride of lime. In a few days afterwards, it may be used without any danger. — ED.]

Treatment. — I have already observed that a glandered horse has, in several instances, been known to get entirely free from the disorder while employed in moderate work, and carefully fed and attended, without taking any medicine: I have also seen the disorder cured by mercury, and have known instances of farcy being so cured. The general opinion, both of English and French veterinarians, is, that glanders is incurable, and that farcy is curable. According to my experience, there is seldom any difficulty in curing farcy, when it is a local disorder, merely by local applications; but such cures are generally followed by glanders, there being often a considerable interval (from a few weeks to a few months) between the disappearance of farcy and the appearance of glanders. Before any attempt is made to cure a glandered horse, with a view to publishing the case if it prove successful, it would be right to make it appear satisfactorily that the horse is really glandered. This rule has been seldom attended to; for, in general, when such cures have been published, or talked of, it has been merely asserted that the horse had the glanders. Now, it is well known that there are diseases which resemble glanders, and that the most experienced practitioners are sometimes unable to give a decisive

opinion upon such cases. A blow on the nose, for example, may injure the bones, and cause a running from one nostril, and a swelling of the kernels under the jaw, for years, which will exactly resemble glanders, except in not being contagious, or fatal in its termination. The cure of glanders, however, cannot be accomplished without great care, and considerable expense; and rarely, I believe, except in its first stage, or mild form. The expense of the cure does not depend so much on the value of the medicine employed, as the length of time that is necessary; therefore, unless the horse is of considerable value, in good condition, and glandered only in a mild degree, it is not worth while to attempt the cure. It should also be recollected, during the treatment, that as long as there is any discharge from the nostril, there is danger of his communicating the disease to other horses. Corrosive sublimate and calomel have been found to have considerable power in correcting the glanderous poison; but they weaken the animal so much, that most frequently they accelerate the progress of the disease. I now recommend the mildest preparations of mercury, such as Ethiop's mineral, or quicksilver rubbed down with chalk, or honey and liquorice powder. In the last case of mild glanders I was consulted about, I advised small doses of Ethiop's mineral to be given daily for some time, and a seton to be passed through the swelling under the jaw. The seton, however, was omitted, but the Ethiop's mineral effected a perfect cure. Dr. Malouin, a French physician of the last century, first employed Ethiop's mineral as a remedy for glanders, and, it was said, with considerable success. Since that time, however, this preparation seems to have lost its reputation, not only as a remedy for glanders, but for every other disorder. I have found it, on many occasions, a valuable alterative, especially when mixed with an equal quantity of *finely levigated* antimony. The dose of Ethiop's mineral is half an ounce, once or twice a day, according to circumstances. A horse readily eats it in his corn. During the whole of the treatment, the horse should be regularly exercised and cleaned, and be fed with the best hay and a moderate quantity of oats. The medicine should be continued until the constitution appears to be affected by it; that is, until the mouth becomes sore, the appetite diminished, the bowels loosened, or until the disorder is subdued. The nose of the glandered horse should be kept clean by sponging it now and then, and the rack and manger should be kept as clean as possible. The stable should be kept clean, and properly ventilated. The only objection to working a glandered horse moderately, is the danger there may be of his infecting others, through the carelessness of the person who has the care of him. A little work rather contributes to health and cheerfulness; and

it should never be forgotten, that by making a horse comfortable and cheerful, we improve the digestive functions, and thereby strengthen the constitution.

The infected horses that gradually got well without medicine, in Mr. Russel's glandered teams, owed their recovery, I have no doubt, in great measure to the comfortable state they were kept in, being taken great care of, having always the best food and good stables, and being always with their companions, and in moderate but regular work.

[Professor Sewell has for some years been in the habit of giving the sulphate of copper, in large doses of four and six drachms, which being administered in the form of a draught, and with plenty of linseed meal, is not found to produce that erosion of the stomach which the same dose given as a ball would occasion. This medicine is doubtless a powerful tonic, and thus assists the constitution of the animal in throwing off the disease; but Mr. Sewell, I believe, considers that it has in addition some specific action on the malady. In addition to this Mr. Sewell frequently inserts setons over the face. By this treatment cures have unquestionably been effected, and Mr. Sewell used for many years a mare that he had cured of glanders. These successful cases, however, are exceedingly few, compared with the number submitted to treatment.

Mr. Vines, in a work published some years since on glanders, recommends powdered cantharides in doses of four to twelve grains, together with gentian and ginger, one to three drachms each, and caraway seeds one to two drachms. A ball thus composed he has administered daily to glandered horses, and in some cases with success. Other practitioners likewise testify to the valuable tonic properties of this medicine thus administered, and in numerous instances I have seen its good effects.

Mr. Storry relates several instances of glandered horses cured by him by fumigating the nostrils with carbonic acid gas, assisted by tonic medicine.

Creasote has been used with success in glanders of the human subject as a topical application to the ulcers, and it has in a few instances been tried on the horse with good effect. I have, myself, in a case of glanders, entirely stopped the nasal discharge and healed the ulcers by its use.

The combination of iodine and sulphate of copper, which readily unite by adding a little proof spirit, has been recommended by Mr. Norton, and administered with excellent effect in doses of two drachms daily.

To sum up the best system of treatment to be adopted in this disease, it should first be repeated that there are but few cases in which the symptoms are sufficiently mild, and the horse of sufficient value, to justify the expense incurred in keeping and

treating the animal except by way of experiment; and we must, therefore, narrowly examine the horse previous to our attempts. If the pulse is increased, though only eight or ten beats in a minute, the lungs are probably affected, and it is better to destroy the animal. So likewise if the animal has been affected for several years, although the symptoms may still be mild. Should, however, the case be comparatively recent, and the appearances favourable, we should then administer daily the tonic recommended by Mr. Sewell, or that advised by Mr. Vines; or what, perhaps, is still better, to give one for several days, and then to try the other, or the iodide of copper in doses of one or two drachms daily. If there are any ulcerations within sight, a solution of creasote should be syringed up the nostrils daily; and if there are none visible, it may be well to try the effect of fumigating the nostrils with carbonic acid gas; and if creasote could be applied in this form it would still be better.

An ointment of hydriodate of potash should be rubbed on the enlarged glands; and if the symptoms should disappear with the exception of the indurated gland, it would be advisable to excise it, as it generally contains glanderous matter, which may fresh inoculate the system.

The above, I take it, forms an epitome of the most judicious treatment to be employed in glanders.—ED.]

Farcy.

[This disease is similar in its nature to the glanders, though attacking a different part. It has been proved by numerous instances that the matter of glanders will produce the farcy, and that of farcy occasion glanders. But whilst the peculiar seat of glanders is the membrane of the nostrils, that of farcy is the lymphatics or absorbent vessels.

Farcy sometimes commences with an apparently trivial sore, which often escapes notice. Soon after which there appears a small tumour called a farcy bud, but which is at first hard, but soon becomes soft, and contains, indeed, the infectious virus, which, however, resembles common pus or matter in appearance. Between these buds there are generally hard corded swellings, which are, indeed, the diseased lymphatics; and the buds are considered to occur at the situation of the valves of these vessels.

Farcy may at first be either local or constitutional, but it rarely remains local long. The poison is soon absorbed from the buds, and the constitution is impregnated. The most frequent seat of farcy, at first, is the inside of one of the hind legs and thighs; next to this, the inside of the fore legs, or the neck and the lips; wherever, indeed, the skin is thinnest.

The buds are sometimes small, about the size of a shilling, at other times as large as a half crown. The disease, at first, is usually confined to one leg; but as it progresses, the buds appear in various parts of the body, and as they approach the head and throat, the symptoms of glanders appear, and the animal soon sinks, if not destroyed. There is often a considerable dropsical enlargement of the leg affected in farcy; and sometimes a peculiar noise is heard when the animal walks, as if the joint-bones slipped in and out of their sockets. These appearances, particularly the latter, are very unfavourable, and the horse rarely recovers when it is present. The causes of farcy are similar to those of glanders, being produced either by contagion or otherwise, although it may be justly considered that it is much less frequently occasioned by contagion than glanders. When a number of horses are worked hard, fed on poor or unwholesome provender, exposed to wet and cold, or closely confined in an impure atmosphere, — when either the whole or part of these causes are present, farcy will very probably be engendered. Mr. Coleman used to relate in his lectures, that in the expedition to Quiberon, the horses had not been long on board of the transports before it became necessary to shut down the hatchways; the consequence of this was, that the horses were almost suffocated with heat, and that almost all of them disembarked either glandered or farcied. When farcy thus breaks out in an establishment, its symptoms are generally very severe, and its course rapid. At other times its progress is slower, but it never continues for years, like chronic glanders.

The *Treatment* must be very similar in its nature to that recommended for glanders, but with a much greater probability of success. The system must be supported by a generous (though not too stimulating) diet, and the vegetable and mineral tonics administered as in glanders; but if the sulphate of copper be employed, two or three drachms will be a sufficiently strong dose. Carrots or green food will form a useful addition to the diet. The buds should be opened with a lancet, and when the matter is evacuated a caustic should be applied to the ulcers. The lunar caustic will form a useful application, but other caustics may be employed. An ointment composed of hydriodate of potash 2 drachms, lard or palm oil 2 ounces, mercurial ointment 2 ounces*, should be rubbed daily in the course of the enlarged lymphatics. The horse should be exercised daily, and properly groomed, and the above treatment continued until all symptoms of farcy entirely disappear. It must be confessed that the most favourable symptoms often prove delusive; for often when the disease appears to be conquered, it will break

* A better form for this ointment will be found in the *Materia Medica*, in which the mercury and the iodine are chemically combined. — Ed.

out again and again, and sometimes the morbid poison has lurked insidiously for many months in the system, and fatal farcy or glanders has again appeared. The probability of eradicating the disease will depend on the circumstance as to whether it be local or constitutional; and if constitutional, on how far the system is affected. — Ed.]

CHAP. XLIII.

ANASARCA. — SWELLED LEGS. — WEED. — CHAPPED HEELS. — GREASE — BURSAUTEE.

ANASARCA in the horse is of two kinds; one depending on general debility, and the other on a high degree of inflammation. The former most commonly occurs in old horses, when turned out into poor pasture, particularly in cold marshy situations. It is known by considerable swellings of the belly, chest, and hind legs, attended with great debility; of this they generally die, unless relieved by a strong diuretic, sudorific, and cordial; these are combined in the celebrated old drench of Markham, which has cured a great number of horses of this disorder, and is considered in the low country, about Glastonbury and Wedmoor, where this disease is prevalent, an invaluable medicine. It consists of a decoction of wormwood in a gallon of ale, which is boiled down to two quarts and skimmed. In this 1 oz. of Castile soap is to be dissolved, and then there is to be stirred in 6 drachms of grains of paradise, powdered, and the same quantity of long pepper. The whole of this mixture is to be given at once, fasting. The horse is to be clothed, and rode about until he sweats and stales profusely, which he soon does, and is then relieved. Some people may be apprehensive of danger in using this formidable remedy; in that case cordial diuretics may be given, so as to make the horse stale considerably.*

* Instead of giving so large a quantity of medicine, the following will be found effectual: —

Yellow resin powdered	4 drs.
Nitre	4 drs.
Ginger powdered ..	2 drs.
Gentian powdered	4 drs.
Sulphate of copper.....	2 drs.

The powders to be mixed together, and two pints of warm ale gradually added, with two ounces of spirit of nitrous ether.

It may be repeated, if necessary, in the course of 36 or 48 hours. — Ed.

The other kind of dropsy, or that which depends on a high degree of general inflammation, most commonly attacks colts during the first, second, or third year, or before they begin to change their grinding teeth. At this period there is less blood formed, not only from the state of the grinding teeth, the gums, and the mouth in general, which is such as to render mastication painful, difficult, and imperfect, but from the stomach participating in, or sympathising with, this state of the mouth. This disorder in young colts is first observed by dulness, disinclination to motion, hanging the head, and indifference in grazing. There are swellings, also, on the belly, chest, sheath, or udder, which are sometimes very considerable.

When these symptoms are observed, the colt should be taken up and bled. I have been assured by a respectable carrier, that he has given Markham's drench to colts when affected with the moor-ill, as the disorder is termed, and almost invariably with success. In the last case I heard of, the colt was so ill that he was unable to rise; but when he had taken the drench, he broke out into a profuse perspiration, and soon after got up and perfectly recovered.*

Swelled Legs.

[This disease occurs most frequently in coarse horses, having naturally round gummy legs. It consists of a dropsical or watery swelling, the nature of which may be readily detected, and distinguished from that of phlegmon, by pressing it with the fingers, when it pits; that is, the impression of the fingers are left for a short time. It is, in fact, a deposition of the watery portion of the blood in the cells of the membrane; the absorbents or lymphatic vessels are unable to take up or carry into the circulation the serum so fast as it is deposited. It may arise from the weak state of the lymphatics, from cold applied to the legs, from the plethoric state of the system, or from the redundancy of serum in the blood. It exists in various degrees: sometimes the legs are merely filled, as it is termed, producing no lameness, and but little apparent inconvenience; at other times the limbs are immensely gorged, and attended with considerable pain and stiffness. Between these two extremes the disease may exist in every intermediate degree. It may thus appear either in an acute or subacute form, and may be produced either suddenly or gradually; when, however, it exists in a severe form, it usually appears suddenly. The horse perhaps is well over night, but the next morning one of his legs is amazingly swelled, and on handling it the horse often catches it up suddenly, and so

* The draught prescribed in the preceding note may also be given here; but for colts one half will be sufficient. If there is no debility, however, the same quantity of ginger and gentian will not be required.—Ed.

violently that he nearly falls. If the disease be not very soon relieved, large abscesses either form in different parts of the limb, or the skin gives way; the heels are affected with grease, or the vessels become enlarged and the swelling organised, and the horse has for life a *big leg*. We often see an animal with one of the hind legs twice as large as it ought to be; the poor brute, in addition to his accustomed labour, condemned to drag for life this weary load, which, in nine cases out of ten, is to be ascribed either to the negligence or ignorance of his owner. These big-legged horses usually belong either to poor men or to farmers; the former neglecting them from poverty, and the latter because many of them prefer treading in the footsteps of their forefathers, and employing ignorant empirics in preference to skilful practitioners.

The *Treatment* of a very slight case may consist either in the administration of a dose of physic or a few diuretics; but a severe case demands very prompt and energetic treatment, if we would avoid the troublesome consequence to which I have just alluded. It must, however, be materially regulated by the state and condition of the horse, and the most predominating cause of the disease. If the horse be in full condition, we should bleed, and that very freely, particularly if we find, as we usually shall find, that the upper surface of the blood is colourless; when this is the case during the bleeding, there is usually a thick coat of buff afterwards. If, however, the horse is in a state of much debility, bleeding is not appropriate; and if the disease is brought on, as it sometimes is, by the redundancy of moisture in his food (the horse being at grass), we must bleed with caution and moderation, and sometimes not at all.

Should the horse be prepared for physic, we may at once administer an active dose; but if he is not so prepared, to lose no time we should give him a diuretic ball, and the physic the following day after he has had some mashes. If the swelling extend much above the hock, we may make some punctures with a lancet, which will produce great relief, particularly if the leg be afterwards fomented with warm water. Care, however, must be taken to rub the leg dry afterwards.

Walking exercise should be given twice or three times a day. It will be necessary to repeat the diuretic medicine every alternate day; and if the animal be debilitated, we should give in addition some tonic: such as,

Powdered ginger 2 dr.
Sulphate of iron 3 dr.
Either as a powder or in a ball.

If in the course of two days the leg is not so materially reduced in size as to lead us to infer its speedy restoration to a normal

e, we may insert a rowel in the thigh. If abscesses should n in the thigh or leg, we must take care to distinguish the e from farcy, to which it then bears a resemblance; but in the latter disease the abscesses are usually smaller, and in the ræ of the absorbents, which are enlarged, whilst in œdema y are larger and more independent in their position. These cesses being opened, usually heal with little difficulty; but if skin should slough, as it sometimes does, the cure is much re tedious. There is, however, a difference in this respect ween the human and the equine subject; for whilst in the ner the cure of ulcers is tedious and protracted, in the horse ; generally accomplished with speed and safety.

Weed.—There is a disease very similar to œdema, or humour, t is commonly termed; but, though usually confounded with it, ; yet different in its nature, — in Scotland it is termed *Weed*. e horse is found in great pain in one of the hind legs, but the dling is considerably less than in œdema, and is situated above hock at first, from whence it extends downwards. On ex- ination, we find a swelling in the course of the thigh vein, ending nearly from the hock to the groin, very hot, and ex- mely tender to the touch. It is, in fact, a local inflammation the lymphatic vessels.

The treatment consists in venesection, purgatives, and diu- ics, together with warm fomentations to the affected part.

Chapped Heels. — Some horses are so predisposed to this com- int, that they prove a source of great annoyance to their ners during the winter months. They have frequently white s, and the texture of the skin gives way from the least ex- ng cause, and a crack takes place, which, from the motion of : limb, becomes widened and deepened, and from this circum- nce is often exceedingly difficult to heal. It is usually ceded and accompanied by œdema of the legs, and a thin id discharge issues from the wound, and from the irritation d pain produced it is often attended with considerable lame- s — the horse catching up his leg in a peculiar manner on ng moved.

The *Treatment* should consist of purgatives and diuretics, l, if the system be plethoric, venesection, but not other- e. The heels being in a state of inflammation, a linseed altice should be applied to them for several nights, in which re may be a solution of alum or sulphate of zinc. By this dicated poultice we accomplish two purposes at the same e — we reduce the local inflammation, and bring about the althy action of the part, by the stimulant the poultice contains. is scarcely necessary to observe that the heels must be kept an, and the hair closely cut from them. When the poultices

are discontinued, the crack should be washed twice a day with a solution of sulphate of zinc; and, if the horse is obliged to work, a little astringent powder, such as prepared chalk with Armenian bole, should be scattered over the wound. Generally speaking, the cuticle is broken, and the cutis denuded and abraded; but it sometimes happens, from the repetition or long continuance of these cracks, that the cutis itself is completely divided, and the case then becomes very troublesome, and cannot be cured without a cicatrix. And when the wounds appear to be healed, it often happens that, after exercise or work, the great motion of the parts causes a separation of the newly-formed skin, and the heels appear in a bleeding state. In these cases, after the inflammatory action is subdued by the local and constitutional treatment we have recommended, it is necessary to keep the parts as much in a state of rest as possible, and the wound must be kept clean, and stimulated with tincture of myrrh.

It sometimes happens, when there is no crack, or wound, or discharge from the heels, there is often a thick dry scurf. This is best treated by frequent ablution, rubbing the part carefully dry, and applying the ung. hyd. nit.

Grease is a white offensive discharge from the skin of the heels, frequently extending as high up as the hock or knee. It is generally the consequence of the dropsical enlargement of the legs before spoken of, and it is indeed an effort of nature to relieve the inflammation and tension of the integuments. Horses with much hair about the legs are more particularly disposed to grease, and well-bred horses are rarely affected. The skin in grease is usually red, and the hair appears staring, and there is at first considerable pain and stiffness of the part. After a while, however, this stiffness goes off; and, if the disease is neglected, the discharge continues in increased quantity, the skin becomes gradually thickened, and sometimes large excrescences, denominated from their appearance grapes, thickly cover the skin. Sometimes abscesses form about the heels, and large portions of the heels slough away.

Treatment.—The constitutional treatment of grease is similar to that recommended for œdematous legs, regulated, of course, by the age and condition of the animal. Our local treatment is, however, a matter of much importance likewise, as it is incumbent on us to cure the disease, if possible, without rendering the predisposition of the horse to become affected greater than before. The parts should first be well fomented and cleaned; and the hair being carefully cut away from the neighbourhood, we should then apply a linseed poultice to the heels, in which a little solution of sulphate of zinc has been mixed. This will be found a convenient method of applying the astringent, and, at

the same time, the inflammation of the heels will be lessened. In the course of a few days it will be proper to discontinue the poultices, and to apply the astringent lotion alone. If the discharge should be unusually offensive, a little solution of the chloride of lime will be found a useful adjunct to the poultice.

When the excrescences called *grapes* have formed, the only method of removing them is by casting the horse, and cutting them off, and applying a caustic to the surface afterwards. This operation, however, should not be practised if the legs are considerably enlarged, and have been so for some time, nor if the grapes are so thick as to occupy nearly the whole of the surface, so as to leave little or no sound skin between them. — ED.]

Bursautee.

[There is a disease peculiar to India somewhat resembling those treated of in this chapter: it is thus described in the eleventh volume of the *Veterinarian*, by Mr. Armstrong: —

“The disease ‘Bursautee’ is most prevalent in July, August, and September, which are the wet months; and thence it derives its name, ‘a disease peculiar to the rains.’

“Horses of every breed, age, and condition, are subject to the bursautee; but the second generation of imported horses are most liable to it. I attribute this to the effect which climate has in weakening the constitution of the horse; and the same thing applies to all animals imported into that country from a more genial temperature.

“The second generation is still worse than the first.

“*Nature and Causes.* — I trace this disease to the change which the atmospheric air undergoes at this season of the year. During the three previous months the hot winds prevail.

“An animal exposed to the parching influence of this air is, to a very considerable degree, relieved by copious perspiration from every part of his frame; and, strange as it may appear, the hot season is remarkable both in the biped and quadruped for the absence of disease.

“Then comes the rainy, or what might be with equal propriety called the pestilential season. Land storms, hurricanes, suffocating heat, and horrid stenches usher in this awful period. The filth of ravines, drains, and other receptacles of putrid animal and vegetable matter becomes saturated with rain, and being acted upon by the heat already in the soil, generates the most noxious gases, which speedily mingle with the circumambient air.

“The bursautee is an eruption all over the body, arising from the pores of the skin being stimulated by the increased animal heat to discharge the perspirable matter; but this is prevented

by the thickening of the epidermis, or the tenacious matter before alluded to.

“The bursautee sore in the horse very much resembles the boil in the human being. It forms a painful tumour, which suppurates and breaks; or should the skin of any horses predisposed to the disease become abraded, it will run into a bursautee sore, and spread. The exposure of common wounds to the action of the air, or to the irritation produced by flies, will dispose them to take on the bursautee character.

“Sometimes, from the great irritation of these tumours or sores, the pulse becomes accelerated, and the general system deranged, and depletion must be resorted to. In all the horses that had been previously attacked with bursautee, and which experience had told me were more liable than others to a recurrence of the eruption, I would at the beginning of the rains insert setons as near as I could to the parts previously affected, provided they did not interfere with the action of the animal. This, by forming an artificial drain, would prevent the unsightly appearance of the foul ulcers which are too frequently seen, and would rob the disease of all its terrors. At the same time I would not forget the importance of cleanliness, and regimen, and regular exercise. During the existence of bursautee the food should be nutritious, but not too stimulating. Fresh grass should be avoided, for it as surely tends to the formation of bursautee sores as the eating mangoes does to the appearance of boils in the human subject.” — Ed.]

CHAP. XLIV.

THE STRUCTURE AND DISEASES OF THE SKIN.

[BEFORE we proceed to its diseases, it will be proper to notice briefly the structure of the skin. It is composed of three separate portions. The outer, called the cuticle, is thin, transparent, and insensible, and when removed is quickly restored again. The next portion, immediately under the skin, is the rete-mucosum, being a sort of network secreting a pigment, on the colour of which depends that of the skin. The internal coat is the cutis or true skin; it is considerably thicker than the other coats, though its thickness varies at different parts, being thinner on the inside of the limbs and about the mouth and nostrils. It possesses great sensibility, and is largely supplied with nerves. It is porous in its structure, enabling the perspiration to pass out freely; and it has, by the same means, a power of absorption, and is well supplied with absorbents as well as other vessels. It not only possesses in itself a high degree of feeling, but also in-

timately sympathises with other parts, and particularly with the stomach. Its sensibility is much greater than the parts underneath, so that it is enabled to guard them from danger. It gives support to the roots of the hairs, which are found towards its internal surface; thus if the hairs are plucked out they are soon reproduced, but if the cutis is destroyed the roots of the hairs are so likewise, and the hair does not again appear, as the new skin is incapable of producing it. The growth of new skin is exceedingly tedious, as it only grows from the edges of the old. It is, however, greatly assisted by the great extensibility possessed by the old skin, which is thus enabled, in some measure, to cover the wound. — Ed.]

Surfeit.

This is a disorder of the skin, consisting of small tumours or pimples all over the body, which become small scabs, and then gradually get well, while fresh ones continue to break out and pursue the same course. The horse has generally a dry unhealthy coat, and is hide-bound; sometimes there is swelling of the hind legs likewise, and general debility. This disorder is commonly produced by unwholesome feeding and general ill treatment.

[In other cases the affection appears in horses full of flesh, in whom it is usually manifested in the spring or early summer months, and is caused by plethora or a redundancy of blood, which, at this season of the year, is most likely to occur. Sometimes it is caused by a draught of cold water in hot weather, and is then often preceded by shivering and a staring coat. The symptoms of this complaint are often very similar to the early stages of mange, and require much discrimination to distinguish the difference.

I have known this disease, or an affection similar to it, appear periodically, and occasion the animal to be denuded of hair, in spite of every thing that could be thought of to prevent it.

Some foreign breeds of horses are much disposed to cutaneous eruptions, particularly white Turkish horses.

Treatment. — If the horse is in a plethoric state, or in full condition, he should be bled, and have a dose of physic; and, if necessary, the following alterative may be afterwards given. If, however, the animal is poor and out of condition, the blood-letting and purging should be abstained from, and the following alterative given daily for several days: —

- Nitre 3 drs.
- Sulphur 4 drs.
- Black antimony..... 2 drs.

To be mixed with a little bran, and then given with the corn. — Ed.]

Hide-bound.

When a horse's hide or skin sticks to his ribs, as it were, and cannot be drawn out or moved as in the healthy state, he is said to be hide-bound. It indicates great weakness and poverty, and sometimes a diseased state of the mesenteric vessels, and consumption. It is generally occasioned by ill-usage, and bad or insufficient food, and cannot be removed without proper feeding and good treatment.

The following powder may be given daily in the food, the effect of which will be, by stimulating the stomach and bowels, not only to assist digestion, but also to affect the skin by sympathy:—

Cantharides, finely powdered	5 grs.
Pimento	2 drs.
Sulphate of iron	2 drs.

If the horse refuses this powder in his food, it may be made into a ball with treacle, and continued for a week or a fortnight.

A good piece of grass is of great service in the early part of summer.

Mange.

[This disease is analogous to the itch in the human subject, and is one of the most infectious diseases to which the horse is liable.

It usually commences with small pimples in different parts of the body, which burst and form scabs. On rubbing off these scabs, there appears a white spot covered by a thin acrid fluid, which contains the source of infection. These scabs, at first, are confined to one or two spots, but, if not removed, gradually spread over the body. The parts most frequently attacked are the withers, the roots of the mane and tail, and the rump or buttocks. The animal, from the irritation received, rubs off the scab, and the acrid fluid spreads and forms a larger scab, and thus denudes the affected part of hair. As the disease proceeds the greater part of the body becomes affected, and the animal presents a miserable appearance. The constant irritation allows him no rest; he rapidly loses flesh, and the skin, particularly that of the neck, becomes considerably thickened and wrinkled.

When the disease has existed some time, its appearances are too striking to be for a moment mistaken; but in the earlier stages it may, in a great measure, be detected by rubbing the animal with a stick, when he immediately expresses his pleasure by elevating and moving quickly the upper lip, and extending the head in a peculiar manner. It is likewise by the diminution

of this symptom that we are enabled to ascertain the progress of the disease towards a cure.

The *nature* of this disease has been found, by microscopic observation, to be owing to the presence of minute insects which have been denominated *acari*. Similar insects have been found in the itch of the human subject, but of a different species. It has been found that mange can be communicated to the human subject and to other animals from the horse, although by no means so readily as between animals of the same species. A curious experiment was tried by a German student, a few years since, by taking eight horse acari, of both sexes, and confining them to his arm by means of a plaster. In a few minutes they produced a great itching, which continued five days; but the part afterwards got well of its own accord. After the lapse of thirty-two hours, four of the insects had disappeared; but there were found several eggs and small passages under the skin made by the insect, — in forming which, in all probability, the itching was produced.

This disease is most frequently produced by contagion, either by direct contact with a mangy horse, or by rubbing on the spot where a diseased horse has been rubbing himself previously. Poverty, also, not unfrequently produces it; and thus it is often found on poor commons or moors, where, however, it quickly spreads from one horse to another by contagion. When it gets into a large stable of horses, it is difficult to eradicate it, in consequence of its infectious character, and the greater portion of the stud will probably become affected.

The *treatment* of this disease must principally consist in the topical application of some specific. As in the itch of the human subject, the chief remedy should be sulphur, which is indeed more certain than any other. The animal should be well cleaned, so as thoroughly to expose the surface of the affected parts, and the following liniment rubbed in with the hand or a piece of flannel: —

Sulphur vivum, or yellow sulphur 4 oz.
 Train, linseed, or olive oil 12 oz.
 Oil of turpentine 2 oz.

Mix.

The efficacy of the above may be greatly assisted by substituting three or four ounces of oil of tar for a similar quantity of the oil. If the smell of train oil be objected to, the olive oil may be substituted in stead; and, if necessary, the ointment may be coloured according to that of the horse. If black or brown, a sufficient quantity of soot may be used to render the ointment black, and it will, at the same time, assist its efficacy, for soot has been found of great assistance in this disease. If the

animal is bay or chesnut, the ointment may be coloured with Armenian bole. In obstinate cases, white hellebore has been added to the ointment with advantage. Bleeding is useless in this disease; and although it is customary to recommend mercurial physic, its exhibition is not always unattended with danger, owing to the poverty of the animal, unless administered in very moderate doses. In general, it is better to avoid physic altogether, but to give the following powder for a week together with the food:—

Yellow sulphur 4 dr.
Black antimony 2 dr.

The ointment should be applied daily for three or four days, when the skin should be well washed with soap and water, and the ointment repeated, if necessary, as before. There is little or no danger of infection after the ointment has been thoroughly applied. Unless the animal is much wanted, his best place is at grass during the progress of the cure.

The mange is very frequently attended by the presence of a great number of lice, and sometimes these lice occur without the mange, and occasion an itching similar to it. If they cannot be removed by washing, the ointment for mange will destroy them. — ED.]

Mallenders and Sallenders.

Mallenders is a disorder that attacks the back part, or flexure, of the knee joint, and depends upon a combination of mange and grease. It appears as a scurfy or scabby eruption, and is often very painful, causing some degree of lameness from the pain the animal feels in moving the joint. Sometimes it is not so considerable as to produce lameness, or any apparent inconvenience, but generally becomes troublesome and obstinate unless attended to. Sallenders occurs in the fore part, or flexure, of the hock joint, and is of the same nature as mallenders. They should first be well washed with soap and water, and all the scurf and loose cuticle completely removed. They may then be cured by the following ointments:—

Ointment for Mallenders and Sallenders.

No. 1.

Ointment of nitrate of mercury, commonly named citrine ointment.

No. 2.

Hog's lard, 4 oz.; melt, and stir in Goulard's extract 1 oz.
This ointment is milder and more cooling than the former.

Crown Scab and Rat Tails.

These are of the same nature as mallenders, and may be cured by the same means. They generally, however, leave a blemish, consisting in a loss of hair, and thickening of the cuticle. Crown scab occurs on the coronet, and rat tails in lines on the back part of the leg, extending from the fetlock upwards.

CHAP. XLV.

WARTS. — WENS. — ENCYSTED TUMOURS. — MELANOSIS.

WARTS are schirrous excrescences, which appear on different parts of the skin. They are sometimes very large; at others small, but very numerous. In some cases the roots are small, in others large, and involving a considerable portion of the skin. The flanks, the belly, the penis, the nose, and the lips are the most frequent situations of warts. If not too extensive, they should be excised with the knife or the hot iron. The worst situation for warts to appear is the penis, the extremity of which is sometimes so covered with them as to produce great inconvenience, and even to interrupt the passage of urine. The glans penis, in bad cases, appears quite a fungous mass, presenting a bleeding and disgusting appearance. In these cases, the only remedy is to amputate the penis above the seat of disease.

The horse being cast as for castration, a straight staff is to be passed up the urethra, and cut down upon with a circular incision. The divided arteries may be closed by torsion or ligature.

Mr. Blaine recommends the following ointment for the removal of warts, when they cannot be conveniently removed by the knife: —

Muriate of ammonia	2 dr.
Powdered savin	1 oz.
Lard	1½ oz.

To be applied once a day.

The success of this ointment is, however, doubtful; arsenic is often employed with greater effect in the form of an ointment.

Wens are oval or round bodies found in various parts of the body, under the skin generally, in a detached state. They are easily removed by making an opening with a knife.

An *encysted tumour* is a collection of fluid within a membranous sac, which often floats loosely under the integuments. It must be cut into, and dissected out.

Sometimes we find a hard white tumour under the skin, and

closely connected with the muscles. It often arises from an external injury, and is frequently found at the shoulders, where it is produced by repeated galls with the collar, and its size and protuberance renders it impossible for the horse to work without galling. The only remedy is to dissect the tumour carefully from the surrounding skin and flesh, removing at the same time the galled skin. I have in this way removed enlargements weighing fifteen pounds and upwards, and rendered an animal before useless again valuable.—Ed.]

[*Melanosis,*

Another description of tumour, appears in different parts of the body. I lately met with a case in a white Arabian horse, belonging to a distinguished nobleman, in which the symptoms were very singular and obscure.

At first the horse was attacked with spasmodic pains; then followed weakness of the hind quarters, which, though slight at first, gradually increased until the neck of the bladder was paralysed, and incapable of retaining the urine, which flowed away as it entered the bladder. On passing my hand up the rectum, I detected a large tumour, which appeared to adhere to the spine, and which, from pressing on the nerves of the hind extremities, accounted for their partial palsy. The animal was destroyed, and the tumour was found of great size, not only pressing on the nerves, but appearing within the cavity of the large vein, the vena cava, the disposition and appearance of which it had completely altered. On cutting into the tumour, it was found to be melanosis, a disease that had not been before noticed by any English veterinary author.

Melanosis is defined by Laennec as “a pathological production deposited upon the surface, or in the substance of an organ, of a darkish or blackish colour, having no analogy with the healthy tissues of the body.” The disease which was described by Brugnini in 1781, as being hereditarily transmitted among the horses of Chevasso, and which he termed hemorrhoids, was evidently melanosis; it was usually developed around the root of the tail and the anus.

Some years later, in 1784, the same disease was observed at Bresse Gollety. Latournelle transmitted an account of it in 1809. He says, “there supervened in a young stallion, on the second year of his covering, black ‘*boutons,*’ or buds, around the anus. They soon extended to the scrotum and sheath. They were placed between the skin and muscles, at first as large as a small nut, and they increased until they attained the size of a pullet’s egg; they did not suppurate, and were insensible to the

touch. In a short time all the cellular tissue was similarly affected, and the animal died. When cut into, a matter like the grease of a cart wheel flowed out. All the progeny of this stallion which had the same colour was similarly affected; those which were black, bay, roan, or iron grey, escaped.

In 1806, Laennec communicated to the faculty the result of his observations on the same subject, which has been further elucidated by other writers since; but much still remains to be done for it. The tumour may either be a black, opaque, homogeneous mass, or may contain a darkish-coloured fluid. Gohier saw a tumour of the kind in a horse weighing thirty-six pounds. The opinions of most writers as to the composition of the melanic substance agree that its black colour is owing to the presence of a large quantity of carbon. Many persons are of opinion that the black principle is an aberration of the pigment destined by nature to be deposited elsewhere, as the rete mucosum, the choroid, the hair. It is said that persons with light hair, and elderly persons whose hair is white, as well as light grey or white horses, are most commonly the subjects of this disease. This opinion is certainly supported by the case related by me, the horse being a white Arabian. He had one tumour only externally perceptible, which was about the size of a walnut, and had existed for some years; but he had an immense number deeper seated in various parts of the body. It will be an interesting subject for future observation to ascertain whether, and to what extent, his progeny are effected; because, if they really become affected to any extent, it will offer a strong objection to the use of these white horses as stallions. Lecturers and writers have but little to say on the treatment of the disease, and that little not very satisfactory. It appears to me that, amongst our remedial agents, the use of iodine demands some attention.

Melanosis appears to be a much more common disease in India than in this country. In April, 1840, Mr. Jackson, of the East India service, communicated the following paper on the subject to the *Veterinarian*:—“I was pleased to find that the conclusion I had come to in my own mind as to the identity of the disease common among horses in India, known by the name of ‘diseased tail,’ with ‘melanosis’ in the human subject, was confirmed by your intelligent correspondent, Mr. W. C. Spooner. The disease, as described at pages 163 and 164. of this journal, is very common about Madras, but in most cases is confined externally to the tail, which is occasionally enormously enlarged. I have seen tumours round the anus, and in various parts of the body. Light grey horses are most subject to it, and of that colour those with curly manes and tails. I have never had an opportunity of making a *post mortem* examination;

for though cast when they can no longer bear the crupper, horses affected with this disease do not generally suffer in health.

The treatment usually adopted is, to cut away the tumours when practicable. I have seen Mr. Hooper, V. S., 4th regiment Light Cavalry, take slices off a tail like a wheelwright would from a spoke of a wheel. The skin soon healed over again, and the tail looked quite respectable to what it did before.

“I have never tried any internal remedy; but I think, as Mr. Spooner suggests, that iodine might be useful.”—ED.]

CHAP. XLVI.

THE STRUCTURE AND FUNCTIONS OF THE EYE.

THE eye may be considered as an optical instrument, by means of which pictures of external objects are painted as it were on an expansion of the optic nerve, by which impressions are conveyed to the brain. It is fixed in a socket of the head, moved by various muscles, and bedded in fat, in order to afford facility to its motions. It is nearly globular in shape, or, rather, it resembles parts of two globes, a segment of a smaller one being apparently joined to the frustum of a larger one. It consists of several humours, and of various coats or membranes, some being transparent and others opaque. In describing the anatomy and physiology of the eye, the most convenient method is to divide the subject into two parts, that is, the eye itself, and its appendages. Under the latter head is comprehended the eyelids, the muscles which move them, the eyelashes, the lachrymal gland, the puncta lachrymalia, and lachrymal duct, the caruncle of the eye, the haw, and the membrane named conjunctiva, and the muscles by which the eye is moved.

The palpebræ, or eyelids, may be considered as the shutters of the eye, their office being to exclude light when so required. They consist of cartilaginous bodies covered with soft and elastic skin, and lined internally by the conjunctive membrane. They are moved by two kinds or orders of muscles. The one, composed of circular fibres, and named orbicularis, is situated immediately under the skin, and, by contracting, closes the eyelids; the other, named levator, is composed of straight fibres, is situated under the upper eyelid, and, by contracting, opens the eyelids. The margin of the eyelids is smooth and thickened, and secretes a mucous fluid, as well as the hairs, named cilia, or eyelashes. In the horse there is only one eyelash, that is, the superior, which serves to keep out dust from the eye, and moderate the light which comes directly from the sun, without offering

any impediment to the reflected light which comes from the surface of the earth. Immediately under the superior part of the orbit, or socket of the eye, and rather towards the inner corner, there is a gland of considerable size, which forms the fluid named tears. This fluid is conveyed to the under surface of the upper eyelid, and is then diffused all over the eye, by the motion of the lids, as well as by the motion of the eye itself. In this action the upper eyelid is principally employed. As the tears accumulate, they are directed, by the closing of the eyelids, towards the inner corner, where they are received by the open extremities of two ducts, which, soon uniting, form the lachrymal duct, a long membranous tube which terminates in the lower part of the nostril, where it may be distinctly seen, with the fluid named tears flowing from it. The inner surface of the eyelids is formed by the membrane named conjunctiva, which, passing inward, embraces the globe of the eye, and serves to keep it in its situation; at the same time it is sufficiently loose to admit readily of all its various motions. This membrane, in its healthy state, is nearly white; but in all cases of internal inflammation, or inflammatory fever, becomes very red. In staggers, and some other disorders of the stomach, and organs subservient to digestion, it becomes of a deep yellow or orange colour. This membrane is closely united to nearly one half of the sclerotic coat, or white of the eye, and has been thought to be continued in a very attenuated and transparent state over the cornea also. In injuries of the eye, this membrane becomes red; but, in internal diseases, it should always be examined, as redness in that case indicates general inflammatory action, and points out the necessity of copious bleeding. In the inner corner of the eye there is a small fleshy eminence, named caruncle, which separates the two open extremities of the lachrymal ducts, named puncta lachrymalia, and thus allows the tears to be forced into them by the contraction of the orbicular muscle. In the human eye, the tears pass from the puncta lachrymalia into a small bladder or sac, which does not exist in the horse; in him there is one continued membranous tube from the inner corner of the eye to the lower part of the nostril. The termination of the lachrymal tube, or duct, in the horse, has often been mistaken for an ulcer in horses suspected of glanders; but it does sometimes become ulcerated from the acrimony of the tears, or from the strong preparations that are sometimes applied in diseases of the eye. I have seen this happen from the application of powdered sal ammoniac (muriate of ammonia) to the eye. Sometimes the termination, or orifice, of the lachrymal duct becomes closed by inflammation, or the cicatrisation of an ulcer, and then it bursts above, and the ruptured part becomes an ulcer. According to Lafosse, the disease named fistula

lachrymalis takes place in the horse; but of this I have seen only one case. In glanders, however, there is often, indeed generally, a slight purulent or mucous discharge from the inner corner of the eye, which probably proceeds from the lachrymal duct. The *membrana nictitans*, or haw, as it is commonly named, is situated in the inner corner of the eye. That part which comes over the eye is a thin slippery membrane, which, towards its basis, becomes thicker, and cartilaginous. Its basis is of some thickness, and imbedded in fat; there are no muscles attached to it; but when the eye is drawn into the orbit, and towards the inner corner, the basis of the haw is prevented from following it by the bones of the orbit; the thin membranous part of the haw is thus forced over the eye, and serves to remove dust or flies that may have fallen upon the cornea.

The eye is moved by seven muscles, which arise from within the orbit, or socket, and terminate in thin sheets of tendon, which, with the sclerotic coat and conjunctiva, form what is called the white of the eye. Of these there are four straight muscles rising from the bottom of the orbit, and inserted into the outer coat of the eye. One of them is situated at the upper, one on the under, and one on each side. Their use is apparent: acting simultaneously they pull the eye within the orbit; and acting separately they draw its transparent surface to one side or the other, upward or downward, according to the situation of the acting muscle. Besides these, there are two oblique muscles, the superior and the inferior; the former rises from the back of the orbit, goes to the inner side, where it passes through a pulley; its tendon then traverses in an opposite direction, and is inserted into the upper and outer part of the eye. The inferior is a shorter and stronger muscle, but, like the former, to which it is an antagonist, takes an oblique course. These muscles furnish, in some measure, a rotatory motion to the eye, and thus giving expression to these organs, are exercised particularly in vicious horses. The seventh muscle, which is peculiar to brutes, is called the retractor, and is situated within the straight muscles, and immediately surrounds the optic nerve. Its use is to draw the eye farther into the orbit, and by pressing on the fat, which forms a soft cushion for this organ, forces the haw to protrude itself more readily over it. This muscle possesses considerable power.

Having described the appendages, as they are termed, I shall proceed to a description of the eye itself, the structure and economy of which is most curious and interesting. It is said to be composed of coats and humours, and this, perhaps, is the best manner of considering it. The first coat that appears is the *cornea*, or glass of the eye, which forms the anterior part, and is beautifully transparent. It may be considered as the window

of the eye, being that part of the case formed to admit light. It is not of a circular form, as in man, but of an irregular oval or rather oblong form when examined out of the socket; but in its natural situation in the living horse, that part which projects beyond the eyelids is a regular oval, or rather of an oblong form, and corresponding, in some degree, with the form of the pupil. It forms a larger portion of the globe of the eye than in man, and, by its convexity, causes the rays of light which pass through it to converge towards the pupil. This convexity may be too great or too little, and, in either case, render vision somewhat imperfect, and cause starting. The convexity of the cornea is preserved by the fluid which it incloses, named *aqueous humour*. On puncturing the cornea this fluid escapes, and then the cornea becomes flat and wrinkled.

The second humour of the eye is situated immediately behind the pupil, and is named the *crystalline humour*, or crystalline lens. On taking it out, it appears to be a solid and beautifully transparent double convex lens, the posterior surface of which is more convex than the anterior one. It is found to become denser and denser from the circumference to the centre; and the slightest pressure so deranges it, as to lessen or destroy its transparency.

The crystalline humour may be considered as composed of numerous concavo-convex lenses, admirably fitted to each other; those of the largest size having their circumference or edge opposed to and nicely joined to each other, thus forming altogether a double convex lens. The point of union between the two largest lenses is embraced by a band of muscular fibres, disposed in a circular direction, and named the ciliary ligament. These, by contracting, assisted probably by the muscles of the eye, increase the convexity of the crystalline lens, or rather of the series of concavo-convex lenses of which the eye is composed, in a manner so just and equal, as to adapt it to the distance of the object at which the animal is looking: while, by the relaxation of these muscular fibres, the convexity of the lens is diminished by its own elasticity. These changes take place with inconceivable rapidity and accuracy. There are other muscular fibres proceeding from the band of circular fibres named ciliary processes in a straight, or rather radiated direction, towards the second coat of the eye, named *tunica choroides*; these are so arranged as to be drawn into folds, by which disposition they are enabled to perform their office more easily, which is that of drawing the lens towards the optic nerve, and thereby increasing the intensity of vision, whereby the animal is enabled to see small objects distinctly. The crystalline lens is enclosed in a transparent capsule, which is not in contact with it, there being about one drop, as it is computed, of a transparent liquid interposed

which, from the anatomist's name who first observed it, has been called "liquor Morgagnii."

I have seen a case where the convexity of the lens has been so increased, by an unusual degree of contraction of the circular fibres named ciliary ligament, that it burst the capsule, and was forced out of its situation. I found it lying with its posterior convex surface on the inferior margin of the iris; about half of it appearing in the anterior chamber of the eye, as it is termed. The transparency of the lens was not affected, at least it did not appear so to me, and I rather think the accident had occurred just at the time I observed it, from twitching the horse violently. In cataract, a disorder in which the crystalline lens becomes opaque, it always becomes globular in its form from an irritable state of the band of circular fibres; the same effect may be observed in the circular fibres of the iris, causing the pupil to be small, even in a moderate light, while the inflammation is going on which occasions the cataract; but when the opacity is such as to exclude the light from the posterior part of the eye, which contains the third or vitreous humour, with the choroid coat, retina, and optic nerve, then the circular fibres relax, and the radiated fibres draw up the iris somewhat irregularly, which, adhering to the capsule of the opaque lens, the pupil remains permanently open, as in fig. 4. p. 254.

[Continually exposed to a changing light, — sometimes to the glare of a summer's sun, at others to the chastened light of the moon or stars,—the eye would be of little use, unless it possessed the power of shutting out too great a glare, or of admitting the utmost during the hours of darkness, or in the grey twilight. This power is furnished by the iris or curtain of the eye, which commences at the same place where the cornea begins, and floats loosely in the aqueous humour, which it divides into two parts, the anterior and the posterior chambers. The iris is composed of two orders of fibres; — the one circular, which, by contracting, diminishes, and even closes the aperture in the centre, named pupil; the other radiated, which, by contraction, opens or enlarges the aperture. These muscular fibres are entirely independent of the will, but sympathise intimately with the retina, so as to lessen the pupil from the stimulus of light.

This may be readily seen in the horse by alternately shading the eye and exposing it to a strong light, under which operation the pupil diminishes from the effects of light. Thus the iris admits just light sufficient to make the object distinctly visible, and excludes all superabundant rays. Light, however, produces no immediate effect on the iris itself; for when the optic nerve is paralysed, the iris is no longer affected by light or darkness. The iris derives its name from its brilliancy, and its colour de-

depends on a pigment secreted on its posterior surface, and whose office is to prevent the rays of light from penetrating through it. In the horse, this pigment renders the iris generally of a light brown colour; but, in some instances, the pigment is wanting, and the iris appears white, and the animal is called wall-eyed. This circumstance, though it by no means adds to the beauty of the animal, is, however, no injury to the vision; in fact, it neither adds to nor diminishes sight.—*Ed.*]

In the human eye the pupil is black, and of a circular form, and forms what is commonly called the apple of the eye. In the horse it is of a dark blue colour, and of an oblong figure, with its long diameter always parallel to the horizon, in whatever position the head may be placed. This uniform parallelism of the long diameter of the pupil with the horizon is effected by means of the oblique muscles before described.

When the horse stands in the stable in a moderate light, the pupil is open or large, by the preponderant action of the radiated fibres, as in *fig. 1.*; but when taken out of the stable,

Fig. 1.

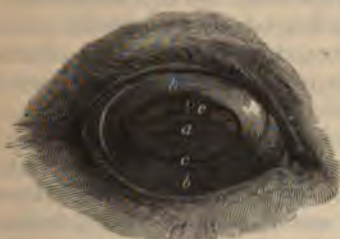


Fig. 2.



The left figure represents the eye with the pupil contracted from exposure to light. The right figure shows the pupil in an expanded state.

a The pupil.

b b The iris.

c c The corpora nigra, or black bodies, both at the upper and lower parts of the pupil.

d The membrana nictitans or haw.

the circular fibres prevail, and the pupil becomes much smaller, as in *fig. 2.*; and if the eye be exposed to the sunshine, the pupil becomes smaller still, and scarcely perceptible.

When the nervous structure of the eye is morbidly irritable, as in ophthalmia, the pupil continues small, and sometimes nearly closed, even in a moderate light. But when the lens becomes opaque, the ophthalmia and morbid irritability cease, and the pupil then becomes open and irregular in its form, as in *fig. 4.* *Fig. 3.* represents a partial opacity of the lens, or partial cataract, or, as it is more commonly called, specks in the pupil; here the form of the pupil is not altered, and it remains capable of contracting or opening, according to the degree of light it is exposed to.

Fig. 3.



Fig. 4.



The right figure represents a complete cataract, the crystalline lens being entirely opaque. The left figure represents a partial cataract, the vision being possessed in some degree.

In the horse there are black pendulous bodies attached to the superior margin of the iris. These serve, like the cilium, or upper eyelash, to moderate or exclude the direct rays of light which proceed from the sun, without interrupting those which are reflected by the surface of the earth; by this admirable provision he sees what it is necessary he should see, while the too powerful stimulus of the direct rays from the sun are excluded, or sufficiently moderated. These black bodies enable the animal also to close the pupil completely, and thus occasionally, or when the nervous structure of the eye is morbidly irritable, exclude the light altogether.

All that part of the eye which is posterior to the iris is chiefly occupied by the third or *vitreous humour*, and it is in this humour that the crystalline lens is imbedded. The vitreous humour is perfectly transparent, and consists of a fluid, inclosed in numerous small transparent cells, all of which appear to be inclosed in one delicate transparent membrane, named tunica arachnoidea. If the vitreous humour is cut, by snipping it with scissors, a fluid, like water, drops from it freely, so that it appears to be nothing more than water, probably holding a little salt in solution, which escapes when the transparent cells are thus cut open.

That part of the vitreous humour in which the lens is imbedded is different from the other parts, and of the consistence of jelly. Immediately behind the ciliary ligament, termed the arachnoid coat, may be inflated with air by a glass pipe, and made to resemble a cataract. This is called, from its appearance, a cataract of air.

eri of the vitreous humour, and has the choroid coat im-
 mersed behind, which therefore acts like the quicksilver of a
 telescope-glass in preventing the light from passing through. The
 choroid coat is supposed to be a continuation of the optic nerve.

The choroid coat, whose use has been specified, appears to be a
 mass of blood-vessels, secreting a dark paint on both its sur-
 faces. It is analogous to the rete-mucosum of the skin, and in the
 subject is quite black, being that which gives the colour
 to the pupil of the eye. In animals, however, we observe a
 variety in the colour of that portion of it immediately op-
 posite the pupil, or at the back of the eye, being in the cat of a
 ruddy, and in the horse of a greenish blue. The light
 of this part serves to reflect some portion of the light ad-
 mitted to the eye, and thus economises and renders available the
 eye that is always present even in the darkest night,
 when that a horse is enabled to pick his way with ease
 in the dark, or to distinguish a single object. The
 use of the choroid coat which accomplishes this effect is
 to prevent the light from being lost, or dissipated in any
 direction.

The next constituent part of the eye is the sclerotic
 coat, or white of the eye, and appears as a
 white, opaque, and somewhat elastic membrane,
 which covers the eye and humour, except the cornea,
 and is the greater portion of the globe of the
 eye. It is composed of a substance which is
 very hard, and is the part which gives the
 eye its form and strength. It is the part
 which is most exposed to the action of
 the atmosphere, and is the part which
 is most liable to be injured by
 the action of the sun, and by
 the action of the wind, and by
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performs an important office, in addition to that which it performs as a part of a most beautiful and wonderful optical apparatus: that is, it serves to collect and retain the impressions of objects, to afford time for the intellect to judge of their distance, as well as of their different properties. The optic nerve passes through an opening in the bottom of the orbit, named foramen lacerum, and crossing the opposite nerve, terminates in that part of the brain named thalamus nervi optici. This decussation of the optic nerves has been a subject of controversy with anatomists. But the fact is completely proved by an examination of the brain and optic nerves of a horse affected with one cataract only; and by an examination of the brain and optic nerves of a sheep affected with that kind of hydrocephalus which depends upon the existence of an hydatid in the right ventricle of the brain, for it is the right ventricle that is generally affected.

In both cases, the nerve which proceeds from the affected thalamus will be found smaller than the other, and it will be found smaller also after it has crossed the other nerve, and to the point where it enters the sclerotic coat of the eye. The thalami nervorum opticorum I consider as the fountain of vision, for it is here the impressions of objects are ultimately received.

On Vision.

[Before we enter on the diseases of the eye, it would be well to notice briefly the phenomena of vision.

A ray of light, when it impinges on a body, is subject either to reflection, absorption, or transmission. If reflected, it recoils from the surface of the object which it cannot permeate, in the same manner as a ball would rebound if thrown against a wall. Each ray of light is composed of seven colours, which may, indeed, be separated by a triangular piece of glass, called a prism, and different objects have the power of absorbing some of these colours and reflecting others. The colours absorbed are, of course, rendered invisible, and those reflected are seen; and thus it is according to the colour or colours reflected that an object appears green, or blue, or yellow. When it appears white all the colours are reflected, and when black they are all absorbed.

It is a law of optics that the angle of reflection and that of incidence are equal. The former signifies the direction in which the object or ray strikes a mirror, and the latter the angle at which it may be seen. They may be represented by two persons standing at an equal inclination from a mirror in which they may be able to see each other's image, though not sufficiently opposite as to discern their own. It is found that the

degree of reflection depends on the degree of obliquity with which the ray impinges on the surface of the reflecting object, and thus the reflected light of the sun and moon is greatest when rising or setting.

All bodies have the power of absorbing rays of light, but in different degrees. Opaque bodies absorb more light than transparent ones; and of these black substances absorb most, and white in the least degree.

When a ray of light enters a transparent medium of greater density than what it has just left, it becomes refracted or turned from the perpendicular; and when the density is less than before, it appears refracted towards the perpendicular. Thus, when a stick is plunged into water, it appears broken at the surface of the liquid, which is owing to the rays of light being broken as they pass from the object into the air. So, likewise, when a ray of light impinges on a curved surface it is refracted; and thus a dense transparent body, of a convex figure, will collect the rays into one common point or focus, which may be shown by the common burning-glass. Concave lenses have a contrary effect, causing the rays to diverge.

The axis of a convex lens is exactly perpendicular to its two surfaces, and this, in a double convex lens, passes through the centre; and when a ray of light comes in this direction, it passes directly through without any refraction; but an oblique ray is turned inwards, so as to form a focal point with a ray coming in a similar manner from the other side.

These being the principal laws by which vision is governed, we are enabled to understand the distinct offices of the various parts of the eye.

The *transparent cornea*, the window of the eye, serves to collect the rays, and, by its convexity, to refract them towards the ocular axis.

The *aqueous humour*, besides its office of preserving the convexity of the cornea and allowing the iris to float loosely amidst it, serves likewise to refract the rays, from its being a denser medium than the atmosphere.

The *crystalline lens*, however, is the principal refracting glass; receiving the rays in some measure refracted by the cornea and aqueous humour, it brings them to a focus on the retina.

When either the cornea or the crystalline lens is too convex, the object is brought to a focus too soon, and vision is indistinct, and the person near-sighted. This is, probably, a frequent defect in the eyes of horses that shy, in which we often find full goggle eyes. When, however, the cornea or the lens is too flat, a contrary defect is produced, and the object is not converged soon enough. This is a frequent complaint in old people, who

are relieved by convex glasses, whilst the former defect is remedied by concave lenses.

The principal use of the vitreous humour is to preserve the globular form of the eye, and thus afford a sufficient surface for the spreading out of the retina, on which, as before observed, a picture of external objects is painted, as may be seen by looking into the eyes of a horse or any other animal.

In taking this course, it must be evident that the rays which enter at the upper part of the cornea are refracted at the lower part of the retina, and *vice versâ*; and thus objects are actually represented in an inverted position, but, from being all painted in the same relation to each other, they do not appear inverted to the mind. — ED.]

CHAP. XLVII.

DISEASES OF THE EYE. — OPTHALMIA, SIMPLE AND SPECIFIC.
— CATARACT. — AMAUROSIS.

[THE eye of the horse is exceedingly liable to disease — quite as much, if not more so, than the human eye; but, unlike it, these diseases are by no means subject to such great variety, but may be comprehended by a few divisions. We have, then, simple ophthalmia, specific ophthalmia, cataract, and amaurosis or paralysis of the optic nerve.

Simple Ophthalmia.

This disease arises from some external injury, such as a blow from a stick or whip, a bite from another horse, or the intrusion of some foreign body. It is important to distinguish this disease from that we have presently to notice, which may be done without much difficulty, by an attention to the following symptoms. Unless the injury is very trifling, there is usually much swelling and inflammation of the eyelids and its envelopments. Shortly afterwards we find an opacity of the transparent cornea; this opacity rarely spreads over the whole of the eye, but is much greater at one part than another. On inspecting the eye in a lateral position, we find that the aqueous humour is either not affected, or only partially so; and on looking into the interior of the eye, we find the parts presenting a healthy appearance.

Treatment. — It is very important to be prompt and energetic in our treatment; for otherwise there is great danger of the acuity increasing and involving the whole of the cornea, so as

to occasion blindness, or otherwise to be permanently fixed in one part, so as to obstruct vision and defy all our attempts for its removal. When the inflammation is considerable we should lance the inflamed vessels of the eyelid, and encourage the bleeding as much as possible, and at the same time open the angular vein which passes from the eye down the face. In performing this operation it is necessary to cut in some measure across the vein, in order to ensure its bleeding freely. If the blood should not flow freely, it will be better to bleed from the neck at the same time. The eye should be frequently fomented with warm water the first day, and afterwards the following lotion should be applied round and in the eye six or eight times a day:—

Cold water..... 1 pint.
Tincture of opium..... 1 ounce.

A dose of physic should be given; and if, in a day or two, there be still much inflammation, a few quarts of blood may be taken from the neck of the affected side. When the inflammation has in great measure abated, but a film or opacity remains on the cornea, a few drops of the following stimulant should be applied twice a day with a camel's hair brush:—

Distilled water 1 ounce.
Nitrate of silver..... 1 or 2 grains.

Or instead of this, a little *vinum opii*, or tincture of opium diluted with an equal quantity of water.—E.D.]

Specific Ophthalmia, or Inflammation of the Eye.

[This disease used to be called by farriers moon blindness, under the idea that its periodical attacks were influenced by the moon, as it sometimes occurs about once a month. This idea, however, is altogether absurd, and its periodical returns are rarely so frequent as once a month. The disease consists of a specific inflammation of the various parts of the eye occurring without any immediate external cause; and though in great measure curable for the time, yet occurring again and again, until the structure of the eye is so changed by these repeated attacks, that blindness follows, or otherwise a cataract takes place, either total or partial.

The *symptoms* generally appear somewhat suddenly; in the evening, perhaps, there might have been nothing amiss, but on the following morning sometimes both eyes, but usually one eye only is found nearly closed and suffused with tears; there is great impatience of light, and indeed it is somewhat difficult to induce the animal to open the lids sufficiently for examination, and when he does so, the pupil is found exceedingly small, so

Fig. 3.



Fig. 4.



The right figure represents a complete cataract, the crystalline lens being entirely opaque. The left figure represents a partial cataract, the vision being possessed in some degree.

In the horse there are black pendulous bodies attached to the superior margin of the iris. These serve, like the cilium, or upper eyelash, to moderate or exclude the direct rays of light which proceed from the sun, without interrupting those which are reflected by the surface of the earth; by this admirable provision he sees what it is necessary he should see, while the too powerful stimulus of the direct rays from the sun are excluded, or sufficiently moderated. These black bodies enable the animal also to close the pupil completely, and thus occasionally, or when the nervous structure of the eye is morbidly irritable, exclude the light altogether.

All that part of the eye which is posterior to the iris is chiefly occupied by the third or *vitreous humour*, and it is in this humour that the crystalline lens is imbedded. The vitreous humour is perfectly transparent, and consists of a fluid, inclosed in numerous small transparent cells, all of which appear to be inclosed in one delicate transparent membrane, named *tunica arachnoidea*. If the vitreous humour is cut, by snipping it with scissors, a fluid, like water, drops from it freely, so that it appears to be nothing more than water, probably holding a little salt in solution, which escapes when the transparent cells are thus cut open.

That part of the vitreous humour in which the lens is imbedded is different from the other parts, and of the consistence of jelly. Immediately behind the ciliary ligament, as it is termed, the arachnoid coat may be inflated with a small blow-pipe, and made to resemble a circular canal; this has been called, from the name of the person who first observed it, the circular canal of Petit. It is supposed to be connected with the radiated fibres of the iris. I have seen the whole of this humour in the eye of a sheep that had an hydatid in the right ventricle of the brain of the consistence of jelly.

[The *retina* is a fine delicate transparent membrane, on which a picture of external objects is painted. It is spread out on the

back part of the vitreous humour, and has the choroid coat immediately behind, which therefore acts like the quicksilver of a looking-glass in preventing the light from passing through. The retina is supposed to be a continuation of the optic nerve.

The *choroid* coat, whose use has been specified, appears to be a net-work of blood-vessels, secreting a dark paint on both its surfaces. It is analogous to the rete-mucosum of the skin, and in the human subject is quite black, being that which gives the colour to the pupil of the eye. In animals, however, we observe a great variety in the colour of that portion of it immediately opposite the pupil, or at the back of the eye, being in the cat of a yellow colour, and in the horse of a greenish blue. The light colour of this part serves to reflect some portion of the light admitted to the eye, and thus economises and renders available the partial light that is always present even in the darkest night and thus it is that a horse is enabled to pick his way with ease when his rider is unable to distinguish a single object. The portion of the choroid coat which accomplishes this effect is termed the *tapetum lucidum*, or luminous carpet. — Ed.]

The last and most considerable coat of the eye is the *sclerotic coat*, which is a very strong, thick, white, and opaque membrane, including all the other coats and humours, except the cornea. The sclerotic coat forms the greater portion of the globe of the eye, and is intimately united, towards the anterior part, with the cornea, which may be viewed as bearing the same relation to the sclerotic coat as the glass of a watch does to the case. By maceration in water the cornea separates from the sclerotic coat completely.

The *optic nerve* penetrates the posterior part of the eye, not in the centre, but rather inwardly: still, however, it is central with respect to the axis of vision, for both eyes are always exerted in looking at objects, and, in doing this, incline a little inwardly, so as to make the optic nerve central with respect to the object, or rather as to the axis of vision.

Anatomists have supposed that, were this the case, the insertion of the optic nerve would cause a dark spot to appear before the eye, and that the nerve, therefore, enters a little inwardly. But this is an error, as has been demonstrated by the experiment of the late Dr. Darwin, in which, after looking at a coloured object stedfastly for some time, upon shutting the eyes the impression will remain a considerable time, and in an equal degree upon the insertion of the optic nerve, and every part of the retina, without the appearance of any dark spot whatever. This not only proves that that part of the optic nerve which enters the sclerotic coat, and from which the retina proceeds, is susceptible of the impressions of light in the same degree as the retina; but that the vitreous humour, or rather its arachnoid membrane,

performs an important office, in addition to that which it performs as a part of a most beautiful and wonderful optical apparatus: that is, it serves to collect and retain the impressions of objects, to afford time for the intellect to judge of their distance, as well as of their different properties. The optic nerve passes through an opening in the bottom of the orbit, named foramen lacerum, and crossing the opposite nerve, terminates in that part of the brain named thalamus nervi optici. This decussation of the optic nerves has been a subject of controversy with anatomists. But the fact is completely proved by an examination of the brain and optic nerves of a horse affected with one cataract only; and by an examination of the brain and optic nerves of a sheep affected with that kind of hydrocephalus which depends upon the existence of an hydatid in the right ventricle of the brain, for it is the right ventricle that is generally affected.

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degree of reflection depends on the degree of obliquity with which the ray impinges on the surface of the reflecting object, and thus the reflected light of the sun and moon is greatest when rising or setting.

All bodies have the power of absorbing rays of light, but in different degrees. Opaque bodies absorb more light than transparent ones; and of these black substances absorb most, and white in the least degree.

When a ray of light enters a transparent medium of greater density than what it has just left, it becomes refracted or turned from the perpendicular; and when the density is less than before, it appears refracted towards the perpendicular. Thus, when a stick is plunged into water, it appears broken at the surface of the liquid, which is owing to the rays of light being broken as they pass from the object into the air. So, likewise, when a ray of light impinges on a curved surface it is refracted; and thus a dense transparent body, of a convex figure, will collect the rays into one common point or focus, which may be shown by the common burning-glass. Concave lenses have a contrary effect, causing the rays to diverge.

The axis of a convex lens is exactly perpendicular to its two surfaces, and this, in a double convex lens, passes through the centre; and when a ray of light comes in this direction, it passes directly through without any refraction; but an oblique ray is turned inwards, so as to form a focal point with a ray coming in a similar manner from the other side.

These being the principal laws by which vision is governed, we are enabled to understand the distinct offices of the various parts of the eye.

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The *aqueous humour*, besides its office of preserving the convexity of the cornea and allowing the iris to float loosely amidst it, serves likewise to refract the rays, from its being a denser medium than the atmosphere.

The *crystalline lens*, however, is the principal refracting glass; receiving the rays in some measure refracted by the cornea and aqueous humour, it brings them to a focus on the retina.

When either the cornea or the crystalline lens is too convex, the object is brought to a focus too soon, and vision is indistinct, and the person near-sighted. This is, probably, a frequent defect in the eyes of horses that shy, in which we often find full goggle eyes. When, however, the cornea or the lens is too flat, a contrary defect is produced, and the object is not converged soon enough. This is a frequent complaint in old people, who

are relieved by convex glasses, whilst the former defect is remedied by concave lenses.

The principal use of the vitreous humour is to preserve the globular form of the eye, and thus afford a sufficient surface for the spreading out of the retina, on which, as before observed, a picture of external objects is painted, as may be seen by looking into the eyes of a horse or any other animal.

In taking this course, it must be evident that the rays which enter at the upper part of the cornea are refracted at the lower part of the retina, and *vice versâ*; and thus objects are actually represented in an inverted position, but, from being all painted in the same relation to each other, they do not appear inverted to the mind. — ED.]

CHAP. XLVII.

DISEASES OF THE EYE. — OPHTHALMIA, SIMPLE AND SPECIFIC.
— CATARACT. — AMAUROSIS.

[THE eye of the horse is exceedingly liable to disease — quite as much, if not more so, than the human eye; but, unlike it, these diseases are by no means subject to such great variety, but may be comprehended by a few divisions. We have, then, simple ophthalmia, specific ophthalmia, cataract, and amaurosis or paralysis of the optic nerve.

Simple Ophthalmia.

This disease arises from some external injury, such as a blow from a stick or whip, a bite from another horse, or the intrusion of some foreign body. It is important to distinguish this disease from that we have presently to notice, which may be done without much difficulty, by an attention to the following symptoms. Unless the injury is very trifling, there is usually much swelling and inflammation of the eyelids and its envelopments. Shortly afterwards we find an opacity of the transparent cornea; this opacity rarely spreads over the whole of the eye, but is much greater at one part than another. On inspecting the eye in a lateral position, we find that the aqueous humour is either not affected, or only partially so; and on looking into the interior of the eye, we find the parts presenting a healthy appearance.

Treatment. — It is very important to be prompt and energetic in our treatment; for otherwise there is great danger of the opacity increasing and involving the whole of the cornea, so as

to occasion blindness, or otherwise to be permanently fixed in one part, so as to obstruct vision and defy all our attempts for its removal. When the inflammation is considerable we should lance the inflamed vessels of the eyelid, and encourage the bleeding as much as possible, and at the same time open the angular vein which passes from the eye down the face. In performing this operation it is necessary to cut in some measure across the vein, in order to ensure its bleeding freely. If the blood should not flow freely, it will be better to bleed from the neck at the same time. The eye should be frequently fomented with warm water the first day, and afterwards the following lotion should be applied round and in the eye six or eight times a day:—

Cold water..... 1 pint.
Tincture of opium..... 1 ounce.

A dose of physic should be given; and if, in a day or two, there be still much inflammation, a few quarts of blood may be taken from the neck of the affected side. When the inflammation has in great measure abated, but a film or opacity remains on the cornea, a few drops of the following stimulant should be applied twice a day with a camel's hair brush:—

Distilled water 1 ounce.
Nitrate of silver..... 1 or 2 grains.

Or instead of this, a little *vinum opii*, or tincture of opium diluted with an equal quantity of water.—ED.]

Specific Ophthalmia, or Inflammation of the Eye.

[This disease used to be called by farriers moon blindness, under the idea that its periodical attacks were influenced by the moon, as it sometimes occurs about once a month. This idea, however, is altogether absurd, and its periodical returns are rarely so frequent as once a month. The disease consists of a specific inflammation of the various parts of the eye occurring without any immediate external cause; and though in great measure curable for the time, yet occurring again and again, until the structure of the eye is so changed by these repeated attacks, that blindness follows, or otherwise a cataract takes place, either total or partial.

The *symptoms* generally appear somewhat suddenly; in the evening, perhaps, there might have been nothing amiss, but on the following morning sometimes both eyes, but usually one eye only is found nearly closed and suffused with tears; there is great impatience of light, and indeed it is somewhat difficult to induce the animal to open the lids sufficiently for examination, and when he does so, the pupil is found exceedingly small, so

as to keep out the light as much as possible. The cornea is not so opaque as when the inflammation is brought on by an external injury; but on looking into the interior of the eye we observe that it has lost its usual brightness. The attendants of the horse usually report that some hay seeds must have got into the eye, or that he must have injured it in some way; but a proper examination will detect the difference, and this will be greatly assisted if we can ascertain that the horse had had a previous attack.

The progress of the case will depend on the treatment employed, the degree of inflammation, and the particular parts most affected.

I have known a case terminate in blindness from cataract in the course of three days, and in another case the animal was subject to periodical attacks for eight years without entirely losing vision at last. Sometimes the crystalline lens is principally affected; in other cases the iris bears the brunt of the attack; in some instances the aqueous humour and the cornea are principally affected, and in others the vitreous humour and the retina are chiefly diseased. When the crystalline lens is principally affected, it usually becomes opaque, or what is called a cataract forms, which, however, may not be so total as entirely to destroy vision. When the iris is chiefly inflamed, the case, I imagine, does not terminate so quickly in blindness, but the attacks are often frequent and very troublesome, and attended by much general irritability.

When the vitreous humour is greatly affected, the interior of the eye often becomes of a yellow muddy colour, and the eye sometimes shrinks from absorption of its substance.

Causes. — The causes of this severe disease, which so often brings the price of a horse from a hundred guineas down to fifteen, has engaged much attention, and been the subject of some dispute. In the greater number of horses that are thus attacked, there is, beyond all question, a natural predisposition to the disease from weakness of the parts. There are, therefore, two things to consider,—the cause of this predisposition, and the exciting cause itself, or that which immediately produces the disorder. The disposition to the disease is decidedly hereditary. The offspring of parents with diseased eyes become blind far more frequently than the produce of animals with healthy eyes; and to the circumstance of the little care taken in the choice of the dam or the sire may to a great extent be attributed the frequency of the disease. We find that sheep and oxen, compared with the horse, are rarely attacked with diseased eyes, and even the dog is seldom affected. What then is the difference in their treatment? The latter are, in a great measure, left in a state of nature; whilst the former animal, at an early age, becomes

domesticated, is taken into a warm stable, exposed to the fumes from the dung and urine, fed on stimulating food, and often used with great severity, either in the saddle or harness. Here we have several causes: a plethoric state of the system is induced by stimulating food, by which much blood is sent to the head; this disposition of the blood is still further increased by exertion, particularly in harness, from the pressure of the collar, retarding, in some measure, the return of the blood. The eyes are exposed to the stimulus of ammoniacal gases, the irritating effect of which on our own eyes may be readily experienced; besides which the young animal is often kept in a dark stable, whence he is often suddenly brought into the full glare of the noon-day sun. Can we wonder that this combination of causes should produce disease, or that the delicate structure of the organ of vision should be the first to suffer? We have here both exciting and predisposing causes. A weakness of the structure of the eye is often derived from the parents, and the causes above-mentioned soon bring on disease.

Specific ophthalmia usually makes its appearance between the fourth and seventh year, but sometimes before, and occasionally in old horses.

Harness horses are certainly more liable to the disease than those used for the saddle alone; and horses with a small sunken eye are more likely to be affected than those with full open eyes. The disease is also more likely to occur amongst coach and post horses, where a number are kept together, than amongst gentlemen's studs.

Treatment. — Although different parts of the eye may be affected, yet the attack being one of inflammation, the treatment should be pretty much the same in all cases, and should consist, in the first place, of local and general bleeding and physic, as advised for simple ophthalmia; the bleeding should be repeated as required; warm fomentations should be used at first, and should be succeeded by the cold lotion before advised, or the following, which is more stimulating: —

Sulphate of zinc..... 1 drachm.
 Superacetate of lead ... 4 scruples.
 Water 1 pint.

Mix, and, after shaking them together, filter through blotting paper.

When the inflammation has in some measure subsided, a seton may be inserted under the eye, and kept in for several weeks.

Some persons object to the seton, on account of the mark it leaves for some time, and recommend instead one to be placed under the jaws.

A few drops of wine of opium may be daily insinuated into

the eye, or the nitrate of silver lotion prescribed in the preceding article.

A variety of stimulants have been applied to the eye with advantage, and it is often necessary to vary them, as they sometimes lose their effect by repetition. A solution of the extract of belladonna, as well as that of digitalis, has been found very useful; and sometimes a stimulant in the form of an ointment has been most convenient and effectual, such as the ointment of nitrated quicksilver, weakened by mixture with one half the quantity of lard, and applied to the eyelids once a day; or an ointment composed of one part of sulphate of zinc and sixteen parts of lard.*

It is of importance that the horse should be removed to a cool and clean stable, where there are no emanations from the excrements.

Mr. Peall, in his observations on the diseases of the horse, relates a striking experiment which he made on a horse affected with ophthalmia. "I have ordered him," he says, "to be removed from the stable, where I observed he kept both eyes shut, into the open air, or to a very cool situation, and have watched the effects of the change. In the course of half an hour, I have commonly found him begin to open his eyes gradually, and in the course of two or three hours, to keep them open boldly, and for a continuance, even though the situation he was placed in was not darkened or shady; for it cannot be denied that strong light is very prejudicial in such cases. Now, to prove that the stimulus of the volatile alkali (the vapours of foul litter) was more offensive to the inflamed organ than that of light, I have placed the animal again in a hot stable, which did not admit much light; and, in the course of a few minutes, have observed him begin to close his eyes gradually, and, after an hour or two, to keep them constantly shut. Not satisfied, however, with this, I have removed the horse back again to a cool situation, and have observed the same effects to be produced as have been already detailed."

It is frequently the case, that as one eye gets better the other is attacked or gets worse; and it is fortunately sometimes the fact that the loss of one preserves the other: this, however, is, generally speaking, when the disease ends in cataract. — Ed.]

Cataract.

[We may consider cataract in three varieties: — total cataract, partial cataract, and specks on the capsule of the crystalline lens, which, however, can scarcely be called cataract.

* For other medical applications for the eye refer to the *Materia Medica*.

Total cataract is an entire opacity of the crystalline lens, so that it no longer admits rays of light to pass through, and blindness is, of course, the result. It proceeds from inflammation of the lens, and it usually takes many attacks to produce total opacity. It may be readily detected by exposing the horse to a moderate light, such as that at the stable door, and carefully looking into the interior of the eye.

Sometimes the opacity is quite white, at other times grey, and occasionally yellow. The lens undergoes some alterations of form when affected with cataract, becoming much more globular than before.

In the human subject, it is well known that the operation of couching is practised, which consists either in extracting the lens, or thrusting it back into the vitreous humour, where it becomes absorbed. In the horse, however, this operation is almost impracticable, and is otherwise objectionable, inasmuch as partial vision would alone be restored, which would probably make the animal shy, as it is impossible to adapt spectacles to him to supply the want of the lens, as is done in the human subject.

It often happens that when a cataract has completely formed in one eye, the other, although it had been before attacked, becomes strengthened and remains sound. This, indeed, is the most favourable termination of specific ophthalmia that can possibly occur.

Partial cataract is when there are opaque spots in the lens, but not sufficient to shut out vision entirely. It is generally the consequence of active inflammation, which may recur again and again until the transparency of the lens is entirely gone. In other cases, the inflammatory attack may not again recur, but partial vision remain through life. In examining a horse, we may expect a recurrence of the inflammation if the other parts of the eye are disorganised: but if the opacity is entirely confined to the lens, and the other parts appear perfectly clear, and the iris is not particularly irritable when exposed to the light, we may consider it probable that the horse will preserve what sight he possesses, although, of course, he cannot be considered as sound.

Sometimes we find slight specks on the crystalline lens occurring without any previous inflammation, or at least any that obtained notice. The appearance of these specks may, by attention, be distinguished from partial cataract. Instead of being white, yellow, or green, they are of a grey hue, and their opacity is not so great as in cataract. It is extremely probable that the opacity is confined to the capsule or covering of the lens; and, in several instances, I have known them disappear without any remedy having been applied. Other veterinary

surgeons have made the same observations; and it is now a matter of doubt whether their existence is a cause of unsoundness. — Ed.]

Amaurosis,

Or Gutta Serena, is blindness either total or partial, from supposed paralysis of the optic nerve. On inspecting the eyes, we find no alteration of structure, but the pupil no longer enlarges and diminishes from the effects of light, and the eyes have an unusually bright or glassy appearance. The blindness is sometimes total, at others partial; sometimes it remains incurable, at others it gives way to remedial measures. The disease often comes on suddenly, and the first intimation received is the horse's running against a wall or post. Amaurosis is of several kinds; it may depend on some lesion of the retina, and then it is called *idiopathic*, or the mischief may be in the optic nerve, which, on dissection, has been found to be the case, and it is then called *symptomatic*; or it may be *sympathetic*, when it depends on the existence of disease in some independent organ. Amaurosis has been known to follow stomach staggers, in which cases it has sometimes proved temporary, at others permanent. It has also, in many instances, succeeded excessive loss of blood from hæmorrhage after castration, and also from ruptured liver. It has appeared, too, in a temporary form during gestation, and also, in many instances, after apoplexy.

The *treatment* must consist in bleeding from the neck rather extensively, and following this by a dose of physic. Local applications to the eye will be of little service.

When, however, it proceeds from disease of another part, our attention must be more particularly directed to the recovery of that part, whether it be the stomach, the liver, or any other viscera. Although bleeding is generally advisable at first, it is not always to be followed, but must be regulated by the general health. When the above treatment fails, calomel may be given for some time combined with opium, and in obstinate cases, strychnia may be tried. — Ed.]

Worm in the Eye is a frequent complaint in India. Its situation is in the aqueous humour, where the worm is found swimming about. It is generally upwards of an inch in length, and often occasions impediment to the sight.

Mr. Skeavington attributes it to the foulness of the water used in that country, and recommends its removal by puncturing the cornea with a lancet prevented by a little tow from passing too far. The aqueous humour escapes through the incision, and

with it the worm. Mr. S. has operated on seven cases successfully. He does not throw the animal, and prefers an incision opposite the pupil as being less likely to injure the iris.—
[Ed.]

CHAP. XLVIII.

ON LAMENESS FROM STRAINS.

LAMENESS is produced by a variety of causes, so numerous, and often so obscure, that to discover its seat with accuracy and promptitude is a mark of professional acumen to which every young practitioner should aspire. Let him not, however, be led by this consideration to give a hasty opinion in cases of lameness; but, on the contrary, let him investigate carefully, and reflect deliberately, upon all the circumstances of the case, and be well assured that he knows the seat and nature of the lameness before he gives an opinion. Lameness may exist in a great variety of degrees; the shades, for so they may be named, between soundness and positive lameness are so numerous, that to give a name to each would be impossible; and if possible, unprofitable. The immediate cause of lameness, in the majority of cases, is the effort of the animal to relieve the lame leg by throwing his weight on the sound one, thus causing that unequal action called lameness. The serious loss and inconvenience arising from lameness have excited particular attention to the subject; and, though considerable improvement has been made within a few years in the art of shoeing, as well as in the treatment of lameness, it is a generally acknowledged fact, I believe, that a large proportion of the lameness that occur will only admit of palliation, and that a considerable number are absolutely incurable, especially those in the feet.

In alluding to the improvements in shoeing, I do not mean to include that which has been introduced from France, except as it regards the nailing of those shoes; for as to the French shoe, and its boasted *ajusture*, I think it the most absurd imaginable. That lameness is much more frequent in this country than in France is a fact that must be admitted, and ought to be deeply lamented, because it is an evil that may and ought to be prevented. On what, then, it may be asked, does this particular frequency of lameness in this country depend? The French say on shoeing; but it is not really so: on the contrary, I am of opinion that the English shoeing, speaking generally, is the best in the world. The frequency of lameness, so loudly and justly complained of, arises wholly from the immoderate

and cruel manner in which the animal is worked, and the early age at which he is brought into work.

[*Strains* may occur in muscles, in ligaments, and tendons, and in the membranes by which tendons are joined together, and they prove a very frequent source of lameness in the horse. They consist in an overstretching of the injured parts, whereby inflammation is produced, and it becomes hot, tender, and frequently swollen; sometimes some of the small blood-vessels are ruptured, and blood is extravasated; at others a liquid is effused by the vessels, and thus causes the swelling. The lameness is produced not so much by the pain the animal receives when the injured part comes to the ground, but rather by the effort to prevent this pain as much as possible by treading lightly on the injured limb, and with greater force on the other.

Strains of the muscles are generally more painful than those of tendons and ligaments, from the greater organisation of the part; but, for the same reason, they are generally more effectually cured, and in a shorter space of time. In strains of the ligaments and tendons what we have principally to fear is the permanent enlargement of the part, by the deposition of new substance around it; this being one of nature's methods in relieving inflammation, but which is generally the source of great weakness of the part.

In the *treatment* of strains our principal object must be to relieve the inflammation as quickly as possible, and thus to prevent an enlargement from taking place; with this view we should have recourse to bleeding, locally or generally, warm fomentations, poultices, and cold lotions, avoiding stimulants till the inflammation is considerably abated. — Ed.]

Shoulder Strain.

[Some years since the practice of the veterinary art was confined to farriers, whose want of knowledge of morbid anatomy left them to guess at the seat of lameness in numerous instances; and thus in the greater number of lamenesses in the fore extremity, where no external signs were manifested, the shoulder was invariably considered the seat of disease. Many veterinary surgeons finding this to be erroneous, in numerous instances have flown to the opposite extreme, and declared that horses were never lame in the shoulder.

Shoulder lamenesses are certainly rare, but they occasionally occur, and may nearly always be detected. There are several parts of the shoulder liable to injury; sometimes the muscles that connect the shoulder blade and the humerus to the body are strained, and this generally arises from the fore legs slipping or spreading apart. Occasionally the large triceps muscle, pass-

ing from the back part of the scapula to the elbow, is the seat of injury.—ED.] More frequently than this the lameness depends on a strain of the tendon, (or an injury of the synovial cavity, or bursa mucosa, through which the tendon passes,) which arises from a protuberance on the lower part of the shoulder blade, and slides over the large grooved process at the head of the shoulder bone. This large grooved process is covered with a slippery cartilage, as in other synovial cavities, to prevent any friction while the limb is in motion. I have seen shoulder lameness that appeared to depend upon a rheumatic affection of this part. The manner of the horse's going, when this part is the seat of lameness, is very remarkable. In endeavouring to trot, and sometimes even in walking, the fore leg suddenly gives way or bends, and it is only by a considerable effort that the horse can save himself from falling. I had a filly under my care for this lameness which fell down several times in walking. The remedies I employed were passing a seton over the point of the shoulder, and blistering all around it pretty freely. This, and confining her some weeks in a box, effected a cure.

[I lately met with a case of this description which arose from severe struggling after being thrown for an operation. The use of the limb was nearly lost for several days, and the seat of injury was evidently in the triceps muscle, just above the elbow, which became much enlarged. Fomentations, bleeding, and stimulants effected a recovery.

The *symptoms* of shoulder lameness are generally detected without much difficulty. The horse is generally lame in the walk as well as the trot, which is not the case with other lamenesses of equal severity. The lameness is particularly noticeable on going down hill. Unlike other lamenesses the injured leg is not extended so far as the other, and is often carried forwards in a circular direction; there appears, indeed, greater pain evinced in extending the limb than in resting the weight of the body upon it. On moving the limb forwards, backwards, and laterally there is often considerable pain evinced by the animal; this, however, depends on the severity of the case.

Horses with thick, upright, and badly formed shoulders are more liable to these injuries than others, from the inability of the parts to respond adequately to exertions demanded, whence they become over exerted and strained. The injuries are therefore produced in galloping over heavy grounds or ruts, or going fast down hill in harness, or from some accidental false step.

The *treatment* should consist of bleeding largely from the plate vein as it is commonly termed, just opposite the elbow-joint; three to five quarts may be abstracted with advantage. Should there be considerable pain, and particularly if the parts feel hot and tender, the shoulder should be fomented frequently

with warm water for a day or two. After which the following liniment should be well rubbed in; but if there be no visible heat the liniment may be rubbed in at first:—

Olive oil 2 ounces.
Spirits of hartshorn 1 ounce.
Strong tincture of cantharides... 1 ounce.

Mix.

We may produce by this liniment what degree of effect we please, by rubbing in a greater or lesser portion. If the case be severe, and the temporary loss of hair no consequence, the greater portion may be rubbed on in one day, and a lesser portion the next, which will be found to produce considerable swelling and discharge of serum. Its strength may be increased by the addition of the last-mentioned medicine, and diminished by the addition of the first. In slighter cases one fourth of the liniment may be rubbed in daily until a sufficient effect be obtained.

This treatment will generally effect a cure in the course of a month, more or less; but, in obstinate cases of longer continuance, setons may be inserted over the shoulders, and after their removal the horse may be turned to grass.—ED.]

Strains of the Knee Joint.

[This joint, being so strongly compacted and secured by ligaments, is rarely strained. Sometimes, however, this is the case, and most frequently in young horses, and particularly in colts in training. The seat of the injury is generally the ligaments on the side of the knee, and it is frequently severe and obstinate. It is generally produced by slipping on the turf, and sometimes attends a broken knee, which it renders considerably worse.

The *treatment* should consist of bleeding from the arm, warm fomentations, cold lotions, and when the inflammation is removed, unless the case is slight, a blister should be applied.—ED.]

A Description of the Tendons, &c. of the Leg

Will here be useful, before the injuries of those parts are considered.

The *flexor tendons*, or back sinews, are the appendages or ropes to the flexor muscles, which are situated chiefly on the back part of the fore-arm of the horse; when these muscles are full or prominent, tapering downwards in a sinewy form, it indicates great strength of the fore-leg, and the sinews will always

be found of corresponding strength. The elbow in such a fore-leg is generally standing out from the side, and not turned in and concealed, as it is in fore-arms of a different description, in the side of the chest or sternum. These sinews are two in number, and the one is inclosed in the other, so that the latter forms what is termed a sheath for it. The inner tendon, or, as it is named, the *perforans*, is one of great strength, nearly round, and extends down to the bottom of the foot, or coffin bone, into which it is firmly implanted. The other, or sheath, named *perforatus*, is considerably thinner, forming, indeed, a mere sheet of tendon, especially at those parts where windgalls happen; these were formerly supposed to be enlarged bursæ mucosæ, but I have clearly demonstrated that they are nothing more than the tendinous sheath, distended with synovia.

These, then, are the two tendons, which, taken together, form the back sinews. Between these two tendons there are, in two parts, thin membranes, by which they are joined together; these membranes appear to serve as bridles, allowing the perforans tendon to move a little way within the perforatus, and then preventing any further motion. The situation of those membranes is about midway in the leg, and midway in the pastern. If the coffin joint happen to be extended in a way the animal was not prepared for, both these membranes are ruptured. The consequence is, an effusion of blood between the two tendons.

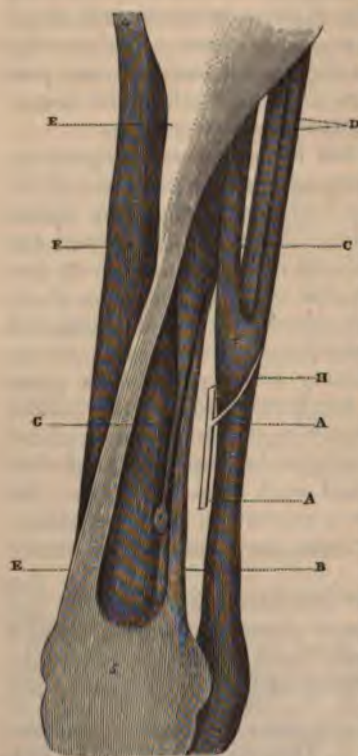
It will be seen from the Plate that there is a strong ligament, but in appearance like a tendon, coming from the back part of the knee, passing down about four or five inches, and then incorporating with the perforans tendon. This I have named the great ligament of the back sinew, and its office is of a very important nature, being no less than that of supporting the whole body; that is, supposing the flexor muscles to be fatigued, and incapable of doing it, and in consequence giving way; for in that case this great ligament forming one rope with the great back sinew, and this sinew being firmly inserted into the bottom of the coffin bone, it must of necessity be the sole support of the whole weight. This ligament may also be ruptured in strains. I have seen a case of this kind, and such must have been the cases that have been described as a rupture of the back sinew, an accident, as must be obvious from the plate *, that cannot happen.

One part only remains to be described, and that is the suspensory ligament. This ligament passes down from behind the knee close to the shank bone, until it arrives to within three inches and a half of the superior and posterior part of the

* A. The outside nerve, or that part of it where the branch H communicates. B. The suspensory ligament. C. The great ligament of the back sinew. D. The two back sinews, or flexor tendons. EE. The extensor ten-

sesamoid bones: at this part it divides into two branches, which diverge from each other, and embrace the sesamoid bones laterally, so as to keep them firmly in their situations; it then passes downward, and obliquely forward, and gains the extensor tendon about midway, in front of the pastern. This ligament is the chief support of the fetlock joint, and is sometimes ruptured in one of its branches: this, however, is rarely the case; but it is much more frequently strained and enlarged.

The fetlock joints are of great importance to the horse: they receive, from their oblique position with respect to the legs, the weight of the whole body, and form that important spring which enables him to perform his wonderful exertions with ease to himself and pleasure to his rider. From this circumstance, they must of course be liable to very severe injuries, and these injuries, it is to be regretted, are often incurable; that is, considered as saddle horses; but as draught horses, they may be sufficiently restored for slow and moderate labour.



don fastened by a ligament to the outside of the knee. F. The cannon or hank bone. G. The splint bone, which is placed on each side, rather posteriorly, of the shank-bone, beginning immediately under the knee, and extending tapering downward, and terminating at fig. 1. in a sort of bulb. H. The back sinews and their great suspensory ligament, apparently, joined together. This, however, is not the case; it incorporates only with the perforans tendon, marked fig. 2.; and so intimately, that they form one and the same substance, at the part marked by the small letter i. The perforatus, marked fig. 3., forms a sheath for the perforans, as already described in the article strains. 4. The knee-joint. 5. The fetlock-joint.

This plate shows also a branch of nerve which crosses over the back sinew, to join the nerve on the opposite side. It must be observed, however, that the nerve is represented crossing in too perpendicular a direction, and joining the great nerve on the outside of the leg a little too high. The distance between the part on the inside nerve, where the branch is given off, and the part on the outside nerve, where it communicates, is about two inches, or within two inches and a half, for it varies a little in this respect. The

plate may, without this explanation, lead the reader into an error.

Strain of the Flexor Tendons, or Back Sinews.

[This injury is of frequent occurrence, and being often neglected in its early stages, an enlargement of the tendons takes place, which greatly depreciates the value of the animal. This being the case, the injury whether trivial or severe, should never be thought lightly of, but always submitted to treatment.

The *Symptoms* are in a severe case, lameness and heat, and swelling of the affected part; on pressing the sinews considerable pain is evinced. Sometimes the fetlock almost touches the ground from relaxation of the sinews or their connections. The enlargement in some cases is so considerable, that the sinews cannot be discerned; this often arises from effusion of blood in the sheath, but the tendons, themselves, are likewise inflamed.

The *treatment* in a severe case should consist of copious bleeding from the arm, which may be repeated the second or third day if necessary; a *patten* shoe should be placed on the foot of the affected leg, so as to put the sinews in a state of rest; and the limb should be placed in a bucket of warm water, and frequently fomented for a long time together. If this cannot be conveniently done, a linseed meal poultice should be placed on the leg and wetted several times in the day with warm water. On the second or fourth day the following lotion may be substituted for the fomentation, a linen bandage being applied, and frequently saturated with the lotion:—

Muriate of ammonia.....	1 ounce.
Pyroligneous acid.....	2 ounces.
Spirits of wine.....	2 ounces.
Camphorated spirit.....	2 drachms.
Cold water.....	1½ pint. —

Mix.

When the part is totally free from inflammation, if a swelling remains, it should be either blistered or fired, the latter is the most effectual, and should be preferred if the blemish is not objected to. — ED.]

Strains of the Fetlock Joint.

This injury may be confined to the joint itself when there is lameness and heat but not much swelling, but its seat generally is the ligaments surrounding the joint.

The *Symptoms* are similar to those before mentioned in strains of the sinews, and the treatment also should be very similar. A *patten* shoe, however, is not so imperatively called for, and if used should not be continued so long.

Breaking Down.

This accident often occurs in racing, and sometimes in hunting, but very rarely upon the road. A strain in the back sinews is sometimes called by this name *; but when a horse breaks down, the fetlock joint, when he rests on that leg, nearly bears upon the ground. This accident is supposed to depend on a rupture of the great suspensory ligament of the leg; but sometimes it is occasioned by a rupture of the ligaments of the pastern. If we examine the tendons and ligament on the back part of the shank, we shall find that the great flexor, or perforans tendon, is supported by a strong ligament, nearly as large as itself, which proceeds from the back part of the knee, or from the upper and posterior part of the great metacarpal or cannon bone. About three or four inches down it joins the perforans tendon, and becomes intimately mixed with it. If this part is examined it will clearly appear that a rupture of the suspensory ligament of the fetlock joint would not bring the horse down upon his fetlock joint unless this suspensory ligament of the perforans tendon were to give way also. I have met with two cases of a rupture of the ligaments, by which the two pastern bones are held together. It happened to two nerved horses, that were driven in the subscription coach from Bath to Exeter. Both these horses came down upon the fetlock joint, and were therefore shot. A perpendicular section was made of the foot and pastern, when this dislocation of the pastern bones was shown very conspicuously. The suspensory ligament of the pastern joint embraces the two sesamoids laterally, and when ruptured it is probable that only one of its branches is broken, which is followed by a dislocation of one or both sesamoids: this accident also I have seen.

This breaking down is most probably owing to a rupture or strain of the ligaments passing from the sesamoid bones to the pasterns, which, on being divided, greatly increases the obliquity of the joint. In the treatment of such cases the patten shoe must be early applied, and the same means resorted to as for other strains.

The *Suspensory Ligaments* which pass down the leg between the back sinews and the bone, are often the seat of inflammation, enlargement, and lameness. The nature of this affection is less severe, though often more obstinate, than that of the tendons.

The *Treatment* must be similar to that before recommended;

* This is the case in racing stables; it is, however, only very severe strains that are thus called, that is, when the enlargement is so great that the sinews present a considerable curve instead of a straight line.—ED.

but, there being less inflammation, firing or blistering should be earlier resorted to. — ED.]

[*Windgalls*

Are soft puffy swellings of a similar nature to bog spavins and thorough-pins. They are found both in the fore and hind legs at the fetlock joint. There are two situations in which they may appear; one on each side, and at an equal distance from the front and back of the fetlock joint; the other on each side of the flexor tendons. The former communicate with the fetlock joint itself; the latter, which are larger and more frequent than the others, with the sheath of the flexor tendons. Thus connected, there must be considerable danger in opening them. Windgalls are, therefore, neither more nor less than a distension of the synovial bags with synovia, and sometimes an extension of these bags by a rupture of their connections. The cavities which are the seat of windgalls are shown in the frontispiece plate,— one just behind the lower part of the cannon, the other behind the tendons. Sometimes we find these enlargements at the front of the fetlock joint, or rather on each side of the extensor tendon. In this case they do not communicate with the joint, but are merely the distension of the mucous capsule just about the joint. They are also found above the knee, and in various other parts of the body.

Blistering these windgalls will generally cause their disappearance for a time; but they are sure to return with work. Puncturing them with a needle in various places, so as to cause an adhesion of the side of their internal surfaces has been suggested, and is well worth a trial. — ED.]

Strain of the Coffin Joint.

[Under this term, most obscure lamenesses of the fore extremity used to be classed by those who were of opinion that the shoulders were not the seat of injury. Later research, however, has discovered that, in nine cases out of ten, the seat of these obscure lamenesses is not in the coffin, but in the navicular joint somewhat posterior to it. The coffin joint is so firmly secured within the hoof, and is so limited in its movements, that its ligaments are rarely strained. This, however, is occasionally the case, and may be detected by heat round the coronet, in addition to the lameness.

The treatment must consist in bleeding from the foot and poultices, and followed by blistering the coronet.—ED.]

Strain or Injury of the Loins.

This injury is not unfrequent, and occurs chiefly to draught horses, especially those in the shafts when they are keeping back heavy burdens in going down hill. In doing this they often slip, and not only strain the muscles of the loins, but may injure the spinal marrow also. When the spinal marrow is injured, a paralysis of the hind extremities, either total or partial, takes place, and the horse is seldom of much use afterwards. This disease is noticed under the head of palsy. When the muscles of the loins are injured, we can generally succeed in curing by the following treatment:—Copious bleeding, perfect rest, suspension or slinging, if the lameness is such as to require it, and covering the loins with a fresh sheep's skin, blistering, or rubbing some strong embrocation upon them. After this treatment has been continued about a week, the horse should be put into a loose box, where he can move himself about freely, and in a week after this he may, if required, have a *charge* put upon his back, and be turned to grass.

Strain or Injury of the Hip Joint, or Round Bone.

This accident is produced by the hind feet slipping sideways, or by blows on the part, as in falls on the side. In the first case, that is, in slipping sideways, the round ligament of the hip joint is injured or torn. In falling on the part, the injury is of a different nature: the cup of the joint or head of the bone may be injured. But a more common effect is a gradual enlargement of the great process of the head of the femur, by which the muscle named *gluteus magnus* (of the horse, but *parvus* of the human body) which passes over it, is thrown off a little, and therefore when in action, it forces the head of the femur into the acetabulum, in such a manner as to render motion painful. This happens, in some cases, in such a degree as to produce inflammation, and very serious lameness. Lameness in the hip joint may be easily distinguished by the horse inclining his hind parts a little on one side, so as to make one hip appear while he is going a little higher than the other; but after he has travelled some miles, he becomes a little tired of bearing so much on the sound side, and puts up with the pain of bearing on the lame side, so that he steps or goes equally, and the lameness is no longer observed, until he has stopped a short time, or rested in the stable; and then, when taken from the stable, he is as lame or lamer than before. Rest alone, at the commencement of the lameness, will often effect a cure; after this period, firing and blistering are also necessary. This lameness is easily distin-

guished from lameness of the hock, or fetlock joint, by the sudden catching up of the hind leg in the two latter.

Strain or Injury of the Stifle.

Lameness in the stifle is known by the difficulty the horse feels in putting forward the hind leg; also by swelling and tenderness of the part. It is generally produced by external violence, though it may be caused by a strain.

The treatment should consist of bleeding, either generally or from the thigh; warm fomentations to the part, followed by cold lotions; and if the lameness continues the joint should be blistered, or setons inserted over it.

Dislocation of the Patella.

There is another kind of lameness in the stifle, which is sometimes only of a temporary nature, and has more the appearance of spasm or cramp of the muscles; but is, in fact, a dislocation of the patella. It takes place when a horse is suddenly moved in the stall, or when first taken out, or when first moved after having been ridden and then standing still a short time. The attack sometimes lasts only a minute or two, but is often recurring. It occurs chiefly in colts, or young horses. When a horse is attacked with this cramp, as it appears to be, he continues with the hind leg stretched out, stiff, and apparently in great pain; he then suddenly draws it up with a jerk, and the knee pan, or patella, can sometimes be heard to go into its place again.

[The injury here spoken of, and so frequently mistaken for cramp, is neither more nor less than a dislocation of the patella or knee pan, whereby the motion of the joint is altogether prevented, and the leg becomes stiff and immovable. Sometimes, from the frequent recurrence of this affection, and its often spontaneous cure, the articulating surface of the patella becomes flattened, and the animal is rendered almost useless, being continually subject to the dislocation.

In other cases, the bone cannot be restored to its proper situation without assistance, which should be thus rendered. The operator should place himself behind the animal, and putting one arm between the thighs, clasp his hands in front of the stifle. The leg now being drawn forwards by an assistant, the patella should, at the same time, be forced in by the operator.

A blister or charge should be placed over the part to prevent or retard its motion, and the animal kept in a state of rest for some days. In cases of frequent recurrence, the part may be fired, with a view of bracing the skin. — Ed.]

CHAP. XLIX.

EXOSTOSIS.

Splints.

“SPLINTS are so frequent, that few horses become old without them; and, in the majority of cases, they produce neither lameness nor inconvenience; in other cases, however, they are attended with much pain and severe and troublesome lameness. We sometimes find large splints not only unaccompanied with lameness, but which never have been so attended; whilst others, one fourth their size, will often produce severe lameness. This used to be explained, or rather endeavoured to be explained, by saying that the latter interfered with the sinew, and the other did not. The enlargement cannot interfere with the flexor sinews, and it is doubtful whether its proximity to the suspensory ligament is ever a source of lameness. The circumstance of splints producing lameness in some cases and not in others can be much better accounted for by supposing that where it produces no inconvenience the ossific deposit is so gradual that the periosteum, or membrane covering the bone, can accommodate itself to its increased size; whilst in other cases the enlargement takes place so rapidly, that the periosteum becomes painfully stretched, and thus produces lameness. A splint usually occurs about three or four inches below the knee, but sometimes we find it much lower down, and occasionally higher up. In these latter instances the case is much worse, as it is likely to interfere with the action of the knee, and in this situation is often complicated with inflammation of the ligaments of the knee. The proximate cause of splint may be considered as a strain of the ligamentous substance which connects the small with the large metacarpal bones, and which may be produced by anything that throws an undue proportion of weight upon these bones. It is found far more frequently on the inside than the outside, which is considered to be owing to the former being more under the centre of gravity, and also to the circumstance that the inner splint bone receives the whole weight of the small bone of the knee, the trapezoid; whilst, on the outside, the unciform bone rests partly on the large, and thus the latter prevents the former from being pressed from above beyond a certain degree. For the same reason, horses that turn their toes out are most liable to splints.

Treatment. — “Professor Coleman used to say, ‘A splint once is a splint always;’ the two bones being once united by ossific matter, this connection, whatever we may do or apply, will never

be altered. It used to be the custom to remove the splint with a hammer and chisel, but the production of a large blemish from the destruction of skin was the consequence of this barbarous method. Another practice, as ancient and barbarous as the former, was the application of corrosive sublimate, or other strong caustic, so as to occasion a slough; in this case, too, the remedy was as bad as the disease,—the horse was disfigured for life. Better and more recent treatment than this was either firing or blistering. The objection to the former, however, was the marks it produced; and to the latter, in common with the former, that though the lameness was removed, it very frequently returned with the resumption of labour.

“The more modern, successful, and scientific treatment of splints consists in the operation of periosteotomy, or division of the periosteum, which covers the bone.

“Professor Sewell has introduced, within these few years, an excellent mode of performing the operation. The horse is cast, the leg properly straightened and secured, and then a small opening is made just below the splint, sufficient to introduce a long, narrow, convex, probe-pointed knife, the edge of which is on the convex side; the knife is then passed up under the skin,



Periosteotomy Knife.

This knife is blunt on the extremity so as to pass under the skin as a probe.

and by drawing it backwards and forwards on the splint, pressing firmly at the same time, the periosteum is completely divided. A small opening is then made through the skin above the splint, and a narrow seton passed from one orifice to the other, after which a bandage is placed on the leg, and the horse released. The seton should be moved and dressed daily with digestive ointment, and at the expiration of a week removed, and the wound permitted to heal. I have found the operation succeed whenever I have adopted it.

“In the very numerous cases that occur of splints being unattended with lameness, it is better ‘to let well alone;’ but when the lameness is slight, and the horse cannot be spared from work more than a few days, it is well to apply a mild blistering application, such as the tincture of cantharides, about a tea-spoonful of which will be sufficient for one application,

which may be repeated according to the action it produces and the benefit it occasions.

“Bony tumours sometimes form in various parts of the cannon bone, but, though often large and consequently offensive to the eye, they rarely produce lameness. They are more frequent with hunters than with other horses, and are often, but not always, produced by blows in leaping. The use of the iodine ointment forms the best treatment. Still more frequently we find ossific depositions round the fetlock joint: the most usual situation is by the side of the sesamoid bones. Sometimes we find these enlargements on the anterior part of the joint, or on the lateral portions anterior to the suspensory ligament. These swellings frequently exist without injury, but they are sometimes the cause of severe lameness.

“*Treatment.*—When these enlargements are produced by strains of the ligaments, they are much more serious than when they come on gradually without any ostensible cause. In the former case, it may be prudent to blister or fire the leg; in the latter, we should recommend the continued application of the iodine ointment.

Ringbone.

“Ringbone is a deposition of ossific matter on the pastern bones, which, from frequently extending round them, derives its common appellation. It exists in various degrees, sometimes being very slight, and in others surrounding the bones, and altogether obscuring their real form. Ringbones arise either from concussion of the joint or a strain of its ligaments; they may either be rapidly produced by a severe strain, or may, as they usually do, come on slowly. It often happens that a horse is lame, and it is somewhat difficult to discover the seat of his lameness; but, after a while, a ringbone commonly forms. Horses with short upright joints are disposed to this disease from the concussion to which they are liable, and more particularly if their action is high; and I have also found that horses with particularly small feet are likewise, from the same reason, more exposed to these ossifications than others with larger feet. The hind legs are subject to ringbones as well as the fore, but not so frequently; and when they appear behind, they are usually found on the side of the pastern bones, and arise generally from some strain of the ligaments.

“*Treatment.*—Should there be any inflammatory appearances, as there generally are, we should take care to remove them before we have recourse to stimulating remedies. For this end, we should employ topical bleeding from the toe or the coronet,

and, after that, evaporating applications to the part, with the immersion of the limb frequently in a bucket of cold water. When perfectly cool, but not before, we may resort to counter irritation. If the horse is blistered, the operation should be repeated two or three times, or the iodine and mercurial ointment may be substituted. If firing be employed, it is necessary to fire deeply, and we may blister a few weeks afterwards. Turning out to grass is desirable, as it insures a long rest; or, what is still better, after the horse has rested for one month, sending him to plough for several more on soft ground, supposing, of course, that he is adapted for such labour.

“ Professor Sewell recommends the operation of periosteotomy for cases of ringbones as well as for splints.

“ *Ossification of the lateral cartilages* is commonly known by the term “false ringbones.” It is produced by concussion, and, consequently, heavy horses, with high action, are more liable to it than others, and more particularly if they are employed on the London pavement. It generally comes on slowly, and originates in different parts of the cartilage in different horses; sometimes commencing at the anterior part of the cartilage, but more frequently at the posterior and inferior part. A great portion of the heavy dray horses in London have ossified cartilages; and in the country nothing is more common than for cart horses with ossified cartilages to work on the road, and particularly at plough, entirely free from lameness. The lateral cartilages, when ossified, are considerably larger than before: they consequently press on the skin, and the surrounding parts, and in this way assist in producing lameness and inconvenience.

“ *Treatment.* — We are rarely called upon to treat the disease, unless it is attended with lameness, which may either be produced by inflammation going on in the part, or from the greater jar the foot receives from the loss of an important spring. If the former be the case, our object must be to remove the inflammatory disposition, and to stay the further deposition of bone. Should there be any appearance of heat externally, we may first bleed from the coronet, and afterwards proceed to counter-irritation, blistering the part several times.

“ If the ossification is fully formed, and there are no signs of active inflammation going on, we can then do little more than endeavour to diminish the jar of the foot. It is the practice in these cases to fire the coronet, but no benefit can be effected by the operation; it is both empirical and unmeaning. We shall, however, find much benefit from the use of leather soles, taking care that the part applied to the heels is the thickest. In conjunction with leather, bar shoes resting lightly on the

frogs will afford still greater relief. If leather soles are not used, a piece of leather corresponding to the shoe may be riveted to both heels, which plan will considerably obviate concussion. By these measures in the country we can generally relieve the horse sufficiently to make him useful; but in London it is often necessary to destroy the sensation of the foot by the operation of neurotomy, the merits and demerits of which will be separately discussed." — *Spooner on the Foot*, &c.

CHAP. L.

STRUCTURE AND DISEASES OF THE HOCK JOINT.

THIS is a most important joint, and one that is more exercised than any other joint in the body: that is, the surface of motion between its two large bones is much greater than between any other bones of the body. Diseases of the hock joint have had distinct names applied to them, by which they are familiarly known, and therefore I will explain them under these terms, which are, Bone Spavin, Bog Spavin, Thorough Pin, and Curb.

But previous to an explanation of its diseases, a concise description of the joint may be useful. The hock is composed of six bones, the principal of which are, the os calcis and the astragalus. The other four bones are considerably smaller, and have been distinguished by names, which need not here be mentioned, and are placed in two rows between the astragalus and the cannon. The astragalus is a very curious bone, and is placed obliquely in the shape of a pulley. It is articulated with the leg bone, or tibia, with the small bones below, and rather posteriorly with the os calcis; and such is the nature of these articulations, that a most extensive motion is afforded to the shank. [The motion of the hock is entirely confined to the upper articulation, — namely, that between the astragalus and the tibia: the former bone presents two round condyles, as they are termed, with a deep concavity between them and the lower part of the tibia is the counterpart of this, having two concavities and an eminence in the middle. These bones, thus adapted, move on each other in the manner of a hinge, having no lateral motion but a very extensive one in a forward direction. The hock joint is the most extensive articulation in the whole body, and it is protected by a capsular ligament of corresponding extent. This ligament is fastened to the lower end of the tibia above, and to the upper row of small bones below, and to the astragalus on each side behind the condyles. At the upper and back part of this articulation there is a moveable cartilage, whose front

surface forms part of the hock joint, and hind surface the front of the joint capsule, through which the flexor perforans tendon passes on the inside of the os calcis. This cartilage, which forms, as it were, a part of the capsular ligament itself, corresponds to the lower posterior part of the tibia, and prevents concussion between the tibia and os calcis when the leg is suddenly and violently straightened as in leaping.

The capsular ligament, just anterior to this cartilage, on both sides, is the seat of thorough pin, whilst the anterior, lower, and internal part of the capsular ligament is the seat of bog spavin.

Thus the hock joint, when the horse is at rest, may be considered to consist of two cavities, one in front and the other behind the lower end of the tibia, for the articulating surface of the astragalus is double the extent of that of the tibia. In the movement of the joint, as one cavity increases the other diminishes; so that when bog spavin and thorough-pin both exist in the same hock, they appear alternately to increase and diminish with the motion of the joint. The capsular ligament is protected in front by the extensor tendons and the annular ligament.

The perforans tendon, we have seen, enters a sheath at the upper part of the hock on the inner side of the os calcis, and continues in the sheath to the lower and posterior part of the hock. This sheath is sometimes the seat of inflammation and lameness. The perforans tendon expands at the point of the hock, where, being firmly bound at the sides, it forms a joint capsule with the point of the hock. This capsule is not the seat of capped hocks, as is frequently supposed; for capped hock is a collection of serous fluid at the back and outside the tendon, and between it and the strong membranous substance underneath the skin. The perforans tendon below the capsule becomes narrower and passes behind a strong ligament, which extends from the os calcis to the metacarpal bones. A strain of this ligament constitutes a curb, although the flexor tendons are often involved in the mischief. — Ed.]

Strain of the Ligaments, &c.

Any of the ligaments and tendons about the hock joint are liable to be strained; and, if taken early, the horse rested, and the case treated on the principles before laid down, we shall generally succeed in effecting a perfect cure. When inflammation can be detected at the hock, bleeding, from the thigh or saphena vein, will effect great relief.

By violent and long-continued exertion of the hock joint, so great is the consumption of synovia, in consequence of its peculiarly extensive motion, that the synovial membrane becomes, at length, incapable of supplying any more, and in this exhausted

state is itself the subject of friction. The joint then becomes inflamed and ulcerated, and the lameness is often incurable.

Bone Spavin.

[Spavin is a deposition of bony substance on the inside of the hock. It is generally produced by a strain of the ligaments which confine the small bones of the hock. The lameness often precedes the spavin, and sometimes gets better after its formation. The effect of spavin is to join the small bones of the hock together, and thus to destroy the spring which the existence of three joints below the astragalus is capable of affording. When the spavin is situated low it only destroys the use of one joint, which is often compensated for by those above. The higher the spavin is situated the worse it is, and sometimes it is so extensive as to ankylose all the bones of the hock, leaving only the action of the tibia and astragalus. The lameness from spavin or disease of the hock is peculiar, — the horse draws up his leg with remarkable celerity, more so than in any other lameness.

The causes of spavin are anything that distresses the ligaments of the joints, — such as hunting or severe exertion, particularly with young horses, and the practice sometimes adopted of making the outer heel of the shoe much higher than the inner.

The *treatment* generally adopted is firing the part deeply, or a seton may be inserted under the skin, immediately over the enlargement, and continued for a month. — Ed.] Some farriers employ caustic, and even arsenic, which they introduce by first making an opening, by boring with a hot iron, or otherwise, into the bony swelling, and into a small hole thus made they introduce some of their caustic. I was once consulted in a case of this kind, in which the farrier had employed arsenic. It produced a dangerous sloughing, and the horse was nearly destroyed by it.

[It must be confessed that whatever *treatment* we may employ for spavins, the majority of cases will be unsuccessful, — the lameness will still remain. This is owing to the disease affecting the deep-seated parts of the joint, and the synovial membrane itself. In some cases we find, on dissection, that the small bones of the hock are in a carious state, and the synovial membrane and cartilage ulcerated. In other instances we find the disease existing between the tibia and astragalus; the prominence or ridge on the former bone is rough and deprived of cartilage, and the synovial membrane around it in a state of inflammation. A similar appearance is presented by the corresponding portion of the astragalus, though not to the same extent. A sort of notch is often perceived on the ridge of the tibia, without any attend-

ing lameness; the joint, however, in these cases, is entirely free from inflammation, and the notch, though denuded of cartilage, is generally covered by a thin synovial membrane.

These diseased appearances of both the upper and lower articulations of the hock, appearing, as they often do, without any enlargement or external inflammation, go far to account for the existence of so many cases of obscure lameness of the hind extremity.

The only treatment for these incurable cases is the excision of the nerve a few inches above the hock, on the inside only: it has been performed successfully several times by Professor Spooner, and also by Mr. Stanley. — Ed.]

Bog Spavin.

Bog spavin is a disease very common among young horses, and occurs chiefly at the time of breaking: it is, of course, more likely to happen when they are broke at too early an age. The hock, it has been before observed, is an important joint, and designed for very extensive motion; but the motion which takes place in a state of nature in this joint, or during reasonable labour of any kind, is very different from that which is produced in throwing the animal upon his haunches, as it is called, in pulling him up from a gallop suddenly with a powerful bit, or in taking high or wide leaps. These violent motions of this joint in particular are, it may well be supposed, likely to produce this disorder. Bog spavin, then, is a distension of the capsular ligament, by an accumulation of synovia, formed in consequence of the violent exertions I have just described, and appearing in a swelling on the inside, towards the bend of the hock.

[When bog spavins appear suddenly, they are usually accompanied by stiffness, and even lameness, and then treatment should be had recourse to; but, generally, they come on gradually, and are productive of no injury or inconvenience.

There has been much difference of opinion on the subject of these bursal enlargements. The following appears to the editor to be their true nature. The seat of bog spavin is the upper articulation between the tibia and astragalus, and it appears in that part of the joint where there is nothing but the capsular ligament and the skin to protect the joint. The capsular ligament is bound down by membrane to the neighbouring parts. In the action of the joint, when there is an abundant supply of synovia, this fluid is pressed with some degree of force against the capsular ligament, and ruptures some of the fibres of the membrane which confines it. The consequence of this is an actual enlargement of the cavity of the joint itself; it is capable

of containing more than it did before; and it is soon supplied with an additional quantity of synovia, which, pressing against the capsular ligament, distends it, as we may perceive in bog spavins. As this usually takes place in a gradual manner, it seldom occasions lameness, or, if it does, it is of a temporary nature. The enlargement, however, continues as long as there is sufficient synovia to distend the capsule; if we blister the part and keep the horse on poor diet, it disappears for a time, there being less synovia secreted: it returns, however, with work and good living. In old horses, it often disappears altogether, from the diminution of synovia secreted.

This being the nature of this disease, the plan of opening it to let out the contained fluid is very injudicious, for we run the risk of creating dreadful inflammation by opening so important a cavity. If it has been sometimes done with impunity, it is because the opening has been so small as to close up very soon, and before much irritation has been produced. A cure must not be expected unless we can cause adhesion to take place between those parts that have given way; and this can only be done, if at all, in the early stages, either by pressure on the part or by perfect rest, which can best be effected by the application of a blister.

Blood spavin is a fanciful disease, and therefore requires no further notice. — ED.]

[*Thorough-Pins*

Are similar in their nature to bog spavins. There are two situations in which they are found; one rather above the point of the hock, and the other below it. In each case, they appear both outside and inside; and their contents may be pressed from one to the other, from which circumstance they derive their name. The upper thorough-pin appears to be the enlargement of the capsular bag in which one tendon moves upon another — the tendo Achilles and the perforatus; and the lower one a distension of the capsular ligament of the hock joint itself, at its upper and back part, and behind the tibia. Thorough-pins and bog spavins often exist together, and then the fluid can be pressed from one to the other, though not readily.

Thorough-pins are more rarely the cause of lameness than even bog spavins. I have, however, known a troublesome and obstinate lameness produced from the upper thorough-pin, or perhaps rather from some strain of the tendon which attended it. It gave way, however, at length, to a seton placed over the part, — not through it. I have also succeeded in removing a very large thorough-pin in the lower situation, by the long continued application of equal parts of iodine and mercurial ointment, pre-

viously, however, stimulating the part with a mild liquid blister. The subject was a race horse of great value, and the thorough-pin entirely disappeared in about ten weeks. In some cases, the synovial fluid in the thorough pin coagulates, and becomes organised and firm. — ED.]

Curb.

This is a swelling in the back and lower part of the hock, extending from five to eight inches; the centre of the swelling being about eight inches from the point of the os calcis. [The curb is, in its nature, similar to a strain in the back sinews, and depends upon a strain and inflammation of the strong ligament that passes from the os calcis down the back of the hock to the shank bone, and frequently involving the flexor sinews at the same time. When the horse is thrown too much on his haunches, this part is unduly exerted, and a strain and lameness is the consequence. Some horses are predisposed to curbs from the shape of their hocks.

If there be much inflammation, blood should be taken from the thigh vein, a patten shoe put on, and the part kept wet with a cooling lotion, after which it should be fired or blistered, the former being by far the most effectual plan: the employment, however, of the compound iodine ointment will be found of much service. — ED.]

CHAP. LI.

WOUNDS, BRUISES, AND ABSCESS.

THESE injuries may happen in various ways, by kicks, by bites, in leaping over hedges or gates, by kicking against stalls, and many other ways. Various names have been applied to such injuries, according to the manner in which they are inflicted. [Thus we have punctured, lacerated, contused, or simple incised wounds. They differ; likewise, according to the part injured, whether muscle, sinew, skin, or bone. In the horse, the healing process is very powerful: the most extensive injuries heal in a short space of time; and there is less danger than in the human being of the wound becoming unhealthy.

Wounds of the muscles or flesh heal much more rapidly than in any other part, whilst those of the skin are particularly tedious; thus, in many wounds, we may judge of the time that will elapse before the part gets well by the quantity of new skin required. This is owing to the circumstance that new skin does not grow in the middle of a wound, but only from the edges, which thus renders *cicatrization* a very tedious process. New

skin is never covered with hair, and thus the blemish caused by broken knees; but the old skin is often, to a great extent, stretched or drawn over the wound by the new skin, and thus the expected blemish is often greatly diminished. Injuries of tendons or ligaments are slower in healing than those of muscles, from the part not being so highly organised; and, for the same reason, those of bones are still more tedious, and often will not heal until a portion exfoliates, dies in fact, and is cast off.

It is generally imagined that, when an extensive wound heals quickly, it is owing to the virtue of some particular medicine employed. This, however, is not the case; it is owing to the powers of nature, and it is rarely necessary to do more than assist her operations.

There are certain principles to be kept in view in the *treatment* of wounds, an observance of which will greatly assist our purpose.

In the first place, it is necessary to check inordinate swelling and inflammation, although inflammation, within certain bounds, is a useful process.

Secondly, it is requisite, whenever it be possible, to get a depending orifice by which the matter can escape as it is formed, otherwise it becomes acrid from being pent up, and, seeking an exit, forms deep-seated sinuses, which greatly protract the cure.

Thirdly, it is essential that the external opening of a wound should be large, so that it may not close up until it be healed from the bottom.

Wounds of cavities, such as the abdomen, the chest, or the joints, must be treated on different principles from those recommended; they must be closed as soon as possible; for the entry of air into the abdomen or chest will be productive of dangerous inflammation, and in the latter situation, indeed, will prevent the lungs from acting. And in joints the escape of synovia will cause the extremities of the bones to rub against each other, and thus produce the most severe and dangerous inflammation, unless the wound is speedily closed, and the synovia confined to its proper receptacle.

To carry out these principles in the treatment of common wounds, it is necessary, in the first place, in a contused wound, to employ poultices, warm fomentations, or cold lotions, in order to keep inflammation within bounds. If any dirt or gravel, or other foreign substance, has entered the wound, it is necessary to remove them and carefully clean the wound with warm water. If, however, the wound has been inflicted with a sharp instrument, the wound itself should not be fomented, but the edges should be brought together and confined by strong sutures; leaving, however, sufficient space at the lower part to afford an

exit to the matter that may form. If this can be obtained without stitches it is better to avoid them. If the wound is not deep, it is desirable to heal it by the first intention, as it is called, but it is rarely the case that this can be done in the horse. In man, sticking-plaster assists this purpose; but the hair, in horses, almost precludes its use. It is, however, an object of importance to save the old skin as much as possible; and, for this purpose, sutures are often necessary, even when there may be no chance of healing by the first intention. Metallic sutures have lately been introduced by Messrs. Simonds and Spooner, with the view of remaining in a much longer time, for silk and thread usually give way in a few days, leaving a gaping wound.

In a *lacerated* wound of some depth and extent, it is frequently desirable, if it penetrates downwards, to insert a seton so as to procure a depending opening for the matter that may form. In these wounds, the lacerated parts may be removed, as this will facilitate the cure. It is desirable to bring on a healthy suppuration as soon as possible. For this purpose, the application of a warm poultice for one or two days will be useful, if the part is convenient for the purpose, otherwise the wound may be sprinkled with a powder composed of equal parts of finely powdered resin and powdered chalk; inflammation being kept down by warm fomentation at first, and cold lotions afterwards. When the wound suppurates, it may be touched daily with a little tincture of myrrh, and the following powder scattered over it:—

Prepared chalk, powdered ... 1 ounce.
 Armenian bole, powdered 2 drachms.
 Alum, powdered 2 drachms.

Mix.

If the granulations grow above the level of the surrounding skin, becoming what is commonly termed *proud flesh*, they must be kept down by the application of a little caustic, such as muriate of antimony. It is important to attend to this, as it will materially lessen the blemish. By this simple method of treatment, the most formidable muscular injuries may be readily cured.

A simple bruise, where no wound is inflicted, merely requires to be treated with poultices, fomentations, or cooling lotions, in order to remove the inflammation by resolution, as it is called, that is, to cause its dispersion. This, however, cannot always be done; suppuration takes place, and an *abscess* is formed. — Ed.]

[*Wounds of the Salivary Ducts*

Are very rare, but sometimes they prove very troublesome from the saliva escaping and preventing the wound from healing, and occasioning, indeed, a fistulous wound. In a recent case, the

application of a caustic to the part will sometimes quickly succeed; and, indeed, this should also be tried in cases of longer standing, — the hot iron being the best mode of application. Sometimes it is necessary to obliterate the functions of the parotid gland, which Mr. Percival has accomplished by the injection of a liquid caustic; and to whose work I beg to refer for a lengthened account of the disease. — ED.]

An Abscess

Is a collection of matter in the membranes under the skin, frequently the effect of a bruise, but sometimes an effort of nature to throw off something detrimental to the constitution.

When there is reason to believe that matter is forming, we should hasten it by poultices or fomentations. We may judge whether matter is collected under the skin, by placing the fingers of one hand on the swelling, and, with those of the other, tapping it lightly at another part, when the undulation of a fluid will be distinctly felt; and if matter is contained, the animal will generally evince pain on pressure. On pressing an abscess with the fingers, no marks will be left as in dropsical swellings.

After some time, the abscess points, as it is termed; that is, the matter approaches the surface at one point in particular, at which part, if left alone, the skin being gradually thinned by absorption at length bursts. Before this takes place, it is better to open the abscess; because the external wound will thereby be less, and also because we can choose the best place for the opening, which should be at the lowest part of the abscess. The opening should be made with a lancet, and should be large, so that it may not heal very rapidly. The matter being evacuated by pressure with the hands requires no tents or ointments, but generally heals rapidly with little further assistance. Sometimes, however, the ulcer, as it then becomes, is ill conditioned, and does not heal. It will then be necessary to inject some stimulating application, such as a solution of sulphate of copper, or of zinc; and if any sinuses have formed, to lay them open with the knife. — ED.]

Serous Abscess, Capped Hocks, Capulets, &c.

Sometimes we find that the contents of an abscess are of a watery nature. It is then called a *serous* abscess, and though productive of less pain than the formation of pus, its removal is attended with greater difficulty. It does not point like a common abscess, nor is it so circumscribed, but often extends itself very considerably. It is generally situated under the fasciæ of the muscles or cellular membrane, as well as the skin. It is usually produced by blows or external injuries, and we often

find it at the point of the elbow, where it is termed *capulet*, and is produced by a bruise from the heel of the shoe in lying down. We also find it at the point of the hock, where it is termed *capped hock*, and is occasioned by kicking in the stable against the stall post. It has been stated by authors, that the fluid in capped hocks is collected within the capsular sheath of the tendon; but if we examine this sheath, we shall find that its great strength renders such distension impossible. The fluid, in fact, is collected outside the tendinous sheath, but underneath the strong cellular membrane, which is here interposed between the skin and the tendon, in order to admit the extensive motion of the hock.

We sometimes find considerable collections of serum in the thigh, either behind or on the inside of the stifle joint, and also on the inside of the fore leg, where it is produced by striking.

The *treatment* of serous abscess is sometimes tedious and troublesome, which is owing principally to the fact that, if we evacuate the fluid, it is sure to form again, frequently several times, and is often attended by much inflammation. If the collection of fluid be not extensive, we may first endeavour to disperse it by external stimulants; in this, however, we shall generally fail, in which case we must evacuate it by a considerable opening, so as to admit a free escape for the fluid which will again form, or, what will still be better, insert a seton through the tumour. After this, a solution of blue or white vitriol should be injected, so as to stimulate the sides of the cavity, and produce an altered action. After some time, pus will be secreted instead of serum, and then the part will soon get well. By this mode of treatment, I have succeeded in curing both capulets and capped hocks; but the latter with greater difficulty than the former. — ED.]

Injuries of Bones.

[When a bone is much injured, either in a lacerated wound or a bruise producing an abscess, it is still more essential to make a large external opening, and to keep it open for some time; for the chances are that a portion of the bone will exfoliate; when this appears likely to take place, we may expedite the process by applying a strong caustic to the bone.

I lately met with a case in which a horse ran with great violence against the corner of a lamp post, which caused a very deep and extensive wound in the breast, and injured the breast bone to such a degree that three or four pieces of the bone exfoliated at different times before the wound would heal. The application of the caustic proved very serviceable, and the animal entirely recovered.

The lower jaw bone is sometimes injured to such a degree,

either by a kick, a blow, or the pressure of the halter from hanging back, that an abscess forms within the plates of the jaw, and close to the teeth, and sometimes the bone is fractured. The external opening being exceedingly small, the mischief often goes on for months, and proves a source of great annoyance. To effect a cure, the horse should be cast, and a portion of the bone removed by means of a trephine, and caustic applied to the exposed cavity, so as to cause an exfoliation of the injured bone.—[ED.]

Wounds of the Abdomen, or Belly.

Wounds in the belly may happen in leaping over hedges, or pale gates, or may be inflicted by the horns of a cow. Sometimes the strong tendinous covering of the belly is ruptured, while the skin remains entire; the gut then protrudes and forces out the skin into a tumour. This is a rupture of the belly, and is thought incurable. I have known one very large rupture cured by cutting out a piece of the skin which covered it, and then sewing up the wound and supporting it with a bandage. In some accidents the skin also is divided, with its peritoneal covering; the gut then comes out, and the wound is of a very dangerous nature, still more so if the gut itself is wounded. The first thing to be done is to put the gut back, taking care to remove any dirt or other matter that may be sticking to it; for which purpose, should it be found necessary, it may be washed with warm water, nothing else. If the gut cannot be returned, from its being full of air, and the opening in the belly too small to put it back again, that opening may be carefully enlarged to the necessary size. But if the animal can be thrown upon his back conveniently, a great deal may be done that cannot be otherwise accomplished. After the gut is returned, the skin *only* should be stitched up; and a cushion of several folds of old linen and tow being placed on the wound, it should be kept in its situation by means of a wide bandage rolled round the body, and carefully secured. The animal should then be copiously bled, and have his bowels emptied by clysters. The only food he should be allowed is grass or bran mashes, and that only in moderate quantity.

Wounds from thorns are often very troublesome. It is necessary in the first place to examine the part carefully, and extract, with a pair of dissecting forceps or pliers, every part of the thorn that may remain. When a tendinous part or a joint has been punctured by a thorn, a very troublesome lameness is sometimes the consequence, especially when the thorn has not been extracted immediately, or soon after the accident. Emollient poultices do not always remove the inflammation produced by such wounds, as might be expected; and when they are found to fail, lunar caustic should be applied; and if the lameness still continues,

the part should be blistered. In dissecting the legs of horses after death, that have been perfectly sound and free from swelling, I have found thorns in different parts, lying flat, and evidently harmless; but I dissected a leg lately of a pony that had been very lame, and found that the two flexor tendons had formed adhesions immediately below the fetlock joint, evidently from inflammation produced by a thorn; for I found the point of the thorn, though probably the accident had occurred several months before. It is remarkable that the thorn was very black, as if charred, and all the surrounding parts were nearly of the same colour.

[*Broken Knees*

May be so slight as to occasion little inconvenience, or so serious as to render the animal entirely useless. Between these extremes there are a great variety of degrees.

The knee consists of three separate articulations, the uppermost of which is that between the radius or forearm and the upper row of bones; the next is that between the upper row and the under; and the third between the under row and the cannon or shank. Thus there are three joints exposed to injury, and placed very near the surface, being protected only by the capsular ligament and the skin, and partially by the extensor tendons. When the knee is bent, as it necessarily is when the animal falls, the joints are opened to the utmost, and the skin is drawn down, — this accounts for the fact that in broken knees the wound appears to go downwards, and the internal injury appears lower situated than the external one. A broken knee may be confined to an injury to the skin, or the tendons may be lacerated and even divided, or one of the joints may be opened, and the bones greatly injured. Sometimes the ligaments of the knee are severely strained by the fall.

When the injury is confined to the skin, and is not extensive, the wound may be covered daily with the astringent powder or paste, before recommended, and the knee frequently wetted with a cooling lotion. A little work will not be injurious.

If the wound be extensive, or the tendons injured, after fomenting the part, removing the dirt or gravel, and cutting off any ragged parts, the knee may be poulticed for a few days, taking care that the ligature which confines the stocking below the knee should not be so tight as to produce mischief; the poultice may be prevented from slipping down by tape or list passing over the withers. In a few days the knee may be treated the same as another lacerated wound, but sometimes it is very desirable to insert a seton through the lowest part of the wound. We find that sinews and ligaments will heal readily, although not so rapidly as the flesh.—Ed.]

Opened Joints.

[When in a broken knee the joint is found to be opened, — which, however, cannot always be ascertained at first, — it becomes a very serious affair, and must no longer be treated as a common wound. Our prognosis in such case will depend on the extent of the wound, particularly that of the capsular ligament, and on the circumstance as to whether inflammation has been set up in the cavity of the joint.

In the *treatment* of such cases our object must be to close the joint as quickly as possible, and thus to prevent the escape of synovia; unless we succeed in doing this, the inflammation of the knee will greatly increase, and the discharge of synovia become augmented in quantity, partly coagulating as it escapes from the knee, and hanging in large flakes from the wound; the animal, from the pain experienced, keeps the knee in a bent position, or paws with the foot continually. A vast deal of fever is excited in the system, which in some cases wears down the animal, and produces death. In other cases, bony substance is thrown out round the joint, which at length closes the wound, but destroys the motion of the joint, and renders the animal useless.

To prevent such result we must by no means keep poulticing or fomenting the knee, as this will only encourage the discharge and keep up the irritation; the real soothing method will be the application of styptics or caustics to the knee. In many cases, if the opening is small the application of the hot budding-iron will produce an eschar that will close the wound; or if it be a punctured wound, the application of lunar caustic, cut to a point, will accomplish our purpose. In other cases, where the injury is more extensive, the application recommended by Mr. Dawson, of spirits of wine saturated with corrosive sublimate several times a day, has succeeded. The clot of coagulated synovia should not be removed from the wound, but the caustic applied round it. It may sometimes be necessary to apply the sublimate in a solid state, alone or mixed with flour or powdered chalk.

It is very important to keep the animal in a state of perfect quietude; he should be removed to the nearest stable, but by no means walked a considerable distance after the accident. The leg should be kept as straight as possible, and, if necessary, splints should be placed at the back of the knee. The animal should by no means be allowed to lie down, as this will open the wound and increase the irritation. In many cases it will be judicious to suspend the horse by means of slings. In severe and desperate cases it will be advisable to adopt the plan recommended by Mr. Thomas Turner.

After washing the wound, and removing all dirt and gravel, he prepares a paste of wheaten flour and table beer with a little

Armenian bole, which he spreads thickly on and round the knee, and above and below it. A pledget of tow is then applied round the joint, then some stout brown paper, and over this a cotton stocking; on the outside of the stocking another layer of paste and a calico bandage six yards long is then to be rolled round with moderate and regular pressure; after which another bandage of the same length. The horse is bled, and has a laxative, but the dressing is not removed until the joint is closed. He advises the horse to be slung. In the course of a few days there will be, probably, much swelling of the leg from the pressure of the bandage, which he relieves by making small incisions through each layer of the bandages on each side of the knee, but not in front. In the course of six or seven days, if there is much accumulation of fluid within the bandages, an incision must be made to afford an exit, and another dressing of paste and a bandage applied. Mr. Turner keeps the horse suspended until a week after the joint appears to be closed, after which the bandages are removed, and the leg washed, and the wound dressed in the usual way. The swollen parts above the knee he has rubbed with an evaporating lotion several times a day, but does not allow it to wet the bandage.

The wounds of other joints must be treated on the same principles as that recommended for the knee.—ED.]

Saddle or Harness Galls, Warbles, Navel Galls, &c.

These may be considered as bruises, and when it can be done, should be poulticed, until the swelling has been dispersed or has suppurated. If the matter has not sufficient vent, the opening may be enlarged or the sinus laid open, if there is any. It must then be dressed with digestive ointment, and when it has been reduced to the state of a clear open sore, the cure may be finished by the astringent paste or powder.

Sitfasts.

These appear like dark-coloured scabs on the back, but are really dead hard skin, and cannot be removed until they have been poulticed a few days. Then they may be separated by means of a pair of pliers; but it requires some force to remove them, and generally a few strokes with the knife. When this has been done, the cure may be completed with the astringent paste, applied once in two days, and the scab removed previously to each application. A little salad oil may be necessary to soften the cicatrix after the wound is healed.

By repeated bruises of the back part of the saddle, the spinous process of one of the lumbar vertebræ is sometimes injured, and

an enlargement takes place, on which it is very tender, and requires to have the saddle elevated or channelled in that part, to secure it from pressure. Sometimes a hard white substance forms, which can only be removed by laying open the skin and dissecting it out.

Horses sometimes become very lame by travelling in muddy roads, merely by the mud being splashed up between the arm and chest, where, by friction of the girth against the skin, it causes inflammation and great soreness. The best remedy for this is fomentations, or the saturnine lotion, and rest.

I have found the following lotion an excellent application in such cases, as well as in allaying the excessive irritation of a blister, when it has been made too strong:—

Lotion.

Sulphate of zinc	1 oz.
Super-acetate of lead	1 oz.
Water	1 quart.

Mix.

Fistula of the Withers.

This disease comes by very severe bruises from the fore part of the saddle, which being neglected and repeated from time to time, produces at length an inflammation of the spinous processes of the dorsal vertebræ. A deep-seated abscess is the consequence, and the matter penetrates in different directions before it arrives at the surface, where at length it causes a tumour, which is very different from a common abscess, and requires always a considerable time to be cured. To give vent to the matter is the first object, and when that has been done, the extent of the injury must be ascertained.* When this cannot be done, and this is sometimes the case, the caustic tents must be introduced; and when the slough or core which this causes, has separated, which will generally be in three or four days, the finger should be introduced as well as a probe, and the direction of the sinuses ascertained. A depending opening for the matter to run off freely must always be obtained, by cutting open the part freely.† If a clean sore has been thus produced, or if it can be ascertained that there are no more sinuses or pipes, the cure may be effected by mild dressings, or

* Sometimes fistulous withers commence with a sort of wen or tumour situated between the shoulder blades, and produced by pressure. This wen is composed of strong membranous substance enclosing a fluid. When such is the case, the whole should be dissected out, as otherwise the part will not heal readily.—Ed.

† It is a matter of much importance to lay open the sinuses as much as can be done with safety.—Ed.

tents of digestive ointment, tincture of myrrh, &c.; but this is seldom the case, and repeated dressings with caustic tents are generally necessary.* As soon as the bottom of the sore is arrived at, it will often be found that the tops of the spinous processes, or the ligament covering them, have been injured, and the bare bone may be distinctly felt with the probe. When this is the case, the bare bone must be scraped with a suitable instrument, and then dressed with tincture of myrrh; after this the wound will readily heal by continuing to dress it with tincture of myrrh or digestive ointment, according to the directions given in the chapter on wounds.

Poll Evil.

This disease may be produced by a mangy horse rubbing his head under the manger, and sometimes lifting it up suddenly when frightened, also by hanging back upon his halter. It is more frequently produced by striking the poll in going under a narrow doorway, or running back when partially got through. The part principally injured is the sharp ridge of the occiput and the neighbouring parts; and thus the mischief being so deep seated, it is some time before the swelling appears externally, and still longer before the matter approaches the surface. The matter that forms in consequence being so completely confined, spreads and renders carious the under surface of the ligament of the neck, as well as the posterior part of the occipital bone, and sometimes of the atlas or first bone of the neck also. I once attended the opening of a horse that was never suspected of having a disease, but died in consequence of some accident. On cutting off the head, I found that the first bone of the neck, as well as the under surface of the great cervical ligament which passes over it, were highly diseased. Since that I have examined another horse that died of an inflammatory disease; I had no suspicion of any disease in the ligaments which unite the two first vertebræ of the neck, but merely wished to examine the part. I found them, however, in a state of disease. This disorder, then, is precisely of the same nature as fistula of the withers, and requires a similar treatment. There is great difficulty in obtaining a depending opening or drain for the matter in this case, and from the large arteries near the bones of the neck, it cannot always be effected by the knife. Caustic tents, therefore, must be depended upon for that purpose, and if properly applied and persisted in, will generally accomplish a cure. The wound, however, must be carefully examined from time to time with a probe, and if a

* The chloride of lime has been employed successfully in these cases.—ED.

carious bone can be felt, it must be freely scraped, and if a loose bit is found, it must be taken out. When the direction of the sinuses can be ascertained, it will be found sometimes that a drain can be made by means of a seton. But setons should never be put in, as they sometimes are, without it has first been ascertained that a drain can be immediately made by them, and that a drain cannot be obtained but by laying open the parts freely.*

Many country farriers have a secret method, or rather a receipt, for the cure of the fistula and the poll-evil, and they certainly sometimes succeed. The preparation they employ appears to be arsenic mixed with a little lard, which, however carefully employed, produces the most alarming degree of inflammation and sloughing, so much so, that I have no doubt of its sometimes proving fatal. I have lately known an intractable case of fistula, cured apparently by this application. The fistula was in the lower part of the neck near the withers, and not in the usual situation of fistula. It appeared as if about the fifth cervical vertebra had been injured. The wound had been healed several times, but always broke out again. At length the case was undertaken by a farrier possessing this secret, who, after making a suitable opening with a hot iron on the opposite side obliquely upwards, introduced his arsenical remedy. The consequence was, a dreadful degree of inflammation and sloughing, which greatly alarmed the proprietor. But the wound gradually filled, and after some time perfectly healed.

[The employment of external pressure by means of splints has been found of great service in the treatment of poll-evil. Mr. A. Gray relates two successful cases of poll-evil of long standing thus treated, in the fifth volume of the *Veterinarian*: he says, "The mare was sent to me, and I proceeded to examine the extent of the disease. I found two deep sinuses, one on each side of the neck, the bones of which could be distinctly felt with the probe. After cleaning away the matter, I took a scalpel, and laid both orifices open in an oblique direction downwards, then having fomented the parts with warm water, I dressed the wounds with tincture of myrrh and aloes; and, in order to apply pressure to the parts, (for in this I founded all my hope of success), I had two pieces of wood prepared, about twelve inches long and three broad, thicker in the middle than at the edges, which were rounded off, and also a long flannel bandage, four inches broad. I then placed two pledgets of tow

* Mr. James Clark strongly recommends setons for the cure of the poll-evil, not only as the most expeditious and least painful method, but likewise on account of its causing less blemish.

next the wounds, putting on the pieces of wood one on each side, and then applied the bandage over all, and as tightly as I could, without impeding deglutition. It is necessary, while putting on the bandage, to keep the nose extended, in order to adapt the bandage more perfectly to the part, and apply it more closely. I removed the bandage night and morning, and had the parts well fomented and dressed with the tincture; and in the course of four weeks the mare was well." — ED.]

CHAP. LII.

FRACTURES.

[FRACTURES are much rarer in the horse than in the human subject, arising, no doubt, from the greater uniformity in the labour of quadrupeds, and from their being much less exposed to casualties than men. They are, however, by no means unfrequent, and the metacarpals and phalanges are probably more exposed to the accident than the other bones, and they likewise admit a better chance of cure than if the radius or the humerus in the fore, or the tibia or femur in the hind extremity, are fractured; from the powerful muscles attached to these bones, and the shape of the limb, it is extremely difficult to retain the parts afterwards in a proper position for union, and in the generality of cases it is most prudent to destroy the horse. The want of success that attends the greater number of cases of fractures in the horse, is owing to the following reasons: — The restlessness of the animal; the impossibility of making him assume the recumbent position as in a man; the difficulty of slinging him for any length of time; the circumstance of his having, in many instances, used the limb after the fracture, thus displacing the bones to a considerable extent; and the fracture extending into a joint, or being very complicated or severe. To ensure a cure, therefore, it is necessary that the horse should be tractable — that the fracture should not be very complicated — that the horse should not have walked a distance on the leg afterwards — and that the bones should not have been much displaced. When these favourable coincidences are present, and the animal is of sufficient value to pay for the expense of a few months' keep, we may then be justified in attempting a cure.

Treatment. — There are many successful cases of fractures on record, a full account of which may be found in the editor's treatise on the foot and leg of the horse. In the eleventh volume of the *Veterinarian*, Mr. Friend, in a judicious paper on the subject, mentions a case of fracture of the humerus, without

displacement, which he treated with depletion, absolute rest, astringent applications, and low diet, under which it perfectly recovered.

In the same volume, p. 144., there is an interesting paper on the subject from Mr. Mayer, in which he supports Mr. Friend's views, and strongly advises the employment of splints and bandages, so as to prevent the displacement of the bones: in support of which, he adduces a case of fracture of the tibia, to which he applied an adhesive plaster, and over this three splints on the outside and two on the inside, bandaging the whole limb from the stifle to the fetlock, and keeping the parts wet with a cooling application. He also mentions a successful case, in which the large pastern bone was fractured and displaced. To these I could add some successful cases of fracture of the large pastern, in which the bones were not displaced: one, a coach horse, that had walked some miles afterwards; no other treatment but bandages and cold application was used; the animal took great care of the lame leg and the parts united, though accompanied with some ossific enlargement. Another was a very singular case of a thorough-bred mare that had injured herself in racing, and could scarcely be got to the stable, where she almost constantly preserved a recumbent posture, the pain she experienced when standing being so excessive. I found one fetlock dreadfully strained, and the large pastern of the other leg fractured, but not displaced. The case appeared hopeless; but as the mare was likely to be useful as a brood mare, she was put under treatment, which consisted chiefly of antiphlogistic measures. The fractured leg entirely recovered, but very considerable bony deposition took place round the joint of the other fetlock, which rendered her afterwards lame, though fit for the purpose intended. — ED.]

CHAP. LIII.

ON THE STRUCTURE AND ECONOMY OF THE FOOT.

It has been justly observed that without a sound foot a horse is but of little value, however perfect he may be in all other respects. It is the basis of the whole superstructure; and when we consider what immense weight is sometimes thrown upon this part in the violent exertions to which the animal is exposed, it will not appear strange that it should be so frequently, as we find it, affected with lameness. It has been the fashion for some years to attribute the frequency of the horse's lameness to bad shoeing; but it is time, as Mr. Bracy Clark has observed, for

all this idle declamation to cease. It is not shoeing that causes the peculiar frequency of lameness, and incurable lameness, in this country; but the immoderate work the horse is made to do. Much has been said of the superiority of the French mode of shoeing, and attempts have been made to introduce an improvement on the French method into this country, and a very important improvement it certainly is; but as to the French shoe, considered without the method of nailing, in which they certainly excel, I think it the very worst form I ever saw in this country. As the diseases of the horse's foot form an essential branch of the subject upon which I am now writing, it is presumed that a brief description of its structure and economy will not be unacceptable to the readers of this volume.

There is not, in the whole structure of the animal, any part so richly organised as the foot, although the eye perhaps may be offered as an exception; for it exceeds in the extreme delicacy of its structure any thing that can possibly be imagined.

To a common observer the foot may appear a mass of insensible horn; but it is composed of an assemblage of springs, especially when considered in relation to the fore leg, which admirably adapt it, not only to the uses of the animal considered individually, but to the uses of man also; and so carefully has it been guarded, that were the animal employed only to supply the necessities of man, his feet would last as long, even if shod, as any other part of his body. He has been made, however, subservient to his luxuries, and that too in so high a degree that he has materially degenerated from his original strength and hardihood of constitution. The immoderate exertions in which he is now generally employed are such as sufficiently account for the great number of crippled horses that are constantly offering themselves to our notice, especially in stage coaches and post chaises.

In describing the horse's foot it may not be amiss to take a general view of the fore leg, in which we shall find an assemblage of large springs, assisting in the same purpose however as those of the foot. The shoulder blade is placed obliquely against the side, and attached solely by muscles, by the elasticity of which the body of the animal, as well as the rider, is enabled to bear those violent motions which must have otherwise been insupportable. If we look at the skeleton of a horse, we shall be struck with the position of the shoulder blade and the shoulder bone, each lying obliquely, but in opposite directions, so as to form an acute angle at the joint, and of course a considerable spring. We may observe the same admirable contrivance in the hind parts, where the femur, or thigh bone, forms an angle with the pelvis, and with the tibia or leg bone, or, as it appears, and is commonly named, in the living horse, the thigh bone. In viewing

the fore leg of the animal, we shall find in the obliquity of the pastern another powerful spring; and when we consider the immense weight it must occasionally support, as in pitching from



Fig. 1. *The Foot with the Wall or Crust removed.*

- a*, The sensible laminæ attached to the coffin bone by elastic substance, secretes the horny laminæ, and the internal layer of the crust.
b, The coronary substance or ligament which secretes the greater portion of the crust.

of the foot. As the quantity of horn necessary for the defence of the sensible foot is



Fig. 2. *The Bottom of the Sensible Foot, the horny parts being removed.*

- a*, The sensible sole.
b b, The sensible bars.
c c, The sensible frog.
 These parts being largely supplied with blood, secrete the horny sole, bars, and frog to which they are attached.

considerable, a large quantity of blood is distributed to it for the purpose, and is supplied by two large arteries which pass down on each side of the pastern; these give off considerable branches to the frog, cartilages, and coronary ring; but the trunk of the artery enters in at the posterior and inferior part of the coffin bone, and divides into eight branches within the bone, which pass out at the circumference, or angle of the toe, and give off innumerable branches about the inferior part of the laminated substance, especially about the toe. The distribution of blood to the frog is remarkable: here we find several branches of considerable size without giving off other branches as in the other parts of the foot until they arrive near the surface, and here they spread into innumerable branches, supplying the skin or secreting surface of the frog, and communicating with those of the skin of

a high leap on the ground with a heavy weight, it must appear astonishing how such a tremendous shock can be supported by so small a body; yet we shall find upon examination such provisions as will enable it to bear any reasonable weight that can be placed upon it. If we now descend to an examination of the foot we shall find in its horny covering another simple and effectual spring; simple as to its construction, and effectual as to the purpose which it answers, which is that of yielding to the impulse of the animal's weight, and thereby breaking the shock, which must otherwise have been gradually destructive to the foot itself. The hoof is a secretion from the living part of the foot, not wholly from the coronet, but from the living surface which it covers, named by Mr. Coleman the laminated substance of the foot; and by others the elastic laminæ or processes

the sole, or sensible sole: so that the frog and sole form one continued surface of skin, of great vascularity and sensibility; but greatly inferior in both respects to the laminated substance, which is more richly organised, both as to blood-vessels and nerves, than any other part of the body. From this view of the foot it will appear that, when the horse stands in the stable, without exercise, the veins of the fore leg do not return the blood freely, from want of the pressure which exercise occasions. The blood therefore accumulates in the foot. The ves-



Fig. 3. *Front View of the Bones of the Foot and Pastern.*

- b*, The large pastern or os suffraginis.
- c*, The small pastern or os coronæ.
- d*, The coffin bone, or os pedis, showing its perforated and irregular surface.



Fig. 4. *Back View of the Bones of the Foot and Pastern.*

- a a*, The sesamoid bones.
- b*, The large pastern.
- c*, The small pastern.
- d*, The coffin bone, showing its lower surface with the holes for the passage of the arteries to the centre of the bone.
- e*, The navicular bone.

sels of the laminated substance, from the pressure of the hoof, admit only of a determinate quantity, especially at that part where the horn is remarkably thick, and where elasticity is not so essential. The lateral cartilages are two elastic bodies attached to the coffin bone, at its upper part, and proceeding backward, like expanded wings, terminate at the extremity of the heel: they assist, as I have before observed, in expanding the heels and quarters. The navicular, or nut bone, is placed behind the coffin bone, and is attached to it as well as to the

small pastern bone, and affords a synovial or slippery surface for the flexor tendon to move upon. This bone with the coffin and small pastern forms the coffin joint, and is represented in the perpendicular section of the hoof. See Frontispiece.

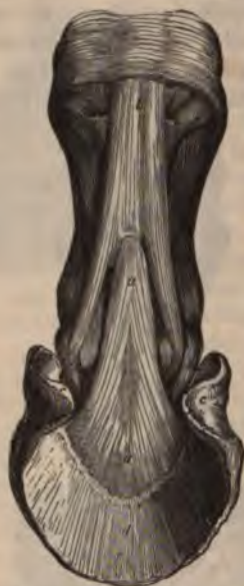


Fig. 5. Back of the Pastern and Fetlock.

- a a*, The flexor perforans tendon emerging from its sheath, expands as it passes down, and is inserted into the bottom of the coffin bone.
- b*, The flexor perforatus tendon, forming a sheath for the other; and after dividing is inserted into the small pastern.
- c c*, The lateral cartilages attached to the coffin bone.
- d*, The bottom of the coffin bone.

Fig. 6. represents the back part of the foot, pastern, and fetlock joint, dissected, in order to show the ligaments and cartilages.

- a*, The smooth surface, over which the back sinews pass.
- b*, The ligament which encloses the back



Fig. 6. Back of the Foot, Pastern, and Fetlock Joint.

- sinews, forming a sheath for them, and keeping them in their situation. In this preparation some part of the ligament was removed, in order to show the smooth surface *a*.
- d d d*, A ligament, going from the sesamoid bones to the small pastern; its use seems to be that of giving strength to the pastern joint, which, from the oblique position of the pastern bones, would otherwise have been very insecure.
- e*, The insertion of the ligament; on each side is shown the perforatus tendon, cut off just previous to its insertion.
- f f*, The lateral cartilages.
- g*, The bottom of the coffin bone.

The small pastern thus articulates with the coffin bone and the nut bone below, and with the great pastern above: these are all the bones comprehended in a description of the foot. The coffin bone is completely cellular throughout, and has more blood within it than any one bone in the body, though not far

from being the smallest of the whole. The great flexor tendon is inserted into the bottom of the coffin bone, and the extensor tendon on its front and upper part. Thus the sensible foot is composed of the pastern, the navicular, and the coffin bone; the lateral cartilages, the sensible frog and sole, and the laminated substance; at the upper part of which there is a kind of cartilaginous ring, which has been named by Mr. Coleman the coronary ligament. This coronary substance, instead of terminating at the heels, is continued into the sensible frog, and from this connection, and its situation over the lateral cartilages, it must be subject to the same motion which these parts have. When the frog, then, is exposed to that pressure for which it was evidently designed, it expands and contracts, and in so doing communicates a similar motion to the cartilages, the coronary ring, and the heels and quarters of the hoof.*

[For an intimate acquaintance of the foot of the horse, other works may be consulted; but a careful inspection of the plates in this work will give a very good general idea of the situation of the parts, and this will be greatly assisted by a comparison of these parts with the foot and leg itself.

Fig. 1., p. 300., represents the foot with the crust removed,

* The following experiment serves to show the expansive properties of the foot. After the shoe of a moderate-sized foot was removed, and the sole part pared out, a smooth sheet of paper was applied to it while off the ground, and being pressed against the foot, the edges of the crust were carefully marked, so as to give the exact size of the foot. This being done, the foot was then placed on a smooth deal board, with another sheet of paper placed upon the board; and the other foot being now held up, the border of the crust was marked with a pencil, taking care that the marks were not made more exterior to the border of the crust than before. On comparing the papers together, the one last taken was found perceptibly wider than the other. The increased width was seen to commence gradually about the middle of the foot, till it reached about half an inch anterior to the heels, when it very slightly diminished. The difference was found to be, as near as possible, one twelfth of an inch at the heels. The experiment was conducted with care and exactness, and clearly proved that the foot expanded from superincumbent weight; and if the horse had been in fast motion, the pressure would, of course, have been greater and the expansion more. It did not appear from the experiment that the front part of the foot expanded at all, so without asserting that it possesses no power of the sort, we must be contented with observing that if possessed, it is not in a sufficient degree to be detected by admeasurement. We are therefore justified in concluding, that the parts anterior to the toe of the frog possess very little expansive power; and this theory, if correct, will agree with the experiments we have detailed. The case, however, is very different with the posterior parts. The navicular bone, we have seen, rests on the flexor sinew, and the sinew upon the elastic frog in the centre, and on the commissures and sole on each side. These commissures are the highest part of the sole, and form, indeed, a sort of a ridge, so that, as any pressure on this part must tend to flatten the ridge, it must consequently expand the foot. Whatever weight, then, is supported by the navicular joint must contribute to the expansion of the foot. — *Spencer on the Foot, &c.*

thereby exposing to view the sensible laminae, the natural colour of which is red, and the coronary substance above, which secretes the greater part of the crust.

The lower part of the foot is shown by fig. 2., the horny parts being removed, so as to exhibit the sensible sole, frog, and bars, the shape of which correspond exactly with their horny coverings. The parts, though largely supplied with blood, are yet not so vascular as the laminae. The bottom of the horny foot is shown in fig. 1., page 307., where the sole, bars, and frog of a good-shaped foot in a natural unpared state is shown.

Figs. 3. and 4. represent the bones of the foot and pastern both in front and behind. The compact and solid structure of the pasterns, and the irregular surface and porous nature of the coffin bone are exhibited, but may be better understood by an examination of the bones themselves.

Fig. 5. principally shows the singular manner in which one flexor tendon forms a sheath for another, thus permitting the very great extent of motion these parts possess, without any diminution of strength. The sheath thus formed is lubricated with synovia, and thus any penetration or injury of the sheath is a matter of great consequence, quite as much, indeed, as that of a joint, for inflammation of the most violent degree is likely to follow, and there is danger of adhesion of the tendons taking place. This plate also exhibits the manner in which the tendons are tied down at the back of the fetlock, also the expansion of the perforans tendon as it passes over the navicular bone and is inserted into the bottom of the coffin joint. The lateral cartilages are also clearly shown.

Fig. 6. exhibits the ligaments underneath the flexor tendons, as well as the smooth surface at the back of the sesamoid bones, over which the tendons pass.

The *frontispiece* is an important figure, as exhibiting, by a vertical front section, the situation and the natural colour of the different parts of the foot and leg, and also the manner in which the weight is supported. It shows the relative proportion supported by the coffin and the navicular bone, and the manner in which it is distributed. The names of the different parts are given on the plate for the convenience of reference. The various joints are displayed with their capsular ligaments, which, in the upper joint, the fetlock, are particularly shown, being formed to admit the considerable action which this joint possesses. The coffin joint is clearly distinguished from the navicular joint capsule, the former being in front, and the latter behind the navicular bone. The course of the back sinews is clearly exposed, as well as that of the suspensory ligament, and the internal structure of the bones is developed, and the colour of the various parts correctly given.

The hoof may be separated from the internal parts either by boiling, by soaking in cold water, or in hot dung; but the natural colour of the parts is altered by this method. The crust may be separated from the coffin bone by putting the foot in a vice, and tearing it off with pincers, first, however, separating the sole from the crust by means of a drawing knife. By this plan, the natural colours of the laminae are shown, and the tenacious union between the horny and sensible laminae strikingly proved.*

The external shape and appearance of the foot can be most readily observed by an inspection of the living foot.

* For a further description of these parts the reader is referred to a "Treatise on the Structure, Economy, and Disenses of the Foot and Leg of the Horse," by the editor of this work, from which the following brief summary of the springs of the leg and foot is obtained. We have seen that the leg of the horse is furnished with a vast number of beautiful springs for the purpose of warding off concussion, and that these springs are mostly situated at the posterior part of the limb. First we have the splint bones, which receive some portion of the superincumbent weight, and which we do not find in oxen; then we have the suspensory ligament, a spring of much greater importance, and whose operation, we have seen, extends to both fetlock and pastern joints; next we find the elastic cushion, on which the small pastern rests, and which, though unnoticed by physiologists, is yet of much importance. Within the hoof we find the horny and sensible laminae extending so considerably the surface of connection between the hoof and coffin bone, and greatly diminishing, by their elastic connections as well as by their extent of surface, the concussion of the foot. We have, also, the lateral and inferior cartilages, and the horny and elastic frog, thus affording altogether a collection of beautiful apparatus far superior to any which the most skilful ingenuity of man can devise. All the superincumbent weight borne both by the splint bones and suspensory ligaments are again transferred to the cannon bone, so that all the weight of each limb is supported by both pastern bones. Below this, however, provision is made not only for rendering easy the support of the weight, but for transferring a portion of it to the ground without bearing on the extreme bone. Each fore leg alternately bears a weight equal to the animal's entire gravity, all which is supported by the small pastern bone, and is thus distributed to the parts below. A moderate proportion is first communicated to the elastic cushion, whence it is impressed on the lateral and inferior cartilages and posterior part of the frog. The remainder being the principal portion is transferred to the navicular and coffin bones, the former of which, by the interposition of the flexor tendon, bears partly on the frog and partly on the sole; and the latter, by the intervention of the laminae, distributes its weight to the crust throughout its whole circumference, and a very slight portion of it is borne by the sole which may or may not bear upon the ground. Thus, at the same moment, these various actions go on in the foot. The coffin bone descends lower into the hoof, the laminae, by their elastic connections, permitting it, and the sensible sole is compressed, and perhaps the horny sole opposite the coffin bone descends. Well, the horny sole and the anterior part of the frog opposite the navicular bone descends and expands the quarters parallel to them, whilst at the same time the elastic or sensible frog being compressed, is forced down upon the horny frog and contributes to the expansion of the heels; but if the horny frog meets the ground, the cushion being pressed upon both above and below, enlarges laterally and expands the upper part of the foot and lateral cartilages." — Ed.

CHAP. LIV.

ON SHOEING AND THE MANAGEMENT OF THE FEET.

So much has been said of late on the subject of shoeing, and so many imaginary improvements have been introduced since we have had a free intercourse with the Continent, that an inexperienced person is naturally enough led to imagine that it is a very intricate art, and one that requires a great deal of study and reflection to be understood. But notwithstanding the great attention that has been paid to the subject during the last thirty years, it is rather questionable whether lameness has become much less frequent, or whether many real improvements have been made since the time of the late Lord Pembroke, who published some observations on shoeing, the utility of which has been confirmed by nearly fifty years' practice of the method he recommends in the regiment of cavalry which he commanded, — the First, or Royal Dragoons. The French shoe is held up by some as the standard of perfection, while others think that the hinged shoe of Mr. Bracy Clark is indispensably necessary to the preservation of the foot, and capable also of restoring it, in a certain degree, when injured by other modes of shoeing; for he considers all shoes, except that which admits of some motion in the hoof, by means of a hinge at the toe, to be injurious to the feet, gradually, and sometimes very slowly, bringing on a contraction of the hoof, and the diseases which result from such contraction. If we consider the horse as he stands at rest, we observe that the feet are the basis of the whole body, and that it is desirable that the whole of the lower circumference of the feet should have a bearing upon the ground.

Bourgelat, in his *Essay on Shoeing*, lays it down as a fundamental law that the shoe should be fitted to the hoof, and not the hoof to the shoe; and this law has been admitted by all succeeding veterinarians; first, as it regards the foot in a sound healthy state, and likewise when defective or deformed. Notwithstanding this agreement with respect to the fundamental law of shoeing, there has been a considerable difference of opinion as to the practice of shoeing, each party bringing forward plausible arguments in defence of his favourite method. It has always appeared to me that it is desirable to reduce this useful art to as great a degree of simplicity as possible; and to attain this desirable object, we cannot, I think, choose a better guide than Nature. Let us take a view of the horse then that has never been shod, and observe in what manner the foot bears on the ground. We shall then find that the outer edge of the bottom of the foot, named the wall, or

crust, forms a large portion of a circle, as in the annexed figure,



Fig. 1. *The Bottom of the Foot.*

- a a*, The frog.
- b b*, The bars.
- c c*, The sole.
- d d*, The seat of corns.

the frog has any bearing unless the horse stands on soft ground,



Fig. 2. *French Shoe.*

- a*, The ground surface with the large counter-sunk nail holes.
- b c*, A side-view of the shoe, showing its *ajusture*.
- b b*, represents the ground or curvature, and
- c c*, the shoe with the elevation at the toe and heel.



Fig. 3. *A Foot shod on the French System, showing the elevation at the toe and heel, and the low method of driving the nails.*

and that the deficiency in this circle is filled up by the frog. If we look at the foot as it stands on a flat surface, we shall find that every part of the external portion of the circle is in contact with the ground; I think, therefore, that this should be considered as the natural bearing of the hoof, as the horny sole which lies within this circle is rather concave, or hollow, so that it receives no bearing when the horse stands on a plain hard surface. Sometimes the frog is sufficiently prominent to take a part in this bearing; more frequently, however, it is otherwise, so that neither the sole nor the frog has any bearing unless the horse stands on soft ground, which allows the outer part, or crust to sink sufficiently into it. From this view of the foot it is obvious, I think, that, having rasped the bottom of the foot, *d*, to a level surface, there can be no difficulty in covering it with a circular piece of iron, of sufficient width and thickness to have nail holes punched in it, as well as to resist the pressure and blows to which it is exposed.

Now let us see how far the French method of shoeing, so highly extolled by some English veterinarians, is conformable to the law so universally admitted.

They direct the smith to alter this uniform bearing of the outer circle of the bottom of the hoof, by paring away the horn at the toe and the heel, until it is brought to the form represented in the diagram, and then forge a shoe of a similar form. I have given the outline view of the hoof, with a shoe attached to it, copied from M. Janze's view of a perfectly shod foot. The question then, with regard to the French shoeing, is, whether it is conformable or not to the fundamental law which Bourgelat, the great founder of veterinary schools, has laid down.

An outline view of a hoof shod in the French manner

is given in fig. 3. : fig. 2. is the French shoe. Bourgelat directs that this curvature, or boat-like form, in the shoe, should be in the following proportion : —

The curvature in the branch, or side of the shoe, is to begin at the second nail hole from the heel ; and the curvature is to be such, that the toe of the shoe should be raised above the bearing part (that is, the lowest part, which is to bear on the ground), a distance equal to twice the thickness of the shoe, and that from the bearing part to the heel the shoe should gradually rise so that at the extremity it is raised from the ground a distance equal to half the thickness of the shoe.* Thus according to the French method, as a well-shod horse stands on the ground the feet have only a partial bearing. M. Janze, who has published a large quarto volume on shoeing, with numerous plates, differs a little from M. Bourgelat with respect to the degree of curvature, or the *ajusture* of the shoe, as they term it, but not materially ; but both direct the shoe to be made concave, or hollow, on that surface which is in contact with the bottom of the foot, and convex, or projecting, on the surface which rests on the ground, so that they resemble one half of a walnut-shell, with a hole cut in the centre, for they make the shoe very wide, so as to cover a great deal of the bottom of the foot.

Mr. Goodwin, in his new system of shoeing, gives an explanation of the advantages arising from the curved, or French shoe. “ If we refer,” he says, “ to the action of the fore leg, it will tend to explain some of the advantages to be derived from the curved shoe. When a horse is about to move, the first indication of motion is a bend at the knee, which necessarily raises the heels, and they become more and more elevated, till the toe (which is the last part that leaves the ground) is suspended for the moment that the foot is lifted. The base of the foot, just at its leaving the ground, is almost perpendicular : when the knee is bent to its fullest extent, the foot is then in the same position, with the heels of the shoe pointing upwards. If we consider this first part of the motion of the limb, we find the movement of the foot very nearly describes a semicircle ; and on viewing the form of the joints connected with action, the necessity for a curve at the toe is clearly demonstrated : again, the form of the shoe worn out at once shows that it must be more suitable to put on a new one of that form, rather than to suffer the action of the leg to be opposed until it is worn to that form. In the second part of the action, when the foot comes to the ground again, the quarters and heels touch first, and they are the only parts occupied in placing it on the ground again. There may be deviations from this general rule, as in those horses that have

* The convexity of the under surface of the shoe is equal to one and a half times its thickness.

bad action; also when horses are drawing heavy weights it must necessarily differ. The fore legs may be considered simply as pillars of support, having no power of themselves to propel the body forward, progression being entirely performed by the hind parts. If it were not so, the action would be different, as I have before observed it to be in those horses that have great weights to draw; and this may be more readily observed in any draught horse going up hill. I have offered these few remarks upon action in order to bring the reader's attention to the curve of the French shoe at the *toe*. This form of shoe certainly harmonises more with the motion of the fore foot than the English does; it affords a greater surface of bearing at the toe than the projecting ridge of the straight ordinary shoe, and is much more calculated to allow of the motion of the leg and foot; the labour of the muscles is also diminished, and the limb being in its natural position, the ligaments have less imposed upon them; they are more at ease, and consequently are not so liable to be strained. The shape of the coffin bone is also another proof of the French system being more consistent with the principles of nature than the straight ordinary shoe. If the coffin bone of a fore foot be placed on a level surface, the quarters and *heels* are the only parts in contact with it, which proves that they are intended by nature to meet the ground first (quære, why the curvature of the heel of the shoe then?) and to bear the greater proportion of weight; but if the quarters of the hoof be removed (lowered, or diminished) to admit of the straight shoe, the portion of weight intended to be borne on the quarters must be thrown upon the heels; and hence the *great mischief* which ensues from the common (plain) English shoe." I perfectly agree with Mr. Goodwin as to the "decided superiority" of the French method of nailing on the shoes; but the curvature of the French shoe toward the heels is certainly contrary both to his own principles and practice, for he expressly tells us in the foregoing quotation that the quarters and heels are intended by nature to meet the ground first: and the plate of his improved French shoe shows that he disapproves of the French curvature towards the heels.

Having given what I consider a sufficient description of the French shoe, I shall make a short remark on Mr. Goodwin's improvement, which consists in making the quarters and heels on a level, and the reverse of the French shoe with regard to its surfaces; that is, Mr. G. directs the foot surface to be convex, and the ground surface concave. This form of the foot surface appears to me to originate in a very absurd notion with regard to the foot: it was thought that, by making the surface on which the foot rests incline or slope a little towards the outer edge, it would promote the expansion or spreading of the hoof, or at all

events prevent that much-dreaded evil, contraction. This notion, I believe, is fallacious; both expansion and contraction must be prevented by the nails, as far as they go; and if any motion takes place in the horn that is confined by them, it must be either from a bending of the nails or from their becoming loose in their situations. This notion of expanding the quarters and heels, by making that part of the shoe on which they rest slope outwards, is not only very old, but also very foolish, in my opinion, and requires only an examination of the foot, and a little reflection, to appear so.

When the hoof becomes hot and dry, and consequently shrinks or contracts, that contraction is general, but takes place principally in those parts where there is least resistance, that is, at the heels and quarters, and at the upper circle of the hoof, or coronary band.

This contraction of the heels and coronary band must compress, and give pain to the sensible parts underneath, especially in trotting. The great merit of the French shoe consists in its placing no restraint upon the necessary motions of the hoof; there are no nails in the heels, or in the moveable parts of the quarters; and instead of making the nail-holes near the outer edge of the shoe, they are placed nearer the centre, and inclining a little outward, so that the nails are driven through the lower and stronger part of the hoof, where there is no danger of their wounding or compressing the sensible parts.

Lafosse, who was cotemporary with Bourgelat, and who greatly distinguished himself, not only as a veterinary writer, but as a practitioner of the art in all its branches, gives a description of the shoe he recommends for a sound foot, which is the once celebrated half-moon shoe. This shoe was soon after strongly recommended by Mr. Osmer, an eminent veterinary practitioner and author, of this country. For good feet, he says the short shoe is the best; it should be made gradually thinner from the toe to the extremities, and so short that both the heels and the frog may bear on the ground. Very little cover or width is permitted, because the sole, the frog, and the heels are never to be pared, being with this shoe exposed to the pressure and friction of the ground, which is sufficient to wear away whatever is superfluous. There is something in this shoe which strongly recommends it to every one who studies the structure and economy of the horse's foot; yet it has not been found to answer in general practice. Our worthy and truly eminent Professor, Mr. Coleman, was struck with the merit of this shoe, and thought he had succeeded in obviating the only inconvenience that belonged to it, which was leaving the heels uncovered, and thereby exposing them, especially in wet weather, to more wear than they could bear. He, like Lafosse, strongly

pointed out the necessity of applying it to the healthy foot only ; and went still farther in showing the danger of applying it suddenly, and without suitable precautions, to the foot of a horse accustomed to wear thick-heeled shoes. He considered some degree of bearing on the frog necessary to the health of the foot, and that it serves also as a spring, and as a stop, to the animal in his various motions. He found, however, that by leaving the heels uncovered they were often worn down too much, especially in wet weather ; therefore he extended the iron covering, or shoe, to the whole of the crust, that is, from the toe to the heels.

Mr. Coleman's thin-heeled shoe, as it was termed, was flat on the foot surface, and concave on the ground surface. If the sole was not concave, or hollow enough to admit of a flat shoe of moderate width resting on it, it was pared out sufficiently with the drawing knife ; and if the sole was too thin to allow of this being done, the foot surface of the shoe was made concave, and the ground surface flat. The shoe was made of the usual, that is, of a moderate, thickness at the toe, and became gradually thinner towards the heels, and in such a degree, that the toe was three times thicker than the heels. The principal precaution to be observed in applying this shoe was to pare away from the toe of the hoof as much as would make up the difference between the thickness of the toe and the heel of the shoe, and thereby prevent too much pressure upon the great tendon of the foot and navicular joint ; and if the heels of the hoof were unusually high, so as to raise the frog considerably from the ground, they were to be lowered very gradually, removing only a small portion of the horn at each time of shoeing, until the frog had a bearing on the ground.

This shoe was tried in the army, and found frequently to occasion lameness. The principal trial was made in the Royal Artillery, and I had an opportunity of witnessing the effect of it at two different periods. About twenty-three years since, when I was in the Royal Dragoons, and quartered at Canterbury, I was desired by Mr. Coleman to examine several horses of the Royal Artillery, in that garrison, that were said to be lame from wearing the thin-heeled shoe. I did so, and was of opinion that the report was well-founded : therefore I directed the common shoe to be applied, and to keep the feet moist, and at rest for a short time, or until the lameness was removed. A few years after this, veterinary surgeons were appointed to the artillery corps, and then, I believe, the thin-heeled shoe was found to answer better ; for when I resided at Exeter, the veterinary surgeon of the artillery quartered in that district was transferred to another station, and I was employed by the Board of Ordnance to attend the horses in that capacity ; when I found that

Mr. Coleman's shoe, both for the fore and hind feet, had been employed several years, and that no inconvenience had resulted from it; on the contrary, I never saw a corps of horses with better feet. Their work was regular, and very moderate, chiefly walking, and in harness. It seems to be a general opinion with English veterinary surgeons of the present time, that the thin-heeled shoe is not fit for English horses, and experience has shown that no shoe whatever will materially diminish the lamentable frequency of incurable lameness in this country while such facility is given to rapid travelling by smooth turnpike roads.

I shall say nothing here of the various contrivances that have been proposed for expanding contracted hoofs, and for preventing contraction, except that they have all been fairly tried, and found either useless or hurtful; but proceed to an examination of Mr. Bracy Clark's shoe, which has of late found so many zealous advocates. If it is found, after a fair trial, that this shoe, which is called the expanding steel tablet shoe, will either so far improve a horse's feet as to relieve him from lameness, or enable a horse to go better than he can in any other kind of shoe, then the only objection that can be made to it is the price, which I understand is half a crown for each shoe; and this would be an unreasonable objection, because the shoe would be capable of doing what no other shoe can. The peculiar principle of the shoe consists in a joint at the toe, so constructed as to admit of a limited and small degree of motion between the two branches of the shoe. I have already said that I do not



Fig. 1. *The common English Shoe usually employed for Hunters.*



Fig. 2. *A hinged Shoe.*

a, A steel rivet by which the two branches of the hinged shoe are held together.
b, The rivet detached from the shoe.

think the various degrees of chronic lameness, which are now so loudly and justly complained of, are caused by bad shoeing; nor do I think that any mode of shoeing will cure them. In making this assertion, however, I wish to be understood clearly: in those chronic lamenesses, I do not include corns, or bruises of the foot from the shoe bearing improperly, or from the nails being of a

bad form or size, or from being driven improperly. If I rightly understand Mr. Bracy Clark, he is of opinion that all the shoes hitherto employed, except his, must inevitably produce contraction, by the restraint they impose upon the elastic parts of the hoof. In direct proof of this, he brings forward a few experiments; and, in support of his opinion, he argues with great learning, zeal, and ingenuity; still he cannot get over this plain matter of fact, that the plain English shoe, such as I shall next describe, has been employed in a regiment of cavalry for nearly fifty years, without producing the effect generally, or in any degree noticeable, that he has ascribed to it. When I was appointed Veterinary Surgeon to the Royal Dragoons, I waited upon General Goldsworthy, the commanding officer, who advised me not to make any alteration in the shoeing, as the method they practised, which had been introduced by his predecessor, Lord Pembroke, had been found to answer completely. I continued in the regiment seven years, and found that this was really the case. When I was last at Exeter, that is, in June 1822, some part of the regiment was quartered there, and, upon inquiry, I found that they still shod in the same manner, and with the same effect. As Lord Pembroke's work is out of print, and perhaps rather scarce, I trust it will not be an unacceptable addition to this small volume, if I transcribe the most interesting part of it, and introduce such remarks as may appear to me useful.

“Physic and a butteris,” his Lordship says, “in well-informed hands would not be fatal; but in the manner we are now (1778) provided with farriers, they must be quite banished. Whoever lets his farrier, coachman, or groom ever even mention anything more than water gruel, a clyster, or a little bleeding, and that too very seldom, or pretend to talk of the nature of feet, of the seat of lamenesses, sicknesses, or their cures, may be certain to find themselves very shortly and very absurdly quite on foot.”

The instrument named the drawing knife is generally employed to remove what appears to be superfluous in the hoof at the time the horse is brought to be shod. The mischief that is done by paring the foot improperly is of two kinds. If too much horn be pared from the sole, it will be incapable of defending the sensible or fleshy sole; and if the bars or frog are improperly pared, we remove parts which are designed to prevent a contraction of the heels.

Making a groove (fullering) round the edges of shoes, if the iron is not very good, may cause a partial yielding there; but, if the iron is good, a groove is very useful to protect the heads of the nails. Farriers should always examine a foot before they shoe it, make the shoe, and pierce the holes for the nails further from or nearer to, the edges of the foot accordingly.

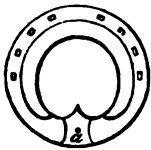
as they find the foot requires; the holes for the nails should always be pierced slanting rather outwards. The best way to forge shoes, in respect to the nails, is to make the holes for the nails at twice, with two different instruments. First, on the outside of the shoe, punch a place, not quite through the shoe, big enough to receive and cover the head of the nail when driven in; next punch a smaller hole from the centre of the above mentioned larger one, for the blade of the nail, quite through the shoe.

This method of punching the nail-holes, with the remarks on the groove or fullering round the shoe, do not differ materially from that now adopted at the Veterinary College, or from Mr. Goodwin's remarks upon it, who says, "The object of this groove or fullering is to receive the nail heads, but in general it is too superficial for this purpose; when a countersink head is used, the groove is made deeper; but the inner edge of the groove is perpendicular, and the outer edge slopes towards the exterior rim to give the edge of the nail a slanting direction inward. It is considered that the smith, who can keep this groove nearest to the edge of the shoe is the best workman, and it is denominated *fine fullering*. If this groove is cut deep into the shoe, it is evident it must weaken it; and if the iron is not good, it will crack in the outer edge of the fuller; and, if it is superficial, it affords no security to the head of the nail; yet, if made with accuracy, and deep enough to afford security to the head of the nail, it is a tedious process, and takes up much time. The fuller, or groove, has been recently altered at the Veterinary College: it is now carried further into the shoe, and is similar to the German method of making the groove, which gives an advantage in taking more hold, by driving the nail through a portion of the sole on the inside of the crust, similar to the French method of nailing.

"If the quality of the iron is not good, it will be put to the test by the application of the punch; it will either burst on the outer part of the hole, or cracks or flaws will be seen; neither of which will appear if the iron is good." (*Goodwin's New System of Shoeing Horses.*) I cannot leave Mr. Goodwin without noticing a remark he has made on an opinion of Mr. Bracy Clark, in which I perfectly agree with him. "Mr. B. Clark prefers the common to the countersink head, believing that it leaves a *degree of room between the shoulder of a nail and the shoe for the* EXPANSION OF THE HOOF. I confess I should not like to commence a journey if there was any play between the shoe and the hoof; as it must be quite clear that, under such circumstances, a shoe could not remain on long. In the *scated* shoe there is not that strain on the nails and in the clenches that there is in the *common* (hollow or concave foot surface, like the French)

shoe ; for the crust, instead of bearing on an edge, bears on a flat surface."

There is but little difficulty in adapting a shoe to a sound foot ; that is, a foot that has a sound well-formed frog, open heels, good bars, strong and rather concave sole, and a strong well-formed crust or wall. To such foot, the best shoe that can possibly be applied is that which has for many years been employed in the Royal Dragoons. I may have made some deviation from the form which was employed, and so may others ; but the following is that which I now recommend. The shoe should be from half an inch to five eighths of an inch thick, all round from toe to heel, and of the same width, except at the heel, where it should be three fourths of an inch wide. The nail holes



Bar Shoe (foot side).

a, A piece of leather riveted to the shoe, in order to bear upon the frog.

should be made somewhat similar to those of the French shoe, and the nails driven in a similar direction. When a foot deviates from the sound form, the shoe must be shaped accordingly. If the sole is in any degree flat and thin, the wide hollow shoe is absolutely necessary.*

If the heels are tender, and have corns, the *bar shoe* is the best that can be applied : and the tender heel, including part of the quarter, crust as well as sole, should be so pared down as to be at the dis-

* No general rule can be laid down as to either the weight of the shoe or its width, it must depend on the wear, the nature of the foot, and that of the work of the horse. Saddle horses require narrower shoes than harness horses, and particularly if they are used for hunting. The purpose of wide shoes is to protect the sole and to diminish concussion ; they are therefore necessary to effect the former object in flat feet, and also for the latter purpose on the road.

The Leather Sole. — For weak feet the leather sole is found particularly useful. It is thus described in my work on the "Foot and Leg of the Horse :"— "It consists of a piece of leather cut exactly the shape of the shoe, covering the sole and frog, and applied between the foot and shoe. In the application of the sole it is requisite, first, to soak it in water a short time, in order to render it more elastic and softer, and to apply a stopping to the sole so disposed as to fill up the vacancies between the bar and frog, so as to prevent any gravel or dirt penetrating. The stopping we have found best adapted and most convenient, is composed of two parts of tar and one of fat melted together, and applied on tow. Some little tact is required in disposing the tow so as to fill up the vacancies we have mentioned. The advantages of the leather thus applied are manifold. It diminishes concussion in a considerable degree by its interposition between the iron and the foot. It preserves the elasticity and stimulates the growth of the sole, at the same time that it protects it from the effect of nails and sharp flints. It preserves the frog likewise from injury and from undue moisture, the source of thrushes. It strengthens the crust in weak feet, particularly at the quarters and heels ; and affords to the sole and frog, when the surface of the ground is the least irregular, that moderate degree of pressure which it meets with in a state of nature."— ED].

tance of a quarter of an inch or more from the corresponding part of the shoe.*

In preparing the foot for the shoe, the loose parts only of the sole

* *The unilateral Shoe.* — The next great improvement in the art, and one which, in justice to its merits, we must characterise as the most important hitherto noticed, consists in applying the nails round the toe, and on the outside quarter, but leaving the inside quarter unfettered. The advantages



Fig. 1. *Mr. Turner's Shoe (foot side), showing six nail holes on the outside, and two only on the inside, of the toe.*



Fig. 2. *Mr. Turner's Shoe modified, having an additional nail on the inside, and one less on the outside, of the foot.*

of this method may be readily seen. The foot, we have seen, expands, or ought to expand, whenever it comes on the ground: and this expansion is greatest at the heels and quarters. If, therefore, the nails on one side be removed, so that those on the other have no antagonists, the same effect will be produced as if they were removed on either side, on the same principle as a common vice operates, one side being moveable and the other fixed. A shoe on this principle has been applied for many years for cases of cutting, the nails being removed from the inside quarter for this purpose only; and it was from witnessing the effect of this shoe in a contracted foot, though applied for cutting only, that first induced Mr. James Turner to recommend its general application. The merit belonging to this shoe is, therefore, due to Mr. Turner quite as much as if he was its original inventor; and the author reflects with pleasure, that he was one of the first to give the plan a trial, and the very first, after Mr. Turner, to make its merits known to the public. It would be well, perhaps, to describe the shoe which I make use of, as it is a slight modification of that used by Mr. Turner. It is, then, a seated shoe, with the flat part rather wider than common. The web of the shoe for a moderate-sized horse, used on the road, is about an inch in width, but varying according to circumstances, and being narrower at the heels, where the upper wearing surface is very slightly bevelled outwards, than at the other parts; the ground surface quite flat, sometimes fullered and sometimes stamped; but when the former plan is adopted, the fuller is not deep, or too near the edge, but somewhat wider than common. Three nails are stamped on the inside toe and five on the outside toe and quarters, with a clip at the toe, and another at the outer quarter. Sometimes, instead of a clip at the toe, the shoe is turned up in the French fashion, as recommended by Mr. Goodwin; this plan is very advantageous where horses are in the habit of hitting the toe and tripping, or wearing it in undue proportion. In contracted feet, the application of this shoe has materially enlarged the foot, quite as much as it is desirable to do; indeed, I believe, if it were applied early, contracted feet would be altogether avoided. It is also calculated, in great measure, to prevent corns, from bearing so easy on the inside heel.

In wide flat feet, side nailing is unnecessary; there is no danger of contraction taking place in this description of feet, for they have rather a tendency to expand too much.

may be removed with the drawing knife; the ragged parts of the frog should be cut away, as they may serve to harbour dirt or gravel. If the toe of the frog is very hard and more prominent than the other parts, it should be pared down moderately. The heel of the shoe should have a perfectly flat and level bearing upon the junction of the bar and crust, which should be rasped to a flat surface for receiving it. The shoe should never extend beyond this part. The whole bottom of the foot, indeed, should be rasped so as to be perfectly flat and level all around; so that when the horse stands on a plane surface, every part of the crust should bear on that surface. The shoe should be made level also on both surfaces, by the same criterion, and then it must of necessity be fitted to the foot. When this is the case, there will not be that motion in the shoe in travelling by which so many shining surfaces are often worn in it, and by which the nails are loosened, and if they are made of indifferent iron, or badly made, often broken.

The hind shoes should be narrower than the fore ones, and made square, as it is termed, at the toe, for the space of one inch. By making the shoe as well as the hoof square at the toe, a steady point of bearing is afforded to that part which is the last to leave the ground. We may readily conceive that as this is the part from which those amazing bounds are made, in galloping and leaping, a more steady and firm point of bearing will be thus afforded, than by the single point which a perfectly round shoe would give. They are less liable also than the round shoe to interfere with the fore shoe. The heels should never be turned up for saddle horses unless it is in frosty slippery weather, and then it is an evil that must be submitted to.

For hunting the shoe must be narrower than for the road, and an additional nail may be placed on the inside; no evil will result from this, because in the field the pressure on the crust is, in a great degree, relieved by the sole and frog. There must be space for a picker to pass between the foot and inner rim of the shoe, but no more, as the foot can then be withdrawn from heavy soil with less difficulty than when the usual space is permitted. To avoid overreaching, the heels of the fore shoes should scarcely project beyond the heels of the crust, and they should be rounded off, instead of being left square, as is usually the case. The hind shoes should also, where there is any disposition to overreach, be square at the toe, set a little within the crust; and the inner rim at the toe should have a piece cut out, so that, instead of a sharp edge, there should be a rounded surface, which, of course, is not so likely to catch the heels of the fore feet. — *Spooner on the Foot, &c.*

CHAP. LV.

INJURIES CONNECTED WITH SHOEING, AND WOUNDS OF THE FOOT.

THESE accidents most commonly arise from the carelessness of the smith in nailing the shoe to the hoof. The nail is either driven so as to wound the sensible parts, or so near them, as to occasion, by its pressure, pain, inflammation, and in a few days, suppuration, or the formation of matter.

When a nail is driven so close as to wound the sensible parts, the animal suddenly draws back his foot, from the pain he suffers; and the smith, aware of what he has done, removes the nail, and takes no further notice of it; though, sometimes, to avoid suspicion, he fills the vacant hole in the shoe with the head of a nail; and when the horse is afterwards found to be lame, he too often denies having any knowledge of the cause. When the horse is not worked immediately, and the wound not considerable, it may not occasion lameness; most commonly, however, it is of a more serious nature, causing violent inflammation, which terminates, in a few days, in suppuration. The matter which is formed, being confined, spreads under the horny sole, and causes so much pain that the horse can scarcely put his foot to the ground, and if he be not relieved, by giving vent to the matter, it continues to spread, and ultimately breaks out at the coronet, or top of the hoof. When the disease has been suffered to proceed thus far, it is difficult to cure, and often leaves a permanent tenderness of the part.*

As soon as it is known that a horse has been pricked, as it is termed, in shoeing, if the smith were to remove the horn, where the nail entered, with a small drawing knife, so as to allow the matter which may form to escape freely, all this mischief might be avoided. It would be proper to let the horse stand without a shoe for a few days, and wrap up the foot in a large bran poultice. It is a common practice with smiths, on these occasions, to pour oil of turpentine into the wound; and, sometimes, in order to increase its power, they set it on fire; after this the shoe is put on, and the bottom of the foot filled up with tow dipped in hot mixture of lard and turpentine. In

* Sometimes lameness is produced by the nail being driven too near the quick, without penetrating it. Lameness in this case is not perceived at first; not until the pressure of the internal parts forces the sensible parts against the offending nail. In slight cases a removal of the cause immediately affords relief; in others, it is necessary to poultice the foot for several days. — ED.

trifling wounds of the foot, the horse often gets well under this treatment, though more slowly, perhaps, than he would had these remedies been omitted. It may be proper, however, to pour a little Friar's balsam into the wound, which forms a sort of coating, and may serve to exclude air and moisture from it, and thereby prevent the formation of matter: with the same view, the cavity that has been made by removing the horn may be lightly filled with tow dipped in digestive ointment. But in wounds of a more serious nature there is generally a high degree of inflammation, so considerable sometimes as to excite fever; and, in a few instances, it has been followed even by locked jaw. All stimulants should here be avoided, until the inflammation has subsided, and matter is formed, which invariably happens in wounds of this description.

The first thing to be done in these cases is to enlarge the opening made by the nail, and pare away the horny sole, on the same side, until it yields to the pressure of the thumb; a large poultice is then to be applied. After two or three days matter will have been formed; and upon pressing the sole, near the wound, a little dark-coloured fluid will be seen issuing from it. On introducing a probe into the wound, it will be found to pass under the horny sole, sometimes to a considerable extent; and as far as the horny and sensible sole are separated, so far is the former to be removed. A dressing of tar ointment is then to be applied; by means of which a new horny sole will be gradually produced. Should the matter have penetrated to the coronet, the same operation and treatment are necessary, excepting the poultice: for, when the disease has proceeded thus far, we may be sure that there is matter confined under the horny sole. The sore or opening on the coronet is to be dressed with solution of blue vitriol or tincture of myrrh. After being dressed for three or four days with either of these preparations, Friar's balsam and a plaster of digestive ointment may be used. When the nail has been driven so near the sensible parts as to cause pain by its pressure, inflammation comes on slowly and gradually: and sometimes the lameness does not appear until several days after the shoe has been applied. This may more properly be termed a bruise of the sensible parts of the foot, than a wound; but it produces the same effects, which are inflammation and suppuration. This kind of lameness comes on gradually; and is often so inconsiderable at first, that it is not observed by a careless rider. When the smith is consulted on these occasions, he seldom discovers the seat of the lameness (unless it be after matter has been formed, when the cause is too manifest to escape his notice), but attributes it to a strain of the shoulder, or a *bit of a wrench* in the fetlock joint. This is more likely to be the case when the smith that shod the horse is applied to; but, if an-

other is consulted, he takes care to search very diligently for any errors his rival may have committed; and, though he find nothing to account for the lameness, will often affirm that the horse has been *pricked*; he then *stops* up the foot with some greasy substance, and trusts to nature and rest for making good his assertion; for, should the horse recover, he depends on its being attributed to his superior skill and penetration.

Much mischief, however, is often done by their mode of investigation; for they cut away the horn so freely, between the bottom of the crust and the sole, or where the nails are placed, that scarcely any room is left for nailing on a shoe; and it is, perhaps, a considerable time before the horn can be reproduced which has been unnecessarily removed. When a horse has been pricked in shoeing, and the lameness does not go off spontaneously, it must, in a short time, be discovered. The lameness gradually increases; and, when matter is formed, it is very easily detected, by pressing moderately with pincers, or by a slight blow on the part: or, should it escape observation at this period, it cannot fail of being noticed when it breaks out at the coronet. The part of the fore foot most commonly wounded is the inside quarter, from the horn being thinner in that part of the foot than any other; but, in the hind foot, the quarters are generally thicker; and here we most commonly find the wound nearer the toe. When it is suspected that a horse has been wounded or *pricked* in shoeing, the first thing to be done is to strike on the foot gently with a hammer all around the hoof where the nails are clenched, and on the shoe also. The wounded part may thus be generally discovered by the horse suddenly withdrawing his foot when it is struck. The shoe is then to be taken off, and the wounded part opened with a drawing knife, and treated as we have before described; but should no tenderness be observed in the foot, it would still be advisable to take off the shoe, and apply a poultice to the foot; that is, supposing every other part of the limb to have been carefully examined also, and no cause for the lameness discovered. If the lameness should arise from a wound in the foot, it will gradually get worse; and, when matter has been formed, the tenderness is so considerable, that it can scarcely fail of being detected. Sometimes the horny sole, by which the matter is confined, is of considerable thickness; and it sometimes happens that the smith, having pared away as much of the horn as he thinks can be done with safety, is afraid to go any further. But, whenever we find great tenderness, upon pressing the sole with the thumb, or striking it gently, we may be assured there is matter underneath, and that it ought to be let out, however thick the horn may be which covers it. If there be no matter, it may be known by minute specks of fluid blood appearing on

the horn, as we approach the sensible sole. This indicates that no separation has taken place between the sensible and horny sole, and that there is no disease in the part. Supposing this mistake to have been made, which, however, is very unlikely to be the case if the directions we have given are attended to, the part is to be covered with digestive ointment, and defended from pressure, until the horn has grown to its usual thickness.

Punctured Wounds.

The horse's foot is often wounded by his stepping on a nail, which, in technical language, is termed *picking up* a nail. The frog is the part generally wounded, and most commonly on one side. When the nail enters at the back or wide part of the frog, that is, towards the heel, there is much less danger than when it enters near its toe, or termination. In the latter situation, the navicular joint is exposed, and is often wounded, causing obstinate or incurable lameness; and, should the nail not have penetrated so far as to enter the joint, it generally wounds the tendon by which it is covered. The treatment is similar to that we have recommended for wounds in shoeing; that is, opening the wound, paring away the surrounding horn, and poultices. When the inflammation is considerable, bleeding, bran mashes, and a purgative, are useful. After a few days, it will be found that the horn surrounding the wound has been separated from the sensible parts; when, by pressing gently on it, a little dark-coloured fluid will be observed to ooze from the wound. All the horn that has been thus separated should be carefully removed, however extensive it may be. A dressing of digestive ointment is then to be applied, having previously poured a little Friar's balsam or tincture of myrrh into the wound. If the wound does not appear to get better, but discharges a thin yellow fluid, it should be touched carefully with the nitrate of silver, or lunar caustic, and afterwards dressed with Friar's balsam. It sometimes happens, however, when the nail has penetrated through the tendon, and injured the navicular joint, that the disease gradually increases, and at length becomes so bad, and so hopeless a case, that it is deemed necessary to destroy the animal. I have seen buttyr of antimony applied with success to a wound of this kind, a few hours after it happened, and am inclined to believe that in all wounds of tendinous or ligamentous parts a caustic is the best application. I prefer lunar caustic, or nitrate of silver, but in some situations a fluid caustic, such as muriate of antimony, may be better. If these wounds are not immedi-

ately attended to, and properly treated, a serious and obstinate lameness is often the consequence.*

On Lameness from Bruises of the Foot by Stones, Gravel, &c.

Cases of this kind are by no means uncommon, and are generally caused by the pressure of the shoe, particularly in horses with thin flat soles. Horses, also, with good soles, are occasionally lame from this cause, through the injudicious management of the smith, who, being generally ambitious of improving the natural form of the foot, pares away so much of the sole for this purpose, that there is not enough left to defend the sensible parts from the blows and pressure to which it is necessarily exposed; for, if the shoe is not made so flat as to bear on this thin part, any vacancy that is left is soon filled with dirt or gravel in travelling: and the same effect is produced as if the shoe were in contact with it. The method of detecting and treating this kind of lameness is similar to that we have recommended in wounds of the foot; that is, by pressing it, or striking it lightly with a hammer; and giving free vent to any matter that may be confined.

A horse is sometimes observed to be tender from this cause, immediately after shoeing, particularly in the fore feet; and it will generally be found that the tenderness arises from the toe having been pared too much. If the shoe does not press on the thin part, the horse should be allowed to rest a few days, and a little tar ointment should be applied to the sole, by which it will acquire its usual firmness; but if the shoe is bearing on the sole, it must, of course, be taken off and altered.

I have known many cases of lameness, from matter forming under the sensible sole, without any apparent cause. It is probable, however, that, in almost all these cases, it was occasioned by a bruise. I have known it happen in several instances at grass; also in the stable, when the horse has been at rest; or while he has been doing his ordinary work.

The following cases are given as examples of such lameness, and of the manner in which they were treated.

Case 1. About forty cavalry horses were turned to grass in soft meadow ground, their shoes having previously been taken off, and the fore feet pared. About two or three weeks after, several of them were observed to be very lame; and on examining the feet it was found that matter was confined under the sole. All the horny sole, which had separated, and by which the

* I have cured several cases of this kind by the application of corrosive sublimate and spirits of wine to the wound, and keeping the foot in poultice for some time. When permanent lameness has succeeded, the horse has been rendered useful by the nerve operation.—ED.

matter was confined, was completely removed, a hollow shoe applied, and the whole of the bottom of the foot covered with digestive ointment; when they all got well in a short time. From this we may learn that when a horse is turned to grass without shoes, his feet should be pared with caution; perhaps it would be the safest plan, merely to rasp the bottom of the foot to a level surface, and leave the sole untouched. It must be recollected, however, that in certain cases of lameness, thinning the sole, previously to the horse's being turned to grass, is recommended as a remedy.

Case 2. A horse that had been at grass some time was observed to be lame; he was taken up and examined by the smith, who could not find anything to account for the lameness, and, therefore, concluded that it must be in the shoulder. On examining the foot, I found a little moisture oozing from a small fissure in the coronet; and, on finding the horse flinch, when struck on the bottom of the foot, towards the inside heel, I pared away the horn from that part with a drawing-knife, and let out some dark-coloured fluid. A separation between the sensible and horny sole had taken place to a considerable extent. All the horny sole that had been detached was carefully removed, and a dressing applied of digestive ointment. The fissure in the coronet was dressed, at first, with a solution of blue vitriol, afterwards with Friar's balsam. By this treatment the horse soon became perfectly sound.

Case 3. A horse had been fired for a lameness in the fetlock joint of one hind leg, and turned loose into a large box: about three or four weeks after, he was observed to be lame in the other hind leg; the smith was called in to take off the shoe, and examine the foot; nothing was found to explain the lameness in the foot, or in any other part of the limb, except that the horse generally stood with the fetlock joint bent, resting chiefly on his toe. This was supposed to arise from some injury of the fetlock joint, as the position in which he stood tended to favour the ligaments of that part; at the same time it was observed, that there was neither increased heat, swelling, nor tenderness of that joint. It was supposed, however, that the lameness was similar to that in the other leg; and, as firing had proved effectual in that case, it was thought proper to have recourse to it in this also. I was sent for to perform the operation; and, on my arrival, being informed that the foot, as well as every other part, had been already carefully examined, we proceeded immediately to the operation. The horse had been fired on the outside of the joint, and turned over, that the inside might be fired also. At this time, a little matter was observed issuing from a transverse crack, or fissure, in the coronet. This immediately led me to suspect that matter was confined under the sole. On paring it away,

this was found to be the case; and so far had the matter penetrated, that it was found necessary to remove about one half of the horny sole. The same treatment was adopted as in the former case, and the horse gradually recovered. This case shows how necessary it is to examine every part minutely before a severe operation is resorted to; and may teach the young practitioner, that he should never trust to the smith on these occasions, but depend only on his own investigation.

On Lameness from Cutting.

In cutting, a horse sometimes strikes himself so severely, or in so tender a part, as to cause lameness for a short time, but generally it soon wears off, and he goes on again very well until the blow is repeated. When the blow is inflicted on the inside, and lower part of the knee joint, it is called the speedy cut, because it commonly happens when the horse is trotting fast. The pain this occasions is so severe, that the horse often falls down suddenly from it, which causes it to be considered a very dangerous failing, more especially as it is a failing that is not easily remedied. In carriage horses, the best remedy is to drive them without a bearing rein, which enables them to go with more ease, and without that high action which this gagging rein occasions: at the same time the shoeing should be attended to, and when the part of the foot or shoe (most frequently it is the former) which inflicts the injury has been discovered, it should be rasped away as much as can be with safety or propriety. I have seen a severe lameness produced by a horse striking his fetlock joint, which continued for several days, and was mistaken for an injury of the shoulder, because, though it was evident the horse had struck the fetlock joint, he had not even knocked off the hair. Upon a careful examination, I found he had struck that part over which the nerve passes, and had left it so tender that the horse could scarcely bear to have it touched.* Cutting is often a consequence of weakness or fatigue; in such cases the remedy is obvious. The part most commonly injured in cutting is the inside of the fetlock joint, and the common remedy is to make the inner branch of the shoe thicker than the outer branch, gradually swelling it from the toe to the heel. This is supposed to alter the position of the fetlock joint, and

* Sometimes considerable swelling, as well as lameness, is produced on the inside of the leg by repeated striking, although there may be no external wound. Such case requires poultices and fomentations; an abscess generally forms, through which a seton should be passed so as to secure a depending opening. Large splents, from their prominence, frequently occasion cutting, particularly when they are situated near the fetlock joint; and sometimes cutting produces bony enlargements on the inside of the leg, which, by repeated blows, increase greatly in size.—ED.

place it at a greater distance from the striking foot. As cutting, however, is often an effect of weakness or fatigue, and not unfrequently of awkwardness in going, this remedy often fails. Mr. Moorecroft, on this account, was induced to try another method, quite the reverse of that I have just described, and in a few instances I have found it successful. He advises the outer branch of the shoe to be raised in the manner before described, so that it may be higher than the inside. For he says, "When a horse is at rest, he supports his weight equally on both feet; but having the inner heel and quarter raised when one foot is elevated, he must be supported obliquely on the other, and hence have a tendency to fall outwards; to prevent which, he brings the moving foot nearer to the supporting one, by which he strikes it; but by raising the outer instead of the inner branch of the shoe, we necessarily give it a disposition to lean inwards, which will induce the horse to throw or incline the moving foot farther from the supporting foot."*

Mr. Goodwin describes an improvement of the common boot, as it is termed, for defending the fetlock joint, when cutting cannot otherwise be prevented, which may be had at Mr. Long's, veterinary instrument maker, 217. High Holborn, London.†

When cutting appears to depend upon weakness, or riding a horse, though it happen to be a moderate journey, until he is fatigued, the most effectual, as well as the cheapest remedy, is to turn him to grass until he recovers his strength.

Over-reaching.

These, in old books of farriery, were termed according to their situation in the heel, or above the fetlock joint, the higher and the nether *attaint*; from the French *atteint*. These accidents sometimes happen from the toe of the hind foot being too long and not squared off as I have advised, but more frequently from the sharp edge afforded by the inner rim of the hind shoe towards the toe. It may also occur from bad riding, in pulling up a horse badly, and making him gallop false, as it is termed. Whenever the wound is such as to leave a flap of skin, whether it be upwards, downwards, or sidewise, it should be immediately

* In the hind feet there is no shoe more likely to prevent cutting than a three quarter shoe, the inside heel being left uncovered.—ED.

† The best boot for cutting the leg is formed with leather fitted to the leg and laced, the leather being double at the part struck by the other foot.

In some instances it is found that a boot buckled round the hoof that cuts, and softly stuffed, prevents injury from the blow when other methods fail.

For cutting the fetlock, a piece of cloth tied round above the joint and doubled down over it answers the purpose.—ED.

cut off as close as possible; a reunion of the parts can never happen, and by leaving the flap, and attempting to effect the reunion of the parts, there would be thickening and a greater blemish, and its removal would be found necessary at last. This may be considered as a contused wound, and to all such wounds I think a poultice the best remedy. This probably will be doubted by surgeons; but in horse surgery it will be found the best practice. When the inflammation has been completely subdued by this poultice, the astringent paste may be applied, and nothing more done for two days, when it is to be soaked and washed off, and a similar dressing laid on. Three or four of these dressings will generally effect a cure.

Astringent Paste.

Finely powdered alum and pipe-clay, in equal proportions; water enough to give it the consistence of cream. When the wound is perfectly healed, a little salad oil or hog's lard may be necessary to soften the cicatrix.

*Halter Cast.**

When the horse entangles his hind leg in the halter, he often injures himself considerably; the heel is the part that generally suffers, and the only remedy required is wrapping up the part in a large emollient poultice, until the inflammation is completely removed; if any sore remains, the digestive ointment, or Goulard ointment, may be applied for a day or two, and then the astringent paste of pipe-clay and alum mixed with water.

Goulard Ointment.

Fresh hog's lard	1 lb.
Linseed oil	2 oz.
Palm oil	2 oz.

Melt over a slow fire, and when removed and getting cool, stir in 6 oz. by measure of Goulard's extract of lead. Continue stirring until it is perfectly cold.

* The subject is included in the present chapter from the similarity of the injury and the proximity of the part to that just described.

CHAP. LVI.

DISEASES OF THE FOOT.

Corns.

THIS is a very common and a very troublesome disorder, and may truly be said to be often occasioned by the smith, being generally in consequence of bad shoeing. Corns most commonly happen in white feet, with weak low heels; but they are too common in feet of all colours. They are occasioned by the pressure of the heel of the shoe, either by its bearing directly on the sole when it is too thin to bear the pressure, or by its forcing the heel of the crust inwards. In this way the sensible sole is bruised, the small blood-vessels ruptured, and the blood penetrates into the pores of the horn, causing the dark red appearance observable on removing the shoe, and scraping off the surface of the sole at the part marked *d d*, fig. 1. page 336. This bruised part is exceedingly tender, and incapable of bearing the pressure of the shoe, and so are the crust and bar on each side of it.

In the *treatment* of this complaint, therefore, all the parts must be so cut down, crust, bar, and sole, situated behind and on each side the part marked *d*, fig. 1. page 336., that when a bar shoe is applied, it may be full half an inch distant from the heel. In this way a horse will be able to do his work, provided the shoe is removed, and the heel pared down as often as is necessary, and a little caustic, such as buttyr of antimony, applied with a feather. As in this case the frog will be constantly receiving considerable pressure from the bar shoe, it is necessary to take care that the heels are not too thick and inflexible, in which case it is necessary to rasp them; and whenever there is a morbid degree of heat in the feet, or dryness, they should be kept constantly moist and cool in the stable, either by poultice, or by several folds of old woollen wrapped round the coronet, and kept constantly wet. The common practice of paring *out* the corn, and leaving the bar and crust to be in contact with the heel of the shoe is doing no good; nor would it afford even temporary relief, if the shoe were not bent up, or made to bear off that quarter a little, as they term it; yet, after riding a few miles, the shoe is sure to yield to the horse's weight, and bear upon the tender heel. It is thus that corns are made so troublesome as we find them, and many horses are rendered nearly unserviceable, or absolutely ruined, by this improper treatment. Matter is often formed within the heel from this sort of management, and breaks out at the coronet, frequently doing great

mischief, and even rendering a horse useless. When corns have been suffered to go this length, the foot must be poulticed, and all the hollow horn cut away. After the inflammation has been thus completely subdued, the sensible parts which have been laid bare may be dressed with Friar's balsam, and the tar ointment, or with a solution of sulphate of zinc. The radical cure of corns is always practicable if taken early; but in old cases, the sensible parts will always remain in a tender state, however carefully they may be treated, and will always require the defence of the bar shoe, applied as I have described. A run at grass *without shoes* is a great relief to a horse with corns, provided the tender heel is cut down as I have described, and the heel and quarter rasped very thin. When a radical cure is attempted, this is the most likely means of effecting it.

Sand Crack.

This is an accident that happens to dry brittle hoofs, and is, in fact, a breaking or fracture of the horn in the weakest part; that is, at the upper part of the inner quarter of the fore feet, and the front part of the hind feet. A sand crack almost always extends to the sensible parts, and can seldom be cured if the horse is kept in work. The first thing to be done is to open the crack with a drawing knife, for it generally runs obliquely under the horn, and cut out every hollow part completely, however far it may extend under the crust. Every particle of horn that is hollow, or detached from the sensible parts, must be completely cut away, and the bar shoe applied eased off the affected heel and quarter.

When a little sound horn is grown from the coronet, a line should be drawn transversely between it and the crack with a firing iron; and as the hoof grows down, the crack will disappear. A strap, however, should be applied round the hoof for some time, so as to prevent too much motion in the foot. A little blister ointment just above the crack often does good, and tar ointment on the crack on the adjacent horn. Observe, too, that the quarter where the crack is must be rasped away as thin as possible. In this way, sand cracks may be always cured without difficulty. The brittle state of the hoof, however, must be corrected, by anointing the foot with the tar ointment; this will be absorbed through the horn, and stimulate the secreting vessels.

False Quarter.

When the coronary ligament has been much injured by quitters, treads, or other contused wounds, it sometimes forms horn

of a lighter colour than the rest of the hoof, and less perfect, often leaving a fissure or seam from the top to the bottom. Sometimes the whole quarter is imperfect, and incapable of bearing pressure; therefore, in such cases, a bar shoe is necessary, by means of which, when the false quarter is kept properly pared down, it will be at some distance from the surface of the shoe, and thus be always free from pressure.

Quittor.

This is a consequence of a contusion on the coronet of the worst kind. The injuries that a horse does himself in the stable by stepping accidentally on the coronet, or a little above or below it, are seldom so severe as to come under the denomination of quittor. It is almost always done in frosty slippery weather, when, in endeavouring to save themselves from falling sidewise, they step with dreadful violence on the foot that is sliding inwards, generally upon the coronet of the inside quarter. The injury is so considerable, that the cartilage, the extensor tendon, or the coffin bone, is always more or less injured. This is the cause of the obstinacy of the disorder. In the first place, it is necessary to find out with a probe the direction and extent of the sinuses or pipes; this being done, let some powdered sublimate be spread on some whity-brown paper that has been smeared with lard, and then let it be cut out in narrow slips; let these slips be folded up, and twisted into a point at the ends. One of these is to be first introduced carefully, and be forced, if possible, to the bottom of the sinus; and if not, as far as it can be forced with a strong probe. When this has been done, another slip is to be forced-in, in a similar manner, and so on, till the sinus is quite full. A piece of tow is then to be placed on the part, and bound down with tape or listing, so as to keep the dressing in. This dressing, in the course of four days, will have done its work; the bandage is to be removed, and then a slough or core will readily come out, and leave a large open sore, which will enable the operator to see the bottom of the injury; and then, if he dresses it daily *to the bottom*, with tents of lint dipped at first in a solution of blue vitriol, or buttyr of antiimony, afterwards in Friar's balsam, the wound will heal gradually, and the horse will be radically cured. [The objection to this severe method of treatment is, that a considerable portion of the lateral cartilage is destroyed, as well as the coronary substance, which secretes the crust; the consequence is, a false quarter frequently takes place. In the greater number of cases, the treatment recommended by Mr. Newport, V.S., will effect a cure. It consists in injecting a saturated solution of sulphate of zinc every twenty-four hours. I have found this treatment effectual in

many cases, taking care to poultice the foot also for several days.

In other more severe cases, I have found the insertion of setons attended with success, the setons being carried to the lower part of the sinuses, and brought out either at the heels, or between the bars and frog. See my Treatise on the Foot, &c.—ED.]

Thrush.

This is a disease of the frog, causing a discharge of matter from its division or cleft, not often productive of lameness, especially in the hind feet, where it is frequently a consequence of negligence in the groom, in permitting a horse to stand in his dung, or upon foul wet litter. This softens and rots the horny frog, the putrid and acrid fluids penetrate through the soaked and rotten horn, and inflame the sensible frog, causing it to discharge a fetid acrimonious matter, instead of secreting horn for its own defence, as it does in the healthy state.

Thrushes in the fore feet are sometimes occasioned by contraction of the heels, but more frequently by the horny box or hoof, considered altogether, becoming too thick, and consequently inelastic. The treatment of thrush must depend altogether upon the cause which produces it. When in the hind foot, and occasioned by filthiness, the cause must be removed, and then the disorder may cease; but this is not always the case, for the thrush sometimes has proceeded so far as to produce ulceration of the sensible frog, which then requires to be dressed with a solution of blue vitriol, or oxymel of verdigris. Before this is done, the cleft of the frog should be thoroughly cleansed to the bottom by means of tow; and if there is any ragged horn covering a diseased part, it should be completely removed. One of these dressings, when it is properly done, is sufficient for the cure. Some tar, or hoof ointment, may be applied, to promote the regeneration of horn, and to defend it from moisture. In cases where the frog has become very tender or rotten, I have found it necessary to apply a mixture of tar and sulphuric acid, which is made by adding one ounce, by weight, of sulphuric acid to one pound of melted tar, and stirring the mixture for some time. As to the thrush in the fore feet, when it is attended with heat of the parts, and contracted foot, the treatment is different: by attempting to stop it by those preparations which are usually employed, the lameness is often increased. The only thing to be done is to rasp the heels and quarters, thin the soles, cover the frog with tar ointment, and wrap the foot in an emollient poultice; in slight cases, complete and permanent relief will be thus afforded. Should the thrush continue after the hoof has been well soaked with the poultice, and especially if the

frog is very tender and rotten, apply the mixture of tar and sulphuric acid. In old thrushes, physic may be useful, and some alterative medicine. In bad cases, palliation only can be expected, unless a new hoof be obtained of a better kind, by rasping the quarters and thinning the sole, until spots of blood appear; and then, after stopping the feet with tar ointment, turning the horse to grass.

Thrushes may happen in the fore feet merely from filthiness, and may then be cured as they are in the hind feet.

The third kind of thrush I have to describe is not so common as the two former, and is no other than incipient canker. It may always be cured by removing from the frog every bit of horn that is detached from the sensible frog, and by which a diseased part may be concealed, and then applying to the affected part a saturated solution of blue vitriol, or tar ointment, with sulphuric acid. Cleanliness must be carefully attended to; and when the disease of the frog has been cured, tar or hoof ointment may be employed to promote the regeneration of horn.

Canker.

This is an obstinate, and often incurable, disorder of the foot, generally beginning in the frog, and spreading from thence to the other parts, even to the coffin bone. It is often a consequence of neglected thrush, or grease, but sometimes comes on without any apparent cause, and most commonly in one or two feet, but sometimes it attacks both the fore and hind feet at the same time. I have now two cases under my care. In one, the near fore foot is principally affected; the off fore and near hind foot slightly.

The first animal is a fine saddle horse, and the disorder seems to proceed from the horse standing idle in the stable upon litter, and upon good keep. The latter is a waggon horse that has been worked rather hard, and kept upon oats, chaff, and beans, with a small portion of grains, and as much hay as he likes to eat. The saddle horse is nearly cured. The waggon horse appears better; still I fear that the disease in him will prove incurable. One thing is essential in the cure, and that is to remove carefully every bit of horn by which a diseased part may be concealed: this must be done at every examination, and the foot must be carefully examined and carefully dressed every day. The treatment of canker and the probability of success, depend upon the length of time it has been standing. When taken in hand at an early period, and before it has extended beyond the frog, a daily dressing of a strong solution of blue vitriol, and a stopping of melted tar ointment, or the mixture of tar and sulphuric acid (one ounce of acid to one

pound of tar), may be sufficient to effect a cure. Should this fail of bringing on a healthy appearance, let some buttyr of antimony be applied, or add to two ounces of the solution of blue vitriol ten drops of sulphuric acid. A solution of blue vitriol in vinegar may be tried. Whatever caustic may be found necessary for the cure of canker, some preparation of tar is useful in promoting the reproduction of horn*; pressure on the diseased parts is conducive to the cure, and may be applied by means of tow dipped in the melted tar ointment, or tar and sulphuric acid, and kept in by transverse slips of wood, or splints as they are termed, confined under the shoe. It would be difficult to enumerate all the remedies or means that have been employed for the cure of canker, and most commonly without success: for the disease after some time appears to penetrate to the ligaments, cartilages, and bones; and those who have been most successful have been, in general, most free in the use of the drawing knife and caustic. In two bad cases that I have seen *cured*, after a considerable time and much labour, the horses were afterwards irremediably lame. Mr. Leigh, Veterinary Surgeon of Bristol, had a carriage horse under his care with a canker in the hind foot. After a little time the horse became so troublesome that it was found almost impossible to dress him, and pare out the foot properly. He therefore, threw him down and performed the nerve operation upon the leg; after which the foot was dressed without resistance, and the canker soon got well. When I heard of this case, the horse had been in work four years after the operation.† The only caustic I have not seen tried in canker is arsenic, or some preparation of that poisonous mineral: I have known it applied with success in fistula of the withers and poll-evil, also for the removal of warts, still I should be afraid to apply it in canker, as its destructive influence cannot be limited. I have seen the actual cantery applied, and, I think, with good effect; also oil of vitriol, nitrous acid, corrosive sublimate, quicklime, tar and sulphuric acid nearly boiling hot, quicksilver, or red precipitate, dissolved in nitrous acid, and many other caustic preparations. A mixture of corrosive sublimate, blue vitriol, and prepared

* An excellent application in this disease is formed by nitric acid, verdigris, and Barbadoes tar.—ED.

† The advantage afforded by this operation is not simply the convenience of dressing the foot, but also that it enables the animal to bear freely on the diseased parts, pressure being of the greatest service. The operation is, therefore, very useful in bad cases. It is, indeed, by pressure, caustic, and the knife that a cure is effected. It must, however, be borne in mind that in this disease the pressure may be too great instead of too little, in which case formidable inflammation may supervene in the joints, and the navicular bone may ulcerate with the flexor tendon, a result which I have known to follow the operation of neurotomy in canker, and which is more likely to occur if the operation is performed than if not.—ED.

chalk, has done good; also a solution of sublimate in tincture of myrrh, or spirit of wine.* At every time of dressing, the spongy surface should be scraped off; and, if any horn remain of the sole and bars, it should be carefully examined in order to discover whether the disease is creeping under it or not; if there is even a suspicion of its being so, the horn must be completely removed, and the diseased part dressed. If, upon a careful examination with a probe, the coffin bone be found carious, it must be freely scraped with a drawing knife, and whatever part there may be in the way so as to impede this operation, must be removed. Sometimes the disease spreads under the wall or crust, and then generally affects the coffin bone. In this direction also it must be scrupulously followed with the drawing knife. It often happens after a great deal of time and labour has been bestowed on this disease, that the practitioner is unexpectedly defeated by suffering the disease to creep gradually under the horn of the bars, sole, or crust. In the case I have now under my care, in which all four feet are cankerous, I have told the farrier who attends, that unless he dresses the feet daily, and observes carefully the directions I have given with regard to paring the feet previously to every dressing, whatever time it may require, his labour will certainly be in vain, and he may as well do nothing.†

It is not unlikely that canker, when of long standing, is, in some degree, a constitutional disease; and, in this case, it may be useful to turn the horse into a dry field or paddock, or, at all events, to keep him on green food.

[It must be acknowledged that there are some cases of so long a standing and so inveterate, that the cure is altogether hopeless, and should not be attempted unless the horse is very valuable. — Ed.]

Laminitis, or Founder

“Is, as its name implies, an inflammation of the sensible laminæ of the foot, as well as the elastic and very vascular substance that connects them with the horny laminæ and the coffin bone. It is a disease, compared with other lesions of the foot, of somewhat rare occurrence; but it most frequently attacks horses whose crust and laminæ are weak, and very obliquely placed. We meet with two varieties of laminitis, the acute and the chronic or sub-acute.

“The *Symptoms* of this disease are a quick and generally a full pulse, accelerated respiration, the feet and coronets hot, and

* Quicklime and chloride of lime have been used with advantage. — Ed.

† This horse is now sufficiently recovered to return to his work.

the horse almost constantly lying down. It is with difficulty that he can be induced to stand or move, and when he does, his hind feet are placed as much as possible under the body, and the fore ones stretched out, the animal resting almost entirely on his heels: the feet and coronets feel very hot. The hind feet may be involved as well as the fore ones, but the latter are more frequently alone affected, the proportion of weight supported by them being so much greater.

“The causes are — first, long-continued and rapid exertion on the hard road during the summer months; secondly, confinement in a standing posture, for a long period, as on board transports; and, thirdly, metastasis.

“That the first cause should produce the disease is an object of less surprise than that it does not more frequently induce it, when we consider that the effect of shoeing is to make the crust and laminæ support the whole weight of the animal whilst travelling on the road.

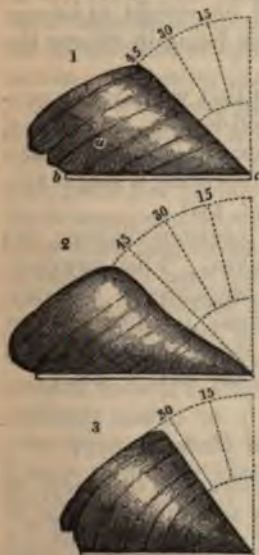
“Some curious cases are on record of horses becoming affected by this disease on board transports, from being unable to lie down. By constantly standing in one position, the elastic connections of the laminæ are put continually on the stretch, more particularly if the shoes are on; and this constant action, though not carried to its greatest extent, is yet much more fatiguing than when the natural functions of alternate elongation and contraction are permitted. The third cause to which we have alluded is, perhaps, a more frequent one than either of the others. After a horse has been labouring for a while under inflammation of the lungs, or the muscles of the chest, it is by no means unfrequent for the disease to leave the part originally affected, and to attack the feet — to fall down into the feet as it is vulgarly supposed. This metastasis is a very singular phenomenon of nature, and one which cannot easily be explained. When laminitis is thus produced, it is usually less acute than when induced by the other causes we have mentioned; but although less acute, it is more obstinate in its character, and more likely to produce permanent disorganisation of the foot.

Treatment. — The shoes being removed, the feet should be pared out, and a large quantity of blood abstracted from the toe, taking care that the artery itself is opened, and not merely the vein. We cannot well take too much blood from the feet; if both are affected, four or five quarts of blood will not be too much from each foot. “To promote the flow of blood, it is well to immerse the foot in a pail of warm water during the bleeding. If the horse cannot be made to stand upon one leg long enough for the performance of the operation, we should bleed from the coronet, putting the feet in a warm bath immediately afterwards, and, if sufficient blood cannot be procured from the coronet, we

should take an additional quantity from the plate veins. A dose of physic should be given as soon as possible, and followed by febrifuge medicine. Unless the urgency of the symptoms is considerably remitted by the following day, the bleeding should be repeated. The poultices should be continued for several days together with the warm fomentations, and should then be succeeded by cold applications, applied by means of cloths tied round the pasterns, and made to fall closely over and around the crust. The refrigerating lotion recommended for strains will be found very useful at this stage of the disease.

“ After this treatment has been practised for about a week, we

shall find it advantageous to blister the coronet, taking care to foment the parts about twelve hours after the application of the blister, which, by this method, may be repeated in a few days. Should the treatment be neglected at first, or not sufficiently energetic, and, in some cases, even in spite of all we may do, disorganisation will take place; the elastic connections of the laminae will give way, at any rate will be unable to oppose the action of the flexor tendon, which thus, having no antagonist, draws the toe of the coffin bone downwards and backwards, and away from the crust, and the sole, at the same time, becomes convex: and thus we find in morbid specimens of this disease a considerable space between the toe of the coffin bone and the crust, the bone becoming preternaturally upright, and the crust more oblique, this space being filled up by a morbid deposition, the nature of which appears somewhat between horn and bone. When this is the case, the horse is rendered almost useless, fit only for slow work on soft ground, where the frog and bars can assist in supporting the animal's weight.



Three side views of the Hoof, showing the different degrees of obliquity in its form.

Fig. 1. A side view of the sound hoof, with a scale, showing the proper degree of obliquity to be 45 degrees of elevation; a, the quarter; b, the heel; c, the toe.

Fig. 2. Side view of the convex, or pumice foot, in which the hoof has lost its natural form, and approaches five degrees toward the horizontal line.

Fig. 3. A hoof approaching too nearly the perpendicular.

“ *Chronic Laminitis* is a disease very insidious in its approach, and the first symptoms being obscure, its effects are oftener destructive than the more active malady we have just noticed. In the latter, we can often knock down the disease with the first blow, by means of

extensive blood-letting; but in the former, disorganisation has probably commenced before we are called upon to combat the evil.

“The *symptoms*, I have said, are obscure: there is lameness, but it is by no means severe at first, and not sufficient to induce the animal to prefer the recumbent posture much more than common; he can generally relieve himself sufficiently by making greater use of his heels. The crust feels warm, and this warmth is constant, but it is often not palpably greater than in a state of health. The surest symptom to direct our judgment is the action of the animal: it is diametrically opposite to that in the navicular disease. He throws as much of his weight as he can on the posterior parts of the foot, his object being to relieve the front portion as much as possible.

“The *treatment* must be very similar to that we have recommended for the acute disease, namely, blood-letting, cataplasms, fomentation, and blisters; but it is necessary to resort much sooner to the last-mentioned prophylactic, repeating it frequently with short intervals.” — *Spooner on the Foot, &c.*

Pumiced feet are often the effect of the previous disease; the laminae give way and the sole becomes convex. This, however, may be produced naturally, or from the weakness of the horn and the weight of the animal. A cure cannot be obtained, but the case may be greatly palliated by bar shoes carefully seated out, and the application of tar ointment to the feet. — *Ed.]*

Chronic Lameness, Contracted Heels.

This is one of the most common and destructive disorders to which the horse is liable, and may almost be said to be peculiar to this country. According to M. Jauze, the number of foundered



A healthy Foot in an unpared state.
aa the frog, *bb* the bars, *ccc* the sole, *dd*
 the seat of corns.



A contracted Foot.

horses in this country, compared to those of France, is as ten to one; and this he attributes to our mode of shoeing. I believe he is perfectly right as to the proportion of foundered horses

between this country and France; but as to shoeing, it has little or nothing at all to do with it. It is entirely caused by the immoderate work that horses are made to do, and until this evil is corrected the number of such lamenesses will not diminish, whatever mode of shoeing may be employed.

I think it necessary, however, to observe in this place, that a great deal may be done for the relief of post and coach, and I may add waggon, horses, but more especially for the two former. They are generally shod in the most slovenly and injurious manner imaginable, and this not altogether from the fault of the smith, but of the proprietor; who, in endeavouring to get his work done as cheap as he can, is not aware that he is causing his horses to be crippled. Corns are very common among such horses, and instead of being properly managed, the horse is compelled to work with them as long as he is able to stand. Their feet are always in a state of inflammation, and no means are employed for relieving them. The low price at which the smith works will not permit him to do what is necessary to the feet. He is sometimes allowed, it is true, a compensation in attending them when they break out at the coronet from neglected corns, or become so lame from excessive inflammation in the laminated substance of the foot that they are unable to stand. He is then permitted, perhaps, to rub in some strain oils on the shoulder or fetlock joint; or he may be paid for bleeding now and then when a horse is too full of corn, or worked into a fever, and then suddenly cooled in a pond or river; or he may be allowed to give some cordials when a horse is exhausted by excessive labour. But it is better for a post-master to attend to a horses' feet himself, and pay the smith a fair price for his labour.

Chronic lameness may exist in various degrees, and in the early stages of the disorder a horse may do considerable work by paring his feet properly, and keeping them cool and moist; by paring the soles, putting on a wide hollow shoe, and keeping them stopped with tar ointment. By such management, the progress of the disease may be retarded, and the horse much relieved; but it can never be cured. Most commonly, the disease gradually gets worse, and at length the horse becomes unfit for every kind of work. At this period the horse is generally blistered or fired, and turned to grass. But this never does any good. Shoes with claws, or hinges and screws, have been proposed and employed with a view to open the heels, but of course they have never done any good, either in the way of prevention or cure. The hoof has been all rasped away, and the horse turned to grass until a new hoof has grown down of a proper form, but it has never done any good. That cruel operation of tearing off the sole, technically termed drawing the sole, was formerly practised for it, but is now, I trust, completely

discontinued. In short, every thing that human ingenuity can devise has been tried, but nothing has ever been found to cure this disorder. I believe, at this time, all veterinarians agree in the opinion of its being absolutely incurable.

A frequent cause of chronic lameness is a disease of the lowest synovial cavity, that is, where the tendon moves upon the navicular or nut bone. I have lately examined the feet of two horses affected with this kind of lameness. In one, a carriage horse that had been lame two or three years, I found the cavity quite dry and of a yellow colour, and on the surface of the nut bone there were many minute bony excrescences, about the size of millet seeds. In the second, a stage-coach horse that had been working in a crippled state for some time, I found the navicular synovial cavity in a similar state; but here the coffin joint also was diseased. There was one part of the articulating surface of the coffin bone, where the cartilage had been worn away, and appeared as an ulcer, and on the lower articulating surface of the small pastern there were three spots from which the cartilage had been worn.

[It has now been ascertained that the chronic disease here spoken of, which used to be attributed to the contraction of the foot, is almost invariably seated in the navicular joint, and that contraction alone, although it may be both a cause and effect of the other disease, does not, in itself, produce lameness. It is therefore termed the navicular disease. — ED.]

The Navicular Joint Lameness.

[The joint above mentioned is the seat of the greater number of obscure lamenesses of the fore extremity. But although so frequent, it was not till some years after the commencement of the present century, that the nature and situation of the lameness was discovered. Before this, the shoulders were invariably pitched upon as the seat of the disease by farriers, (and, indeed, this is pretty much the practice with them at the present day,) whilst veterinary surgeons considered that when the foot was contracted, this was the cause of the lameness, and when it was not, that the seat of mischief was the coffin joint. The great merit of pointing out the nature and seat of this before obscure disease is due to Mr. James Turner, of Regent Street, London, who has written various essays on the subject.

The *symptoms* are lameness, pointing or resting the affected foot, and sometimes contraction of the foot. The lameness is rarely perceptible in the walk, and is generally greatest at first, diminishing or disappearing from exercise. Its degree depends altogether on the severity of the case, being sometimes so severe

as to render the animal useless, and in other cases so slight, as scarcely to be perceived.

Pointing, or resting, is an almost invariable symptom; the foot is generally thrust in a straight line beyond the other, but sometimes only slightly extended.

Contraction of the foot is generally the consequence of the lameness, and is owing to the horse not bearing the same weight upon it as before. Sometimes, however, the lameness is preceded by contraction, particularly by contraction of an insidious kind.

The *nature* of this disease is peculiar, and has been brought to light by morbid dissections. Sometimes, it comes on suddenly, and then the injury, though severe, is more curable; but, generally, it is gradual and insidious in its approach, and is for some time preceded by pointing. In dissecting feet affected with this disease, we find it in various stages. In many, the sinew is found adhering to the bone, in which cases the action of the joint is obliterated; but the case may remain stationary for a long time. In others the cartilage is abraded, and partially absorbed, and little bony excrescences appear on the surface of the bone, or carious holes may penetrate its substance. In some instances of long continuance, the sinew is found exceedingly thin.

The *causes* of this disease are either predisposing or exciting. Long rest in the stable without exercise, the heat of the litter, and the confinement of the shoe, all predispose the joint to be injured by a sudden bruise, on the horse being suddenly taken from this state of rest to fast work on the hard road. The same causes, too, produce a morbid thickness of the horny sole, with some contraction of the hoof, whereby the navicular joint has a hard unyielding surface to rest on, instead of a soft cushion, and thus becomes more likely to have its synovial membrane bruised from concussion.

The *treatment* of this disease is not generally attended with success; if ulceration has commenced, we may relieve, but cannot cure. If the horse become suddenly lame, our chances of success are greater, as then inflammation alone may exist. The sole should be pared thin, the quarters rasped, the toe shortened, and three to five quarts of blood taken from the foot, by opening the artery at the toe. The foot should then be immersed in a linseed meal poultice, and so continued for a week, after which a frog seton may be inserted, and kept in for a month.

If after this treatment the horse is not considerably better, we may then despair of success, unless we have recourse to the nerve operation, by which we may remove the lameness, although we cannot eradicate the disease. — Ed.]

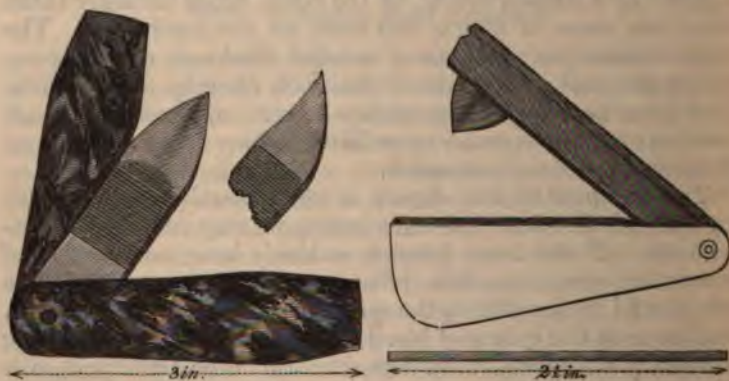
CHAP. LVII.

OPERATIONS.

Bleeding, and its Consequences.

THIS operation is frequently required in the diseases of horses; and if employed seasonably, and to a sufficient extent, is the most efficacious remedy we are acquainted with. When a horse appears dull and heavy, and indifferent about his food, by bleeding we often prevent a fever. If a horse is bled at the commencement of a cold, the complaint generally proves moderate, and of short continuance. In all cases of internal inflammation, or symptomatic fever, bleeding is the most essential remedy, provided the operation be performed at an early period, and the blood drawn in sufficient quantity. In such cases I have often taken away six quarts or more, and repeated the operation the same or the following day when it appeared necessary. By bleeding copiously at first, those formidable diseases are crushed at once; while by suffering them to proceed, or become at all violent, which they will do unless this practice is adopted (or if only a small quantity of blood is drawn), they generally prove fatal; nor will bleeding be of any service.

Bleeding is either general or local: that is, it is done either so as to affect the system in general, or a particular part only.



Lancets.

This lancet is usually employed for bleeding. The blade with concave edge is used for opening abscesses.

Improved Fleam.

This fleam, introduced by the Editor, is recommended as being very light and small, so as to be carried conveniently in the waistcoat pocket; the back is one fifth of an inch broad, so that it can be struck with the right hand, and requires no blood-stick.

For general bleeding, the jugular, or neck vein is most convenient.

The proper situation for bleeding is about four inches from the part where the vein divides into two branches. Farriers sometimes tie a cord round the neck in order to raise the vein; but this is unnecessary, and may do mischief.

When the jugular vein is firmly pressed with the fingers of the left hand, the blood is prevented from descending, and that part of the vein which is above the fingers is considerably distended, and becomes very conspicuous. In this state it may be easily opened with a lancet held in the right hand.* The vein will continue to bleed so long as the pressure below is continued.

Farriers bleed with a *fleam*, which, though apparently a clumsy method of operating, is certainly safer than the lancet in unskilful hands.† In topical bleeding, a vein is chosen as near as possible to the affected part, or the vessels covering the part are opened; in the inflammation of the eye, for example, it is done by scarifying the inner surface of the eyelid, or by opening a small vein, which is easily seen going from the inner corner of the eye towards the nose.‡

* In bleeding with a lancet, the off-side is most convenient. The head should be elevated so as to put the vein in some measure on the stretch, the flow of blood should then be stopped by the fingers of the left hand, and the lancet being held in the right hand between the finger and thumb, the vein should be opened by one incision, not two, as advised by some writers. It is necessary that the lancet should be very sharp, particularly at the point, otherwise the vein is apt to roll from the instrument. This, indeed, forms the principal objection to its use, for the thickness of the skin and the coat blunts the point after being used some time, and it then renders the operation difficult. — Ed.

† In bleeding with a *fleam*, the near side is most convenient. In skilful hands, there is no occasion for a bloodstick, as the *fleam* may be struck with the right hand if it is made broad and round at the back. It may also be made much smaller and neater than that generally employed. — Ed.

‡ The situations most favourable for local bleeding are the toe and coronet in both hind and fore feet; the inside of the arm and elbow joint in the fore leg, and the inside of the thigh in the hind; the angular or facial vein and the palate. A *fleam* is the most convenient instrument in bleeding, either from the arm or thigh, as the vein is very apt to roll when a lancet is used. In other places a lancet is preferable, except for the foot, where a sharp drawing knife is the most suitable and is less likely to occasion festering. In this situation the artery itself should be opened, which lies somewhat nearer the frog than the vein; the blood is readily stopped with a compress of tow. There is some difference of opinion as to the benefits of local bleeding, some denying its efficacy altogether. For my own part I am favourably inclined towards it if judiciously practised, and have, in many cases, witnessed its good effects. It should, however, be borne in mind, that it is of very little service to abstract a pound or two of blood locally if the system is in a plethoric state, unless we relieve this plethora, for the inflamed part will very soon be loaded with blood again. In such a case we should first have recourse to general bleeding so as to reduce the system, and then having, in great measure,

A graduated tin vessel, capable of containing six or seven quarts, is very convenient for the purpose of receiving the blood, every pint being marked on the inside of the vessel, so that the quantity of blood drawn may be exactly known. The blood should always be preserved, that we may judge from its appearance of the nature of the disease, and whether it is proper or not to repeat the operation. When it continues fluid a considerable time, it denotes an inflammatory state of the system. Should a whitish or light buff-coloured jelly appear on its surface, after it has coagulated or settled, and should this jelly be of considerable thickness, rather firm, not easily penetrated by the finger, we may be satisfied that the horse's complaint is inflammatory, that bleeding was a proper remedy, and that if the symptoms continue, the operation may be repeated with advantage; but if the blood coagulates quickly, is uniformly of a dark liver colour, loose, and easily broken, with a considerable quantity of water upon its surface, it denotes debility, and shows that the disease arises from a weakness of the system; that, instead of *bleeding*, *tonic* and *cordial* medicines are to be employed, with every thing that may tend to restore the animal's strength.

In order to judge correctly by the appearance of the blood, it should be drawn from a large orifice, and not suffered to run down the sides of the vessel which receives it, and should be put aside for examination, and not shaken or disturbed in any way, until it has perfectly coagulated.*

stopped the supply, we may employ topical bleeding with advantage. It is for want of attending to this that local bleeding has, in some instances, been held in disrepute. In those situations where a large quantity of blood can be abstracted locally, general bleeding is, of course, most required. To relieve local inflammation we should, if possible, either bleed from the gorged vessels themselves, or from a vein proceeding from them, or from an artery going to the inflamed part. Farriers will bleed in the thigh veins for an inflammation of the kidneys, which is ridiculous and absurd as a topical remedy. For inflammation of the brain great benefit has been obtained from opening the temporal arteries. Now these vessels do not supply the brain it is true, but by opening them an artificial drain is made, through which much of the blood escapes that would otherwise have gone to the brain, besides which a large quantity of blood is abstracted in a short time, when, perhaps, it would have been difficult to have bled from the neck at all, owing to the violence of the animal. The benefit of topical bleeding is duly appreciated in human surgery, where, by means of cupping and leeches, it is very frequently practised. By such means enteritis and pleurisy have been quickly alleviated in numerous instances. I have known a person suffering most acutely from the former disease relieved from acute pain in a few minutes, by cupping as near the seat of pain as possible. We cannot very conveniently employ cupping in the horse, but may often obtain much benefit from scarifying with a lancet — dry cupping as it is termed. — Ed.

* We must be cautious in not placing too much reliance on the appearance of the blood. Connected with other symptoms it will prove very serviceable, but taken alone it is likely to deceive. — Ed.

When bleeding is employed as a preventive, or in any slight complaints, from two to three quarts of blood may be taken away, according to the horse's strength and condition; but in cases of internal inflammation or fever, a more copious evacuation is necessary.

The quantity of blood generally drawn in inflammatory disorders is too small. It should always be carried so far as to weaken the pulse. Two gallons may sometimes be necessary to produce this effect; and in mad staggers, I have seen four gallons taken off in the course of an hour with the best effect.

When horses are taken from camp or grass, and put into warm stables, they are very subject to inflammatory complaints and dangerous fevers; under these circumstances, moderate bleeding now and then will prevent such diseases. Horses that are getting into condition, as it is termed, are liable to similar disorders, unless moderate bleeding be occasionally employed. I am inclined to believe, however, that it is a bad practice to bleed often upon trifling occasions; it is liable to induce plethora or fulness of habit, whereby a horse is rendered more susceptible of disease than he would otherwise be.* Moderate purging and regular exercise, with a proper regulation of diet and temperature, are fully adequate to the prevention of disease on those occasions; but these are too often neglected.

It has been asserted, that it is seldom necessary to pin up the orifice, which is made in the skin by bleeding. I grant there is not often any danger to be apprehended from its bleeding again; but unless it be pinned up, that is, unless the lips of the wound be brought into contact, and kept in that situation, by passing a pin through the edges of the skin, and twisting a little tow round it, as is generally done, inflammation and swelling will sometimes take place in the wound, and matter will form in consequence.

[In pinning up, the edges of the skin should be brought intimately together, and care should be taken that no hair insinuates between them. The skin should be drawn from the vein as little as possible, and the pin should not be too large. For want of attending to these precautions, those disfigurements are produced which we often perceive in the necks of horses that have been bled.

Sometimes, after bleeding, the part swells considerably from blood escaping from the vein, and diffusing itself under the skin. The best applications, in these cases, is cold water, which should

* Mr. Taplin's story is a very instructive one. He tells us, a coachman requested his master to let him have the horse bled and physicked, because they had been upon high feed, and had had but little work: he was permitted to have it done provided he would submit to the same operations himself, as there was exactly the same reason for it; but told to avoid the expense for the future, by using less food or more exercise.

be frequently applied, the horse's head being tied to the rack, as he always ought to be after bleeding from the neck, for one or two hours. With this treatment the swelling will commonly subside, but sometimes it terminates in an

Inflamed Vein.

This is a very troublesome complaint, requiring a considerable display of that patience, of which, very frequently, the owner has none to spare. It may commence with a swelling just after the bleeding; but generally the first appearance is a little swelling, and a few days afterwards a separation of the lips of the wound, and a little acrid fluid oozing from it. In slight cases, matter may form external to the vein, and the part soon gets well, the vein itself not being much affected. More frequently, however, a considerable swelling takes place, the vein above the wound feels hard, and the parotid gland is greatly enlarged. This denotes a stoppage in the passage of the blood, which therefore becomes stagnant, and chokes up the vessels passing through the gland. When this occurs, the vein will unquestionably be lost. Sometimes there is considerable hæmorrhage from the vein, which is stopped with some difficulty.

Treatment. — If there be considerable swelling, and some heat, the best plan is to foment with warm water the first day, and keep the swelling wet with cold lotion for a day or two afterwards; by so doing, we get rid of a good deal of superficial enlargement, although the principal swelling still remains. We should next blister the enlargement, either by a strong application at once, which may be washed off the second day and repeated, or by frequent mild blisters in a liquid form. The horse should be tied up to the rack as much as possible, so as to prevent the head from being held in a depending position. The diet should consist principally of mashes; hay should be avoided, as it requires so much mastication; the action of the jaws forcing the blood towards the jugular veins, and thus increasing the swelling. A mild dose of physic should be given, and a little nitre subsequently. This simple mode of treatment I have found effectual in every case (a vast number) in which it has been employed. The vein is generally lost; but in the course of a month the swelling is in great measure absorbed; the blood finds other channels, and the horse is fit for the saddle, and a few weeks afterwards for harness. I deprecate the practice of using caustic injections, not only because they are uncalled for, but also because they are dangerous; they have, in a few instances, entered the vein and caused death. I have experienced no difficulty in healing the sinuses when they have formed, merely by pressing out the matter and applying the blister as before observed; and

if matter forms at another spot and points it should merely be opened with a lancet; but the knife should be used sparingly, and setons should be avoided, as well as the plan of dissecting out the diseased vein or its contents. In some instances, there is considerable hæmorrhage; when this is the case, a little caustic powder should be applied to the lips of the wound, such as sulphate of copper; and the horse's head being tied up, he should be kept from feeding for twelve hours. This plan will generally succeed in stopping the bleeding; but if not, the orifice must be pinned up, or, if necessary, two small pins may be inserted, and tow wound round each.

If the parotid gland continues enlarged, a little iodine ointment may be rubbed in daily several times. I have not found any inconvenience from turning horses to grass subsequent to the loss of a vein; the principal evil is the circumstance that we cannot bleed on the side the vein is lost.

The proximate causes of inflamed vein are very obscure. Bleeding with a rusty instrument, striking too hard, cutting through or across the vein, badly pinning up, neglecting to tie up the head, rubbing the neck afterwards, have all been considered as causes: but it has been found that, when these supposed agents have been purposely tried, they have failed in producing an inflamed vein; whilst it has occurred when the operation has been properly performed, and every precaution exercised. It must, however, be confessed that it occurs much more frequently when the operation is performed in a bungling manner, and proper means neglected afterwards. It may, however, depend, in some measure, on the state of the atmosphere; for, at some periods, the disease is much more frequent than at others; and it may also be influenced by the constitution of the animal. It has been a matter of surprise that the swelling should almost invariably extend towards the head in inflamed jugular vein; but this is produced by the blood being rendered stagnant at this part, and not below; the inflammation probably does not extend more in one direction than the other; but as soon as it is sufficient to produce a stoppage in the vein, it of course occasions it to swell above. — ED.]

Physic.

The usual period for physicking horses is at the time or soon after they are taken up from grass, or the straw yard, and when they are getting into condition by suitable feeding and exercise: three doses are generally thought necessary.* There is no

* The immediate effects of purgative medicine are a determination of blood to the intestines, and the removal of a portion of its watery part with

foundation, I believe, for this opinion: for when horses are brought gradually from green food and the open air into a stable diet and temperature, they bear the change very well. It is not often, however, that horses have all the care and attention paid them that are necessary on such occasions, and therefore two or three doses of mild physic generally do good; probably preventing illness and promoting condition. Physic is useful when a horse appears heavy and feeds badly, and especially if the eyes and mouth are of a yellowish colour. A horse should be kept chiefly on bran mashes for one, two, or three days before he takes physic.* The ball should be given him after fasting a few hours, and no food should be given till two hours after he has taken the physic. He should then have a bran mash and a little warm water, and in the afternoon another and some warm water. In the evening another bran mash and one or two pounds of hay, with a little warm water. Next morning, the horse should be exercised with clothing according to the season and weather; and on his return from exercise he should have some warm water and a bran mash. The physic will now begin to work, and its operation must be promoted by a repetition of the exercise†, warm water, and mash. About the afternoon, a little hay may be given, and some warm water. In the evening a mash and warm water; at night a little hay. The following morning a small quantity of oats may be given: still the water must have the chill taken off, and only a small quantity of hay should be given. The horse may, on the fourth day, be brought to his usual diet. There should be an interval of a week before another dose is given. When a horse is weak, or low in flesh, a handful or two of ground malt or ground oats may be put into each mash. When the physic makes a horse sick, and does not operate at the usual time, that is, the morning after it is given, and especially if he appears griped or in pain, throw up a clyster, and give him a little exercise, which will make the physic work and relieve him. If the physic works too violently, or continues its operation too long, it must not be hastily checked by astringents or cordials; but by giving arrow-root gruel now and then; and if arrow-root cannot be had, some fine wheat

the feces. It also cleans out the intestines, and thus removes unhealthy secretions. By the first purpose it lessens inflammation, and by the two latter it removes superfluous fat and improves the digestive organs, and thereby promotes condition. — Ed.

* By keeping the horse two or more days on mashes, a lesser dose will be required and the same effect produced with less irritation. The mashes before physic should be cold, as the horse is then not so likely to sicken and refuse the warm mashes which are necessary after the dose has been given. — Ed.

† The degree of exercise should depend on the operation of the physic: if it operates very little the horse may be trotted, but if it operates freely little or no exercise is required. — Ed.

flour must be substituted for it. This will almost always be found to be effectual; but should it prove otherwise, give a teaspoonful or two of tincture of opium in a little warm water.*

The strength and composition of physic will be found in the *Materia Medica*.

Clysters.

This useful and innocent mode of exhibiting medicine is too much neglected, and when employed is frequently done in a slovenly and ineffectual manner. The usual apparatus is a pewter pipe, about 14 inches long, and an inch in bore, to which a large pig's or bullock's bladder is firmly tied. The apparatus invented by Mr. Read affords, however, by far the best method of administering a clyster. Any quantity may thus be given, and with a moderate force only. An opening clyster is made by mixing a handful or two of salt with four or five quarts of warm water: to this a little hog's lard or sweet oil should be added. Linseed tea, or thin gruel, with a little treacle or sugar makes a good emollient clyster. And an anodyne or opiate clyster is made by dissolving from one to three or four drachms of crude opium in three or four pints of warm water. This last kind of clyster is employed in locked-jaw, especially when it is found impossible to give medicine by the mouth. In this case, nourishment must be given also in clysters. Nourishing clysters are made of broth, milk, rich gruel, and sugar. It was observed by Gibson, that when nourishing clysters are given in locked-jaw, they are sucked upwards by the bowels, and absorbed into the blood. He sustained a horse a considerable time in this way. I have seen clysters sucked as it were upwards after the pipe has been withdrawn, which is evinced by the rumbling noise made in the bowels soon after, and the plentiful discharge of dung, evidently from the colon. The stimulus of a saline clyster in flatulent colic seems to be propagated by the nerves of the bowels, throughout the whole almost of the alimentary canal.

Blisters.

Before a blister is applied the hair must be cut off from the part as closely as possible. The blistering ointment is then to be well rubbed into the part with the hand; and after this has been continued about ten minutes some of the ointment may be smeared on the part. In blistering the legs the tender part of the heel, under the fetlock joint, is to be avoided, and it may be better to rub a little hog's lard on it in order to defend it

* If the purging, however, should be excessive, we may treat the case as advised for diarrhoea.

from any of the blister that may accidentally run down from the leg. When the legs are blistered all the litter should be removed from the stall, and the horse's head should be carefully secured, to prevent his rubbing the blistered parts with his nose. On the third day he may have a cradle put about his neck, and be turned loose into a large box, or a paddock, or an orchard. In a field he would be apt to take too much exercise. About a week or ten days after the blister has been applied, the parts should be oiled with some mild oil, such as olive oil, or fresh made neat's foot oil. If flies are troublesome, and make the horse restless, they may be kept off by the tar ointment, or tar and train oil mixed.

[The formula for blisters will be found under that head in the *Materia Medica*. It will there be seen that cantharides forms the principal and indispensable ingredient, and that its effect is to produce considerable pain and irritation. The statements put forth therefore by the puffers of quack blistering ointments to the effect that their nostrums produce no irritation, and that no precaution need be exercised afterwards, are altogether fallacious, and calculated to do much mischief. The fact is, the greater number of horses will not rub or blemish themselves after any blister; but if one in ten will do so it is desirable to use precautions with the whole number. If, however, a very slight blister is used there will be no occasion to tie up the head, as the irritation will depend on the degree of vesication excited. — Ed.]

Rowels.

Rowels are seldom so convenient or so useful as setons. They are formed by making an incision in the skin where it is rather loose, as in the chest, about an inch in length. This being done the finger is to be introduced, or an instrument called a cornet, that is, the crooked end of a small horn made for the purpose, and the skin separated from the parts underneath all around for the space of about an inch. Into the cavity thus made a round piece of leather, with a hole in the middle, wrapped in tow and smeared with digestive ointment, is to be introduced. The orifice in the skin is then to be plugged up with tow, and kept there until suppuration takes place, that is, four or five days. The tow is then to be taken out, when a great deal of matter will flow from the orifice. The rowel is afterwards to be moved daily and kept clean.

Setons.

These consist of tape, threads, or lamp cotton passed under the skin, and smeared with digestive ointment.* The instrument employed for conveying these under the skin is named a seton needle, and may be purchased at the instrument makers. When lamp cotton is used it can be withdrawn gradually, thread by thread, which on some occasions is desirable. Setons are preferable to rowels, being more convenient and equally efficacious.

[The frog seton, recommended for the navicular disease, may be inserted through the heel, the horse being either thrown or in a standing posture. I generally insert it standing. The twitch being applied, the foot to be operated on must be held up by an assistant. I then plunge the curved seton needle into the heel, with a second effort bring the point out at the cleft of the frog, which has been previously thinned for the purpose, and by a third effort draw it through, after which knots are tied at each end of the tape, which may be rendered thicker by means of tow. When the horse is thrown it is more convenient to insert the seton in a contrary direction, viz. from below upwards. The seton should be kept clean, occasionally dressed, diminished in the course of three weeks, and removed a week or two afterwards.—ED.]

* Mr. Morton recommends the tape or cotton to be saturated with the following mixture:—
“One part of powdered cantharides is to be digested with a gentle heat for fourteen days in eight parts of oil of turpentine. The solution being filtered, an equal portion of Canada balsam is added. The tape or cotton to be drawn between the finger and thumb and dried.” When this is used digestive ointment is not required.—ED.



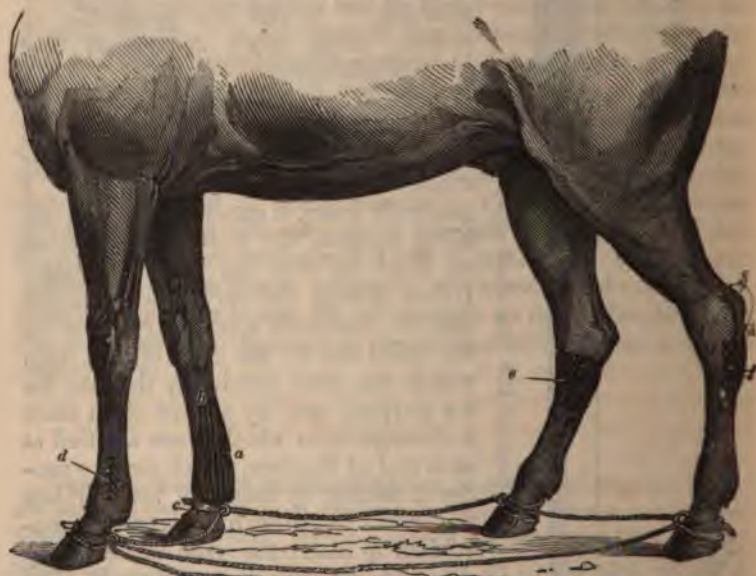
being filtered, an equal portion of Canada balsam is added. The tape or cotton to be drawn between the finger and thumb and dried.” When this is used digestive ointment is not required.—ED.

CHAP. LVIII.

OPERATIONS.

On casting or throwing down a horse in order to secure him for operations.

HORSES are thrown down by means of hobbles, all of which are represented below fixed on a horse's legs. The hobble is



The common hobbles, and the mode of fixing them; also the seat of several diseases, and the different methods of firing, &c.

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| <i>a</i> , Enlargement of the flexor tendons, and the vertical method of firing. | <i>e</i> , The seat of bone spavin, and a mode of firing for ditto. |
| <i>b</i> , The seat of splent. | <i>f</i> , A curb, and another, though not an advisable, method of firing. |
| <i>c</i> , The seat of ringbone. | <i>g</i> , The seat of capped hock. |
| <i>d</i> , The seat of enlargement of the suspensory ligament, and a mode of firing for ditto. | <i>h</i> , The seat of thorough pin. |

about two feet in length, two inches and five eighths in width, and about a quarter of an inch thick. It is formed by a strong piece of leather, about four feet in length, which, being doubled, has a strong iron buckle included at one end, and firmly sewed in. About four inches and a half further back, a large iron ring is to be sewed in the same manner for the purpose of

allowing a strong rope to pass through it easily. The ring, or rather the part so named, may be made straight where it is sewed into the leather, and the rest may be rounded. The remaining part of the leather is to be strongly sewed together, which will make the thickness of it what we have before described. Several holes are to be punched at this end of the hobble, to admit the tongue of the buckle when it is put round the horse's leg. On the under side of the hobble a piece of thinner and wider leather is to be fixed, extending from the part where the ring is attached to about half an inch beyond the extremity of the buckle; this is intended to prevent the latter from galling the horse's leg. The rope should be strong, not twisted tight, but made flexible, like a bell-rope, and about six yards in length. One end of the rope is to be firmly and permanently attached to the ring of one of the hobbles; and this hobble must be placed on the fore leg, opposite to the side on which the horse is to be thrown. If the hobble to which the rope is attached is placed on the left fore leg, the other end of the rope is to be passed first through the ring of that on the left hind leg, then through that on the right hind leg, next through that on the right fore leg, and lastly through the ring where the rope is attached, that is, the left fore leg hobble.*

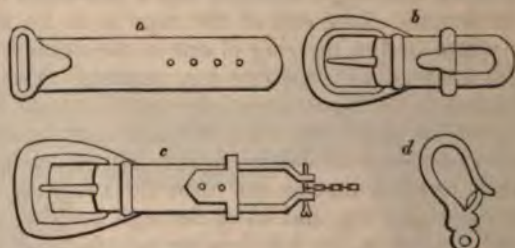
By this contrivance it will be readily seen that the legs of the horse may be drawn together, so that if pushed or forced towards the right side he must of necessity fall. Three men are generally required to pull the rope, in order to draw the legs together; and, to render this more easy, the hind legs should be placed under him as much as possible before any attempt is

* Mr. Gloag has very praiseworthy introduced, through the medium of the *Veterinarian*, some improved hobbles which possess all the advantages of those just mentioned, and are far more convenient. Each of his hobbles he advises to be furnished with a buckle, as well as with a D at each end, of unequal sizes, so that one can be passed through the other. Thus, by means of the buckle, the size of the hobble can be varied so as to suit different legs, as well as to unloose any that may be required during an operation, and the D's will enable each leg to be free the instant the screw is withdrawn.

Mr. Daws has still further improved these hobbles; and I cannot do better than introduce his description of them, as well as his drawings, which are given in the eleventh volume of the *Veterinarian*. He says:—"The alterations I have made are, first, in having the iron work a size larger, so as to admit of an easier passage for the chain, which, in my opinion, should not be more than eighteen inches long; the long D's should be an inch and a half wide, and two and a quarter inches long in the clear. The squares should be made sufficiently large to allow the others to pass through them with freedom. Each hobble should have a curved buckle, two inches in the clear, the leather of the same width, and not less than half an inch in thickness, and four inches long, with a galling leather under each buckle, and the long D attached to it by means of an iron chape and rivets. The strap end should not be less than eighteen inches long, with the square attached to it by the same means as above. Instead of the cottrell recommended by Mr. Gloag, I

made to pull the rope. The horse should have blinds, or have his eyes covered with a piece of rug, before the hobbles are put on: it may be necessary, also, to twitch him, and hold up the fore leg while the hind leg hobble is putting on. But the twitch must be removed before he is thrown, and not used unless absolutely necessary. The men who are to pull the rope should stand within two yards of the horse, as they then pull with double the force they would at a distance of four yards, their power then having a tendency to draw the legs off the ground

have found it more convenient to have one of the long D's made open at the curvature, and its end tapped for the screw, with its head downwards, as in the diagram.



- a, Strap-end; the square attached.
 b, Buckle and D attached.
 c, Buckle with open D. This would be improved and strengthened by the

two ends of the D being connected together by iron on the left of the screw.
 d, The hook.

“ This hobble I always place on the near fore leg, and it matters not which side the horse lies upon after the operation, as the thumb-screw is removed with more ease than from the cottrell. The hook for securing I have made with a spring; and there is no necessity for a small chain attached to it. These hobbles have been still further improved by Mr. Bowles, the long D's being placed on the long strap of two of the hobbles for the off fore and hind legs in the place of the squares, by which means the chain will pass easier and the buckles be on the outside.

“ From the description of these hobbles, it must be evident that they can be placed on the legs and removed with the greatest facility, and any leg that may be required can be unloosed by means of the buckle during the operation. Mr. Gloag advises the chain to be two and a half yards long, so that there may be no impediment to the passage through the D's by the place of junction between the rope and the chain. Mr. Daws, on the other hand, prefers one of eighteen inches only. It is a matter of little importance which plan is adopted.” — *Spooner on the Foot*.

Mr. Bowles has constructed a new set of hobbles, to which he has given the name of Cross Hobbles. They are for firing horses while standing, shoeing vicious animals, docking, and various other purposes, for which they will be found extremely useful. They consist of a neck collar, to which is attached a broad leather strap, passing between the fore legs. A surcingle is passed over the withers, embracing this strap, which reaches beyond the umbilicus; a D buckle is attached, with which are connected two chains about fourteen inches in length. These terminate in two D's to which leather straps are affixed for the purpose of buckling, either below or above the hocks, thus confining the animal. — *Veterinarian*, vol. xiii.

and upwards, which causes him to fall more quickly. One man should stand at the rump, on the left side, to push him when the legs are drawn up together; and another should hold him steadily by the head, standing in front of him; and as soon as the horse is down that man should throw himself on the neck, and incline the nose upward by lifting the halter; thus he can keep the head and neck down without difficulty.

M. Girard, in his *Traité du Pied*, has proposed an improvement in throwing horses, which is very simple, and should always be employed. If the horse is to be thrown on the right side, a long piece of web or a rope is to be fastened round the right fore arm, close up to the elbow. The other end is then to be passed over the withers, and held at a little distance by one or two men. The force which is applied in this way will cause the horse to fall more readily, and with more certainty, and exactly in the situation where he is required to be thrown. This contrivance, therefore, is extremely useful in confined places, where there is just room enough to throw a horse, and no more.* The horse being thrown down, and his legs closely drawn together, the end of the hobble rope is to be passed under the hobble rings, between the fore and hind legs, and secured with a hitch as it is termed, so that he cannot separate them again until the hobbles are unbuckled, and then they all may be taken away at once, and the horse suffered to get up.†

In letting the horse get up again the hobbles must be unbuckled cautiously, beginning with the under fore and hind one. These should be unbuckled gently, and not jerked, as that would cause the horse to struggle, and render it difficult to take them off, or the leg might get loose, and he may thus hurt one of the assistants who happens to be standing incautiously within the stroke of his fore or hind leg.‡ I have seen hobbles in which the tongues were moveable, so that by drawing them out with a pair of pincers the hobbles were all taken off at once.

In performing operations upon the horse it is not only necessary to throw him down as I have described, but in firing the outside of the fore leg, for example, in the pastern, the hobble must be taken off and the leg secured by means of a web passed

* A roller round the horse's body and a piece of web attached to its upper part is still better. One man, unless the horse is very heavy, is quite sufficient to pull this web. If hands are scarce the operator himself can pull the web; and he will then require only four other men to assist him in casting a horse, and two only after the horse is down. — Ed.

† This trouble is obviated by having a chain at one end of the rope to pass through the rings, and a hook at the other end of the rope, which, being inserted into one of the links of the chain, firmly secures it. — Ed.

‡ By the improved hobbles, all this trouble and danger is obviated; all that is necessary being to remove the screw which loosens all the hobbles at once. — Ed.

round the leg above the knee, and secured to the upper hind leg immediately above the hock, or it may be secured to the under fore leg; perhaps both these contrivances would be found useful in strong horses that struggle much. In firing the inside of the fore leg, that is, the under fore leg, nothing more is necessary than to take it out of the hobble, and draw it forwards by means of a web passed round the hoof or the pastern.*

Horses, however, have sufficient power to extend even the under fore leg considerably, unless a man lies on the shoulder, which should always be avoided. It is better to restrain the leg, by passing a web round it above the knee, and fastening the other end to the hind leg above the hock. If, then, the other three legs are drawn backward, by means of the hobble rope, the under fore leg will be sufficiently exposed for any operation that may be required. In firing the upper hind leg, in the pastern, it is necessary to take off the hobble; but the leg must first be secured by means of a web, fastened above the hock, and the other end brought forward, and, under a collar of web, passed round the neck, close to the shoulder. The leg may thus be effectually restrained; but, as an additional restraint, it may be tied also to the under hind leg.

In securing a horse for castration, he should be placed on his left side; the right hind leg should then have one web placed above the hock, and another above the pastern; both of these webs should then be passed under the collar, and the leg drawn up as far as possible, or until the hind foot is brought considerably beyond the fore leg. Here it must be firmly secured, for unless this is done, the operator will be in great danger. When the upper hind leg is thus secured, the testicles will be completely exposed. I have found it useful, also, in this operation, to make a man lie down on the horse's body, and grasp the hock and hind leg with his hands; this seems to confine the leg more completely.

Another method of hampering a horse is sometimes employed, but is far from being so safe or effectual as throwing him down. This is termed the side line. The rope hobble is buckled on one of the hind legs: the rope is then brought forward between the fore legs, and over the opposite shoulder; the end is then passed under the rope at the chest, and after draw-

* Instead of this web the cross straps are much more convenient and secure; they consist of four straps, one of which is buckled on each leg above the hocks and knees, and two of them are furnished with buckles and the others with straps that correspond to these buckles. Thus the legs of the animal are additionally secured, and the straps can be tightened or slackened as we please. When it is necessary to unbuckle a hobble, as in the nerve operation, and in firing the pasterns, a piece of web is slipped round the foot and drawn forwards, by which means the web pulling in one direction, and the straps in another, the leg is straightened and secured. — Ed.

ing up the leg sufficiently, it is secured in this situation with a hitch, which may be quickly loosened in case of the horse's struggling so as to be in danger of falling. This contrivance is rendered much more secure if the horse's head be firmly secured to a strong ring in the manger, and his hind parts supported by a breeching, while kicking and lying down may be prevented by a back and a belly strap.

There is a permanent contrivance for securing a horse in this way, named a break, or a trevis. I once knew a horse die by struggling in a break, therefore I consider them dangerous: they are chiefly used in nicking and docking horses, and in shoeing vicious animals. A plate, and description of a break, may be found in Bourgelat's "Essai sur les Appareils et sur les Bandages propres aux Quadrupèdes."

Another method is commonly employed in throwing down cattle. A long rope is doubled, and tied in a bow at the doubled end, of sufficient size to go over the animal's head, and rest at the bottom of his neck like a collar. The two ends, of equal length, are then to be brought down between the fore and hind legs, and one of the ends round each hind leg. The ends of the rope are now drawn forwards on both sides, by which the hind legs are so drawn up under the belly, that he is easily pushed down, and must then be secured.*

Firing.

[The principal object of this operation is to produce considerable superficial inflammation, and thus, by counter-irritation, to withdraw it from some deep-seated part. It also causes a

* In casting colts that have never been handled, and likewise some vicious horses, there is a difficulty, and sometimes an impossibility, in placing the hobbles on the hind legs. To obviate this, the colt may be thrown by a common cart rope, or, what is much better, by the following contrivance recommended by Messrs. Simonds and Wardle:—

"It consists of two ropes, to the end of one of which was sewed a leather strap with a buckle attached to it, and to the other another strap with holes pierced in it. At the distance of fifteen inches from these ends, the ropes were sewed together by strong waxed thread. When this point of union was placed under the neck, and the ends buckled together, the ropes formed a collar for the neck, and could be slackened or tightened at pleasure. To each side of this rope collar, and somewhat nearer to the point of union than to the buckle and strap, an iron ring was attached on each side, inclosed in a piece of roping.

These ropes, dividing under the neck, were passed between the legs and under the belly and round the hind legs on each side, and then brought forward outside the legs, and the extremities passed through the iron loops at the shoulder on each side. When every thing was ready, the ropes were gently lowered to the heels, and, running over the hollow of the heels, as a kind of pulley; the colt was brought down in an instant by a man on each side pulling at the portion which had passed through the ring."—Ed.

thickening, and contraction of the skin, and thus occasions, in some degree, a permanent bandage. It produces considerable pain, and leaves a blemish: it therefore should not be employed unnecessarily, but when had recourse to, it should be done effectually.

This operation is sometimes performed standing, but generally the horse is thrown. For curbs, ringbones, and whenever the surface to be fired is inconsiderable, and the animal is tolerably steady, we may fire standing, the horse being secured with the side line for the hind leg, and one foot held up, when the fore leg is operated on. A twitch should always be used. In other cases, the horse may be cast, which is the safest method, and the legs secured in the manner before stated.

The firing iron should have a smooth round edge, nearly as thin as the edge of an old shilling. The skin should never be penetrated; but the cuticle should be destroyed, and a dark brown impression left on the skin, from which there will be a glutinous exudation soon after the operation, when the iron has been properly applied. The hair should be cut off from the part previously to the operation, as closely as possible.

Messrs. Turners advise for many cases to fire quite through the skin, which they find far more effectual than the common method. The irritation, by this plan, is kept up much longer, and the benefit is greater, and it will no doubt succeed in removing lameness in many cases when the usual plan will altogether fail. It is liable, however, to considerable objection, on account of the long time necessary to keep the horse in the stable, and also from the great blemish it produces. To obviate these objections, and at the same time to derive the benefit of deep firing, I have been in the habit of penetrating the skin with a small pointed iron in numerous places, either on the fired lines or without them, according to the nature of the case. This plan I have found to create little or no blemish, and is yet attended with considerable advantage. A horse may or may not be blistered after firing, according to the degree of irritation we wish to produce. There is much difference of opinion as to the best direction for drawing the lines in firing, some preferring a vertical, others a horizontal, and some an oblique direction. The first plan is the best adapted for forming a bandage, the second for leaving little blemish; but for my own part, for ordinary purposes, I prefer the third or feathered form, conceiving that it unites the advantages of both allowing the hair to cover the mark, as in horizontal, and forming a bandage as in vertical, firing. It is a bad plan to cross the line, as this isolates the skin, and is thus likely to increase the blemish.—ED.]

Nicking.

This operation is now seldom performed: it consists in weakening or destroying the power of the flexor muscles of the tail. This is done by making two or three transverse incisions on the under part of the tail, through the skin and muscles. The horse should be thrown down for the purpose, or put into what is termed a break. The first incision should be about two or three inches from the origin or basis of the tail, continuing it from one of the sides where the hairy part terminates, to the other, and quite down to the bone, except in the centre, where the skin only should be divided. There are some, however, who go deeper than this, by which there is more bleeding. The second incision should be made in a similar manner, and three inches distant from the first, and so with the third. On making the second incision, the ends of the muscles will protrude through the first, and must be drawn out with forceps, and cut off; the same with the second. This being done, it is usual to place bandages round the incisions, and then put the tail in what is termed a pulley, which may be seen in the stables of horse-dealers, and need not be described. The weight first applied to keep the tail up should be moderate, not exceeding three pounds; and it is necessary the following morning to loosen the bandages, or cut them through on the back part of the tail. By neglecting this precaution, a serious and even fatal inflammation has taken place. In about three days matter will form, and then the bandages will fall off. They must on no account be forced off; but the loose ends may be cut off with scissors. A large gaping wound will then appear, but it requires no kind of dressing, and is generally completely filled up, and sometimes cicatrized in about sixteen days, or three weeks. About the third or fourth day after nicking, the weight employed to keep the tail up should be increased to six or seven pounds; and the transverse line upon which the pulley runs may be placed a little further back, so as to bring the tail a little over the back. After a week, the horse may be led out for exercise, and if he carries his tail on one side, the pulley on the transverse line should be so confined as to draw the tail in a contrary direction, for a sufficient time to make him carry it straight. The time of keeping the horse in the pulley is from three weeks to a month.

[This cruel and unnecessary operation has now gone into general disuse in England, though it is still practised in Ireland. — Ed.]

Docking.

A convenient instrument for docking, or cutting off a horse's tail, is sold by Mr. Long, and other veterinary instrument makers,

*Docking Knife.*

The semicircular notch receives the tail, which is held out by an assistant, and the operator pressing on the handle, by one motion divides the tail.

London. Colts may be docked even while suckers, as it generally renders nicking unnecessary. The tail should be divided at a joint, which may be ascertained from being somewhat thicker than the other parts. It is necessary to apply a hot iron afterwards to stop the bleeding, but it should only be of a dull red heat, and smaller than is generally employed, so as not to sear the skin, which is the most sensitive part.

On the Nerve Operation.

This operation was discovered by Mr. Sewell, Assistant Professor of the Veterinary College, and first communicated by him to the Royal Society.*

* " This operation is likewise known by the different appellations of nerving, unnerving, and neurotomy, and consists in the division and excision of a portion of the metacarpal or plantar nerves, thus destroying sensation in the foot. The nerves which arise from the spinal column have been found by the discoveries of Sir Charles Bell and others to have a double origin, one from the back, or, in brutes, upper part of the cord by a number of filaments which coalesce, and then form a sort of knot called a ganglion; the other portion rises in a somewhat similar manner from the under or anterior part of the spinal column, and joins the other without forming any ganglion. Thus though the nerves are apparently united, the filaments are yet distinct, each having its neurilema or nervous covering. The former is the nerve which communicates sensation; the latter that which conveys the power of motion, and a part is endowed mostly with sensation or with motion, according as the filaments of the former or of the latter predominate. It is a law of nature that no structure nor function is ever supplied in a situation where it cannot be brought into operation; consequently, as the motion of the limbs is effected by means of contraction of the muscles, and there are no muscles below the knee, there are therefore no motor nerves below the knee; sensation alone is cut off; and pain being the cause of lameness, the effect ceases with the removal of the cause.

The honour of the discovery of this important operation belongs to Pro-

It consists in cutting out a portion of the metacarpal or pastern nerves on each side. The portion cut out, he directs, should be one inch or more. I have generally performed the operation above the fetlock (see the Plate), in order to destroy



This plate of the *Nerve Operation* shows the situation of the section both in the upper and lower operation on the inside of the leg. The skin is held back by hooks, in order to display the parts, and for the same purpose more of the cellular membrane is removed than is necessary in the operation.

Upper Section.

- a, A probe passed under the nerve.
- b, The nerve.
- c, The artery.
- d, The back sinews, or flexor tendons.

Lower Section.

- a, The nerve.
- b, The artery.
- c, The vein.
- d, A branch of the nerve between the vein and artery, not divided in the lower operation.

fessor Sewell. We are told that Mr. Moorcroft and others had previously performed it, but, be this as it may, they never publicly introduced or recommended it, and could therefore have had no confidence in its merits. It was Mr. Sewell, and he alone, who first generally practised and recommended it for incurable foot lameness. Like most other discoveries it has met with assailants, from all quarters, both in the profession and out of it; and not a few of them have been owing to the careless and indiscriminate manner in which many practitioners have performed it, heedless altogether as to the nature and history of the case, or of the work the horse was afterwards to perform. This was the fact more particularly during the early days of the operation. There were goggy horses all over the country far more than there are at present, particularly in coaches. Many of these had been lame for years, and were at once submitted to the operation, and soon afterwards resumed their work at a quick pace on the road; the consequence was, in a

the sensibility of the foot entirely; but am inclined to think that the lower operation is preferable; and this, I believe, is the opinion of Mr. Coleman and Mr. Sewell.*

To perform the nerve operation so as to render the foot completely insensible, the following directions must be followed, as being the best and easiest method I am acquainted with, and

number of cases, the inflammation, that, perhaps, had never subsided, became vastly increased by the renewal of severe labour and the unusual boldness with which the animal put his foot to the ground and bore his weight upon it; swelling and morbid fomentations succeeded, or, in other instances, suppuration supervened, the hoof sloughed off, and the animal was obliged to be shot.

In other cases, where lameness has existed for years, and ulceration had been going on to a great extent, and the flexor sinew had become attenuated, the horse with the removal of pain and lameness, no longer having these often useful monitors to tell him of the consequences, treads boldly on these diseased parts, and the thin sinew which, perhaps, never would have given way as long as the foot possessed sensation, suddenly snaps like a thread, and the horse presents the sad aspect of walking entirely on his heels, the toe being elevated from the ground. Notwithstanding these deplorable results, which the practitioner should always bear in mind when he recommends the operation, in spite of their very frequent occurrence in times past, and their occasional recurrence at the present day, the operation still continues to be successfully practised, when performed with discretion, and proper care is exercised afterwards; and although it is vilified by a few veterinary surgeons, and often condemned by the ignorant as a cruel and barbarous operation inflicted on a dumb creature, yet I, for my own part, having fairly tested its merits, must regard it as one of the most merciful and humane operations that surgical science has ever invented for the relief of suffering quadrupeds.

— *Spooner on the Foot, &c.*

* There are two situations for the operation of neurotomy, the high and the low, the former being above the fetlock, and the latter just below or upon it. Each of these situations are attended with peculiar advantages and disadvantages, the nature of which it is well to understand. It must be borne in mind that each metacarpal nerve, just above the fetlock joint, gives off an important branch, which takes an oblique course towards the front of the pasterns and descends to the coronet, on which it is dispersed after giving off branches to the neighbouring parts. This being the case, it must be evident that if the operation be performed below the departure of this branch, the front of the foot and coronet will still possess a degree of feeling of much importance to the animal, and which will enable him to travel with a greater degree of safety than he would possess if sensation were entirely cut off.

When, therefore, we have reason to be pretty certain that the disease is limited entirely to the sphere of the navicular joint, and the horse is of sufficient value to make the possession of a slight degree of sensation an object of importance, we may justly give a preference to the low operation. In favour of this situation, it is proper to mention that Mr. Sewel generally advises and practises the low operation. On the other hand it must be observed, that, although the low operation generally removes the lameness at first, yet it is by no means unfrequent for it to return some weeks or months afterwards, either from the extension of the disease beyond the sphere of the joint and the dominion of the nerves whose source is cut off, or otherwise from some anastomosis of nerves which cannot easily be anatomically traced.

— *Spooner on the Foot, &c.*

uniformly producing the desired effect.* The incision should begin between three and four inches above the fetlock joint, that is, the most prominent part of the side of the joint, and extend downwards for an inch and a half. By making a free incision in the space that is felt between the bone and ligament, and the tendon, the nerve may be almost immediately exposed; and it is only necessary to remove a little cellular membrane, and then it will be distinctly seen: one inch or more of the nerve is usually cut out. Thus the foot may be rendered absolutely insensible, and the lameness cured, if a proper subject has been chosen for the operation. There are many circumstances to be considered with respect to the nerve operation, and it is a subject of such importance as to demand a full and impartial consideration. Before this operation is performed, all the circumstances of the case should be carefully inquired into, and practitioners should be cautious as to the subjects they select for the operation.† It has been a subject of admiration

* Before the operation is performed it is necessary, nay, all important, that the leg should be cool, not simply free from inflammation, but in a state of preternatural coldness. If the practitioner venture on the operation before this state is produced, he will have, at best, a very troublesome affair from the vascularity of the smaller blood-vessels; it will occupy a much longer time, and from the greater dissection of parts required, the wound will not granulate so well nor so quickly, but will leave a much greater blemish than otherwise; the leg for some days previously should be immersed in a bucket of cold water several times a day for half an hour at a time. — *Spooner on the Foot, &c.*

† The nature of the cases which justly call for the operation of neurotomy demands peculiar attention, as well as those from which we have the best reason to anticipate success.

Diseases of the navicular joint capsule form the bulk of foot lamenesses, and, consequently, those which too frequently, from their incurable nature, call for the aid of neurotomy. If the foot be strong, and there is but little contraction, the operation is more likely to succeed; but should there be a great deal of contraction there is danger of inflammatory action going on external to the joint, and enlargements of a soft spongy nature taking place. If the foot is flat and weak the operation is not to be recommended, as there is great danger to be apprehended from bruises and pricks in shoeing. And here it may be observed that great care should be always used in shoeing afterwards; the smith should be cautioned that the foot does not possess its usual sensibility, and that he must not expect the horse to flinch from the nail going too close; every nail must therefore be driven with unusual care. The operation is sometimes performed for ringbones and ossification of the cartilages. In these cases we must always suppose that other treatment has been previously tried without success; and we must bear in mind that from these ossific depositions there has been considerable loss of elasticity, and, consequently, great concussion; and that the operation is likely to increase this concussion, by preventing that care being taken which pain and lameness induces. This being the case the operation should not be performed unless the horse be too lame to be useful; and, after the operation, means should be used to ward off concussion by the interposition of leather between the foot and the shoe, and the employment of the horse in moderate work only. The operation should not be performed when there are corns, unless they are very

and astonishment, that although the nervous communication with the foot has been completely cut off, the secreting arteries, as they are termed, continue to perform their functions as well as before.*

In determining upon the expediency of performing the nerve operation, it is necessary to consider, not only what probability there is of its being successful, or in what degree it may be so, but likewise whether the chance of cure is equal to the expense of the operation, and that of keeping the horse before he is fit for work. The expense of keep need not be considerable; for after a few weeks, or even before, he may be turned to grass, where he should be kept two months; and then may be put to work. Now, if the expense of the operation and the expense of keep can be afforded, there can be no objection whatever to the operation. Relief from pain and lameness is, in almost all cases, immediate and certain; and the duration of this relief, if limited, may extend to a period of some months, or even years; and so complete is this relief, that during this period the horse may do considerable work without suffering pain.† But there are cases of lameness where the relief it affords is complete and permanent. These cases may be known by there being no deformity in the hoof, no ossifications about the coronet or

slight; because these corns are likely to increase and fester, without the animal testifying their existence by the exhibition of lameness.—*Spooner on the Foot, &c.*

* It was doubted when the operation was first introduced, and there are some who doubt it still, whether if nervous communication were cut off the proper secretion of parts could be carried on in the foot. The fact, however, is, there are a set of nerves which supply the various arteries of the body with nervous energy of a peculiar kind, and which are independent of those of common sensation, both in their nature, distribution, and course. Accordingly we find that the hoof and other parts of the foot are reproduced with the same energy after the operation as before; and even extensive wounds have been found to heal with equal felicity. We have here much pleasure in referring for further information to Mr. Youatt's beautiful lectures in the *Veterinarian*, where the separate functions of the nervous system are admirably enforced and clearly explained.—*Spooner on the Foot, &c.*

† We have here collected no less than sixty-three cases of the successful performance of neurotomy, nearly all of them being on horses that stood sound a considerable time afterwards, some of them being hunted, and others severely worked. Of these cases we find twenty-seven, in which it is not mentioned whether the operation was performed above or below the fetlock. There are eight cases of the low operation on one leg, and two in which it was thus practised on both legs. We have thirteen cases of the high operation, nine out of which are on one fore leg, two on both fore legs, one on one side of the leg only, and one on both legs, but one side of each. Besides which we have six cases in which it was performed on one or both hind legs. There are many other cases mentioned, though not related; and there are two instances in which the operation failed."—*Spooner on the Foot, &c.*

pastern, and no particular appearance of injury about the fetlock joints.

The horse being thrown down and secured, according to the directions given under that head, an incision is to be made through the skin, three inches above the most prominent part of the fetlock joint, when viewed sideways, and just within the flexor tendon, or back sinew, as represented in the plate of the nerve operation. The incision having been carried quite through the skin, the white cellular membrane will appear; this must be carefully lifted up with the forceps, and as carefully and gradually dissected off, and then the nerve will appear (as represented in the figure). As soon as the nerve is seen, a tenaculum, or a large crooked needle, armed with a little small twine, is to be passed under it, from within, outward, in order to avoid puncturing the artery; and, with the same view, the point of the needle may be blunted in the most trifling degree. A needle should be made for the purpose, not quite so crooked as they commonly are, and curved only towards its extremity. The needle then may be taken out, and the nerve being gently lifted up with the twine, the cellular membrane underneath may be snipped away with a pair of scissors, or with a knife, carefully, so as to admit of a slender curved bistoury being passed under it without touching the nerve with the edge; as soon as this is done, and the nerve cleared up to the highest part of the incision, the probe-pointed curved bistoury is to be passed under it at the highest part, and the nerve quickly divided by a drawing kind of a stroke. This is necessary that the nerve may be divided with as little violence as possible: for, when it is done with scissors, or by lifting the knife directly up, or with a knife that does not cut well, a thickening will remain at the upper extremity of the divided nerve, with considerable tenderness; and when this happens to be struck in going, it gives the horse intolerable pain, and makes him go lame for a short time. The nerve cannot be divided with too keen an instrument, or too gently. The division of the nerve causes great but momentary pain, like that of an electric shock, apparently, and the horse's struggling at that moment must be guarded against: but as soon as it is done, the pain of the operation may be considered as over: the inferior portion of nerve is then to be laid hold of by the forceps, and from an inch to an inch and a half cut out. The skin may be closed with one stitch, for no bandage or dressing is required. For the first four days, the leg should be sponged several times a day with tepid water; on the fifth the stitches will give way and the wound will open, but this must not be attended to. No kind of dressing is necessary; the wound will be completely healed in four weeks, and

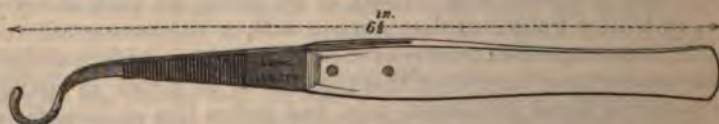
then, or even a week before this time, the horse may be turned to grass, and there he may be kept three weeks or longer.*

* The horse being cast by the method before advised with the leg to be operated upon uppermost, the cross straps are to be buckled on, the web applied to the foot just above the heels of the shoe, which being then released from the hobble is drawn forwards by an assistant, so that by the cross straps pulling in one direction and the web the other, the leg is brought perfectly straight. A truss of straw covered with a horse-cloth, or a bag stuffed with straw is then to be interposed under the leg to be operated on, so as to afford it a firm and secure resting-place; and a piece of tape may be tied tightly round the leg, just below the knee, so as to diminish sensation. The operator having all his instruments in readiness, will find it convenient to kneel on one knee. In a very well-bred horse the pulsation of the artery on the inside of the leg may be seen, and, in most horses, felt in the hollow between the flexor tendons and suspensory ligament. Having felt it, a free vertical incision is to be made, with a convex-edged scalpel, about two inches and a half above the fetlock joint, and slightly posterior to the artery. The incision by a second application of the knife is to be lengthened to about an inch and a quarter. A little cellular membrane may next be removed by means of the knife and forceps, so as to distinguish the artery from the nerve. The quantity of cellular membrane necessary to be removed will depend on the breed of the horse, and the state of the legs; if they are very clean, it is scarcely necessary to remove any; and the less taken away the better, and the sooner will the wound heal.



Nerving Knife.

This knife should be sharp on the point, and cut both on the concave and convex edges.



New Nerving Knife.

The point of this knife may be readily passed under the nerve, which may then be divided by its concave edge.

Having clearly made out the nerve and artery, a curved needle threaded is to be passed under the nerve at the upper part of the incision; the thread is then to be cut and twisted several times with the left hand, by which it is slightly drawn up, whilst it is separated from the artery and cellular membrane sufficiently for a probe pointed bistoury to be passed under it, which being done, the nerve is quickly divided, the pain of which induces the animal to struggle violently, but this struggle is generally the last he makes. The nerve is now to be carefully dissected out to the full extent of the incision.

The edges of the skin may or may not be connected with sutures, but the bandage should be applied, and the horse turned for the operation on the other side.

The inside of the leg requires more care than the outside, inasmuch as the nerve lies close to the artery in the former, and in the latter there is no artery

Castration.

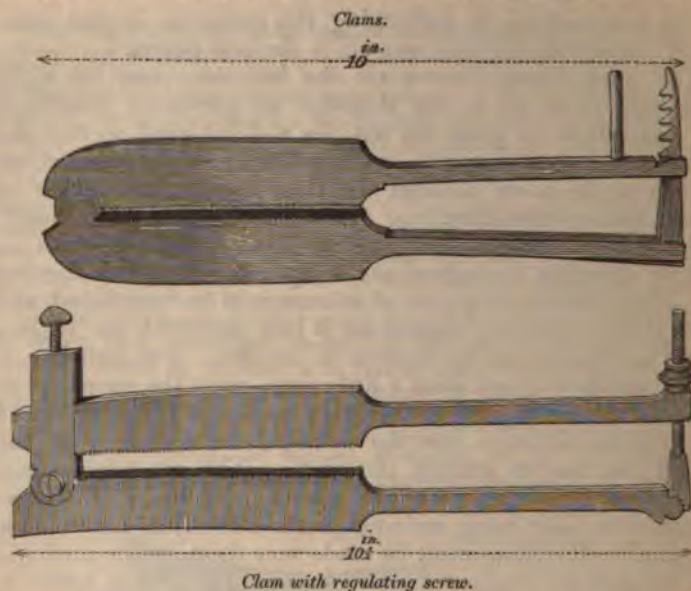
The best method of performing this operation is that commonly employed, and one year old is the best period.*

The horse being thrown on the left side, and the right hind leg drawn up to the shoulder, as previously described, the operator is to grasp the testicles with his hand, so that the skin over the testicle may be tense and easily divided, an incision is then to be made through the skin, about three inches in length, rather more than less. He is then to proceed gradually with his knife until a little fluid or water issues, by which he may be sure that the vaginal sac is opened. Into this opening one of the blades of a pair of scissors is to be introduced, and when this is done the vaginal sac is laid open with the scissors to the same extent as the incision in the skin. The testicle now comes readily out, and after a little time, when the cremaster or retractor muscle has relaxed sufficiently, the cord is to be placed between the clams, so that the whole of the testicle, with the epididymis, may be outside the clams. The vas deferens may be divided before the clams are put on; but this is of no importance, as their being included in the clams does not increase the pain. The clams must be made very tight, or the cord will slip through the moment the testicle is cut off. When, however, the testicle is cut off with the nearly red hot firing iron, the

very near it. It is better, therefore, to operate on the inside of the leg first. The precise situation of the nerve is pretty much the same in every horse, being in the inside, somewhat behind and within the artery; and in the outside rather nearer the sinew than the ligament. When the low operation is preferred an incision is to be made just behind the course of the artery, which may be felt, and extending from about the middle of the fetlock joint to somewhat below it. After the operation is completed on both sides, a linen bandage, being rolled from each end to the middle, is then to be carefully wound round the leg, so as to assist in keeping the edges of the wound together. The after treatment of the wounds requires much care and attention; for, when they are not nicely managed, the granulations being too luxuriant and unchecked are skinned over, and form an enlargement, which from its connection with the divided nerve is endowed with acute sensibility, and from its prominence is very likely to be struck with the other leg, the pain of which often throws the horse down. The bandages may remain unmoved for two or three days, but should be frequently wetted with cold water, as it is an object of much importance to keep down the inflammation that succeeds the operation, as otherwise the leg may be permanently thickened. — *Spencer on the Foot, &c.*

* Mr. Brettargh says in the *Veterinarian*, vol. ii., "Every spring since 1811, I have operated upon foals of all ages, from ten days old to four months, and have, on all occasions, been convinced of its being the most eligible period for castrating. Operating thus early produces very little change in the appearance of colts, as they are generally well in ten days; and in every case they grow larger than when castrated later." I believe Mr. Brettargh's plan is the best, unless the foal should appear too light about the neck. — *Ed.*]

same as is employed for firing, it is generally all the searing that is required; therefore if the cord does slip through it is of little



consequence. This being done, the other testicle is to be removed in the same manner. There may be a little bleeding after the horse gets up, but it will stop of itself within half an hour. No kind of dressing is necessary. The horse should be turned into a loose box for a week, and after that he may be put to work if required. The general fault of operators is searing too much, whereby, instead of stopping or preventing bleeding, they produce it, so that the horse bleeds considerably after the operation. If the cord is cut off with the hot firing iron, and not touched with the iron afterwards, it seldom bleeds at all. There is always some degree of swelling afterwards; but it is never of importance: if it continues, however, after a week, a few punctures should be made with a large lancet, in the lowest part of the swelling, when drops of water will fall from the punctures, and the swelling will gradually disappear.

[There are several other methods of performing this operation, each of which has its advocates; that most generally practised on the continent is by means of the caustic clam, and there are two ways of doing this, the covered and the uncovered.

The caustic clam.—To perform this operation it is necessary to be provided with a pair of clams, and a pair of long pincers to bring their ends together. The clams, says Hurtrel d'Arboval, are

made with a piece of old elder five or six inches long and an inch in diameter; this must be split in two and a notch made half an inch from each end sufficiently deep to hold the string. The pith is then taken from the wood, and the vacancy filled with a plaster composed of flour and corrosive sublimate. Mr. Goodwin considers the caustic quite useless, and thus recommends the operation to be performed. — “The horse being secured, and the necessary instruments at hand, the operator, laying hold of the near testicle and drawing it out, sufficiently to render the scrotum tense and secure the cord, makes his incision, through the scrotum and tunica vaginalis, if the operation be the uncovered one; the testicle presenting itself is to be cautiously laid hold of by the operator, having given up the knife; at this moment the twitch should be tightened on the nose to prevent, if possible, the animal struggling during his effort; caution must be used merely to support the testicle, and not to make the same pull on it as when the cremaster muscle is acting. Having obtained the testicle sufficiently out of the scrotum to place the clam, the assistant should do this by opening and putting it on the anterior part of the cord. At this part of the operation the Russians generally cut through the vas deferens. When the clam has been placed on the cord, the operator, giving up the testicle to the care of the assistant, should be cautious that no parts of the scrotum are included in it, and then take the open ends of the clams in his right hand, having disengaged every thing with the left; the assistant then brings the end of the clam together by his pincers, taking care to keep them close to the horse at the moment of his struggling. The ends being secured by a double round of strings and tied, the generality of practitioners take away the testicle by cutting through the cord at about the distance of half an inch from the clam. Others allow them to remain on till the clam be taken off, as a matter of security from second hæmorrhage. The clams must have a sufficient degree of pressure completely to stop the circulation in the part, yet not so great as to lacerate the vessels. If pressure be made inefficiently, the animal suffers severely from it; on the other hand, the pressure being properly made, he suffers less than in any other way of operating.

Mr. Goodwin thus describes the uncovered operation, to which he gives the preference:—

“After opening the scrotum and dissecting through the dartos, which is very readily done by passing the knife lightly over its fibres, the testicle and its covering, the tunica vaginalis, must be taken in the right hand, while the left should be employed in pushing back the scrotum from its attachments, and, having your assistant ready as before with the clam, it must be placed well above the epididymis, and greater pressure is, of

course, necessary, as the vaginal covering is included in the clam."

The principal advantage of this method of operating is, that if there should be scrotal hernia, the operation may still be safely performed without those dangerous, and sometimes fatal, consequences which often attends the common method of operating when a portion of the intestines has escaped into the scrotum.

Mr. Goodwin states that he has practised the first operation a great many times successfully, and with very little subsequent inflammation. He has also tried the uncovered method with equal success, and gives it the preference, for the reason before stated.

The operation by ligature is not frequently practised, having gone into disrepute for many years in consequence of the operation having been performed by Mr. Cline, the celebrated surgeon, and followed by inflammation and death. It is, however, to be doubted whether the method of performing the operation was really the cause of death, for we find that the ligature has been employed by some veterinary surgeons for many years with the best effects. Mr. Richard Collier, of Dublin, says that he has adopted it for thirty years, and it has been very successful. He thus describes his method of operating in the 13th volume of the *Veterinarian*:—

After securing the horse on his back, I open the scrotum in the usual way, and let out the testicle. I then place the iron clams on the cord, and divide it. This being done, I take hold of a small portion of it with the forceps (embracing the artery, of course), and apply the ligature. "I generally have an assistant ready with the ligature made into a noose, who places it on that portion of the cord which I intend it to embrace before I apply the forceps. I then draw up the artery, whilst he secures the ligature. This I consider the most important part of the operation."

Mr. C. frequently bleeds afterwards, and gives a laxative.

Mr. Dray, of Leeds, states, in the same number of the *Veterinarian*, that he employs the ligature in castration. After casting the horse, he says:—"I then proceed to remove the left testicle, first by a bold incision through the scrotum, and sometimes through the tunica albuginea testes with a scalpel. I separate with my fingers the vas deferens from the spermatic cord; a yard of waxed three-thread twine is placed round the cord, and, by the aid of an assistant, the ligature is pulled very tight and made secure. The testicle is then removed by a pair of scissors or the scalpel. The ligature should be left long, so as to allow six or seven inches of it to project below the scrotum, in order to prevent the external incision uniting by adhesive

inflammation before the slough is ready to come away. The ligatures generally come away by themselves in ten days or a fortnight.

Torsion. — Another method of performing the operation has been introduced by Messrs. Daws, Simonds, and Wardle, and is thus described by Mr. Daws : — “ The operation of castration by torsion is performed as follows : — An incision through the scrotum on one side is first made with the scalpel sufficiently large to admit the free escape of the testicle ; the vas deferens is then divided with the same instrument about an inch above the epididymis. By pursuing this plan, the resistance of the cremaster muscle will be defeated ; and the testicle, with its vessels, will lie in a quiet state until the conclusion of the operation.

A longitudinal incision is now to be made through the tunica vaginalis reflexa, and a portion of the spermatic artery laid bare, and freed from its adjacent attachments. The torsion forceps is then to be applied to the artery, which should be divided in that portion immediately below the grasp of the instrument, the thumb and index finger of the left hand pressing back the blood in the vessel. The artery is then to be twisted by the forceps, held in the right hand, until the elasticity is destroyed, and it will no longer recoil, but remain curled up in a knot. The torsion forceps may then be removed with safety, and the remaining portion of the cord should be divided, and returned within the scrotum. Should the hæmorrhage from the artery of the cord prove at all troublesome, it may be arrested in a similar manner. The number of twists will depend upon the size of the artery, from four to six revolutions being sufficient for small, and eight or ten for larger vessels. The effect which torsion produces on the vessel, independent of destroying its elasticity, is a laceration of its internal tunic, the edges of which become speedily agglutinated by means of plastic lymph : a clot of blood plugs up the end, so that the obliteration is rendered doubly secure.” This description is followed by numerous cases, in which this method of operating has been practised by the three practitioners before mentioned with success.

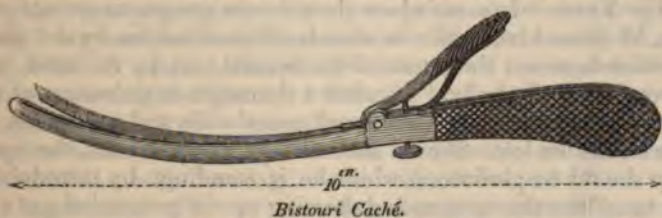
The use of torsion as a mode of stopping the hæmorrhage from arteries was introduced by Mr. Costello in 1824, and for many operations, particularly in cutting out tumours, it has been employed with great advantage. The present writer has employed it for this purpose with the best effects ; but for castration he does not consider that it has any advantage over the ligature, than which it must certainly be less secure.—Ed.]

On Hernia or Ruptures.

[This disease consists in the escape of the bowels or other viscera from their proper cavity. There are two principal varieties of hernia; one in which the intestine escapes through the abdominal rings, which, in the horse, continue open; and the other, when it takes place at any other part of the abdomen. The latter is called ventral hernia, and generally arises from blows, kicks, or falls, by which the parietes of the abdomen are ruptured, and thus form an opening through which the bowels pass, and are only prevented escaping by the skin. The former variety has different names, according to the part in which the gut is found; thus, if it reaches the scrotum, it is called scrotal, or, in the gelding, inguinal hernia. There are numerous other subdivisions, which it is unnecessary here to notice, but which may be found treated at length in Girard's "Treatise on Hernia," translated by Mr. Percivall, in the *Veterinarian*, and also in a very excellent paper read by Mr. Simonds before the V. M. Association, and reported in the 12th volume of the *Veterinarian*.

Hernia sometimes becomes *strangulated*, in which case the intestines are tightly pressed by the stricture; and, if not relieved by operation, mortification and death are sure to ensue. *Scrotal hernia* is more likely to become strangulated than any other, from the smallness of the opening through which the gut escapes. From the general practice of castration in this country, it is comparatively rare; but in India, where it is common to use entire horses, the disease is of frequent occurrence. Mr. Rogers, who has practised some years in India, thus describes the symptoms and the operation in the 12th volume of the *Veterinarian*: — "A horse is brought in from the lines said to have gripes. If the case is recent, the pulse may not be much affected, but the animal is very uneasy, looks round at his flanks, and, if carefully noticed, it will be found that he is gazing intently at the groin or scrotum. Small quantities of dung are sometimes voided at intervals; he lies down, rolls on his back, gets up again, paws and stamps, probably stales; the testicles are evidently uneasy, and alternately drawn up and relaxed; the scrotum drips with sweat; the pulse becomes quick, small, and wiry; the conjunctival and Schneiderian membranes are highly injected; the flanks heave violently; he groans, and shakes his head; the countenance assumes the look of horror, not difficult to recognise as indicating some terrible affection, and the agony is sometimes dreadful. He has heard a horse shriek out with agony. If relief is not afforded, the horse breaks out in cold clammy

sweats; the mouth becomes dry, the membranes congested; he throws himself down; stretches his nose to the groin, at which he intently gazes; allows his head to fall violently on the ground; the muscles, particularly of the belly, are seized with spasms, and death closes the miserable scene. When the mind of the surgeon is made up, not a moment is to be lost; he should at once proceed to operate. He should bleed to the full extent, or until it caused the horse to sigh. The animal should then be carefully thrown, and secured as for castration, the hind leg or legs being drawn towards the collar, and the horse on its back well secured in that position by bundles of straw. The instruments which he uses are one or two scalpels, and bistouri caché,



The bistouri lies concealed in the groove of the director, and is elevated when required by pressing on the spring handle, the screw below limiting the action of the knife as may be required.

and others generally needed in castration. Everything being in readiness, the operator places himself on his knees in the rear of the horse, and commences an examination externally and by the rectum, by which means he is generally able to ascertain the nature of the hernia. He then takes the testicle of the affected side in both hands, and, manipulating it so as carefully to bring it in close contact with the scrotum, leaves it in the left hand. Tightening the skin, and guided by the raphe, he makes a free incision through the integuments, and then through the tunic, which latter he dilates to the extent of three or four inches by means of the scissors or scalpel, first introducing one of his fingers as a guide. If the operator has a knowledge of the parts, he needs not to be afraid of opening the scrotum by free incisions, made with caution. On opening the scrotum, a quantity of serum, depending on the length of time the strangulation has existed, will escape.

If the operator takes the testicle firm in his hand, there will be little danger of wounding the gut.

After having opened the scrotum, by putting aside the testicle, he may generally obtain a view of the intestine.

“ He next attempts to introduce the index finger of his left hand into the stricture; but this is sometimes difficult, as the spermatic cord becomes occasionally enormously enlarged, the stricture preventing the return of blood by the veins, but allow-

ing it to proceed to the testicle by the arteries. In such a case it is an advantage first to castrate, and to get this distention out of the way.

“ Having carefully passed the finger into the stricture, he then introduces the bistoury, and having taken great care to avoid the intestine, very carefully dilates the stricture; but this is to be done with the greatest caution, so as just to enable him to return the gut and no more, for if he much enlarges the opening he will, in all probability, have a return of the hernia, and lose his patient. Having reduced the hernia, and removed the testicle, he dresses the scrotum with turpentine liniment, and allows the animal to rise.”

The Taxis.—In cases where these severe symptoms are not present, M. Girard recommends what is called reduction by the taxis, by which is meant the return of the hernial part, by the hand, into the cavity of the belly. If, after a thorough examination of the parts, reduction being considered practicable and profitable, no time should be lost. Should the animal quietly submit, the operation should be performed while he is standing, by introducing one hand into the rectum, and drawing up the protruded gut; in cases of resistance or difficulty, however, it is best to cast our patient, and then we may work with both hands at the same time,—one in the rectum drawing up the gut, and the other in the sheath gently forcing it into the abdomen. The operator will only recollect that force in drawing up the gut is to be avoided as much as possible, the consequences too often being inflammation, gangrene, and rupture.

Ventral hernia.—When hernia occurs at birth it is called congenital. Umbilical hernia is often found in foals, and should be reduced by the following method, which Mr. Simonds has found successful:—“ I first cast the animal, and, placing him on his back, grasped the hernial sac between my fingers, drawing it up from the belly, and being careful not to include any portion of the protruding intestine, of which there is little fear, except (which is not likely in so young an animal) adhesion has taken place between the peritoneum covering the intestine and that portion of the membrane lining the sac. Being safe with regard to these things, I take a strong waxed cord or string and place it round the sac, as near as possible to the abdomen, and, pulling it tightly, I pass it round the sac two or three times, and securely fasten it. The patient may then be permitted to rise; and, in a majority of cases, no after-treatment will be necessary. In the course of a few days the parts included in the ligature begin to slough, and, the healing process taking place, the sac is entirely got rid of, and the cure is perfected.”

Mr. Simonds concludes the valuable paper before alluded to

by the relation of two cases in which he operated successfully for ventral hernia. One, by the plan before advised for colts; the other, by a more severe operation. In the latter case, the patient was an old black mare that had been injured by falling in the shafts six days before the operation. Mr. S. says:—
“The most extensive rupture I had ever seen presented itself on the left side. The sac formed by the skin, which was not broken, nor even the hair rubbed off, extended as far forwards as the cartilages of the false ribs, and backwards to the mammæ. A perpendicular line drawn from the superior to the inferior part of the tumour measured more than twelve inches. It appeared, from its immense size and weight, as if by far the larger part of the colon had protruded. To my surprise, there was comparatively little constitutional disturbance. The pulse was 45, and full, with no other indication of fever, and no expression of pain on pressing the tumour. She was bled until the pulse was considerably lowered. A carthartic was given, and the sac ordered to be kept constantly wet with cold water, and to be supported with a wide bandage. She was placed on a restricted and mash diet. On the next day, being honoured by a visit by Messrs. Morton, Spooner, and Youatt, I had the pleasure and advantage of submitting the case to their examination, and obtaining their opinion. They urged me to attempt to return the protruding viscera and secure them by a surgical operation; and Mr. Spooner kindly offered to be present, and to give me his valuable assistance.

“On the 24th, we therefore gave her two ounces and a half of the tincture of opium shortly before she was led from the box to the operating house. Her pulse was 31, owing, probably, to the administration of the opiate: her respiration and other vital functions seemed not to be interfered with.

“She was cast on her right side, and the hobbles being secured, we had her elevated so as to place a large quantity of straw under her quarters, which being done, she was turned nearly on her back, and kept in that situation by more trusses of straw. Her head was made fast to a ring in the front, by means of a long rope; while the left hind leg, being disengaged from the hobbles, was fixed to another ring behind, by which means she was well secured, and so confined that she scarcely moved from the spot; but this was probably produced more by the opiate than by our arrangements. After a careful examination, externally as well as per rectum, in order to ascertain the situation and probable size of the laceration of the muscles, an incision was carefully made through the integument into the sac, in a line with the inferior border of the cartilages of the false ribs; which incision was about seven inches in length. This, as we had hoped, proved to be directly upon the aperture in the mus-

cular parietes of the abdomen. The intestines were exposed, and after having sufficiently dilated the opening to permit the introduction of the hands, they were quickly returned, portion after portion, into their proper cavity, together with a part of the omentum, which we found somewhat annoying, it being frequently forced back again through the laceration.

“At times, it required the exertion of our united strength to prevent the escape of the intestines, and which was only effected by placing our hands side by side, covering and pressing upon the opening. By these means we succeeded in keeping in the viscera, until we were satisfied that we had placed them all within their proper cavity. At about the central part of the aperture, we decidedly found the greatest pressure of the intestines to effect an escape. A strong metallic suture of flexible wire was then passed through the edges of the laceration, taking in the peritoneum and portions of the transversalis, rectus, and internal abdominal muscles, and other sutures, embracing the same parts, were placed at convenient distances, so as nearly to close the aperture. Two sutures of smaller metallic wire, and three of stout silk cord, were then passed through the external abdominal muscles and their aponeuroses, which effectually shut up the opening into the abdomen. The integument was then brought together by the interrupted suture, taking care to bring out the end of the other sutures, and which had been purposely left long, so that, in case of supervening inflammation or swelling, they might be readily examined. The whole operation occupied rather less than an hour, our poor patient being occasionally refreshed with some warm gruel.

“The hobbles were now quietly removed, and after lying a few minutes she got up, and was placed in a large loose box. A compress and a suspensory bandage, that could be tightened at pleasure, were applied to the wound.”

This case, which reflects great credit on the skilful operators, eventually did well; and it affords us some very useful practical hints as to the treatment of similar formidable cases, although they may not frequently occur.—ED.]

CHAP. LIX.

THE STRUCTURE OF THE TEETH, AND THE METHOD OF JUDGING THE AGE.

[THE horse has, at five years old, forty teeth; viz., twenty-four molar or jaw teeth (twelve in each jaw, and six on each side); twelve incisors, being six in each jaw; and four tusches, one on

either side of each jaw, and situated between the molar and incisor teeth. In mares, the tushes are generally absent, and sometimes there are a few supplementary teeth.

The teeth are placed in very deep sockets in the jaw-bones, by which, with the assistance of the gums, they are firmly kept in their situation.

The structure of the teeth is very curious; in the horse we find it composed of three portions: first, the bone, or rather the ivory for it is similar to the tusks of the elephant, forms the bulk of the tooth; secondly, the enamel, which is exceedingly hard, and forms the surface of the crown and a portion of the face, and dips into the body of the tooth; thirdly, the *crusta petrosa*, softer than the other portions, and more opaque; this portion appears to be a sort of cement to unite the other constituents together, but it is only found in herbivorous animals.

In the fœtus of three or four months old we find the germ of the first pair of teeth in the alveolar cavity. It appears a soft pulpy substance secreted by a membranous capsule, which in an incisor tooth is single; but in the molar there are no less than four to the under and five to the upper, which accounts for the irregular appearance of the molar teeth. The pulp is gradually changed into the hard material. The membrane of the incisor teeth that secreted the pulp is double; and from its outer surface it afterwards secretes the enamel, and from its inner the ivory. A tooth is divided into the crown and the fang; the former being that portion outside the gum, and the latter that contained within the socket; whilst the part immediately embraced by the gum is called the neck. The upper surface of the crown is called the face, and is that part on which the mark is situated in the incisor teeth, by which we judge of the age.

The horse has two sets of teeth, the temporary and the permanent: the former are considerably smaller and whiter than the latter. The tushes, however, are permanent, and do not appear till after four years old.

The permanent incisor teeth are too inches and upwards in length: their face presents a deep funnel-like cavity, which extends some distance into the interior of the tooth, and constitutes what is called the mark. The interior of the tooth is also provided with a cavity that communicates with the bottom of the socket by an opening at the end of the root. (See page 371., fig. 12.) The tooth, therefore, when young, is nearly hollow; but both cavities diminish with age. The lower one is filled with a gelatinous substance, which contains the nerves and vessels by which the tooth is nourished. The arrangement of the ivory and the enamel in the incisor teeth deserves particular consideration. "The enamel," says M. Girard, "after having covered the entire of the external surface, doubles itself towards

the surface of wear, and dips down into the interior of the tooth, forming a conical cavity which becomes narrow, and approaches towards the posterior edge of the tooth, the more according as it is nearer the root. This prolongation of the enamel presents, then, two portions for our consideration:—first, the cavity that it forms to the exterior; secondly, the horn or infundibulum which envelopes this cavity. This funnel, which is very easy to perceive in making different sections of the tooth, is surrounded in young teeth by the cavity of the pulp, which is continued to the extremity of the free portion, but which is found more especially on the side corresponding to the anterior edge of the tooth.* As the animal advances in age, this outer cavity becomes obliterated, and the infundibulum is then only surrounded by a mass of ivory, much thicker anteriorly than posteriorly.†

Before that of five years old, the age of the horse is ascertained by the presence or disappearance of the temporary teeth; and from five to eight by the disappearance of the mark which is commonly supposed to be filled up; but in fact disappears by the borders of the cavity being worn down. It takes about three years to wear the teeth down to the bottom of these cavities; thus, the anterior teeth, being first formed, are first to lose their mark; the middle teeth following the next, and the corner teeth the succeeding year. The French distinguish the incisor teeth by calling the anterior ones the nippers, the corner the corners, and those between them the dividers; which terms will serve to distinguish them in this place. When the incisors first appear, the anterior border of the cavity is somewhat higher than the posterior internal border; but in the course of a year it is worn down level.

For many years it has been customary to judge of the age by the marks we have mentioned; but at eight years old, the horse is said to be aged; and after this time it was considered to be impossible to ascertain the age. There are, however, other means which enable us pretty generally to judge of the age, if not with certainty, at any rate approaching to it. If we take an incisor tooth and make three or four transverse sections of it, we shall find that each surface is of a different shape. The tooth becomes gradually less from side to side, and more from front to

* In many young teeth, on looking into the lower cavity at the root, we can see the bottom of the funnel (see fig. 12.), which forms the upper cavity, inclining to the posterior part of the tooth; the tooth, indeed, appears somewhat like a man's double nightcap, one part being folded within the other. The face of a tooth just cut presents a sharp edge surrounding the cavity or mark: this edge is entirely covered with enamel, which, however, soon gets worn off, and thus the internal enamel becomes separated from the external.

† The old tooth is therefore considerably heavier than the young tooth; and from the length of time the central enamel remains after the disappearance of the mark, it appears that the old solid tooth wears much more slowly than the young hollow tooth.

rear. At a certain depth it becomes triangular, and, lower still, the oval appears almost reversed, the diameter being less from side to side than from front to rear. (See fig. 13., *a, b, c, d, e.*) Each of these several portions of the tooth becomes, in the course of time, its face, the shape of which therefore enables us to approximate to the age. This is still more assisted, up to a certain age, by the fact that the enamel that forms the side of the infundibulum dips deeper into the tooth than the cavity within it. It may therefore be seen in the centre of the face for some years after the disappearance of the mark.*



This plate exhibits the lower incisors at eleven different periods of life; also the internal structure of a young permanent incisor, with several transverse sections of a similar tooth.

Fig. 1, Soon after birth.

2, One year off.

3, Rising three years.

4, Four and a half years old.

5, Five years old.

6, Six years old.

7, Seven years old.

8, Eight years old.

9, Twelve years old.

10, About fourteen years old.

11, About sixteen years old.

12, A young horse's incisor tooth, with an opening made at the middle, exposing to view the lower portion of the funnel *a*.

13, Exhibits five transverse sections of a young incisor tooth, the three first portions *a, b, c*, having the funnel; the variation in the shape of each surface is worthy of notice, the oval gradually becoming triangular.

* The funnels in the upper incisor teeth being deeper, and the wear being less than in the under teeth, the marks are longer disappearing. It has been

In this country, for years past, it has been customary to reckon the ages of horses from the first of May, although they may, in many instances, be foaled several months either before or after this date. It has, however, within these few years, been decided by the jockey club that the ages of race horses shall be reckoned from the 1st of January. They are generally foaled earlier than other horses, it being desirable that they should be as early in the year as possible, in consequence of the practice of running horses so early as two and three years old.

A few months, in a young animal, often makes a material difference in its size and strength; and as thorough-bred mares, at this time, are kept in comfortable boxes, the inclemency of the weather is of little consequence. In other horses, the plan of early foaling would not answer, in consequence of the want of sufficient pasturage.

The following are the changes by which we judge of the age of a horse: it is unnecessary to notice the molar teeth, as they cannot be readily examined, nor the upper incisors, as their changes are very uncertain:—

- At birth, the nippers only have made their appearance.
- At one year old, the incisors are all visible, the corners having appeared last.
- At two years old, the nippers have lost their marks, and both edges of the corners are level.
- At three years old, and several months before, the permanent nippers have made their appearance.
- At four years old, the permanent dividers appear, and the cavity has nearly disappeared in the temporary corners.
- At five years old, the mouth is said to be perfect; and, if a male, the tushes are up; the permanent corner teeth have appeared, but the posterior border of the cavity is much lower than the anterior; and the mark is much diminished in the nippers.
- At six years old, the mark has disappeared from the nippers, and considerably diminished in the dividers; but the inner edge of the corners is not yet level.
- At seven years old, the mark has disappeared from the nippers and dividers, and the corners are level, though still retaining the mark.
- At eight years old, the mark has disappeared from the corners also, and the horse is said to be aged. The face of the

stated that there are two years' space between the disappearance of the marks in the different teeth; the middle teeth losing them at ten, the dividers at twelve, and the corners at fourteen; but this is a matter of much irregularity and uncertainty. Their presence and disappearance will, however, serve to assist the other signs in informing us of the age.

teeth is becoming more oval, but the enamel, the remains of the funnel, is still to be seen in the centre of the face.

At nine years old, the nippers become rounder, and the dividers oval; the following year the dividers become round, and the next the corners assume this shape, the central enamel gradually diminishes, and,

At twelve years old, has disappeared: sometimes, however, it remains several years. The marks in the upper teeth by this time have disappeared; some say at eleven years old, but this is very uncertain.

At fifteen years old, the nippers have become triangular, having been gradually assuming this shape for the last two years. The following year the dividers assume this shape, and,

At seventeen years old, the lower incisors are all triangular, and the central enamel has disappeared from the upper incisors. After this, the face of the teeth lengthen from front to rear, and diminish from side to side.

In judging of the age of a horse, we must not expect the foregoing rules to be invariably correct, particularly after eight years, but they will be in many cases, and in all will materially assist the judgment, and enable us to make the important distinction between one horse of ten and another of twenty years. There are some horses that retain their marks several years after the usual time; it is desirable, therefore, not to be guided entirely by one rule, but to let one correct or regulate another.

As the horse increases in age, the incisor teeth appear longer, and assume a more horizontal position, and other signs of age appear manifested. — ED.]

CHAP. LX.

PRECAUTIONS TO BE OBSERVED IN PURCHASING HORSES, AND ON WARRANTY AND SOUNDNESS.

IT is a very ancient but valuable maxim, that in all transactions "Honesty is the best policy;" and I can see no reason whatever why horse-dealing should not be regulated by this excellent law, for such it ought to be, and really is — *foro conscientia*. I have known those who have continued in the practice of never giving a warranty with a horse, and have experienced the advantage of it; for nothing can be more evident than that no one who has occasion for a horse would sell one he is accustomed to unless he had some fault; and if we go to a horse-dealer to purchase a horse of five or six years old, it is but reasonable to conclude that the

horse has been tried by some other person, and sold for some fault. Still it should be recollected that there are few, if any, horses without some fault or imperfection; and, perhaps, if the qualifications of riders, even the best, were strictly inquired into, they would be found equally deficient: we had better, therefore, go upon the principle of getting a horse that has no serious fault or defect, or what may be fairly deemed unsoundness; and having purchased such a horse, we should ride him a few days or weeks, and not be too hasty in giving an opinion of him, nor too ready in listening to the opinion or criticisms of others. Having premised thus much, I will proceed to give some further advice, or suggest some precautions, which may be usefully recollected by the purchasers of horses.

The numerous shades which exist between a state of perfect soundness in horses, and those obvious diseases or defects which so clearly constitute unsoundness as to admit of no doubt on the subject, often occasion much trouble and perplexity in the purchase or sale of these animals.

If a person, inexperienced in the mysteries of horse-dealing, wish to purchase a horse, he would do well to consult a professional man, or some one capable of guarding him against any deception that might be attempted, and of pointing out any defects there may be of too obscure a nature to attract his notice. When such assistance cannot be procured, the following hints may, perhaps, be found useful.

It would be useless to attempt a minute examination of a horse while the dealer or his assistants are present: the sloping ground upon which the horse stands for examination gives a deceptive view of his form and height, while the constant fear he feels of the whip, and the high-flown panegyrics lavished upon him, are so perplexing to a person unaccustomed to the business, that he is apt to overlook the most palpable defects; nor is it possible for the most experienced to examine him with all the accuracy and attention that are necessary; as an unobserved flourish of the whip, or some other private hint from the seller, keeps the horse constantly in motion, particularly when the eye happens to be directed to a part that he does not wish to be inspected. I do not mean to say that this is always the case; there are many dealers, no doubt, of strict integrity, who afford ample opportunity to those who wish to examine their horses; and, so far from wishing to practise any deception upon the inexperienced, will never warrant a horse to be sound unless they are convinced that he is really so; but that there are men in the business who have recourse to a variety of tricks to deceive the unwary, is too notorious to be doubted. It is advisable, therefore, after taking a general view of the animal, so as to be satisfied with respect to his figure and action, to ride him off, to

some convenient place, where he may be examined without interruption.

The first and most important point to be inquired into is the state of the feet and limbs, and whether the horse be in any degree lame or not. And though he appear perfectly firm and free from lameness in all his paces, it will be necessary to inspect carefully the feet and limbs, lest there be any defect, which at some future period may occasion lameness. It is a fact pretty well known to horse-dealers*, that a slight degree of lameness is easily concealed, particularly in high-spirited horses, by the stimulus of the whip and spur, and supporting the head with the bridle. To ascertain, therefore, whether a horse be lame or not, he should not be ridden, but a person should be made to run before him, holding the end of the bridle, that the head may receive no support from it; the slightest lameness will then be readily perceived, particularly if the trial be made on rough ground, and on a moderate declivity.

Should it appear that the horse is perfectly free from lameness, the feet and legs are to be carefully inspected, beginning with the former, which should be first viewed in front, as the horse stands, to observe if there be any difference in the form or size of the hoofs. If the feet are very small, and particularly if one foot appears smaller than the other, it affords reasonable cause for suspicion that there is some serious defect; the bottom of the foot is then to be examined; and, if the heels are much contracted, the frog imperfect, and matter issuing from its cleft or division, it is probable that the horse will soon become lame. I would not advise that a horse be rejected merely because the feet have become rather narrow at the heels, and smaller than they were originally. If no difference can be perceived in the size of the feet, if the frogs appear sound, and free from thrushes, and particularly if, at the same time, the horse step boldly and firmly when trotted on rough ground, and down a hill, I think he may be safely purchased, if free from all other defects. The next point to be attended to is the form of the sole, or bottom of the foot, which is, in its natural state, rather hollow, or concave: we sometimes, however, find it quite flat, or even convex: in either case, it is proportionally thin, and unfit for the office it seems to be designed for, that is, to protect the

* In a book published a few years since, on this subject, by Mr. R. Lawrence, he observes, that there are two kinds of horse-dealers — the common, and the gentleman dealer — and that there is this distinction between them: “the former is obliged to warrant a horse sound before he can sell him; whereas the latter simply avers that he *believes* the horse to be sound, but that *it is not his custom* to give a warranty. Thus, the first is bound by law; the latter by honour; nevertheless, there are some *eccentric and narrow-minded purchasers*, who, in spite of the numerous bright examples of modern honour, prefer the former mode of dealing to the latter.”

sensible or fleshy sole which it covers. The flat sole, however, is by no means so serious a defect as the convex, and, if the horse is carefully shod, seldom occasions lameness; but, when the sole is in any degree convex, or projecting, it is extremely thin, and incapable of bearing much pressure. A horse with this defect will sometimes step firmly when the sole is protected by a wide, hollow shoe; but he is constantly liable to become lame by gravel getting under the shoe. We generally find, in this kind of foot, that the front of the hoof, or wall, has lost its natural form, having become flatter; it is also thinner, and more brittle, than it is naturally; so that it is difficult to nail on a shoe securely without wounding or *pricking* the foot, as it is termed. This defect, therefore, is of a serious nature, and constitutes unsoundness.*

Sanderack is an important defect, when it runs longitudinally from the coronet into the hoof, and is so deep as to affect the sensible parts of the foot: sometimes, however, it is very superficial, or in a horizontal direction, and perhaps too trifling to deserve notice. It should be recollected, however, that these trifling cracks in the hoof indicate an unnatural dryness of the horn, and, consequently, a tendency to sanderack; therefore, when such a horse is purchased, proper means should be employed to improve the state of the hoof.

There is no part of the horse which requires a more careful inspection than the foot; for it sometimes happens, that lameness is for a time removed by rest, or a run at grass, and may not again appear, until the horse is put to work. Horses that are foundered are generally much relieved, and sometimes apparently cured, by running at grass; but the lameness invariably returns when the horse is worked or kept in a stable.

A horse's foot may have suffered so far by bad shoeing, improper management, or some unknown cause, that although lameness may not have taken place at the time of purchase, yet, from its appearance, it may reasonably be suspected that he will soon become lame. Should such a horse be purchased with the warranty of soundness, he could not perhaps be legally returned, if lameness take place two or three weeks afterwards; as the seller would be able to prove, that the horse had not been lame up to the time he was purchased. It may be said, perhaps, that the defect in the foot was observed at that time; but it is well known that we rarely meet with a horse, at the age of six, whose feet are not more or less imperfect, and that a consider-

* In examining the fore feet we should observe attentively whether there be any corns. We can sometimes discover this without taking off the shoes, but by no means so well as when they are removed. If the corns are slight they do not form a sufficient objection to an otherwise good horse; but if they are extensive, and particularly if the heels are likewise weak, the horse should be rejected. — ED.

able alteration in form sometimes takes place without causing lameness.

Cutting is a defect often met with; and when it is considerable, that is, when the scar on the inside is large, the parts surrounding thickened and enlarged, and if it appears also to have been recently wounded, it may be deemed a serious imperfection. Cutting on the inside, and immediately below the knee-joint, or the *speedy cut*, as it is termed, is also a material defect, as it sometimes causes a horse to fall suddenly in trotting or galloping.

The back sinews are next to be examined, by passing the hand down the back part of the leg. If the tendon or sinew can be distinctly felt, with the suspensory ligament, which lies immediately before it; if the tendon feel clean and free from swelling; and if the leg, on a side view, appear flat, clean, and sinewy, as it is termed; it may be considered as a sound, well-formed leg. But if the leg, on a side view, appear rather round than flat, or rather bent and inclining inwards; if the sinew and ligament cannot be distinctly and separately felt; and particularly if one leg is larger than the other; it may be concluded, that the part has sustained some injury, and that there is a probability of the horse becoming lame, when put to hard work.

If any mark be found on the knees, it is the safest plan to infer that it was occasioned by falling, though the seller should affirm that it happened in going over the bar, stepping into a boat, or by striking it against the manger.

Few horses are entirely free from splents; they need not, therefore, be regarded, unless of a large size, immediately below the knee-joint, or so near the back sinew, or suspensory ligament, as to interfere with their action, or unless they are tender on being pressed.

In examining the hind legs, begin with the hock; and if there be any spavin, it may be seen most readily by looking between the hocks, or still better by looking between the fore legs, rather inclining to one side. The bones, which form the projection on the inside of the hock, are in some horses rather larger than in others, which should not be mistaken for bone spavin: but there is no great difficulty in making the distinction, for should both hocks be affected with spavin, it rarely happens that they are exactly alike, or of the same size; and when one hock only is affected, the difference is sufficiently manifest to point out the disease. A side view of the hocks should next be taken, and if there be a curb, it will readily be perceived. Observe, in the next place, if there be any ringbone upon the pastern, which, though a considerable defect, does not always produce lameness, but more frequently in the fore leg than the hind. I have lately

seen a mare that was purchased about two years ago with a ringbone on the hind pastern. She was not lame from it, and never has been since that time, though hunted regularly for two seasons.

In examining the bottom of the hind foot, we have only to ascertain that it is not affected with canker, or very bad thrushes.

Some horses have a tendency to swelling of the hind legs, or to that discharge from the heels which constitutes the disease termed grease; and horses with white legs seem to be more disposed to this complaint than others. When a horse's hind legs, therefore, appear to be swollen, if the hair about the heels appear rough or furzy, or if there be scars on the heels, or an appearance of their having been affected with cracks or ulcers, it may be inferred that the horse is subject to grease and swelling of the legs.

Having finished our examination of the feet and limbs, we should proceed to the eye, which is an important part, and requires the most careful inspection. The most favourable situation for viewing the eye is at the stable door, or under a shed; for when too much light falls upon the eye, so much is reflected by its cornea, or surface, that it is difficult to see the internal parts.

The age at which the eyes most frequently become diseased is from five to six; next to that, from four to five; sometimes, but not often, it happens after six; after seven the disease rarely occurs, except from accidents, to which of course, they are equally exposed at all ages. In purchasing a horse, therefore, about five years old, it is necessary to be particularly attentive to the state of the eyes. If they appear dull, cloudy, or watery, if the lids appear to be more closed than usual, if the inner corner of the eyelid appear puckered up, and particularly if there be a manifest difference in the appearance of the eyes, they may justly be suspected of unsoundness.

Having taken a general view of the eye, the pupil, or dark bluish oblong spot in its centre, should be closely and carefully examined; and if a difference is perceived in the size of the two pupils, if, instead of a dark blue colour, they appear cloudy, or if white specks are seen in them, a diseased state of the organ is indicated. I have often observed, however, that when a small speck has formed in the pupil it does not gradually increase, as by many it is supposed to do; on the contrary, I have, in many instances, known it remain in the same state for years without causing any material impediment to vision. I should not, therefore, reject a horse simply on account of this defect; that is, if the eyes appeared perfectly healthy in every other respect, and particularly if the speck was small, nearer the edge than the centre of the pupil, and only in one eye; it would be advis-

able, however, to be certain that the pupils are alike in size, that they become small when the eyes are exposed to a strong light, and enlarge again when the horse is brought into a darker situation.

When an imperfection is observed in the eye, it is frequently said to arise from a bite, or blow, or from hay seeds falling into it; but though the seller should positively affirm this to be the cause of the imperfection, I should always be inclined to doubt it, because experience has taught me that the diseases of the horse's eye almost always arise from internal causes; that, however trifling in appearance, they are really of a serious nature, and most commonly, even after they have been apparently cured, terminate, sooner or later, in blindness. Too much caution, therefore, cannot be observed in examining this important part.

When the eyes become inflamed from a blow or bite, or from any dust getting into them, the disease, although apparently considerable, is seldom of long continuance; that is, when the injury is not severe, and proper means are employed for its removal. But when the inflammation has subsided, there often remains on the surface of the eye an opaque spot, or *film*, as it is termed, which in severe injuries extends over the whole of the cornea, or surface of the eye. After a little time, this opacity gradually diminishes, and sometimes wholly disappears; more commonly, however, a small film remains, which does not in any material degree impede vision; this defect, therefore, is of no importance, and may safely be overlooked, provided the purchaser is certain that the opacity is really on the surface, and not in the pupil of the eye, and that the other parts appear bright, and free from every kind of imperfection. As a further security, a condition may be annexed to the warranty, by which the horse may be returned in three or four months, should the imperfection prove to be of a serious nature. When a complete cataract takes place, which is known by the pupil being of a white or pearl colour, the strength of the other eye is generally restored, and it rarely becomes diseased afterwards, except from accidents: he may, therefore, be safely purchased as a one-eyed horse.

We have now to extend our investigation to another point; that is, the state of the wind, or, rather, of the lungs, and parts connected with them. When a horse is absolutely broken-winded, there is no difficulty in detecting the disease: the laborious breathing, or working of the flanks, particularly in going up a hill, and the short asthmatic cough, are symptoms which cannot escape observation. Between this state of the lungs and perfect health there are many degrees, and it is the intermediate defects that we find most difficulty in discovering. The criterion by which dealers judge of the state of the wind is

by no means a bad one; they make the horse cough by pinching or grasping the top of the windpipe: if the lungs are in that state which constitute broken wind, or if they are approaching to that state, the sound of the cough is so peculiar that it cannot well be mistaken; it is short and husky, exactly like that of an asthmatic person. When this kind of cough is observed, the horse should be rejected, even if the motion of the flanks appear perfectly easy and regular. I have, in several instances, known broken wind apparently cured by keeping a horse at grass; that is, he seemed to breathe with ease, and did not cough when moderately exercised, but by pinching the throat there was still that peculiar cough, and by keeping him in the stable a few days, he became as bad as ever. It is advisable, however, for those who have often occasion to purchase horses, to make themselves familiar with the sound of this asthmatic or broken-winded cough: there will be no difficulty in this, as the complaint is very common. Horses are more liable to coughs than other domestic animals. The complaint is sometimes of little importance, and with care easily removed; it often proves, however, extremely obstinate, and not unfrequently incurable. When a horse is observed to have a cough at the time of purchasing, it is necessary to inquire whether it be a recent complaint or one of long standing; and this is a point that cannot be always easily determined. In the old, or chronic cough, as it is termed, the horse generally appears lively, feeds heartily, and appears in every other respect to be in perfect health; sometimes the sound of the cough is husky, or asthmatic, which indicates a tendency to broken wind; more commonly it is loud and clear; the fit of coughing is generally violent, and the horse often appears as if some extraneous body had got into the windpipe, and he was endeavouring to cough it up.

The chronic cough is most considerable when the horse is first put in motion; by continuing the exercise it gradually ceases, after which the horse may be rode a long journey without coughing. I have often observed that horses with chronic cough are very shy of having their throats touched, often rearing and making considerable resistance when any one attempts to make them cough by grasping the top of the windpipe; and in many instances I have observed that they cannot be made to cough in this way, however strongly the windpipe be grasped: this, probably, as well as the shyness they manifest on the occasion, may arise from the trial having been made often upon them.

In the recent cough, the horse generally appears rather dull, and looks like a horse labouring under a catarrh, or cold: he readily coughs when the windpipe is pinched; in doing which there is no difficulty, as the horse seldom makes any considerable resistance. In the recent cough, moderate trotting is sufficient

to excite coughing, which is seldom diminished by continuing the exercise. In the chronic cough, the horse is sometimes relieved by throwing up mucus through the nostrils; and the cough is often so moderated, by strict attention to his diet and exercise, as to appear scarcely worth notice. I have also known it completely suppressed for the space of a day, by means of opium. When a horse, therefore, is observed to have a cough the purchaser may not always be able to determine whether the complaint be unimportant, or of long standing, and incurable. In such doubtful cases, it would perhaps be the most prudent plan to secure himself by having a suitable condition added to the warranty.

There is another complaint of the lungs, or parts connected with them, and an incurable one, which the purchaser should be guarded against. This disease is named *roaring*, from the wheezing noise a horse makes when rode fast, particularly when galloped up a hill: it is sometimes so considerable as to be heard at a distance of many yards; but in walking, or moderate exercise, it can seldom be perceived. The method which dealers usually employ to detect this complaint, at a repository, where no other trial is allowed, is to whip the horse under the belly, and make him turn suddenly, or by making him leap over the bar; if he is a roarer, this sudden exertion causes him to grunt. But this criterion should never be depended upon when an opportunity offers of galloping the horse.

The age of a horse is known by certain marks in the teeth, as described in the preceding chapter. When these are worn out, artificial marks are sometimes made, to make the horse appear younger than he really is. It often happens, also, that some of the sucking, or colt's teeth, are drawn out; in which case they are soon replaced by horse's, or permanent teeth; this is done with a view to make a horse of three or four years old appear to be five. As experience alone can enable the purchaser to detect these deceptions, it is advisable to have the age of the horse always expressed on the warranty; he can then avail himself of the first opportunity that offers of obtaining correct information on the subject, and if he has been deceived, will, no doubt, have a right to return the animal.

I have known persons so cautious when about to purchase a horse, as to examine the neck, and if they find marks of his having been bled often, they suspect, sometimes justly perhaps, that he has had some serious complaint. They have also thought it necessary to inspect the chest, belly, thighs, or the parts where rowels are usually placed, and if they observe the marks which generally remain after rowelling, they suspect it was done for a complaint of the eyes when the mark is under the throat, or between the branches of the under jawbone; and if in other

parts, for what they term humours, that is, swelling of the legs, or grease.

Having finished our examination of the horse, as it relates to soundness, we have to inquire if he has any vicious habits, such as crib-biting, or if he is in any degree restive.

Crib-biting is a vicious habit, which often causes a horse to become lean and weak, and sometimes renders him very subject to flatulent colic. It is, therefore, a defect of importance, and a frequent cause of unsoundness. In crib-biting the horse lays hold of the manger with his teeth, and appears to be sucking in air with an almost convulsive effort, and a slight grunting noise. The manner in which this injures a horse has not been satisfactorily explained, but it is allowed by all to be an important defect. It may easily be detected by watching the horse for a short time in the stable.

Restiveness is sometimes discovered by separating a horse from his companion after riding together a few miles, or after riding him and bringing him back to his stable, by attempting to ride him off again. On these occasions, if a horse has any restiveness he generally discovers it.

Before I finish this chapter, it may be proper to remind the reader that we rarely meet with a horse that is in every respect perfect; and though, from the high price of the animal, it is necessary to be very cautious, yet it is possible, perhaps, to carry our caution too far; that is, there may be some trifling imperfection, such as a small splent, which is not worth noticing. One caution I always think necessary, however perfect the horse may appear, and this is, to have a receipt upon a stamp in the handwriting of the seller, in which the horse is described, and warranted sound, and free from vice.

This will be found very useful should any defect afterwards appear which may render it necessary to return the horse. It is by many thought necessary, when a horse is returned, to put him into the stable of the seller, or to get him to receive the horse; but it has been established in our courts of law that this is not necessary, and that it is sufficient to give notice, by a witness, that the horse is unsound or vicious, or is not what he was warranted to be, and that he is ready to be delivered up when sent for.*

It is advisable, after purchasing, neither to have him shod nor to give him any medicine, until satisfied, by a sufficient trial, that he is in every respect sound.

* By tendering the horse, and afterwards placing him at livery, the keep of an unsound horse after this tender can be recovered; it is, therefore, the best plan to adopt when the seller is a solvent and responsible man. If the horse is sold to a third party, after due notice given to the dealer, an action can be brought for the difference between the price given and received by the plaintiff. If the horse be retained, the action may be brought for the difference between the price given and his real value.—E.D.

Perhaps I have dwelt longer upon this subject than some of my readers may think necessary; but it should be recollected that it is intended only for those that are inexperienced in horses. It may be thought, also, that what I have written may tend to excite an unjust prejudice in the minds of those to whom it is addressed, or that it may make them over-cautious, and induce them to reject horses without sufficient reason: but, if we take into consideration the many defects or diseases to which horses are liable, the difficulty of detecting them, the numerous deceptions that are practised, and the shifts and evasions sometimes resorted to, I trust that in what I have written the candid reader will not accuse me of having gone too far, or that it will excite an undue prejudice against the horse-dealer. I am aware that there are men in that trade who would descend to the deceptive practices I have occasionally hinted at, but have no doubt that there are also to be found among them men of integrity and honour.

I cannot conclude this subject without advising those who are satisfied with a moderate degree of goodness in a horse to put up with a few trifling faults, as it often happens that the rider is as much in fault as the horse; and after a little use these trivial faults often disappear.

[There is no money better expended, when purchasing a valuable horse, than the payment of the ten-shilling fee to a *respectable* veterinary surgeon, one whose *professional knowledge* enables him to form, and whose *reputation* induces him to give, a correct and honest opinion as to the soundness of a horse. Through saving this trifling sum hundreds of pounds have often been subsequently lost. The certificate of a veterinary surgeon as to the soundness of a horse does not prevent such horse from being returned should he afterwards manifest such symptoms as would prove him to be unsound at the time of sale. Cases may occur in which disease may exist in a latent form, and which professional vigilance may be unable to detect. But to one case of this sort there are hundreds in which the unsoundness would have been detected by the veterinary surgeon, though not by the owner or amateur. There are two grounds on which a horse can be returned, and the value recovered. One a breach of warranty, the other on proving a fraud. If a horse be warranted sound, free from vice, steady in harness, and five years old, and he proves either unsound, vicious, unsteady in harness, or more or less than five years, the warranty is broken, and the horse is returnable. The warranty must either be written or be given before a witness, and must be at or after the time of sale, not before it. It is of little use the dealer saying that he *will* warrant the horse unless he *actually does*, and any professions that he may make amount to

nothing; thus though he were to say the horse was the soundest animal ever foaled, or the gentlest creature that ever looked through a collar, it amounts to nothing unless he warrants the one or the other. A warranty before a witness is better than a written warranty without a witness, but it is not essential that the latter should be written on a stamp provided the receipt for the money is so.

A warranty does not extend to any limited time unless specified accordingly, as at some of the great auction marts. In former days it used to be the law to allow a trial of so many weeks for the eyes, and so many for the wind, &c.; but such is not the case at present.

The other ground on which a horse can be returned, that of fraud, is more difficult to prove. If a person sells to another a glandered horse at such a price as the animal would be worth if sound, it is an act of fraud, and the buyer can recover the amount as well as that of the damage, should the infection have been communicated to other horses belonging to him. If any gross deception be practised to hide a fault the horse is returnable on the ground of fraud, though no warranty be given. It is necessary, however, that the fault afterwards discovered should not be of such glaring description that any man of common judgment would have readily discovered, such as a large blemish on the knee or the absence of an eye; for the law expects the purchaser to exercise common vigilance. In cases where there exists some temporary unsoundness it is desirable to have such defect mentioned in the warranty: the horse to be returnable, or a fair allowance made, if the unsoundness becomes permanent. In cases where there is an unsoundness, but one to which the purchaser does not object, it is desirable that a qualified warranty should be given, — that is, sound in every other respect but this one exception. — Ed.]

Soundness.

[In what does soundness consist? This question has been a subject of the most contradictory opinions, has given birth to numerous arguments, and has sadly puzzled the heads of lawyers themselves. Indeed, the most opposite opinions have been expressed by the learned judges, at various times; though, at the present day, when the opinions of veterinary surgeons are allowed more weight than formerly, the decisions of the bench are much more uniform. Perfect soundness appears to consist in the total absence of disease, but as this very seldom occurs in horses that have been used; and as, from the rarity of its existence, the strict definition would be useless, it is now understood to mean that a horse has no disease or alteration of structure

that makes him in any respect less useful, or is likely to make him less useful than he would be without such defect. Soundness has, therefore, strict reference to utility; it does not apply to blemishes, although they may be alterations of structure, and produced by disease. Freedom from blemishes must be specified in the warranty, in order to guard against them. With regard to the greater number of points, veterinary surgeons are pretty well agreed as to what is unsoundness and what is not; but there are some cases in which there is a difference of opinion: some practitioners, perhaps, are too strict in their opinion, and others not strict enough, but there are many, it is to be hoped, who preserve the happy medium.

On the following diseases, no doubt can be entertained that they constitute unsoundness:—

- Lameness of all kinds and degrees;
- Diseases of any of the internal viscera;
- Cough of all kinds, *as long as it exists*;
- Colds or catarrhs, while they last;
- Roaring*; broken wind; thick wind;
- Grease; mange; farcy and glanders;
- Ruptures or hernia of all kinds;
- Megrims, if manifested both before and after the time of sale;
- Founder, and convex feet; also contracted feet, unless naturally so;

- Spavins and ringbones;
- Enlargements of the sinews or ligaments;
- Cataracts and other alterations of structure in the eyes that impede or are likely to impede vision.

Crib-biting is now considered unsoundness, as, though at first but a vicious habit, its ultimate effect is to injure both strength and condition.

The following diseases either may or may not occasion unsoundness, according to the state or degree in which they

* Some horses make a considerable noise either on first going off or on being much excited, but which frequently goes off after awhile, and may be distinguished from roaring by the latter increasing with speed and the former diminishing. It evidently arises from some peculiar action of the nostrils, which may be seen to be greatly inflated, and thus produce a sort of vibration. It is said that Eclipse, the celebrated race-horse, was a roarer; if so he must have been one of this sort. I have known many superior hunters make this peculiar noise. It does not impede usefulness, and, therefore, although it may be disagreeable, does not constitute unsoundness; for Lord Ellenborough has decided that "if the horse emits a loud noise which is offensive to the ear merely, from a bad habit which he has contracted, or from any cause which does not interfere with his general health and muscular powers, he is still to be considered a sound horse: on the other hand, if the roaring proceeds from any disease or organic infirmity, which renders him incapable of performing the usual functions of a horse, then it does constitute unsoundness."—*Surtees on Warranty.*

exist: — Corns, splents, thrushes, bog spavins, thorough pins, wind-galls, crib-biting.

If corns are extremely slight, being merely specks of ecchymosis, I should not consider them unsoundness; if, however, they are large, and more particularly if the foot is weak and flat, they decidedly constitute unsoundness.

Splents, if recent and evincing tenderness on being pressed, are causes of unsoundness, and so likewise if they are so large as to be struck by the other leg. If, however, they are small or moderate in size, and have existed for some time without occasioning lameness, they do not constitute unsoundness.

Thorough pins, bog spavins, and wind-galls rarely occasion lameness. If, therefore, they are very slight and unattended with stiffness, I do not consider them unsoundness; if, however, they are considerable or attended by the slightest stiffness, they must be considered as unsoundness, but wind-galls are very rarely so: they are, however, always blemishes, unless very slight.

Curbs are unsoundness unless the horse has worked with them for some months without injury or inconvenience.

Cutting, particularly speedy cutting, constitutes unsoundness only when it cannot be remedied by care or skill.

Opaque specks or streaks in the transparent cornea, evidently the effect of blows or accidents, and attended with no inflammation, do not constitute unsoundness unless they materially interfere with vision.

Very slight specks on the crystalline lens, evidently on its capsule and not in its substance, often disappear, and rarely prove injurious, and therefore should not be considered unsoundness. This, however, is a disputed point.

Quidding is generally removeable, but, when confirmed, it often materially injures the usefulness of the horse, and in such case is unsoundness.

Dragging the toes of the hind feet so as to wear away the crust to such a degree as to cause or threaten lameness is certainly unsoundness, and in a lesser degree constitutes a blemish.

Those defects comprehended under the term blemishes are: — Scars, the effects of broken knees; capped hocks, splents, bog spavins, and thorough-pins, even when these defects do not occasion unsoundness; loss of hair from blisters or scars; enlargements from blows or cutting; specks or streaks on the cornea, and a few others unnecessary to mention.

Under the term vices we comprehend — restiveness, shying, bolting, running away, kicking, rearing, biting, kicking in the stable or when shoeing, weaving or moving the head from side to side, stringhalt, confirmed quidding or throwing out the

food. Slipping the halter, or being frequently cast in the stable, may also amount to vice.

It is the duty of a veterinary surgeon to point out blemishes and vices too, when he perceives them, and when there are any doubtful points, such as curbs or specks in the eye, a specific warranty should be given that such defects shall not prove injurious, within a given time,— a precaution as desirable for the seller as the buyer. It must be borne in mind, that a horse may have serious defects not comprehended in the above description, yet requiring much vigilance and materially affecting the value of the animal, such as stumbling, dropping, crooked and stale fore legs ; or, indeed, any bad conformation of importance. — E.D.]

PART IV.

MATERIA MEDICA AND PHARMACOPŒIA.

INTRODUCTION.

THE following portion of the work consists of a MATERIA MEDICA, that is, a description of the various articles or drugs employed in medicine, especially such as are used in veterinary practice; and a PHARMACOPŒIA, or directions for compounding or mixing them, with occasional observations on the diseases for which they are usually prescribed.

In some former editions the Pharmacopœia and Materia Medica formed two distinct parts; in the present they are incorporated; that is, the medicinal article or drug, the class to which it belongs, and the formulæ or receipts, are arranged in the same alphabet. This plan appeared to the author more convenient than that originally adopted. Some readers will perhaps object to the number and variety of the formulæ, as well as to the number of ingredients which some of them contain; but, however desirable simplicity may be in medicinal composition, there is, perhaps, a limit which it would be dangerous to pass. On this subject, Dr. Paris, in his Pharmacologia, makes the following remark: "I have already observed that all extravagant systems tend, in the course of time, to introduce practices of an opposite kind: this truth finds a powerful illustration in the history of medicinal combination; and it becomes a serious question, whether the disgust so justly excited by the *polypharmacy* of our predecessors may not have induced the physician of the present day to carry his ideas of simplicity too far, so as to neglect and lose the advantages, which in many cases, beyond all doubt, may be obtained by scientific combination." "I think," says Dr. Powel, "it may be asserted, without fear of contradiction, that no medicine compounded of five or six simple articles has hitherto had its powers examined in a rational manner." Dr. Fordyce first demonstrated the existence of the singular and important law, that a *combination* of similar remedies will produce a more certain, speedy, and considerable effect, than an equivalent dose of any single one; thus cathartics not only acquire a very great increase of power by combination with each other; but they are at the same time rendered less irritating in their operation. The same observation is applied to other

classes of medicines, especially to diuretics, alteratives, cordials, and tonics. The sanction of such authorities is sufficient, it is hoped, to obviate any objections that may be made to the complexity of some of the formulæ: and though the structure of the human stomach and parts connected with it is so different from those of the horse, as to render all analogical reasoning as to the effect of medicine uncertain, yet we have been too precipitate, perhaps, in dismissing it almost entirely from our consideration. There are several medicines, such as sugar of lead, white vitriol, &c., which produce scarcely any effect on the horse, though of considerable power in the human body; yet it is not very improbable that such medicines when given daily for some time in small doses may produce a salutary effect, or even prove deleterious when largely and incautiously so employed. Arsenic has been given to a horse in a dose of two drachms twice a day, for several days, without any considerable effect being produced; but in one case a sixth part of that quantity occasioned a fatal inflammation of the stomach and bowels. When the stomach of a horse is in a healthy state, it will bear an astonishing quantity of medicines which in the human stomach are either poisonous or powerful medicinal agents; but in some diseased states of the horse's stomach, which are not unfrequent, the same medicines, or others commonly deemed innocent, will produce a powerful and even fatal effect. Mr. James Clark relates two cases of this kind:—one of the horses died from taking a pint of vinegar, and the other from taking a drench in which there was one ounce of nitre and half an ounce of spirit of hartshorn. The experiments that have been made with a view to ascertain the effect of medicine upon the horse should not be too confidently depended upon, as they have generally been made on glandered horses, or such as were incurably lame; in which case it may fairly be presumed that the stomach was in a healthy state. The experiments that have been tried also to ascertain the effect of tobacco on the horse afford a striking proof of the propriety of attending to this circumstance. At the Veterinary College an immense dose (it has been stated three pounds, in infusion,) has been given without any perceptible effect; at Exeter a much smaller quantity, not exceeding, I believe, two or three ounces, was infused in a quart of beer during the night, and in the morning given to a horse at one dose; immediately after taking it the animal fell down and died.

From considerations of this kind, the Author has been led to believe, that simplicity of prescription in veterinary as well as human medicine, may be carried too far; and that many useful medicines, and combinations of medicines, or receipts, may be improperly dismissed from the Veterinary *Materia Medica* and *Pharmacopœia*, were we to confide too much in the experiments

that have been made on the healthy stomach, or attempt to form general rules or deductions from one, two, or three experiments, however carefully they may have been conducted. There is only one source from which any precise or really useful knowledge of this interesting subject can be derived; that is, a *careful and impartial observation, and an accurate recollection of the symptoms of diseases, and the effects of such medicines, whether simple or compound, as are employed for their removal.*

With respect to the names of the simple and compound medicines, the Author has for the most part employed those of the last London Dispensatory, by Thomson, 1830; but he has given also the older and more common names, and in such a manner as may make the general reader, or the young Veterinarian, familiar with both: for our medical nomenclature, even when founded on chemistry or botany, will probably be variable and uncertain.

[The additions made by the Editor of the present edition are by no means numerous. They consist principally of some new medicines, whose effects have been ascertained to be useful or valuable in the horse. In supplying this, he has had free recourse to the Veterinary Pharmacopœia, lately published by Mr. Morton, Lecturer on Chemistry at the Veterinary College, to whose valuable work he begs to refer for a more scientific acquaintance with the greater portion of medicines used for animals.

In former Editions, the names and properties of a number of medicines were given which had either never been tried, or had been found useless for the horse; these have been freely erased, as their retention could have answered no useful end. There are some medicines, however, whose use and value for animals have been disputed, being praised by some and condemned by others; these have been retained in order to afford every facility to those who would again try their effects: the convenience of parties in situations where particular medicines cannot be obtained has also been considered in the present Edition. The Editor, in condensing this portion of the work, has endeavoured to render it more valuable.—ED.]

WEIGHTS AND MEASURES.

THE measures employed in medicine are of two kinds, one for solids, the other for liquids. But there are some fluids much heavier than water, such as sulphuric acid and Goulard's Extract; and there are others much lighter, such as ether and alcohol or spirit of wine; such liquids are, therefore, sold by

weight. Formerly a drop was the smallest liquid measure; this being found very variable, depending upon the size and form of the vessel from which the liquid was dropped, upon the density of the liquid, and other circumstances, a more correct and convenient method has been established. For this purpose a small glass measure is made, in which the drachm, or sixty grains, is divided into sixty parts, which are named minims; it is therefore named a minim glass, and the term minim is substituted in prescriptions or receipts for drops.

Liquid Measure.

Medical
character.

60 minims	M.	minim	1 drachm
8 drachms	3	drachm	1 ounce
16 ounces	3	ounce	1 lb. or pint
2 pints or lbs.	lb	pound	1 quart
4 quarts	qrt.	quart	1 gallon.

The Latin word Octarium is sometimes used for pint, and Congius for gallon; Cyathus, a tea-cup full; Cochleare Magnum, a table-spoonfull, or about half an ounce; Cochleare Medium, a dessert-spoonful, or about 2 drachms; Cochleare Minimum, a tea-spoonful, or 1 drachm.

Dry Measure (TROY).

Medical
character.

20 grains	gr.	grain	1 scruple
3 scruples	ʒ	scruple	1 drachm
8 drachms	ʒ	drachm	1 ounce
12 ounces	3	ounce	1 pound *
	lb	pound.	

M. or Manipulus, signifies a handful.

P. or Pugillum, the 8th part of a handful.

In reading French medical or veterinary books, some difficulty is experienced in bringing their measures to correspond with ours, in consequence of their having adopted a decimal division, both in their liquid and dry measure, and they also appear to feel a similar inconvenience from the difference between the old and the new division of measure. For example: in Thomson's London Dispensary, the French gramme is stated to be equal to 15.444 grains, or about 15 grains and a half. Dr. Nysten, in his Dictionnaire Medicale, makes the gramme amount to 20 grains; and in Bourgelat's Matière Medicale, by Huzard, it is stated to be equal to 18 grains. There appear to be some errors

* Medicines are bought and sold by Avoirdupois weight, in which the pound consists of sixteen ounces, or one fourth more than Troy weight.

in Dr. Thomson's Tables, and it is equally clear, that neither Nysten or Huzard are correct. The following table of French medical weights is from Nysten's French Medical Dictionary:—

			<i>New Names.</i>
			Hectogrammes
Livre, the pound	℔	}	Equal to
Once, the ounce	℥		
Scrupule, the scr.	ʒ		
Grain	g		
12 oz. are equal to	$3\frac{1}{2}$		12 oz. $3\frac{1}{2}$
1 ounce.....to	32		Grammes
1 drachm.....to	4		1 dr. 32
1 scruple.....to	1		Gramme
1 grain.....to	5		20 gr. 1
			Centigrammes
			5

There is an obvious error in this table; for if one gramme is equal to one scruple, four grammes must exceed one drachm. If, therefore, four grammes are equal to one drachm, one gramme can only be equivalent to fifteen grains, instead of a scruple or twenty grains. The following tables are also taken from Nysten's Dictionary:—

Old Measures.

1 poisson.....	125	grammes, or 1	.....	2
1 demi setier....	250	..... or 2	.....	5
1 chopine.....	500	..... or 5	.....	0
1 pinte.....	1000	or 1 litre	0	..... 0

New Measures.

Decilitre. Centilitres.

New Measures.

	Grammes	lb.	oz.	dr.	
1 Centilitre, equal to	10 or 0	0	0	$\frac{1}{2}$	about a spoonful (cuillerée)
1 Decilitre.....	100 or 0	3	1		about $\frac{2}{3}$ of a poisson
1 Litre.....	1000 or 2	0	$3\frac{1}{2}$		a little more than a quart.

Old Measures.

In Crabb's Technological Dictionary, the French litre is stated to be equal to the 35th part of an English bushel, which contains 8 gallons or 32 quarts.

In Nysten's last table, 1 centilitre is said to be equal to 10 grammes, or half a drachm. This is a considerable error; for if the gramme be taken only at 15 grains, 10 grammes would amount to 150 grains, or $2\frac{1}{2}$ drachms.

VETERINARY MATERIA MEDICA AND PHARMACOPŒIA.

ABLUENTS (from *abluo*, to wash away). Medicinal liquids, or water slightly impregnated with mucilage, such as bran tea, or white water, linseed tea, or decoction of marshmallows, which are supposed to wash away or carry off gradually any noxious matter there may be in the stomach or bowels, the biliary or urinary passages, or the blood.

ABSORBENTS. Medicines that absorb or neutralise any acid matter there may be in the stomach or bowels. Of this kind are potash, soda, magnesia, chalk, common clay and earth; the two last owe their absorbent properties to the carbonate of lime they contain. The formation of acid in the stomach depends on some derangement of that important organ, which is brought on by the improper quantity or quality of the animal's food. It will be to little purpose, therefore, to give medicine to absorb the acid, unless the state of the stomach be corrected, which cannot be done without avoiding the cause which disordered it. This morbid state of the stomach, and consequent formation of an acid in it, is very common among horses, and is indicated by a disposition to eat earth or drink muddy water, especially when it is rendered turbid by clay or chalk; and for want of these they will gnaw or lick the walls of the stable, or the dirt from their stalls, or eat their litter. This state of the stomach appears to be brought on by eating too much hay, especially when the hay is indifferent or bad; and this propensity to eat too much hay is acquired gradually, by keeping young horses idle in the stable with a rack full of hay before them, and allowing them too much water; also by irregular feeding, that is, keeping them fasting too long, and then giving them as much as they choose to eat and drink; or by giving them bad hay, and an insufficient quantity of oats, or bad oats as well as bad hay; exposing the animal to cold and wet, when heated and fatigued by exercise, will disorder the stomach, and immoderate work will do the same. In whatever manner this morbid condition of the stomach is brought on, it must be obvious, after what has been said, that absorbent medicines can only act as palliatives, and as such they are certainly useful. It is advisable, however, to give in the first place a mild dose of physic. If good hay cannot be procured, some good straw may be substituted for it, and a mash of fresh sweet bran, or pollard, by some named

gurgings. When new or musty oats are the cause of the disease, and better cannot be had, they should be dried on a malt kiln: or some barley that has been boiled or steeped for twenty or thirty hours in water may be given. The farinaceous or saccharine roots, such as potatoes, parsnips, mangel-wurzel, or carrots, may be found useful, especially if cooked by steam. Though an improvement in diet is the remedy to be mainly relied upon for restoring the stomach to health, there are other circumstances to be attended to, which may hasten or assist in the cure. Pure air, regular exercise, assiduity and kindness in the groom, and the society of other horses, will greatly exhilarate the animal's spirits, and thereby improve the digestive function. When the season is favourable, a run at grass in short sweet pasture is perhaps the most effectual remedy of all.

Though animals are led by instinct to eat dirt and drink muddy water, in order to allay the irritation caused by an acid in the stomach, much mischief has sometimes arisen from allowing horses to indulge such an appetite. Mr. Feron states, that many fatal attacks of colic have been produced by horses eating earth or sand when at camp, as it accumulates and forms large balls in the bowels; that he has opened horses that died from this cause, and found nearly two buckets of sand in the cæcum and colon (the large bowels). Hard stones of considerable size are sometimes found in horses' bowels, most commonly in millers' horses. I have seen one that weighed eight pounds, and I think there is one in the Museum of the Veterinary College, that weighs ten pounds. Cattle that are tied up during the winter often acquire a propensity to lick up earth; they also, as their coats become loose on the approach of spring, are frequently licking themselves, and often swallow a great deal of hair, which is formed into balls in the stomach, and sometimes occasions serious disorders. I have known a great number of these balls discharged by the droves of cattle that pass through Oak-hill, towards Benegar Fair, in Whitsun week; some of them as large as a man's fist. Calves, when fattening, are often fed so injudiciously, as to bring on serious disorders of the stomach. This organ in the calf, and probably in all animals, has the property of coagulating milk; but when it is disordered by being overloaded with milk, or by drinking stale milk, or milk from a cow that has a bad udder, an acid appears to be formed in the stomach, which sometimes coagulates the milk suddenly, and forms it into hard indigestible curds, similar to cheese; I have known calves and lambs die from this cause. It is a common practice with farmers, to give young lambs chalk, mixed with barley or oatmeal, when fattening them. This certainly does some good, by correcting the acidity of the stomach; but still they are often affected with either diarrhœa, or costiveness, and

loss of appetite, and sometimes with colic and convulsions. It would be much better, therefore, in fattening calves, to adopt a practice more conformable to nature.

Absorbents.

- No. 1. Subcarbonate of soda 2 to 4 dr.
 Ginger 1 dr.
 Columbo root, powdered 2 to 4 dr.
 Mix for one dose.
- No. 2. Prepared Chalk 4 dr.
 Gentian root, powdered 2 to 4 dr.
 Aromatic powder 1 to 2 dr.
- No. 3. Aloes 3 dr.
 Rhubarb 3 or 4 dr.
 Subcarbonate of soda 2 or 3 dr.
 Ginger 1 to 2 dr.
 Treacle enough to form the ball.

Remark.—Nos. 1 and 2. are absorbent and stomachic, and may either be given in a little gruel, water, or beer, as a drench, or made into a ball with treacle. Should there be no convenience for giving either of these, the horse would probably swallow them with his food or water, especially if the bitter powders were omitted.

No. 3. is a gentle purgative, as well as absorbent and stomachic, and is that which should be preferred when a horse can be spared from his work for a day or two. The receipts Nos. 1 and 2. may be repeated daily as long as it is necessary; and at an interval of a week or ten days the purgative may be repeated.

ACACIA CATECHU, commonly, but improperly, called Terra Japonica, or Japan Earth, and Catechu, or more properly Extract of Catechu, is obtained from the inner dark-coloured wood of an Acacia tree, which grows plentifully in the mountains of Kankana, in Hindostan, and flowers in June. The wood is boiled in water, and when strained off and boiled down to one-third part, is set in a place to cool for one day, and afterwards the evaporation is completed by the heat of the sun. There are two varieties of this extract; one brought from Bengal, the other from Bombay. The latter kind is of a pale reddish-brown colour, and is generally in small square cakes; the other is in round masses, of a deep chocolate colour internally, with the hue of rusty iron on the outside; it is heavier than the pale, its specific gravity being generally about 1.39, possesses more astringency, and should therefore be preferred. Catechu is a powerful astringent, and is given in obstinate diarrhœa, as the scouring of cattle, and in diabetes, or excessive staling. I have

given it also with good effect in bloody urine. In the two latter diseases, I have given it with opium, ginger, and sometimes with alum; and in the first with allspice, caraway seeds, and ginger, simmered in half a pint of table beer, and afterwards mixed with half a pint of good ale, or strong beer. The dose of catechu is from 1 to 4 drachms. I am inclined to think that it would be found a useful tonic, in habitual or constitutional weakness of bowels; that is, in horses that scour from any unusual exercise, or upon drinking cold water; also in cases of general debility. Alkaline salts destroy the astringent powers of catechu, and metallic salts form with it insoluble compounds.

ACACIÆ GUMMI, ACACIA GUM. Gum Arabic. This gum is procured from the bark of a species of mimosa, which is very common in Egypt, and Arabia Petræa. Several other trees also produce it, and it is remarkable that the barks of those trees from which it is obtained are extremely bitter. Cherry and plum trees are an instance of this. There are two principal sorts of gum Arabic, one procured from the Levant, another from the East Indies. The latter is the darkest, is not so readily soluble in water, and forms a thicker mucilage than the former. The mucilage of acacia is formed by gradually adding half a pint of boiling water to four ounces of the gum in powder, until they form a mucilage. Although it exerts no specific action upon the system, still it is extremely useful as a demulcent, forming, as it were, a coat which shields those parts through which it passes from the action of acrid substances. It is prescribed in inflammation or irritation of the fauces and alimentary canal, and in painful affections of the urinary organs.

ACETATE. A salt formed by combining acetic acid or pure vinegar with an alkali, an earth, or a metallic oxide. There are several acetates used in Veterinary Medicine, each of which will be noticed under its respective name.

ACETATE OF AMMONIA, SOLUTION OF.—*Liquor Ammonia Acetatis.* Formerly named Mindererus's Spirit, and is made by adding vinegar to carbonate of ammonia in powder, until it ceases to produce effervescence; about an ounce of the carbonate of ammonia will be sufficient for two pints of vinegar. It may also be made, by adding spirit of hartshorn to vinegar till it tastes neither salt nor sour. Mr. Blaine strongly recommends this medicine in febrile disease, and epidemic catarrh when debility is present combined with camphor and camomile. Its action is diaphoretic, slightly diuretic and tonic, the dose from 4 to 6 ounces. The Editor has given it in influenza with good effect.

ACETATE OF COPPER.—*Cupri Di-acetas.* This was formerly named crystallised verdigris, and distilled verdigris. It is composed of the oxide of copper and acetic acid. It is sometimes

employed finely powdered as an escharotic to cleanse foul ulcers, and has been used with success as a remedy for quitters.

ACETATE OF LEAD.—*Plumbi Acetas*. Is made by mixing one pint of strong acetic acid (vinegar) with a pint and a half of boiling distilled water, and then adding gradually one pound of subcarbonate of lead. The solution is then to be filtered through paper and evaporated until a thin pellicle appears on its surface, when it may be put by in order that crystals may form. These, after pouring off the water, are to be dried upon blotting paper. The superacetate of lead is commonly named Sugar of Lead, and the liquid subacetate, Goulard's Extract of Lead. Mr. Morton recommends sugar of lead for internal hæmorrhage, and for protracted diarrhœa and diabetes in doses from half a drachm to a drachm. Sugar of lead has been given internally; but I consider all the preparations of lead not only unnecessary, but dangerous as internal remedies, though one very large dose may be given without any perceptible effect. Animals have often been poisoned by grazing in the neighbourhood of lead mines; this is well known in the parish of Wookey, near Wells. The disease thus produced is there named *mindinging*; or rather the animals so affected are said to be *minded*.

ACETIC ACID and ACETOUS ACID.—*Acidum Aceticum*; *Acidum Acetosum*. See ACIDS and VINEGAR.

ACIDIFICATION. A natural or artificial operation, by which an acidifiable substance, becoming saturated with oxygen, acquires the property of an acid. The acidified substance is called the *base*, and its name designates the particular acid of which it forms a part. Thus, the base of sulphuric or carbonic acid is sulphur and carbon.

ACIDS. All substances whether solid or liquid, which have a sour taste, are termed acids, although it by no means follows that all acids are sour; prussic acid, for instance, is not so. Most acids are composed of oxygen, in combination with a combustible base, and when several acids have the same base, united with different proportions of oxygen, the name of that which contains the larger portion terminates in *ic*, while that of the one combined with the smaller quantity ends in *ous*; thus nitric, nitrous; phosphoric, phosphorous; sulphuric, sulphurous; &c. Acids possess the property of changing the blue juices of vegetables into red, and of readily combining with alkalies, earths, and metallic oxides, forming with them various kinds of salts, which are used in medicine. Of this kind are the preparations commonly named Glauber's salt, Epsom salt, blue and white vitriol, sugar of lead, &c.: each of these will be noticed under its respective name. Acids are divided into three classes; viz. mineral, vegetable, and animal acids. The mineral acids used in veterinary practice are the sulphuric, the nitric, and the

muriatic. Of the vegetable only two: viz., the acetic, or acetous acid, commonly named vinegar; and the tartaric acid, or rather the combination of it, with a small proportion of potash, which is named cream of tartar: no other acids are employed.

ACID, ACETOUS OR ACETIC.—*Acidum Aceticum*. A strong acetic acid is now very commonly obtained from wood, by distillation in iron cylinders. When all the acid and other volatile parts have been expelled, there remains in the iron cylinder the best kind of charcoal. The liquid is at first very impure, and commonly named pyroligneous acid, but by another process it is purified, and becomes a pure and powerful acetic acid. It has of late been much used for medical as well as culinary purposes. Strong acetic or pyroligneous acid is about six times the strength of common vinegar. It is very useful and convenient for veterinary purposes, either as a rubefacient, an antiseptic, or an ingredient in cooling lotions. For veterinary purposes, common vinegar will do very well. Hot vinegar is sometimes used as a fomentation for deep-seated strains; it is used also with water as a cooling lotion; sometimes it is employed with the addition of crude sal ammoniac (muriate of ammonia) and spirit of wine; it is seldom given internally. Mr. James Clark relates a case of a horse dying immediately after being drenched with a pint of vinegar. Combined with water it forms an excellent lotion for washing out small particles of lime from the eye.

ACID, MURIATIC. (New name, HYDROCHLORIC ACID).—*Acidum Hydrochloricum*. Commonly called spirit of salt. This is sometimes used externally as a caustic, and is an excellent agent in neutralising putrid miasmata. When united with earths, alkalies, or metallic oxides, it forms *muriates*. Muriatic acid is now denominated hydrochloric acid, the real acid contained in the liquid preparation being composed of equal volumes of chlorine and hydrogen. On exposure to the air it emits fumes which are readily seen. It has been given with advantage in cases of calculi, in doses of one drachm to three in a pint of water, continued for some time. Its effect is to soften and even dissolve the calcareous body.

ACID, NITRIC AND NITROUS.—*Acidum Nitricum et Nitrosum*. Both these are powerful caustics. The first is limpid or colourless, and transparent like water; the nitrous acid is of a dark yellow colour, and gives off suffocating fumes of a deep yellow colour on opening the bottle in which it is kept. This acid is obtained by the action of sulphuric acid on nitre. Some useful external applications are made from nitrous acid, especially nitrate of silver or lunar caustic, and nitric oxide of mercury or red precipitate. Sweet spirit of nitre, now named spirit of *nitrous ether*, is made by the distillation of nitric or nitrous acid.

(for there is but little difference in their medicinal properties), and alcohol or spirit of wine. That very useful salt named nitre is composed of nitric acid and potash. When nitric or nitrous acid is diluted with an equal quantity of water, it forms *aqua fortis*. Nitrous acid or *aqua fortis* should be kept in a bottle with a glass stopper, as a cork is soon destroyed by it. When quicksilver or copper are dissolved in nitrous acid, they are employed as remedies for the foot rot in sheep, or the canker in horses, either alone or diluted with water, or they may be mixed with hog's lard, provided the latter be first melted, and the mixture stirred until it becomes cold. Nitric acid forms *nitrates*, when combined with the alkalis, earths, or metallic oxides.

ACID, PRUSSIC. "New name, Hydrocyanic Acid, *Acidum Hydrocyanicum*. This acid is composed of hydrogen and chlorine. It is a most powerful poison; a few drops being sufficient to destroy many large animals.

"By the Pharmacopœia, it is directed to be prepared of such strength, that two parts of real acid shall be contained in 100 parts of the dilute acid. Dilute hydrocyanic acid is a transparent liquid, free from colour. Its action is that of a powerful sedative, and may be given to the horse in doses of from half a drachm to a drachm and even more; for it is surprising what large doses, when gradually increased, this animal will bear. I have administered four fluid drachms; and although the action was very violent for a time, there being a loss of consciousness, with convulsive movements, stertorous breathing, and accelerated pulse, yet this passed away, and then its sedative influence was shown by the pulse being lessened in frequency, and the vital powers depressed. It has been given in cases of gastric and pulmonary irritation, accompanied with cough; also in carditis; and by some it is advocated as a vermifuge, slowly thrown up as an enema, in quantities of a drachm two or three times in the day, and mixed with about a quart of water, it has been found to lessen the muscular contractions in tetanus. The impression of the first injection on the nervous system is very powerful, but subsequent ones produce comparatively little action that is apparent. It may be given by the mouth in the same disease, after the bowels have been acted upon by a purgative, combining it with other sedatives for the purpose of tranquillising the excitement of the motor nerves, and thus allaying the general muscular spasm." — See *Morton's Manual*.

ACID, SULPHURIC. — *Acidum Sulphuricum*. Vitriolic acid, or oil of vitriol. This is the strongest of the mineral acids, and a very powerful caustic. It was formerly made by distilling green vitriol, or copperas (sulphate of iron), and then named vitriolic acid; it is now made from sulphur, and therefore named sul-

phuric acid. Sulphuric acid is sometimes used as a caustic in canker of the horse's foot; it is sometimes mixed, or rather combined, with oil of turpentine, and forms with it a blackish liniment, which, when mixed with hog's lard, is sometimes used to disperse callous tumours; and this, by adding some powdered cantharides to it, forms a strong blister (see BLISTERS); and, by the addition of sulphur, a good mange ointment. Sulphuric acid (in a small proportion, such as a few drops to an ounce) will unite, by shaking, with olive oil, and form a good stimulating liniment*; and when mixed with tar in the proportion of from one or two ounces to the pound, it forms an excellent application for bad thrushes and canker of the foot. For internal use sulphuric acid is sometimes mixed with spirit of wine, and in this mixture spices, such as cinnamon and ginger, are steeped. This preparation was formerly named elixir of vitriol, and new aromatic sulphuric acid. A spirit of vitriol is kept in the shops, which is nothing more than sulphuric acid diluted with seven or eight times its weight of water. Sulphuric acid mixed with alcohol, and distilled, forms that powerful medicinal preparation named ether. It forms neutral salts, named *sulphates*, when combined with the alkalies, earths, and metallic oxides; thus, with soda, it forms sulphate of soda, or Glauber's salt; with magnesia, sulphate of magnesia, or Epsom salt; with copper, sulphate of copper, or blue vitriol; with zinc, sulphate of zinc, or white vitriol; and with iron, sulphate of iron, salt of steel, or green copperas. When pure, sulphuric acid should be as colourless and transparent as water. By exposure to the atmosphere it quickly becomes of a brown colour. Horses have been destroyed by the administration of too large a quantity of sulphuric acid, either wilfully or by mistake. It soon inflames and corrodes the stomach, and renders the mouth black. The antidotes are magnesia, the carbonates of soda or potash, or soap, the effect of which is to neutralise the acid by combining with it.

ACID, TARTARIC. See TARTAR.

ACID, VITRIOLIC. See ACID, SULPHURIC.

ACONITUM. Wolfsbane. Common Monkshood. This is a perennial plant, which flowers in July, and is a native of the Alpine forests, and of the mountains of Germany. Its properties are narcotic, diaphoretic, and diuretic, but it loses most of its medicinal qualities by being dried. It has been fairly tried on horses in this country and in France, and found to be extremely deleterious. M. Collaine, a veterinary professor at Milan, has given it to horses affected with farcy, in the large dose of one ounce and a half daily. It distressed the animals extremely,

* The common black oil of farriers, a useful digestive application, is made by mixing two ounces of oil of turpentine with a pint of olive oil, and then adding six drachms of sulphuric acid.

without producing any good effect upon farcy sores. Being satisfied of its inefficacy as a remedy for the disease, as well as of its deleterious quality, it was discontinued, and the poor animals were killed. Mr. Coleman gave it a trial, and was so satisfied, after a few experiments, of its being merely a poison with regard to the horse, that he has never repeated the experiment.

ACORUS CALAMUS. Sweet Flag. This is found in most parts of Europe, growing in marshes or streams of water. It flowers in May and June, and is an excellent stomachic. Its dose in powder is from one to two ounces, mixed with bran or honey; in infusion from four to six ounces may be given with two quarts of water.

ADEPS. Hog's Lard. Lard is emollient, and is chiefly used in the composition of ointments. If long exposed to a warm air it attracts oxygen from the atmosphere, for which it has a strong affinity, and becomes rancid.

AIR. As the health of horses materially depends upon the salubrity of the air in which they are kept, it is probable that many of their diseases arises from the little attention that is paid to the ventilation of stables. It has been said that even the *glanders*, a fatal and contagious disease, has been generated by confining horses in an impure air. It is a common practice with groomers, particularly those who fancy themselves profoundly skilled in the art of farriery, to stop every crevice they can find in the stable, so that pure air is with difficulty admitted; and the noxious vapours arising from the litter, from perspiration and respiration, are in a great measure confined. Horses thus situated must necessarily suffer in a greater or less degree; and though the air may not be so contaminated as to occasion fatal diseases, it is sufficiently so to debilitate the constitution, and thereby lay a foundation for numerous complaints, as well as to create local diseases, such as inflamed eyes, obstinate coughs, and perhaps *moon blindness*, as it is termed. Horses that have weak eyes and lungs are sure to be injured by this treatment. Another inconvenience arising from it is that of rendering a horse very susceptible of cold. *Ventilation* is, therefore, an object of great importance in the construction of stables; and is most conveniently obtained by making proper apertures in the ceiling, communicating with the external air; or by means of windows, adapted to the form and size of the stable. It is a bad method of ventilation to leave the upper parts of the racks open, so as to communicate with the roof of the building, as a current of air is thereby produced in a stall, over the horse's head. The litter should not be suffered to remain in the stall during the day, but be removed to some open place and well shaken, that the ammoniacal vapours it affords may be thoroughly dissipated. Should it be

necessary for a horse to lie down in the day-time, he should be allowed fresh straw.

ALCOHOL. — *Spiritus Rectificatus.* Alcohol. Rectified spirit. This is obtained by the distillation of fermented liquors, in a diluted state; it is afterwards rectified or concentrated by a second or third distillation more gradually conducted, and with less heat. Alcohol is extensively employed in medicine, chiefly in making tinctures; with an equal quantity of water it forms proof spirit (*spiritus tenuior*), the most usual form in which it is employed. The strength of alcohol is sometimes judged of by shaking the spirit, and observing the length of time the bubbles thus created on its surface remain; but this is a most uncertain criterion. Another method is to pour a few drops of it upon gunpowder, in order to ascertain whether it is capable of making it explode; but, if it be not strong enough to do so, this experiment affords no certain data for judging of its strength. A simple mode of determining the relative degrees of strength possessed by spirits, is to take a phial capable of containing 500 grains of distilled water. Rectified spirit of equal bulk should weigh 418 grains, and proof spirit 465. Proof spirit, either in the form of brandy, rum, or gin, or made into a cordial tincture, by having some spices or bitters steeped in it, is sometimes given to horses as a cordial or carminative, when fatigued before they arrive at the end of their journey, or when seized with the fret or gripes. From 2 to 4 or 6 oz. diluted with water are the doses generally employed. If a horse is unaccustomed to this cordial, or to beer, a small dose will generally be sufficient. When we consider that the excitement produced by cordials, especially diluted spirit or beer, is only temporary, that it causes a greater flow of nervous power or animal spirit towards the stomach in particular, and likewise to all the muscular system, it must appear evident that it has a tendency to weaken the sensorium or brain, as is proved by the excitement it produces being always followed by more or less depression in the stomach, and all the organs of the body, according to the degree of excitement that has been produced. From this consideration it is obvious that we should be cautious in the use of spirituous cordials, and not give stronger doses than are necessary. It is not an unusual thing to give two bottles (about a pint) of Daffy's Elixir, a tincture made with proof spirit, at a dose; sometimes undiluted, and even mixed with pepper. Half a pint of gin, and two ounces of pepper, is not an unusual dose with stable-men for gripes or fret; and as it often cures the disease they think nothing of the consequences. Mr. Bracy Clark recommends four ounces of a tincture of allspice, made with proof spirit, as an excellent remedy for the

gripes or fret; and such I have no doubt it is, especially if made with old brandy. I have been assured by a veterinary surgeon, that he once cured a horse of gripes by a dose of hot water; and it is by no means unlikely that a warm infusion of some of our medicinal herbs, such as peppermint, pennyroyal, rosemary, &c., would be found effectual, especially if a glass of gin were added to it. I have experienced the good effect of giving a horse a little brandy and water when fatigued, and off his feed during a journey; it generally restores the appetite, and enables him to finish his journey with comfort.

ALE. See BEER.

ALKALIES. *Alkalies* form one of the classes of saline bodies, and are of three kinds: 1st, The *vegetable alkali*, kali, or potash. 2d, The *mineral alkali*, soda or natron: and the *volatile alkali*, or ammonia. Each of these will be described under the following heads, *potash*, *soda*, and *ammonia*; which names are employed by the London College of Physicians. *Alkalies* are distinguished by their changing blue vegetable colours to a green, and yellow to orange; by combining rapidly with acids, and forming with them neutral salts (see ACIDS); and by rendering oils miscible with water. (See EMULSIONS and SOAP.) The *vegetable* and *mineral alkalies*, from not being evaporable, except in a high degree of heat, were termed *fixed*: and *ammonia*, being evaporable in a low temperature, obtained the name of *volatile alkali*.

ALKANET ROOT. — *Achusa Radix*. The best species of this root is imported from France. It is used for imparting a beautiful red colour to oils, ointments, and plasters, and to preparations of alcohol and ether.

ALLSPICE. — *Pimenta Bacca*. Jamaica pepper, a powerful cordial and carminative; the dose from 2 to 3 or 4 drachms. Mr. Bracy Clark, in a book he has published on flatulent or spasmodic colic, or gripes, strongly recommends a tincture of allspice in proof spirit, as an effectual or sovereign remedy for that disorder. The dose about 4 to 6 oz. in water.

ALOES. — *Aloë*. This is the inspissated juice of certain plants of the same name, and the most effectual purgative for horses we are acquainted with. It is of an intensely bitter taste, and of a strong unpleasant odour.

The different sorts of aloes are distinguished by the names of the places whence they are brought.

SOCOTRINE ALOES* is brought from the island of Socotra, in the Indian Ocean, and is supposed to be more safe in its operation than the other kinds. It is of a dark reddish or yellowish-

* The Socotrine aloes, Mr. Morton states, is no longer to be met with in the market. It was an extract from the same aloes as the Cape, viz. the spiked aloe.—ED.

red colour, quite opaque, perfectly soluble in alcohol or water, and has a less disagreeable smell than the others; when reduced to powder it is of a bright yellow colour; it sells at a high price, and is therefore not unfrequently adulterated. I have been so often disappointed in the effect of *Socotrine aloes**, or rather what is commonly sold under that name, that I now always use the *Barbadoes*†, which cannot so easily be adulterated without detection.

BARBADOES OR HEPATIC ALOES is brought from Barbadoes, and has been generally considered as a rough medicine, very liable to produce griping, and other unpleasant effects; but I have always found it a safe and efficacious purgative. *Barbadoes aloes* is of a darker colour than the former kind, not so clear and bright, less brittle, and of a stronger and more disagreeable smell.‡ It is certainly more active than the *Socotrine*; and, as far as my experience goes, more certain in its operation: nor have I ever found it produce those dangerous effects that have been attributed to it, when given in a proper dose, and when the horse is not neglected during its operation and is properly prepared for it (see **CATHARTICS**): indeed, every kind of aloes is liable to produce even fatal consequence if given too largely, or if the horse be treated improperly while under their effect. There is a peculiarity in the horse's intestines which renders them more liable to be injured by purgatives of every kind, than those of any other domestic animal: cathartic medicines should therefore be always prepared by persons of judgment and experience.

CAPE ALOES is rather transparent, and very brittle: it is easily powdered, in which state it is of a bright yellow colour with a greenish tint; the odour arising from it is not so strong as the *Barbadoes*, but rather stronger and less agreeable than the *Socotrine*. This kind is sold at a much lower price than the others, but is weaker and more uncertain in its effect. The dose of *Barbadoes* is from four drachms to six; and of the *Cape*, from six to nine drachms.

Aloes generally operate more speedily when joined with *soap* or either of the *fixed alkalies*.§ In the old books on farriery,

* In December 1805, *Socotrine aloes* was at about the same price or cheaper than *Barbadoes*.

† In 1823, *Barbadoes aloes* was very scarce, and sold at from 10 to 12 shillings per pound; *Barbadoes aloes* is now prescribed by many physicians, and often used by apothecaries.

‡ There is an inferior kind called caballine or horse aloes, supposed to be the refuse after the *Barbadoes* extract has been obtained.—ED.

§ Mr. Morton considers that the purgative quality of aloes is lessened by the addition of the alkalies, though it is thereby rendered more soluble, and therefore quicker in its effects.—ED.

cream of tartar is generally prescribed with aloes, under a supposition that it prevents griping; but I consider it by no means proper, and have for some time preferred soap and the alkalies, such as potash and soda; but soap is by far the most convenient. (See CATHARTICS.)

Aloes is sometimes given as an alterative in the dose of one or two drachms. It is also an ingredient in *Friar's balsam* and *compound tincture of myrrh*.

ALTERATIVES are medicines that act very gradually upon the constitution, and therefore require to be continued for some time. The medicines most commonly used as alteratives for the horse are antimony, nitre, sulphur, resin, and Æthiop's mineral; these are generally given together, particularly the three former. The cases in which alteratives are commonly employed, are diseases of the skin, such as mange and other itching humours, hide-bound and dry, staring coat. They are given also in swellings, or humours of the hind legs, and worms. They appear to do good, by increasing the discharge of excrementitious matter from the body, through the various emunctories or outlets, such as the bowels, the kidneys, and the skin. From viewing the subject in this light, I have been induced to arrange them under three heads; viz. laxative alteratives, diuretic alteratives, and diaphoretic alteratives. Were we to confine ourselves strictly to the common acceptation of the term alteratives, we should describe them as medicines, which cure diseases by a gentle, slow, and insensible operation upon the body; and under this impression, it would appear unnecessary to watch the effect which such preparations produced upon the body. This would be a departure from the precept which I have before offered; viz. "there is only one source from which any precise or really useful knowledge of the interesting subject of Veterinary Medicine can be derived; that is, a careful and impartial observation, and an accurate recollection of the symptoms of diseases, and the effects of such medicines, whether simple or compound, as are employed for their removal." By attending to this rule, I have observed that the medicines given as alteratives have generally some visible effect upon the bowels, the kidneys, or the skin; the division of them, therefore, into laxatives, diuretics, and diaphoretics will be found useful in practice.

LAXATIVE ALTERATIVES are useful in many cases, and may often be substituted for *purgatives* with great advantage.

When a horse is troubled with worms, and is too weak to take strong medicines, or when he cannot be spared from his work, they are extremely convenient, and generally beneficial. In obstinate cases of *grease*, and in chronic inflammation of the eyes, they often do good; they are generally serviceable also in coughs

of long standing, or even when they are recent, if not caused by strangles, in which disease the throat is often so much inflamed, and so very sore, as to render the exhibition of medicine by the mouth improper. Clysters, however, are often beneficial in those cases.

In short, there are few medicines of more general utility in the diseases of horses than the laxative alteratives, the most effectual of which is *aloes*, in the dose of two or three drachms, with an equal quantity of Castile soap.

DIURETIC ALTERATIVES are composed of *nitre*, *resin*, *soap*, and *turpentine*. They are employed in swellings of the legs and other parts, or as a preventive, in horses that are subject to such swellings; and they are given also to improve the coat and general condition of the animal.

Though not so effectual in some cases as the preceding, they are certainly very convenient and innocent, and produce so little disturbance in the body, that a horse may continue his work while taking them, without the least danger, even in the winter season. Nor is there any trouble in giving them; as a horse readily eats them, when in the form of a powder, with his corn. The *laxative alterative* has not this advantage, the *aloes*, of which it is composed, being extremely bitter, and therefore requiring to be given in the form of a *ball*.

DIAPHORETIC ALTERATIVES are composed of medicines that act on the skin, gradually increasing the insensible perspiration, and giving a smoothness and gloss to the coat. The most effectual medicines of this class are the preparations of *antimony* (see ANTIMONY); but these may be rendered more efficacious by being joined with other medicines, such as cordials, camphor, opium, &c.

The complaints in which this kind of *alterative* is most useful, are those termed *surfeit* and *hide-bound*; they are also employed to remove an undue determination of blood to any internal organ, or to diminish general plethora.

Diaphoretic alteratives seldom prove effectual, unless assisted by exercise and good grooming.

The alteratives recommended by writers on farriery were not composed according to the distinction we have here made; but laxatives, diuretics, &c. were mixed with little discrimination; thus, as we have before observed, antimony, nitre, sulphur, and resin, formed their general alteratives; and when it was required to remove diseases, supposed to arise from obstruction in the blood-vessels, some ponderous medicines were prescribed: among these were cinnabar, and Æthiop's mineral.

LAXATIVE ALTERATIVES.

- No. 1. Barbadoes aloes..... 8 to 12 dr.
 Castile soap..... 1 $\frac{1}{2}$ oz.
 Caraways, or aniseed, powdered.... 1 $\frac{1}{2}$ oz. or 2 oz.
 Ginger..... $\frac{1}{2}$ oz.

Syrup or treacle enough to form a mass, to be divided into four balls, one of which is to be given daily until the bowels are opened.

- No. 2. Barbadoes aloes..... 8 to 10 dr.
 Calomel..... 2 to 4 dr.
 Caraway seed, powdered..... 1 $\frac{1}{2}$ oz.
 Ginger... 4 dr.
 Oil of cloves..... 40 drops.

Mix as above for four doses, and give one daily until the bowels are opened. While taking these balls the horse must have mashes, and the chill taken off his water; he should not be exposed to the cold, but have moderate exercise.

- No. 3. Sublimed sulphur..... 6 oz.
 Tartarized antimony..... 6 dr. to 1 oz.
 Calomel..... 3 dr.

Mix and divide into six doses, one of which is to be given daily.

DIURETIC ALTERATIVES.

- No. 1. Yellow resin, and nitrate of potash,
 of each..... 4 oz.

Mix and divide into six or eight parts, one of which is to be given daily in the horse's corn, until a diuretic effect is produced.

- No. 2. Yellow resin 4 oz.
 Spanish soap..... 3 oz.
 Venice turpentine..... 2 oz.

Powdered caraways enough to form the mass. To be divided into balls of a moderate size, one to be given daily until a diuretic effect is produced.

- No. 3. Powdered nitre 4 oz.
 Resin and flour, of each..... 2 oz.

Treacle enough to form the mass. To be divided into balls of a moderate size, and given as above.

DIAPHORETIC ALTERATIVES.

No. 1. Levigated sulphuret of antimony...	2 dr. to 1 oz.
Caraway seeds	$\frac{1}{2}$ oz.

Mix for one dose.

No. 2. Tartarized antimony.....	1 to 2 dr.
Camphor.....	1 to 2 dr.
Liquorice powder	3 dr.

Syrup enough to form the ball.

The following will be found an useful alterative in diseases of the skin :—

Sulphur.....	4 dr.
Nitre.....	3 dr.
Antimony	2 dr.

To be given daily with the food.

Diaphoretic medicines are very uncertain in their effect upon the horse, and unless great care be taken of the animal with respect to grooming, exercise, diet, and clothing, little benefit is to be expected from them. Opium has been prescribed, with camphor, tartarized antimony, ammonia, and other stimulants, for the purpose of relaxing the skin and producing perspiration; but there is often danger in giving such medicines, especially when there is any degree of fever present: the medicines prescribed in the above receipts are innocent if they fail in affecting the skin, as in such cases they are generally determined to the kidneys, and cause an increased discharge of urine, especially if the horse be not warmly clothed. (See DIAPHORETICS, FEBRIFUGES, SUDORIFICS, &c.) Many other medicines have been prescribed as alteratives, by veterinary writers, among which are Æthiop's mineral, cinnabar, guaiacum, kermes mineral, cream of tartar, the neutral salts, &c. To these may be added one which has often been found more efficacious than all the rest, that is, soiling in the stable on vetches, or tares, lucern, &c., or a run at grass.

ALTHÆA. See MARSH MALLOWS.

ALUM. — *Alumen*. A saline body, composed of *sulphuric acid* and *alumine*, or pure clay, and *potash*. It is used internally as an *astringent* in *diarrhœa*, *diabetes*, *red-water*, &c. in doses from two drachms to half an ounce in the horse, and one ounce in cattle, or more, and is generally joined with *bitters* and *aromatic stimulants*, such as *gentian*, *cassia*, *aniseed*, *caraway seed*, &c. It has been employed in doses of one and two ounces to dry the milk after calving in cows. For external purposes *alum* is very useful: it is a good remedy for the *grease*, when dissolved and applied to the diseased parts; it is also used in the form of an ointment:—

Powdered alum.....	4 oz.
Turpentine	4 oz.
Hog's lard, or palm oil	12 oz.

The lard and turpentine to be melted together, and when nearly cold the alum to be stirred in.

Alum dissolved in water is used in aphthæ and other diseases of the mouth; and sometimes, much diluted, is applied to the eyes in ophthalmia. In a state of powder it has been applied with advantage to open joints, either alone or mixed with sulphate of iron and myrrh. The burnt alum is best for this purpose, and should be applied frequently.

BURNT ALUM is made by putting any quantity of alum in an iron ladle, or common firepan, and keeping it over a gentle fire, until its watery parts are evaporated, and it is converted into a light and easily pulverisable substance. If exposed to a strong heat for some time, the alum is decomposed, and of course useless.

AMALGAM. The combination of mercury with any metal is termed an amalgam.

AMBER. — *Succinum*. This is what naturalists term *bitumen*. It affords only one preparation that is used in veterinary practice, — an essential oil, of a dark colour, and very disagreeable odour, — which is employed as an embrocation in strains, bruises, &c., generally mixed with other oils, such as *oil of elder*, *turpentine*, &c.* It is given internally as an antispasmodic, in doses from two drachms to half an ounce or more. For medicinal purposes this essential oil is rectified, whereby it becomes of a lighter colour, and loses in some degree its unpleasant smell; but it does not appear to be rendered more efficacious. There is a *salt of amber* kept in the shops, procured from *amber* by sublimation, but it is never used in veterinary practice.

AMMONIA. This is the modern term for what is named *volatile alkali*, and is procured either from bones or sal ammoniac. It is kept in the shops both in a solid and a liquid form. Strictly speaking, *pure ammonia* exists only in the form of *gas* or *air*: but water will absorb a considerable quantity of this air; and when saturated with it becomes a violent stimulant, capable of inflaming, and even blistering the skin. This is termed *liquor* or *water of*, or *solution of pure ammonia*, or *strong spirit of sal-ammoniac*, and is useful in dispersing indolent tumours, if mixed with an equal quantity of sweet oil, and oil of turpentine, in which camphor has been dissolved. *Liquor of pure ammonia* is too strong for internal use; but when *ammonia* is, by a chemical process, combined with *carbonic acid*, or fixed air, it assumes a solid form, and is rendered sufficiently mild for that purpose. In

* This drug is not used in veterinary medicine at the present day.—ED.

this state it is named *carbonate of ammonia*, or *prepared ammonia*, *volatile sal-ammoniac*, or *smelling salts*, being much used for smelling-bottles, as its quick pungent odour is well calculated to remove faintness. Ammonia is invariably produced during the natural or artificial decomposition of organised bodies.

CARBONATE OF AMMONIA. — *Ammonia Carbonas*, now called Sesqui-carbonate of Ammonia. This is stimulant, antacid, and cordial, and is given in doses from half a drachm to two drachms.

When carbonate of ammonia is dissolved in water to saturation, it forms *water* or *solution of mild ammonia*, or *common spirit of sal-ammoniac*; when distilled with spirit and some aromatic oils, *spirit of sal volatile*, or *compound spirit of ammonia*: and if *assa-fetida* be added, the *fætid spirit of ammonia* is produced, which is sometimes given as an antispasmodic. See ASSAFÆTIDA.

The SALT and SPIRIT OF HARTSHORN are nearly the same as the *carbonate*, and the *solution* or *water of ammonia*; but being distilled from bones, or stag-horns, which are of the same nature, they are slightly impregnated with *animal oil*, which gives them a peculiar smell, and is supposed to increase their antispasmodic power. See ANTISPASMODICS.

AMMONIACUM; Ammoniac. This is divided into two sorts. The first is of a yellowish colour, interspersed with small pieces of wood, and other extraneous matter; the other, in small pieces or drops, of a whiter colour than the former, and much more pure; this is commonly called *drop ammoniacum*. The former, however, may be employed for veterinary purposes, making a little allowance in the dose for the extraneous matter it contains; but this may be in a great measure separated by pounding and sifting.

GUM AMMONIAC is an expectorant (see EXPECTORANTS), in doses from two or three to four drachms. It is advantageously joined with powdered squills, and in some cases with camphor, opium, and balsam of sulphur.

Horses that are of a full habit should be bled, and take a cathartic ball previously to the exhibition of expectorants, which renders them more efficacious. It may be proper to observe that *ammoniacum* is never to be employed in recent coughs, arising from *catarrh*, or cold, but only in the *chronic* kind, that are not dependent on inflammation.

ANGELICA. — *Angelica*. This root is largely cultivated for medicinal purposes. Its properties are tonic and carminative. Although a very elegant aromatic, it requires to be conjoined with some other stimulants when administered to the horse. The dose is from half an ounce to an ounce and a half.

ANISE-SEED. — *Anisi Semina*. This seed is much used in horse medicine, as a stimulant, carminative and cordial; but its power is by no means considerable. It is thought to possess also

an expectorant quality, and is therefore given in coughs and other complaints of the lungs, but is generally joined with other expectorants. It is certainly, though weak, a very grateful stimulant, and does much good where the stomach is weak, and disposed to flatulency; it is therefore an useful ingredient in cordial medicines. The dose is about one ounce or rather more. (See CORDIALS and CARMINATIVES.) The virtues of anise-seed are contained in its essential oil, the dose of which is about half a drachm or more: it may be rubbed in a mortar with sugar, mucilage, and ginger, and given in warm ale or water.

In the human being anise-seeds are supposed to increase the secretion of milk; but I am not aware that they possess this power over animals.

ANODYNES. Medicines that alleviate or remove pain, the most effectual of which is opium. The other narcotics have also been occasionally employed for this purpose, among which are henbane, deadly nightshade, hemlock, white poppy-heads, &c. When pain depends upon spasm, as in the flatulent or spasmodic colic, commonly named gripes or fret, it is an excellent remedy. (See article COLIC.) In that dangerous complaint, named locked-jaw, opium is the medicine that is principally relied on, though it is generally given with others, such as camphor, &c. See ANTISPASMODICS, OPIUM, HENBANE, &c.

ANODYNE BALL.

No. 1. Opium.....	$\frac{1}{2}$ dr. to 1 dr.
Castile soap.....	2 dr. to 4 dr.
Powdered ginger	1 dr. to 2 dr.
Powdered anise-seed.....	$\frac{1}{2}$ oz. to 1 oz.
Oil of caraways	$\frac{1}{2}$ dr.
Syrup enough to form the ball.	

ANODYNE DRAUGHT, OR DRENCH.

No. 2. Tincture of opium.....	from $\frac{1}{2}$ oz. to 1 oz.
Spirit of nitrous ether	1 oz. to 2 oz.
Essence of peppermint.....	1 to 2 dr.
Water.....	1 pint.

ANODYNE CARMINATIVE TINCTURE.

No. 3. Best Turkey opium.....	1 oz.
Cloves, bruised.....	2 oz.
Jamaica ginger, bruised.....	3 oz.
Old Cognac brandy.....	1 quart.

Keep them together in a well-corked bottle three or four weeks, frequently shaking it. The dose, two or three ounces in water.

The ball may be mixed with warm ale if the form of a drench be preferred to that of a ball, and either of the receipts will be found a good remedy for the flatulent or spasmodic colic. In the anodyne draught warm beer may be substituted for water. It should be recollected that when the colic is attended with costiveness, clysters and oily and saline laxatives are necessary, either in addition to the anodyne, or after the anodyne is exhibited. Essence of peppermint consists of the essential oil of peppermint dissolved in spirit of wine: one part of the former to three of the latter. (See ESSENCE and MINT.) Anodynes are sometimes exhibited in the form of clyster, as in locked-jaw, when no medicine can be given by the mouth, which often happens in bad cases; it is then necessary to employ about a double dose, or rather more. (See LOCKED JAW; see also CLYSTERS.) Anodyne fomentations are prescribed occasionally, which consist chiefly of a decoction of white poppy-heads. See FOMENTATIONS.

ANTHELMINTICS are medicines that destroy worms, or expel them from the intestines. The mercurial purgatives are generally considered the most effectual anthelmintics.

A variety of vegetables have been thought to possess this quality, but I believe without foundation: among these are box, rue, savin, and wormwood. Æthiop's mineral, antimony, sulphur, and tin, have also been considered as *anthelmintics*. I believe tin has not been fairly tried: and as it is an efficacious anthelmintic in dogs, it may probably be found useful in horses. Of all the mercurial preparations, *calomel* is by far the best for this purpose, and may be given with aloes, soap, and some aromatic oil, with a little ginger. Many prefer giving the calomel at night, and the purgative the following morning. Aloes is a good *anthelmintic*. A saline substance was some time ago introduced from India, as a remedy for that species of worm termed *botts*. It seems to be composed of common salt and liver of sulphur, but does not appear to deserve the high character that was given of it; though, like salt or brine, it may sometimes have been found an effectual *anthelmintic*.

It has been supposed, that worms are sometimes generated in consequence of debility in the digestive organs. Tonics have therefore been recommended, particularly the vegetable bitters; such as bark, wormwood, camomile, &c. When worms are discovered in the horse's dung, after a fair trial has been given to mercurial purgatives (especially if he appears to be weak, and incapable of much work), it would be advisable to give tonic and cordial preparations, with a generous diet; but whenever this is done, there must be proportionate exercise. One plan of treating a horse with worms is to keep him fasting for several hours, and then give him a small quantity of milk and sugar, which is to be followed by a dose of the anthelmintic in a liquid form: a solu-

tion of common salt has been recommended for this purpose, to which may be added two or three drachms of aloes. The dose of salt is about four ounces, in three pints of water. Oil of turpentine has of late been recommended as an anthelmintic, and has, I believe, been found more efficacious than any other medicine. The mode of giving it is to keep the horse without food for several hours, and then to give four ounces mixed with a pint or more of oatmeal gruel; the day before the horse is to take about three drachms of aloes, with an equal quantity of soap, in order to open the bowels moderately, and so that they may be in a loose state at the time the turpentine is given. Some caution is necessary in adopting this method, as in two cases that have come to my knowledge, the stomach appeared to have been dangerously affected, and in one it produced a degree of inflammation that proved fatal. In one of the cases the turpentine was given undiluted when the stomach was empty. In the second, the horse was kept fasting a long time, I believe twelve hours; in the third, which proved fatal, the purgative given the day before appeared to have been too strong. I would advise, therefore, when oil of turpentine is given as an anthelmintic, that the horse be prepared with bran mashes, as for physic; that only three drachms of aloes, with an equal quantity of Castile soap, be given the day before the turpentine, and that when the latter is given, the stomach should not be in so exhausted a state by fasting as it appears to have been in one, if not all of the above cases. Perhaps a small bran mash may be given, about six or seven in the morning, and the turpentine about eleven or twelve.* A run at grass, in May or June, has been found a good remedy for worms; soiling in the stable with vetches, or tares, lucern, &c. may also be tried. I have lately discovered a cause of worms which is not generally, if at all, known. Since I have resided near the Hill of Mendip, I have frequently met with a kind of worm in the bowels of horses, dogs, and cats, which I never before saw, nor can I find a description of it in any book. It is found generally in the small intestines near their termination, and sometimes in the large bowels also. They adhere pretty firmly by one of their extremities to the mucous membrane of the bowels, and when contracted appear like a flake of whitish mucus, but when extended they are quite flat, like a very narrow riband, and are covered with transverse lines like the leech worm. They are from one to three or four inches in length. I think I have found them of greater length in the bowels of dogs than in other animals. The extremity by which they adhere has a bulbous appearance, with a mouth and other minute apertures. The other extremity is square, as if cut off trans-

* The safest plan to administer oil of turpentine is with an equal or double quantity of linseed oil, which in itself is an excellent anthelmintic.—ED.

versely. I have known these worms discharged from the bowels of a man, who brought one of them to me; he called them the blood worm, and said he had often voided them, especially after drinking rather freely of beer. These worms have been seen in a small stream which runs through a village near Mendip.

ANTHELMINTICS.

- | | |
|---|-----------------|
| No. 1. Aloes..... | 4 to 6 dr. |
| Castile soap..... | 3 dr. |
| Oil of cloves..... | 10 drops. |
| Calomel..... | 1 to 2 dr. |
| Ginger..... | 1 to 2 dr. |
| Syrup enough to form the ball for one dose. | |
| No. 2. Aloes..... | 4 to 6 dr. |
| Powdered tin..... | 3 to 4 dr. |
| Castile soap..... | 3 dr. |
| Oil of Cloves..... | 10 to 20 drops. |
| Ginger..... | 1 to 2 dr. |
| Syrup enough to form the ball. | |
| No. 3. Oil of turpentine..... | 4 oz. |
| Oatmeal gruel..... | 1 pint. |
| No. 4. Oil of turpentine..... | 4 oz. |
| Castor or linseed oil..... | 8 oz. |
| Gruel..... | 8 oz. |

Mix for one dose.

A larger proportion of aloes is generally prescribed by farriers and druggists; but such strong doses are injurious, and sometimes fatal. See CATHARTICS and PHYSIC.

As worms in horses generally arise from bad management and improper food, by which the digestive organs are weakened, no permanent good can be expected from medicine, unless that error be corrected. Wholesome food, therefore, in proper quantity, or in proportion to the animal's labour, is essentially necessary, in order to eradicate worms from his bowels, and restore him to a state of health and good working condition. See WORMS.

ANTIMONY. — *Antimonium*. This is a heavy, shining, brittle mineral, somewhat like black lead when powdered, but of a darker colour. It is common in Germany and France. A small quantity is found in Cornwall, but not sufficiently pure for medicinal purposes.

It is given as an alterative, in doses of 2 drachms to an ounce, to improve the coat and condition of horses: some give it to destroy worms; but it does not appear to possess much power

of that kind. A variety of useful preparations is made from antimony, many of which are more efficacious than the mineral itself; among these are *antimonial powder*, which is said to be the same as *James's powder*, *emetic tartar* (tartarised antimony), *kermes mineral*, or *precipitated sulphuret of antimony*, *oxide of antimony*, &c. The most useful preparations are the tartarized antimony, commonly named emetic tartar (see EMETIC TARTAR), antimonial powder, and the sulphuret, or common antimony, such as is sold under the name of antimony; but this should be finely powdered or levigated, or prepared in the way chalk is. When antimony is thus brought to an impalpable powder, a smaller dose will be sufficient, and its effect will be much more certain. To these may be added the precipitated sulphuret of antimony, though it is seldom employed, except as an alterative. As a fever medicine tartarized antimony and antimonial powder* are certainly preferable to every other preparation, and are those most commonly employed. There is another fluid preparation which is often employed as a caustic, formerly named *butter of antimony*, but now muriate of antimony. The dose of tartarized antimony is from one to two drachms; and, though a powerful emetic in the human stomach, does not appear to excite nausea in the horse; but given largely is more apt to affect the kidneys or bowels. It is considered, by veterinary practitioners, as a safe and effectual fever medicine. The common dose is about $1\frac{1}{2}$ drachm or 2 drachms. Some practitioners, however, prefer the antimonial powder, as being milder and more effectual; but I believe they are both perfectly innocent in the dose commonly employed; and joined with nitre certainly produce a good effect as an auxiliary to that important remedy, bleeding. (See FEBRIFUGES, or FEVER MEDICINES.) Both tartarized antimony and antimonial powder are occasionally joined with camphor as a fever medicine, and sometimes, but not often, with opium. (See SUDORIFICS.) The sulphuret of antimony is inert, unless it meet with an acid in the stomach.

ANTISEPTICS are medicines which prevent putridity, or remove it if already begun. The most efficacious are *bark* and other bitters; *opium*, *wine*, *ether*, *ammonia*, and *camphor*.

Horses do not appear to be subject to those fevers which, in the human system, are termed putrid; so that these medicines are not required. However, as in putrid fever, it is certain that the presence of very offensive fæces in the alimentary canal will prove a source of great irritation to the system; and it may also here be remarked, that the urine, if retained for any considerable time, will have a similar tendency to create irritation and

* Antimonial powder is now rarely used in the horse, being considered ineffectual. It is, however, found useful in the dog, particularly in distemper.—E.D.

consequent distress. Antiseptics are nothing more than cordials and tonics, and are as improper for the horse as for man during the febrile stage. They can only be serviceable when debility remains *after the symptoms of fever have vanished*. The best external antiseptic is a solution of chloride of lime.

ANTISPASMODICS are medicines which possess the power of allaying inordinate or painful motions in the system, particularly those involuntary contractions in parts which are naturally subject to the command of the will.

Medical writers divide *antispasmodics* into two kinds; viz. stimulants and sedatives. To the former belong preparations of copper, zinc, and iron; also ammonia, ether, essential oils, &c. The latter comprehend opium, musk, camphor, Valerian, and all the vegetable narcotics.

Medicines of the fœtid kind, such as galbanum, assafoetida, &c. have also an antispasmodic quality.

When spasm arises from irritation, *sedatives* are to be given; but when it depends merely on debility, *tonics* are evidently proper. The spasmodic complaints to which horses are mostly liable, are locked-jaw and spasmodic or flatulent colic, commonly named gripes or fret, in which the most efficacious antispasmodic is opium; but it is generally joined with others, such as camphor, assafoetida, ether, oil of peppermint, juniper, caraways, allspice, or other aromatics.

The spices and aromatic seeds, such as cinnamon, cloves, ginger, caraways, anise-seed, &c., are often joined with opium, either in powder or infused with it in proof spirit, to form a tincture, and will be found a good antispasmodic in that form.

APERIENTS. Opening medicines. See **LAXATIVES** and **CATHARTICS**.

AQUAFORTIS. Weak nitrous acid. See **ACID, NITROUS**.

ARBUTUS, UVA URSI. Whortleberry, Bearberry, or Trailing Arbutus. This shrub is a native of the northern parts of Europe, and is found growing in a wild state on the heaths and mountains of Scotland. It flowers in June, and should be gathered in Autumn, the green leaves alone being taken and dried by a gentle heat. The principal property of *Uva ursi* is astringent. It is given to man in ulcerations of the urinary organs, as the kidneys or bladder, and as been strongly recommended in cases of phthisis pulmonalis. It may likewise be exhibited in most fluxes arising from debility, as menorrhagia, fluor albus, diabetes, &c. I am not aware that it has yet received a sufficient trial with regard to the horse; but I am inclined to think it might be found serviceable in many cases of relaxation of the solids. In chronic diabetes I should feel much tempted to make use of it. It may be given in substance in doses of from half an ounce to an ounce three times a day. It

may be detected in the urine three quarters of an hour after its administration.

ARGENTI NITRAS. Nitrate of Silver. Lunar Caustic. A very powerful escharotic. This is generally used for destroying the exuberant fungous growths from ulcers. It is also employed in a liquid form, for the purpose of injecting sinuous sores, and stimulating indolent ulcers or wounds. It is occasionally prescribed as a tonic and antispasmodic for man; but, I believe, is seldom, if ever, administered internally to the horse. (See CAUSTICS and ESCHAROTICS.) Of course, when used as an escharotic or stimulant it will require to be diluted with different proportions of water.*

AROMATICS. Stimulants that possess an agreeable odour, such as cinnamon, cloves, &c.

AROMATIC CONFECTION.—*Confectio Aromatica.* This is made by triturating together, until reduced to a very fine powder, two ounces of cinnamon bark, two ounces of nutmegs, the same quantity of dried saffron, one ounce of cloves, half an ounce of cardamum seeds, and sixteen ounces of prepared shells, and then gradually adding one pint of water, mixing the whole until thoroughly incorporated. The combinations of aromatics are stimulant, cordial, and carminative; and, if not thought too expensive, may be given to the horse, in the dose of from half an ounce to an ounce, dissolved in warm ale. It is a common custom to administer cordials to horses after hunting or undergoing any great degree of fatigue; but it should be remembered that there are limits to this practice, and that when undue action is excited, whether in the stomach or any other organ, it is invariably followed by proportionate depression.

AROMATIC POWDER.—*Pulvis Aromaticus.* Take of cardamum seeds, ginger, and cinnamon bark, equal parts. Rub them down to a very fine powder, and keep in a well-stopped phial. This is a good cordial powder, and may be given in a dose of two or three drachms in warm ale, in such cases as require the use of cordials. For veterinary purposes, the following composition is, I think, preferable:—

VETERINARY AROMATIC POWDER.

Powdered caraway seeds.....	6 oz.
Powdered allspice.....	4 oz.
Jamaica ginger powdered.....	2 oz.
Liquorice powder.....	2 oz.—Mix.

The dose from 6 to 8 drachms.

* Lunar caustic is sold in the form of sticks, one of which being inserted in a quill forms a very convenient caustic for many purposes, but particularly as an application to the wounds caused by the bite of a rabid dog. It forms a

If the form of a ball is preferred, it may be obtained by beating up a dose of the powders with a little treacle.

ARROW-ROOT. See STARCH.

ARSENIC. — *Arsenicum*. New name, Arsenious Acid. There are two preparations of arsenic that are principally made use of in veterinary practice: and these are the *white arsenic*, or *oxide of arsenic*, and the *yellow arsenic*, or *sulphuret of arsenic*. The latter is a combination of white arsenic and sulphur, either natural or artificial, varying in colour according to the proportion of sulphur, which, when considerable, gives it an orange or red colour; it is then called *Realgar*, and used as a pigment only.

White arsenic is obtained in the process of roasting certain ores. The arsenic sublimes, and is collected in chimneys adapted to the purpose. It is beautifully white, and very heavy, but easily reduced to a powder. The powdered arsenic of the shops is generally adulterated, and ought never to be depended upon. The practitioner should always buy it in the lump, and either powder it himself, or see it done.

White arsenic has been considered a good tonic for horses; and, though a violent poison in the human system, may be given to these animals with safety. From its tonic quality it has suspended, or apparently cured the glanders; but its effect in this way, I believe, is never permanent. It is prudent to begin with a small dose—from two to eight grains. This may be gradually increased, and continued as long as it does not occasion irritation of the stomach or bowels, or bring on vertigo. When any symptoms of these complaints manifest themselves the use of arsenic should be immediately discontinued. In experiments on glandered horses, I have seen a dose of two drachms given twice a day, and continued for a week; at which period it produced inflammation of the bowels. I have even known two drachms given for two or three days successively, without any violent effect; it will sometimes, however, occasion great disturbance in the stomach and bowels, in much smaller doses, and if continued without carefully watching its effect, may do great mischief.

Though arsenic has been often given by way of experiment to glandered horses, even in large doses, without producing any violent effect, yet cases have occurred where moderate or even small doses have occasioned considerable disturbance in the stomach and bowels. In one case I have known it produce a fatal inflammation of the stomach in a moderate dose; the groom having persisted in the use of it after the injurious effect

black eschar in which the poison is absorbed, and thus rendered harmless. A weak solution of lunar caustic in distilled water has been applied to inflamed eyes with advantage. See OPHTHALMIA.

which it sometimes produces had taken place. When arsenic disagrees with the stomach it causes loss of appetite, shivering, dejection, uneasiness in the stomach and bowels, which gradually increase, unless it be discontinued; in such cases castor oil, oatmeal gruel, and infusion of linseed, should be given. When castor oil cannot be procured, linseed oil may be substituted for it, or olive oil. Perhaps the most efficacious antidote to the effects of arsenic is lime water, which forms with the arsenic arseniate of lime, an insoluble, and consequently an innocuous, substance. Chalk and water is likewise a good antidote to arsenic, and where this cannot be obtained, one part of common soap may be dissolved in four of water, by weight, and given in large quantities.

In reviewing the experiments that have been made with arsenic, it does not appear that it has ever done any good in glanders, and that when it has proved beneficial in farcy, it has been given in small doses from ten to fifteen grains or even less, joined with sublimate; and then the latter, that is, the sublimate, was, I suspect, the most useful ingredient.

As the white oxide of arsenic is found, after death, to adhere to the coat of the stomach, it is not improbable that a solution of arsenic would be a more advantageous mode of employing this medicine. The preparation generally known by the name of "Fowler's Solution" may be exhibited in doses of half a drachm, twice or three times a day, to begin with, and gradually increased so long as no unfavourable symptoms are perceived. The use of arsenic is contra-indicated whenever there exist any affections of the lungs, or where febrile action is going on. In short, this being a dangerous medicine to trifle with, should never be used without the sanction of the veterinary surgeon. As a tonic*, it has been strongly recommended in small doses, or in solution, but it should be given with caution, and not until the vegetable tonics, such as gentian, columbo, bark, cordials, wholesome food, and occasionally physic, have proved ineffectual. Yellow arsenic, finely powdered and mixed with lard, is sometimes used by farriers to remove warts; also in fistula of the withers and poll-evil, but its effect is sometimes violent, and extends beyond the diseased parts. †

ASSAFŒTIDA.—*Assafœtidæ, Gummi-resina.* Assafœtida is sent to this country packed in cases, casks, and mats. That contained in the cases is to be preferred. It is in irregular

* Arsenic in doses of four to eight grains has been given as a vermifuge and a tonic with good effect, combined with ginger and sulphate of iron. It may be thus administered in the food for six or eight days, and if given for worms may be followed with a dose of physic.—ED.

† Arsenic in the form of a lotion with carbonate of potash is recommended for the destruction of vermin in cattle. See *Work on Cattle, &c.*—ED.

lumps, of a reddish-brown colour, intersected by small glistening tears, of a pale red, whitish, or violet hue. The best quality is that which contains the most tears, and is of a light red colour. It is a gummy and resinous substance, possessing a powerful and most unpleasant smell. It is much used in human medicine as an antispasmodic, in nervous and hysterical complaints. In veterinary practice it is not so frequently employed, though some practitioners speak highly of its virtues. It is said to be serviceable in obstinate coughs, or thickness of wind, flatulent colic, and locked-jaw. It appears to be more efficacious when joined with ammonia, in the form of *fœtid spirit of ammonia*, a preparation kept in the shops. The dose of assafœtida is from two drachms to half an ounce or more; it is generally joined with galbanum, ammoniacum, opium, &c. When employed as an expectorant, squill, ammoniacum, camphor, or opium may be added.

The dose of the fœtid spirit of ammonia is from one ounce to one ounce and a half.

ASTRAGALUS TRAGACANTHA. Gum Tragacanth. The properties of this gum are similar to those of Gum Arabic.

ASTRINGENTS. Medicines that diminish increased evacuations, as those of dung or urine in the diseases named diarrhœa and diabetes: they are employed also for the cure of bloody urine, and sometimes externally to heal wounds, or put a stop to that discharge from the heels, termed grease, as well as to heal those painful sores or cracks with which that part is often affected in winter. Medical writers generally class the preparations of iron, copper, zinc, and lead, with astringents: these, however, have not been found very useful as internal remedies in the horse; and whenever they prove serviceable, it is in cases of debility, in which tonics are required.

The mineral tonics have been recommended in diabetes, especially sulphate of copper (blue vitriol), which I have been informed has, in several cases, been found an effectual remedy for diabetes. The dose, about one drachm, joined with other tonics, cordials, or astringents, such as cascarilla or cinchona bark, or the common cordial ball. The effect of those medicines is considerably promoted by a nutritious diet, moderate exercise, and good grooming. Astringents must be employed with much caution in *diarrhœa*, especially in horses. In these animals it is generally occasioned by bad hay or oats, and may be corrected by altering the diet. In horses of weak constitutions it may be brought on by drinking too freely of very cold water. In such cases the remedy is obvious. In general, the diarrhœa of horses may be stopped by attention to these circumstances, especially if assisted by gruel made of arrow-root or wheat flour; and it is only after this has failed that astringents should be resorted to. The diarrhœa of cattle is of a more formidable nature, and ge-

nerally proves incurable, unless the animal is sheltered from the weather, and fed partly or wholly on wholesome nutritious food. The astringents most useful in the diarrhœa of cattle are catechu, kino, oak-bark, pomegranate-bark, with aromatics and opium, joined with a nutritious diet. Diuretics have been prescribed, such as turpentine, which probably may be advantageously joined with tonics or cordials. Astringents are often required as external applications, as in grease, and troublesome sores about the heels or other parts, or thrushes of the frog. For such purposes finely-powdered alum, either alone or mixed with pipe-clay, or bole-armenic, may be used; or sulphate of zinc or copper, finely powdered and mixed with pipe-clay, chalk, or bole, or dissolved in water or vinegar. These astringents may be occasionally mixed with lard, or wax ointment, in which case they should be reduced to a very fine powder. Acetate of lead (sugar of lead) is an excellent astringent for external use, whether dissolved in water, or diluted with vinegar or spirit, and employed as a lotion, or with lard or other unctuous substances, and used as an ointment. (See ACETATE OF LEAD.) Though the sulphate of copper (blue vitriol) is named here as an astringent, it may be rather considered an *escharotic* or mild caustic when used alone externally; but it may be so weakened by dilution as to become an astringent, and when sufficiently weakened with water, may be applied even to the eyes. (See COPPER.) Sulphate of zinc (white vitriol or copperas) is also an useful astringent when rendered mild by mixture with water or unctuous substances, such as lard; but alum is still milder, and may be used as an astringent in powder. Sulphate of iron (green copperas or vitriol) is a powerful astringent, and is sometimes used internally as a tonic. The dose from one to two or three drachms. It is seldom employed externally, and then in solution only. From the foregoing observations it will be seen that the distinction between tonics and astringents is not very clearly marked. The mode of operation of astringents on the living body has been erroneously supposed to be similar to that by which dead animal fibres are constricted and condensed. That property of vegetables which is termed astringency, as it relates to dead animal matter, results from a peculiar principle, termed by chemists *tannin*, and the gallic acid. The former is remarkable for its strong attraction for animal gelatine, and the latter for striking a black colour with the salts of iron. But increased evacuations, or a discharge of matter or other fluid from the skin or from sores, do not depend merely upon mechanical laxity of the solids; nor does the process by which they are restrained resemble that by which dead animal matter is constricted or condensed, as in tanning hides. Astringency therefore, in a medical sense, is a peculiar power exerted upon living matter, by which inordinate evacuations or

discharges are restrained or suppressed, in a manner with which we are unacquainted. There are other vegetables, besides those above prescribed, that are occasionally used as astringents, such as tormentil, bistort, galls, madder, dragon's blood, catechu, logwood, &c., each of which will be noticed under its respective name. The term astringent is often applied to those medicines or preparations that are supposed to possess the power of putting a stop to hæmorrhage or bleeding, either internally or externally from wounds; these will be noticed under the head *Styptics*.

ASTRINGENTS,

For diarrhœa, diabetes, or red water.

No. 1. Opium.....	$\frac{1}{2}$ dr. to 1 dr.
Ginger.....	$1\frac{1}{2}$ dr.
Prepared chalk.....	3 dr.
Flour.....	2 dr.

Mix into a ball with treacle, syrup, or honey, for one dose.

No. 2. Powdered opium.....	1 dr.
Powdered catechu	2 dr.
Powdered chalk.....	1 oz.

To be given in arrow root, starch, or thick gruel.

No. 3. Powdered catechu.....	2 to 4 dr.
Alum.....	2 to 4 dr.
Powdered opium.....	$\frac{1}{2}$ dr. to 1 dr.
Powdered ginger.....	1 to 2 dr.
Oil of cloves	10 drops.

Treacle to form a ball.

For diabetes, or an excessive discharge of urine.

No. 1. Catechu, or kino.....	2 to 4 dr.
Powdered ginger.....	1 to 2 dr.
Powdered gentian.....	2 to 3 dr.
Opium.....	$\frac{1}{2}$ dr.
Oil of caraways.....	20 drops.
Syrup enough to form the ball.	One dose.

No. 2. Opium.....	$\frac{1}{2}$ dr. to 1 dr.
Ginger.....	1 to 2 dr.
Cinchona, or Peruvian bark; or when that cannot be had, powdered oak bark.....	1 oz. or more.

To be mixed with a decoction of oak bark, or a strong infusion of camomile flowers, and given as a drench. Either of these may be given early in the morning, and repeated at night, should it be found necessary.

EXTERNAL ASTRINGENTS.

POWDERS.

- No. 1. Powdered alum..... 4 oz.
 Armenian bole..... 1 oz.— Mix.
- No. 2. White vitriol..... 2 oz.
 Flowers of zinc 1 oz.— Mix.

LOTIONS.

- No. 3. A strong Goulard mixture.
- No. 4. A solution of blue vitriol, white vitriol or alum.

OINTMENTS.

- No. 1. Venice turpentine..... 4 oz.
 Bees' wax..... 1 oz.
 Hog's lard 4 oz.
- Melt over a slow fire; and when rather cool, but while it is liquid, add sugar of lead 1 oz., or alum, finely powdered, 2 oz. Stir the mixture until it is cold.
- No. 2. Ointment of yellow resin..... 4 oz.
 Oil of turpentine..... 1 oz.
 Sulphate of copper finely powdered $\frac{1}{2}$ oz.— Mix.
- No. 3. Red nitrated mercury, commonly named red precipitate, rubbed down to a very fine powder..... 1 dr.
 Calamine cerate, commonly named Turner's cerate..... 2 oz.— Mix.

Remark.—The astringent powders and ointments are designed chiefly as remedies for the grease, after the inflammation of the part has been in great measure removed by proper poultices; but the ointment is applicable only to those ulcerations or cracks which are sometimes an effect of that disease; and often occurring from other causes.

BALLS.—*Boli.* Medicine is most commonly given to horses in the form of a ball or bolus, the size of which should not exceed that of a hen's egg. Though named a *ball*, it is generally rolled up in a cylindrical form, about one inch in diameter, and two and a half or three in length; but the form of an egg, perhaps, is preferable. There is sometimes difficulty in giving *balls*, without using the instrument termed a *balling iron*; and there

are some horses that will not take a ball by any other means. In giving a ball, the horse's tongue is drawn out on the off or right side, and held firmly with the left hand, while with the right the ball is quickly passed over the tongue into the pharynx, or top of the gullet. The hand should be kept as near to the roof of the mouth as possible in giving the ball; there will then be much less danger of being wounded by the teeth. The moment the right hand is withdrawn from the mouth the tongue is let loose, and the ball generally swallowed. The *balling iron* is so contrived as to keep the mouth open, while the ball is forced into the throat; it is then immediately withdrawn.

Balls should be made at the time they are wanted; as by keeping they often become so hard as to be almost insoluble in the stomach, sometimes passing through the intestines unchanged: by keeping they also lose much of their strength, particularly when the ingredients are evaporable in the common temperature of the atmosphere, which is the case with camphor, ammonia, essential oils, &c. But the most serious inconvenience which arises from giving balls that have been kept until they become very hard, is, that they are liable to stick in the throat or gullet, and thereby endanger the horse's life; indeed, I have known horses destroyed in this way.

Balls cannot be conveniently given unless wrapped up in paper: but for this purpose the softest and thinnest should be chosen.

The balling iron may be covered with cloth or listing to prevent the mouth from being bruised by it. In holding the tongue with the left hand while the ball is introduced, great care is required, as the rough and violent manner in which this is sometimes done often injures the tongue or lacerates the under part of it, named the bridle. The muscles by which swallowing is effected may also be seriously injured in this way. In violent colds, strangles, &c., there is often so much soreness of the throat as to render swallowing very painful and difficult; in such cases neither *balls* nor *drenches* should be given, as they are sure to do mischief by irritating the throat, and may even suffocate the animal by getting into the windpipe. (See *DRENCHES*.) An instrument has been contrived for introducing balls into the mouth, and is sold by the veterinary instrument makers.

When a ball is found to exceed the proper size, it should be divided and given separately, as much injury has been done by giving balls too large, especially when they have become dry and hard, or wrapped in thick paper. I have known two horses killed in this way. In making balls, the dry ingredients should be finely powdered and well mixed; the liquid for forming them into balls should be adapted to the nature of the other ingredients. When a ball contains any acrid, or very powerful ingre-

dient, such as sublimate or arsenic, flour and paste may be employed for mixing it up, and a small bran mash should be given a little before or after it. After giving a ball, grooms sometimes press or pinch the throat for the purpose of making the horse swallow it: but this should never be done, as it is apt to excite coughing, by which swallowing is prevented. The only thing necessary after the hand is withdrawn is to keep the mouth shut, and press the nose downwards, in a moderate degree, towards the chest. Previous to the composition of a medicine it is necessary to consider whether its operation is required on the stomach, the alimentary part of the intestinal canal, or the large intestines. If on the stomach, a drench is the best form; if on the alimentary canal or small intestines, a soft ball, containing a small quantity of potash or soda, should be preferred, unless there is any ingredient in the ball which renders an alkali improper. There is a quality in potash which may be considered an inconvenience, but it is really an advantage; a ball containing potash continues soft, and, if kept, becomes too soft by the moisture which the potash attracts; therefore it must be given soon after it is made. In forming a cathartic, soap is the best article that can be employed, provided it be not incompatible with the other ingredients of the ball. Balls, made with soap, even if kept some time, may be given without that danger which attends the exhibition of old or hard cordial or diuretic balls, which do not contain soap or potash; therefore, balls which are intended to be kept some time, such as diuretics, should always be formed with soap. Balls made with resin or turpentine, nitre, &c., or cordial balls made with syrup, and kept to become hard, are not only liable to remain in the large intestines, causing the conglutination of the earthy matter contained in the excrement, or serving as a nucleus for it, and producing the large stones sometimes found there, but are liable also to stick in the œsophagus or gullet, and so low down, that is, within the cavity of the chest, as to remain undiscovered, and cause the animal's death. I have met with such cases, and was not aware of the circumstance till after the horse's death, when I discovered the ball wrapped in brown paper and firmly lodged in the lower part of the œsophagus. In the three cases I have seen, the ball was of the cordial kind, and two of them wrapped in brown paper: in one of them sulphur was an ingredient. One of them was lodged about the pharynx, and produced a fatal inflammation of the windpipe and lungs. This horse was labouring under a severe catarrhal affection at the time the ball was given, attended probably with sore throat, in which case no attempt should ever be made to give either balls or drenches. In the other two cases the balls were lodged in the lower part of the œsophagus. The symptoms were those of choking terminating in suffocation. In one instance the appetite

and power of swallowing continued until the upper or all that part of the œsophagus that could be felt in the neck was distended with masticated food, as if it had been rammed into it, so that the animal was at length suffocated.

COUGH BALLS.

- No. 1. Gum ammoniac 2 to 3 dr.
 Powdered squills 1 dr.
 Camphor 1 dr.
 Castile soap 2 dr.
 Oil of anise-seed 20 drops.
 Syrup and flour enough to form the ball.
- No. 2. Digitalis 2 scruples.
 Camphor 1 dr.
 Nitre 3 dr.
 Tartarized antimony 1 dr.
 Soft soap to form a ball.

CORDIAL DIURETIC BALL.

- Common turpentine and hard soap,
 of each 3 dr.
 Powdered ginger 1 dr.
 Powdered allspice 1 to 2 dr.
 Liquorice or linseed powder enough to form a ball.

CORDIAL BALLS.

- No. 1. Powdered ginger 1 dr.
 Powdered allspice 2 dr.
 Fresh powdered caraway seeds 3 dr.
 Treacle enough to make a ball.

If this should not succeed, give —

- No. 2. Sulphate of iron 2 or 3 dr.
 Powdered gentian 3 or 4 dr.
 Powdered ginger 1 dr.

Treacle as much as is requisite to form the ball.

BALSAMS. — *Balsama.* Balsams are generally fluid, of various degrees of thickness, odorous and combustible: they resemble resins, being soluble in spirit of wine; and when thus dissolved, impart to water a sweetish taste, and a milky appearance.

BALSAM OF CANADA is a very pure kind of turpentine; and though preferred on this account to Venice and common tur-

pentine, is unnecessary in veterinary medicine, being very expensive; whereas Venice turpentine is much cheaper, and I believe equally efficacious.

Canada Balsam is a strong diuretic in the dose of one ounce or more; in smaller doses it has been recommended in chronic cough, and diseases of the lungs. [It is recommended by Mr. Morton for the preparation of tape or cotton for setons. See SETONS.—ED.]

BALSAM OF COPAIBA, or *Capivy*, possesses nearly the same properties as the preceding.

The dose is about one or two ounces, or more.

BALSAM, FRIAR'S, or *Traumatic*, now named Compound Tincture of Benjamin, or Benzoin, is made in the following manner:—

Benzoin.....	3 oz.
Storax balsam, strained.....	2 oz.
Balsam of tolu.....	1 oz.
Extract of spiked aloes.....	$\frac{1}{2}$ oz.
Rectified spirit.....	2 pints.

Macerate for fourteen days (seven days; Dub.), and filter or strain through blotting paper. The properties of this tincture are stimulating and expectorant, and it is therefore by some prescribed, in combination with other remedies, in cases of old chronic cough or broken wind. As it is decomposed by water, it should first be amalgamated with mucilage or yolk of egg, in order to suspend it in aqueous liquids, when given internally. However, its principal use is that of a stimulant external application to indolent sores or wounds.

BALSAM OF GILEAD is nearly similar to the *capivy*, but more pleasant. Many virtues have been attributed to these balsams by medical writers: they were supposed to heal ulceration of the lungs, kidneys, or other internal parts, and to be powerful corroborants. They do not appear, however, to possess these qualities, nor do they seem to differ much from *turpentine* in their medical virtues. See TURPENTINE.

BALSAM OF PERU. This is of a different kind from the former balsams, being more stimulating.

The dose is from one to two drachms. (See EXPECTORANTS and PECTORALS.) It is sometimes used externally as an application to irritable ulcers.

BALSAM OF TOLU. This is generally in a solid form, of a light yellowish colour, and fragrant odour: it is used for the same purposes as the balsam of Peru, in doses from one to two drachms.

BALSAM OF SULPHUR. This is made by boiling sulphur and olive oil, until they are united: they form a dark-coloured mass,

rather like treacle in appearance, but more tenacious, and of a very disagreeable odour.

Balsam of sulphur is used as an *expectorant*; but farriers frequently employ it in recent inflammatory coughs, which is improper.

The dose is from half an ounce to one ounce, mixed with anise or liquorice powder.

BARBADOES ALOES. See ALOES.

BARBADOES TAR.—*Petroleum*. This is a bituminous substance, brought from the island of Barbadoes. It is nearly of the colour and consistence of common tar, but smells differently, and its colour approaches more to brown. It is insoluble in water, but dissolves in alcohol, ether, and in the fixed and volatile oils, and combines with fat, essential oil, resins, and camphor. By subjection to the influence of sulphuric or nitric acid it becomes a solid resin. It has a considerable diuretic power, and is said to be useful in chronic coughs. Farriers frequently use it in this disease; but by giving it indiscriminately they often do mischief.

BARK, PERUVIAN, or *Jesuits' Bark*.—*Cinchona*. Though in the human subject bark is an useful tonic and febrifuge medicine, it has no very remarkable effect on the horse. I have seen it do good, however, in *diabetes*, a disease consisting in an excessive discharge of urine.

The dose is from six drachms to one ounce and a half or two ounces.

There are three sorts of bark: the pale or *Jesuits'*, the *red*, and the *yellow*. The first is considered the best, and is most commonly used; but the others do not greatly differ from it in their effects. *Oak bark* would probably be found an useful substitute for Peruvian bark. By boiling bark in water a considerable time, its virtues are said to be considerably diminished.

There is a concentrated preparation of bark, called the Sulphate of Quinine. I am not aware that it has ever been employed as a horse medicine, but should feel disposed to give it a trial. The dose may be from ten grains to thirty, twice or three times a day.*

BARLEY.—*Hordei Semina*. This is sometimes used as food for horses; but is less fit for that purpose than oats or beans. I have known it tried as a substitute for the former, when it was found difficult of digestion, and productive of many complaints.†

* Mr. Morton recommends it as a valuable tonic after inflammatory action has been subdued, in doses of from $\frac{1}{2}$ to 1 drachm. Its chief objection appears to be its expense.—ED.

† Barley is a very inflammatory diet for horses, and apt to induce grease and swelled legs, but when infused in water till it begins to germinate, its inflammatory properties appear to be removed.—ED.

If horses, however, be accustomed to it gradually, it proves very nutritious and useful.

Boiled barley is recommended by Gibson as nutritious food, easy of digestion, and fit for sick or convalescent horses. Barley-water, sweetened, may be found an useful drink in fevers, or may be employed as a vehicle for cooling medicine, such as nitre. It is made by boiling pearl-barley for two or three hours in water. A nutritious gruel may be made with barley-meal, though perhaps inferior to that made with oatmeal or wheat flour. (See RESTORATIVES and GRUEL.) I have been informed, that Mr. Rogers, a coach proprietor at Southampton, has, for some time, fed his post-horses with barley that has been soaked in water from twenty to thirty hours, and chopped straw; sometimes, I believe, he puts a little hay in the rack for them.

Mr. Coke, of Norfolk, a celebrated agriculturist, tried the experiment of feeding his horses upon steeped barley, which was kept until it began to sprout, and found that his horses throve uncommonly well upon it, and also that this species of provender was much less expensive than oats. However, the money saved by this mode of feeding was afterwards lost in another way; for the Excise, hearing of Mr. Coke's experiments, forced him to pay the *malt duty*.

BARYTA.—*Terra Ponderosa*. Barytes. This mineral has not yet been discovered in an uncombined state. It is usually found united either with sulphuric acid or with carbonic acid; from which combinations result the sulphate of barytes or *heavy spar*, and the carbonate of barytes, or *witherite*, so denominated after its discoverer, Dr. Withering. Both these substances are used for making the muriate of barytes, the only preparation of this mineral in general use. It is a medicine of very uncertain power, and should be used with the greatest caution. M. Dupuy gave 9 drachms 36 grains to a glandered mare, of which dose she shortly after expired. Mr. William Percival made some experiments with barytes upon glandered horses, the results of which were various, and showed that, although in some cases possessed of considerable efficacy, it is not altogether a medicine to be relied on. Some of the horses treated by Mr. Percival were destroyed, without their having received any perceptible benefit from the barytes. Others were completely cured by its administration; and not a few died from the effects of an overdose. In general, those horses that were in pretty good condition at the time of their admission into the infirmary were found to receive most benefit from barytes. Mr. Percival employed the muriate of barytes in the dose of one drachm, which was cautiously increased to three drachms; the horse died. Another case, where half this quantity was used, did well. One ounce and a half of the solution of muriate of barytes, gradually

increased to two ounces, destroyed life in twenty-four days. A similar effect was produced by half a scruple of pure barytes, augmented to one scruple and a half, and administered for seventeen days. The same dose, however, succeeded in two other instances, in one of which the use of the medicine was persevered in for seventy-one, and in the other for thirty-two days. Where the pure barytes was given to the extent of four scruples (beginning with one), it caused death; and when carried to the extent of two drachms, the patient, a bay gelding, eight years old and in good condition, died suddenly. The carbonate of barytes, given from three drachms to half an ounce for sixty-four days, did not afford relief. However, as this was the only case treated by this preparation of barytes, it can hardly be said to have received a sufficient trial. It will be prudent to make trial of this medicine in small doses, giving not more than half a drachm of the muriate of barytes to begin with, and not increasing the dose to more than three times that quantity. Of pure barytes, from fifteen grains to one scruple may be administered, and cautiously increased to one scruple and a half.

BASILICUM, or **BÁSILICON**, a digestive ointment, composed of resin, bees' wax, and olive oil, of each equal parts. It is now named ointment of yellow resin. By adding to it a little oil of turpentine and verdigris it may be employed as a digestive for horses. See **DIGESTIVES**.

BATHING. A remedy seldom employed in the diseases of horses. The warm bath would probably be found useful in some cases, and appears to be used in the French veterinary colleges. I have been informed, that Mr. Maberly, of Spring Park, Surrey, was formerly in the habit of putting his horses in a warm bath whenever they returned from hunting. This, although only within the reach of people of fortune, is a very excellent practice, as there is frequently congestion of some particular organ, as the heart, lungs, or liver, after excessive fatigue, and the warm bath, by drawing the blood into the capillaries of the skin, tends to relieve the over-loaded organ, and thereby to equalise the circulation. A topical bath, both warm and cold, applied to the feet and legs, is often of great service in lameness.

BATH, VAPOUR. Though a vapour bath would be very servicable on many occasions, yet from the difficulty in constructing it and the expense attending it, it has not been generally used. Mr. Mavor has invented some apparatus for applying steam locally; and Mr. Read is now devoting his ingenuity to the construction of a vapour bath for horses: his proposed mode of application is, I believe, by means of an air-proof case. — **ED.**]

BAY TREE. — *Laurus Nobilis*. The leaves and berries of the bay tree are employed in veterinary medicine, the former as

an ingredient in the decoction for fomentations; the latter as a stomachic, and as an ingredient in that ancient, but still celebrated stomachic powder, named diapente or diapenty. (See STOMACHICS.) Oil of bays assists the action of blisters.

BEANS are often used as an article of diet. If given moderately to horses that work hard, they prove extremely useful and invigorating; but to such as are not much worked they often do harm, by disposing the system to inflammatory complaints. Beans should be bruised or ground, being more easy of digestion in that state.

BEER or ALE.—*Cerevisia*. An useful vehicle for cordials and tonics; and when mild and perfectly free from harshness or acidity, is of itself a good cordial, especially when given warm with a little grated ginger. It may be given also with oatmeal or wheat flour gruel as a restorative, when a horse is exhausted by fatigue and long fasting. (See GRUEL and RESTORATIVES.) In colic, gripes, or fret, when medicines cannot be procured, warm ale with a little gin or other spirit, and ginger, may be given.

BEES' WAX.—*Cera Flava*. See WAX.

BELLADONNA. Deadly Nightshade. "A powerful narcotic. The extract which is generally employed is the inspissated juice of the leaves of a plant indigenous to Britain and the south of Europe. It is found growing in shady places, where the soil is calcareous, flowering in June, and ripening its seed-vessels in September. The roots are said to possess the most activity, although the leaves are commonly employed medicinally. In order to prepare the extract, these are bruised in a mortar, a little water being poured over them; then submitted to pressure, and the juice evaporated until it has acquired a fit consistence.

"*Properties and Uses*. The odour of this extract is peculiar, and its taste bitter. Its action is that of a narcotic and sedative, relieving pain and lessening both the force of the pulse and the number of its beats; hence its use is indicated in all those diseases where an undue action of the nervous and vascular systems are present, as tetanus, carditis, and pneumonic affections generally. Mr. Mavor, of Bond Street, who employs it largely, speaks highly of it, as do many other practitioners. It is given in doses of from two to four drachms: in larger doses it acts gently on the bowels. Externally it is sometimes applied to the eye, and by its influence on the radiated fibres of the iris, it dilates the pupil. The same effect I have witnessed from a large quantity having been administered internally. In the form of plaster, it may be beneficially applied to wounds creating much irritation, particularly in such as have given rise to tetanus, for its influence in all neuralgic affections is even greater than that of

opium. A watery solution may be injected into the bladder, to allay irritation in that viscus." — *Morton's Manual*.

BENZOIN. — *Styrax Benzoin*. A concrete resinous substance of a yellowish colour, inclining to pink, and variegated with small white masses. By exposure to a strong heat, it gives out an extremely light flowery substance, which is termed *flowers of Benjamin*. This is beautifully white and fragrant, and is used in human medicine in coughs, and other complaints of the lungs. In veterinary medicine neither the resin nor flower are employed, nor do I know any disease in which they are likely to be of use.

The former is an ingredient in the traumatic or Friar's balsam, now called compound tincture of benzoin; and the latter is employed in making paregoric elixir, or camphorated tincture of opium.

BITTER SWEET, or WOODY NIGHT-SHADE. — *Dulcamara*. The stalks of bitter sweet. This is an indigenous shrub, found growing in shaded places. It flowers in June and July, and its properties are diuretic and narcotic. It is generally given in the form of decoction, made by boiling one ounce of the sliced stalks in a pint and a half of water, until a pint only of the liquor remains. The dose from four to eight ounces.

BITUMEN. Bituminous Oils. Barbadoes Tar. *Petroleum*. Certain inflammable substances are thus named, obtained from the mineral kingdom, among which are Barbadoes Tar, Naphtha, Asphaltum, &c.

BLISTERS. This term is applied to medicines that inflame the skin, and cause watery bladders to rise upon its surface: the most useful of this kind is the Cantharis, or Spanish fly, which forms the principal ingredient in all our blisters. There are many others, however, which are generally mixed with it as auxiliaries: among these are hellebore, euphorbium, turpentine, and sublimate.

Blisters are of great use in veterinary medicine: they are extremely efficacious in dispersing callous swellings, the consequence of *strains, bruises, &c.*

In inflammation of parts remote from the surface, they are of great service. When the internal parts of the foot are inflamed, relief is generally obtained by blistering the pastern, provided the subordinate or auxiliary remedies are not omitted, such as paring the sole, soaking the horny part of the foot in warm water, or applying a poultice to it, and giving a dose of physic. When the lungs are inflamed, blistering the sides freely is an excellent remedy, especially when we feel doubtful as to the propriety of further bleeding.

Blistering is employed also for *curbs, windgalls, spavins, &c.*

Broken knees, unless skilfully treated, frequently leave a cal-

lous swelling on the part; for the removal of which blistering is employed. When blisters are properly made, and free from any caustic ingredients, such as sublimate, vitriolic acid, &c., there is no danger of destroying the hair; and if the first blistering does not prove effectual, it may be repeated until the desired effect is produced.

Before a blister is applied, the hair should be closely cut off, or even shaved off if the situation of the diseased part will admit of its being done without wounding the skin; but good scissors or shears, if skilfully used, will answer the purpose sufficiently. If the skin is scurvy it may be washed with flannel, soap, and warm water, and be made perfectly dry before the blister is applied. Blisters are generally employed in the form of ointment, but on some occasions they are preferred of a thinner consistence, or in the form of liniment, or even still thinner or more fluid, and are then named liquid blisters. Formulæ, or receipts for each of these, are subjoined. Though a variety of ingredients are generally used in blisters, I believe that the Cantharis, or Spanish fly, is the best; and if not injured by long keeping, or adulterated, is the only blistering ingredient required for common purposes. Spanish flies should be finely powdered, and used while fresh. See SPANISH FLIES.

BLISTER OINTMENT.

No. 1. Hog's lard	4 oz.
Oil of turpentine	1 oz.
Powdered cantharides	1 oz. — Mix.

Melt the lard by a gradual heat; remove it from the fire, and stir in the turpentine; then add the cantharides, and continue stirring until it is cold.

No. 2. Hog's lard, or palm oil.....	12 oz.
Oil of Bays	4 oz.
Oil of turpentine.....	2 oz.
Powdered camphor.....	2 oz.
Powdered cantharides	4 oz.

The two first ingredients to be melted, then add the turpentine, and afterwards the camphor and cantharides, and continue stirring till cold.

This will be found the best blister for general purposes. The camphor, as observed by Mr. Morton, greatly lessens the irritation. In blistering the legs an ounce to an ounce and a half of the ointment for each leg is sufficient.

In some cases, as for enlargements, it is desirable to use iodine ointment with the above, but it is better to keep them separate, and mix them when required.

ACETATE OF CANTHARIDES.

Cantharides in powder 1 oz.
 Diluted acetic acid, or vinegar..... $\frac{1}{2}$ lb.

Macerate for fourteen days, then strain.

TINCTURE OF CANTHARIDES.

Powdered cantharides 2 oz.
 Boiling water 6 oz.

Mix. When nearly cold, add —

Water of ammonia..... 6 oz.

Macerate for a week, then strain.

This is a very excellent and convenient form of liquid blister, as it may be used alone or mixed with olive oil, with which it forms a liniment.

By using a greater or lesser quantity we may obtain almost any effect we please, from a slight stimulus to a strong blister.

Cantharides may be also used as a liniment with olive oil alone, or as a tincture with spirits of wine, the latter forming Leeming's essence.

BOLE ARMENIC. A red clay, containing a small proportion of oxide of iron, sometimes used by farriers as an astringent in diarrhœa, or in bloody urine; but it certainly does no good in those complaints. It is, however, serviceable as an astringent application to ulcers and wounds, combined with prepared chalk.

BORAX. — *Sodæ Bi-boras.* Bi-borate of Soda. This, when dissolved in water, is sometimes applied to the mouths of young horses that are inflamed by cutting teeth; I have found, however, that alum, which is much cheaper, is equally effectual. The *Mel Boracis*, or *Honey of Borax*, is made by mixing one drachm of bi-borate of soda, in powder, with one ounce of clarified honey.

BOX. The leaves of box have been said to destroy worms; but, if really *anthelmintic*, it is certainly too weak to deserve our attention. It may be given with the horse's corn. It is said to have a purgative quality.

BRAN. An useful article of diet for sick horses, and a preparative for purgative medicine or physic, as it is commonly termed. (See *CATHARTICS*.) Bran should be chosen that is sweet, and free from any musty smell, which it generally acquires by keeping, especially in damp places. There is a superior kind of bran termed pollard, which is sometimes to be preferred; that is, when a little more nutriment is wanted in the mash than common bran will afford; but, as a medicinal mash, common

bran is perhaps preferable. *Bran mashes* are made by pouring boiling water on bran, and letting it stand in a pail until sufficiently cool.

Bran Water, or *White Water*, is made in the same manner, using only a larger proportion of water. Bran is of an opening quality *, and therefore a proper diet for horses that have but little exercise; it may be occasionally mixed with oats or split beans. Bran, with linseed powder or oatmeal, makes a good poultice. See **POULTICE** and **MASHES**.

BRICKS, OIL OF. An old absurd preparation made from a mixture of brick-dust and olive oil, used formerly in strains. Barbadoes tar dissolved in oil of turpentine is generally sold as such when it is inquired for.

BRIMSTONE. See **SULPHUR**.

BURDOCK. — *Bardana*. A common plant known by its burs. The leaves are said to be diuretic, and are employed in making the green elder ointment, or Pompillion (*Ung. Populeum*), so much used by farriers.

BURGUNDY PITCH. — *Abietis Resina*. The inspissated juice of the Norway spruce-fir: it somewhat resembles yellow resin, but is less brittle and transparent. What we commonly meet with in the shops appears to be an artificial composition. *Burgundy-pitch* is often used in making *charges* and strengthening plasters; also in some of their ointments.

BUTTER OF ANTIMONY, or, according to the London Dispensatory, Muriate of Antimony — *Antimonii Murias*. † A dark-coloured liquid, possessing strong caustic powers, and composed of antimony and muriatic acid.

It has been highly spoken of as a remedy for quitters and canker, and other ulcers of a similar kind: it is certainly a strong caustic, and may be employed in cases where such applications are required.

There is something peculiar however in this caustic; which is, that by coming into contact with a moist part, it is immediately decomposed; so that when applied to ulcers its action is of very short duration.

CABALLINE or **FETID ALOES**. This species is distinguished from the Socotrine and Barbadoes or Hepatic Aloes by its rank offensive smell, of which, when prepared in the most careful manner, it cannot be divested. It is supposed to be the remains after the Barbadoes extract has been obtained.

* The slight cathartic property of bran is supposed to be owing to the small silicious particles it receives from the mill-stone, which thus acts mechanically in stimulating the intestines. The irregularity of the bran itself may, however, act in the same way. — **ED.**

† The new name for this preparation is sesqui-chloride of antimony. It is a convenient caustic, as it immediately changes the colour of the part to which it is applied. — **ED.**

CAJEPUT OIL, or CAJUPUTI OIL. — *Cajuputi Oleum.* The tree whence this oil is obtained is a native of the Molucca islands. It is a medicine of highly stimulating properties, and possesses a fragrant, agreeable smell, not unlike a mixture of camphor and oil of turpentine. If dropped on water it immediately diffuses itself over its surface and quickly evaporates, and this is one test of its purity. It is frequently adulterated with oil of turpentine, and in this case will not, like other volatile oils, be found soluble in alcohol. The properties of this oil are considered to be stimulant, antispasmodic, and diaphoretic internally; but in veterinary medicine it is more commonly employed as an embrocation in chronic cases of rheumatic pains, old strains, &c. It may be used alone or diluted with olive oil. A mixture of oil of turpentine, camphor, and oil of rosemary is a good substitute for it.

CALAMINE. — *Carbonas Zincī Impurus.* Impure Carbonate of Zinc. An ore of zinc, which, when powdered, resembles a white earth inclining to a red colour. It is employed for the purpose of drying or healing ulcers which discharge a thin acrimonious matter: it is also mixed with hog's lard, oil, and wax, so as to form an ointment, which is used for the same purposes. This ointment, or cerate, is the celebrated *Turner's Cerate*.

CALCINATION. The operation of submitting any substance to the action of fire for a considerable time, in order to deprive it of its aqueous and volatile particles.

CALCINED MAGNESIA. — *Magnesia.* In this preparation the carbonate of magnesia is deprived of its acid and water. It is used for the same purposes as the carbonate of magnesia, but is preferable to it in cases accompanied by great flatulence or acidity of the stomach (as in the affection known by the name of *blasting*), because it contains more magnesia in a given bulk, and, being deprived of its acid, neutralises the acid it meets in the stomach and bowels, without the extrication of gas, which, if it occurs, obviously cannot fail to prove hurtful where there is a tendency to flatulence. The dose may vary from half an ounce to four ounces, according to the effect required to be produced.

CALOMEL. — *Hydrargyri Sub-murias.* Sub-muriate of Mercury. New name, Chloride or Proto-chloride of Mercury. This is the most useful of the mercurial preparations. When prepared it is a fine white powder, rather inclining to yellow, and very ponderous. It is the most efficacious *anthelmintic* we are acquainted with (see *ANTHELMINTICS*), and an excellent *alterative*. When a brisk purgative is wanted, calomel may be added to the common physic, which is composed chiefly of aloes.

Though calomel possesses these useful qualities, it must be given with caution, and its effects carefully watched; as it sometimes

acts very violently and unexpectedly on the stomach and bowels, and induces a dangerous degree of weakness. Salivation is sometimes the effect of calomel when given daily as an alterative, or as a remedy for farcy or mange; the mouth becoming so sore, and the tongue so swollen, as to prevent the horse's feeding. When these accidents occur, the medicine should be discontinued a short time, and the horse allowed to drink plentifully of water-gruel, linseed infusion, or any other mucilaginous drink. When the bowels are affected by it, opium is the best remedy, should arrow-root gruel or wheat flour gruel prove ineffectual. In some cases, where it has produced great irritation about the *anus* or bladder, opium should be given in the form of glyster. (See GLYSTERS.) If the mouth becomes very sore, let it be washed with a solution of alum by means of a syringe.

Whenever calomel is given, the horse must be kept warm, drink warm water, and have regular exercise. When calomel is given as an anthelmintic, or as a purgative, the dose is from one to two drachms; as an alterative, from fifteen grains to half a drachm. Calomel, combined with diuretics, increases their action upon the kidneys, and, when joined with sudorifics, augments their diaphoretic effects.*

COLUMBA ROOT. — *Columbæ Radix.* A good tonic and stomachic, generally joined with an aromatic and sometimes with rhubarb. The dose about two or three drachms.

CAMOMILE. — *Anthemis.* A bitter herb, the flowers of which are employed in fomentations. No other use is made of camomile in veterinary practice.

CAMPHOR. — *Camphora.* There are two species of camphor, the one produced by a species of laurel, which is a native of North America, China, and Japan; the other found in masses in the trunk of a tree which grows principally on the north-western coast of Sumatra. It was formerly purified by the Venetians and Dutch, but this process it now undergoes to a very considerable extent in this country.

Camphor is a medicine of considerable efficacy in the diseases of horses, though scarcely known to farriers as an internal remedy. It is a powerful narcotic, sedative, and antispasmodic, and is often employed in fevers. When joined with nitre, it gives speedy relief in suppression of urine, or difficulty in staling; except when it arises from inflammation of the kidneys, but in the horse this complaint is generally caused by distended bowels.

Camphor is a good remedy in flatulent colic, or gripes, particularly if joined with oil of juniper or other carminatives. (See

* It is given in most diseases of the liver, its irritating properties being guarded against by the addition of opium, which combination has been also administered in inflammation of the bowels. — Ed.

CARMINATIVES.) It has been recommended also in locked-jaw mixed with opium. The dose is from one to two drachms; though it may be given, I believe, to a greater extent without danger. The dose I employ is one drachm and a half, or two drachms.

As an external remedy, *camphor* is much used; it is generally dissolved in spirit of wine, oil of turpentine, or common oil, so as to form embrocations for strains, bruises, hard swellings, &c. Soap is often added to those solutions, and sometimes oil of rosemary. See EMBROCATIONS and ANTISPASMODICS.

Mr. Morton recommends camphor as an ingredient in blisters to allay the irritation of cantharides. In pulverising it, it is necessary to add a small portion of spirits of wine.

CANELLA. Canella Bark. This tree is a native of the West Indies. The odour of the bark when fresh broken is aromatic, and its medicinal properties are stimulant and tonic. It forms a good stomachic in combination with columba, gentian, rhubarb, &c. The *Pulvis aloes cum canellâ*, vulgarly called *Hiera Picra*, is made by powdering separately one pound of hepatic aloes, and three ounces of white canella, and then mixing them. The dose is from two drachms to half an ounce or more.

CANTHARIS. Cantharides. Blistering or Spanish Fly. These insects are found adhering to trees of different kinds in the south of Europe.

Cantharides are so very acrimonious, that they inflame and excoriate the skin; and hence raise a more perfect blister than any other substance: this property renders them extremely useful in veterinary practice, in which a good blister is the most important of all external remedies. *Cantharides* should be finely powdered; but previously to this operation they should be sifted, that they may be freed from a great deal of dust and useless matter, which we generally find with them. When powdered they may be either formed into an ointment, a liniment, or a spirituous tincture; but the former is the best form, and most commonly used. (See BLISTERS.) “*Cantharides* are imported from Sicily and Astracan, in casks and small chests. The best are of a lively fresh colour, a small size, and not mouldy, nor mixed with the *Melolontha vitis*, an insect resembling them in some degree, but possessing no vesicating property. It may be distinguished by its form, which is more square than that of the Spanish fly, and by its black feet. If Spanish flies have been properly dried, and kept in a well-stopped glass bottle, they retain their acrimony, and remain unchanged a great length of time; but sometimes they are attacked by a small worm, which, however, feeds on the inactive part only of the fly, reducing it to a powder that still

possesses the active quality of the entire insect. They soon putrify when kept in a damp place, and therefore should be occasionally spread out to the air." — *Thompson's London Dispensatory*.

Tincture of cantharides is sometimes given internally in human medicine, and has been prescribed for horses in incontinence of urine. Its principal effect is supposed to be upon the neck of the bladder. When incontinence of urine is produced by over-distension of the bladder, however, drawing off the urine for a few times, and not allowing that viscus to retain any great accumulation of urine, may, and indeed generally will, restore the tone of the bladder without having recourse to cantharides. Seven grains of powdered cantharides have been prescribed by Mr. Bracy Clark in a tonic drench.* An over dose of this medicine will produce strangury and bloody urine, to counteract which demulcents, as decoction of marsh-mallows, infusion of linseed with gum Arabic, &c. are the most efficacious remedies.

CAPIVY. See BALSAM OF COPAIBA.

CAPSICUM. Cayenne Pepper. This plant is found both in the East and West Indies. Its medicinal properties are those of a strong stimulant, without producing any narcotic effects. The pod, when powdered, forms *Cayenne pepper*, which is a powerful stimulant. I have been informed that it is used with the best effect as a horse medicine in the East Indies; but could not learn precisely what the complaints were in which it was employed, though I believe it was the *flatulent colic*, or *gripes*. It has been successfully given in cases of flatulency, weakness of the stomach, and indigestion, in doses of a scruple or half a drachm, joined with a little powdered aniseed, liquorice, and syrup, so as to form a ball. See CORDIALS.

It appears, however, to be inferior to good ginger as a cordial and stimulant, though more pungent or acrimonious.

CARAWAY SEEDS. — *Carui Semina*. These seeds are much used in veterinary practice, as a *cordial* and *carminative*. The essential oil, which contains all the virtues of the seed in a concentrated state, is the most convenient for veterinary purposes, the dose of which is from half a drachm to a drachm: it may be mixed either with ale, milk, or water, into a drench; or formed into a ball with liquorice powder, ginger, and honey. When the seeds are made use of they should be powdered, but never boiled in any liquid, according to the practice of farriers, as their virtues are thereby in a great measure evaporated: nor should

* It has been more generally introduced by Mr. Vines as a remedy for glanders, farcy, and anasarca. It is certainly a valuable tonic and stomachic, and may be given as a powder with the food, combined with sulphate of iron and vegetable tonics. In this form I have found it promote condition considerably. — ED.

they be purchased in powder; for by being kept in that form, their essential oil is gradually dissipated.

In whatever form it may be used, *caraway* is certainly an useful *cordial* and *carminative*. The dose of the *seed* is about an ounce; to which may be added a drachm or two of powdered ginger. It may be useful to observe, that from twenty to thirty drops of *oil of caraway* are an useful addition to aloes, in making a purgative ball; or, as it is commonly termed, a *dose of physic*. See CORDIALS, CARMINATIVES, and CATHARTICS.

Though the essential oil is the most convenient form for giving caraways, it is not perhaps so grateful to the stomach, or likely to produce so gradual or durable a stimulus as the *recently powdered seeds*. Caraways, though unpowdered, lose much of their power by long keeping, especially in damp places. When the essential oil is employed, that which is pure should be chosen, as it is often adulterated with spirits of wine. The best manner of mixing the oil is to rub it in a mortar with sugar and treacle, and to add the ale or water gradually. Or it may be mixed in the proportion of one part of the oil to three of spirit of wine, and kept as an essence of caraway: this, when mixed with ale or water, will be more uniformly diffused through the liquor than the oil alone, which will immediately float on the surface.

CARBON. Charcoal. *Carbo Ligni*. Recently prepared charcoal is an antiseptic, and may be made into a poultice with linseed meal, and applied to foul, offensive ulcers, for the purpose of correcting their fetor.

CARBONATES. Combinations of alkalies, earths, or metallic oxides, with carbonic acid, such as carbonate of potash, carbonate of lime, carbonate of lead, &c. (See POTASH, LIME, LEAD, &c.) The carbonates always preserve their alkaline properties in some degree, and are decomposed by all the acids, forming a brisk and colourless effervescence.

CARBONIC ACID GAS, is transparent, colourless, without any odour, irrespirable and incapable of supporting combustion. In medical practice this air has been employed, on account of its *antiseptic* quality, in foul and fœtid ulcers, or in gangrenous wounds.* It is generally applied by means of a fermenting poultice, composed of oatmeal and yeast. This poultice has been found serviceable in that disease of the horse's heels termed grease, generally correcting the offensive smell which attends it.

CARDAMOM SEEDS. — *Cardamomi Semina*. The plant from which these seeds are obtained is a native of India. There are two sorts of cardamoms, the *greater* and *lesser*: the latter are commonly sold in their shells or pods, from which they are easily freed: these are preferred in medical practice, probably on ac-

* It has been applied by way of fumigation to the ulcers of the nostrils in glanders with good effect. — ED.

count of their more grateful smell and taste, but the larger sort, which are generally termed *grains of paradise* (see GRAINS OF PARADISE), are better for veterinary purposes, being a stronger stimulant, and much cheaper. The lesser cardamoms make an excellent cordial, and are possessed of considerable strength. The dose is from one to two or three drachms.

CARMINATIVES. Medicines that correct flatulency in the stomach and bowels. The disorder for which carminatives are employed is named *flatulent* or *spasmodic colic*, also *gripes* and *fret*. This disease frequently happens to horses, and from the nature of it not being understood, often proves fatal. We constantly hear of horses dying of inflammation of the bowels, and this is really the case, but the inflammation is produced by the flatulent colic. When air or wind is generated in the horse's stomach it cannot escape upwards as in man, and is prevented from passing in the other direction by a valvular structure at the part where the small intestines terminate; that is, in the cæcum or large intestines, which in the horse is very capacious. As the air accumulates it distends the stomach and small intestines, and if they have not sufficient energy to overcome by their contractile power the resistance made by this valvular structure, inflammation takes place, and the animal dies. Carminative medicines increase for a short time the vital power of the stomach and small intestines; put a stop to the process by which air is generated; excite them to more vigorous contractions; and enable them to overcome the obstacle above described, and expel the confined air. It is in this way that carminatives cure the flatulent colic. Sometimes, however, carminatives prove ineffectual, not often from a want of power in the medicine, but from a circumstance that is not sufficiently attended to, that is, from an accumulation of excrement in the large intestines. The carminatives usually employed are by far too strong; they often cure the disorder, but always increase the tendency to it by impairing the tone of the stomach. Large doses of turpentine and other essential oils are injurious in this way, also pepper and other strong stimulants.

CARMINATIVE MIXTURES.

No. 1. Best Cognac brandy..... 4 to 6 oz.
Hot water 10 or 12 oz.

Mix for one dose.

No. 2. Anodyne carminative tincture 2 to 4 oz.
(The receipt for this tincture will be found under the article
ANODYNE.)

Hot water 8 or 10 oz.

Mix.

No. 3. Tincture of opium.....	$\frac{1}{2}$ to 1 oz.
Essence of peppermint (see PEPPER- MINT).....	1 dr.
Water.....	10 or 12 oz.
No. 4. Oil of turpentine.....	4 oz.
Linseed oil.....	4 oz.
Gruel.....	10 or 12 oz.

Mr. Bracy Clark recommends above all other remedies a tincture of allspice, made by digesting one pound of bruised allspice in three quarts of proof spirit. Of this he gives four ounces in a little water every hour until the horse is relieved. It may not be superfluous to observe, that the strength of the carminative prescriptions or receipts is according to the number affixed, and that the strength of the remedy should rather be adapted to the habits of the horse, than to the violence of the symptoms. A horse that has had several attacks of the disease, and has taken the violent doses commonly employed, may require number 4, especially if numbers 2 and 3. have been found ineffectual. It is of great importance, however, to apply clysters effectually, and other subordinate remedies pointed out. Bleeding according to circumstances is likewise a matter of importance.

CARROTS. — *Dauci Radicēs.* Carrots are sometimes used as an article of diet, and may be given, in moderate quantity, with great advantage, to horses that are thick-winded, have coughs, or are disposed to inflammatory complaints, such as grease, inflamed eyes, &c. They appear to be easy of digestion, and very nutritious. They are excellent food for young stock, but will not do for horses that are hard worked. Carrots form an excellent diet for sick horses, being cooling and nutritious, and are generally eaten with avidity.

CASCARILLA BARK. — *Cascarillæ Cortex.* This tree is a native of the Bahama Islands, and is likewise found in Jamaica and St. Domingo. The bark has a fragrant spicy odour, and emits when burning a smell like that of musk. It is sometimes joined with cinchona, colombo, gentian, or other bitters, and sometimes given with cordials. According to Dr. Paris, cinchona, cascarilla, and other medicines which contain tannin and the gallic acid, or, in other words, which strike a black colour with iron, are decomposed by the sulphates. According to this doctrine, cascarilla would be what he terms an *incompatible* ingredient with the sulphates of iron, of copper, and of zinc. The dose of cascarilla is one, two, or three drachms in powder.

CASSIA BARK. — *Lauri Cassiæ Cortex.* The tree from which this bark is obtained is a native of Malabar, Ceylon, Sumatra, and Java, and has by some been accounted a variety of the cinnamon-tree, the odour of which it in some degree re-

sembles. It is sent to this country in sticks or quills; is of the colour of cinnamon, and, if broken, appears to consist of two distinct rinds or barks, the inner of which is darker than the outer, and possesses the flavour of cinnamon, though a little more pungent, whilst the outer has scarcely any taste whatever. There are some fine pieces of *cassia* which so nearly resemble cinnamon, as not to be easily distinguished from it, and are frequently sold for it in the shops. For every veterinary purpose *cassia* is equal to cinnamon, provided it is well chosen: such parts should be selected as have a pleasant, sweetish taste, succeeded by one extremely hot and pungent: this is generally found in the thinner pieces, which are curled up like cinnamon.

Cassia is a strong aromatic stimulant, and an efficacious ingredient in cordial preparations. The dose is from one to two drachms. An essential oil is obtained from *cassia*, which bears a high price, but is so excessively powerful, that two drops on a lump of sugar will impart a strong taste to half a pint of water.

CASSIA BUDS. These nearly resemble *cassia* in their taste and medical qualities, and may be used for the same purposes.

CASTOR OIL. — *Oleum Ricini.* Castor oil is obtained by boiling, or by expression from the seeds of the *ricinus* or palma Christi, a plant found in the East and West Indies, in Greece, South America, Africa, and on the Rock of Gibraltar. The former method was generally used till lately, and was performed by tying up the seeds in a bag, (having previously taken off the bark and bruised them,) and suspending the bag in boiling water till all the oil was extracted and rose to the surface, when it was skimmed off; but it is now more generally obtained by pressure like that of almonds or olives. The castor or *ricinus* seeds are a strong purgative. The best castor oil is made in England from cold blanched seeds with the eye taken out. It is said that the dark-coloured castor oil, brought from the West Indies, is bleached or rendered colourless by some process in this country, and sold as cold-drawn castor oil. Castor oil is an excellent purgative, as it opens the bowels without producing griping or irritation. It is therefore peculiarly suited to those disorders of the intestinal tube which require laxatives. The dose is from half a pint to a pint, or a pint and a half.

It has been asserted that *castor oil* is a good remedy for worms; but I have seen it given for this complaint without effect. It has been suggested that either olive or linseed oil may be substituted for castor oil; perhaps they are inferior as laxatives, but so much cheaper that they ought to be fairly tried. See LAXATIVES.

CATAPLASM. — *Cataplasma.* See POULTICE.

CATECHU. See ACACIA CATECHU.

CATHARTICS, or PURGATIVES. Medicines that cause purging. The preparations employed for this purpose are commonly termed physic. Previously to physicking a horse, he should be fed with bran mashes for two or three days, and have moderate but regular exercise, or be worked with moderation. He should be allowed only a moderate quantity of hay, especially if he has a voracious appetite; and if inclined to eat his litter he should be prevented by a muzzle, or by being tied up to the rack in the day-time, or, what is still better, by having his litter removed during the day, and by applying the muzzle at night after he has eaten his allowance of hay. If in low condition some oats may be mixed with the bran mashes; but eight to ten pounds of good hay are a sufficient allowance for a day and night. On the morning when the physic is given, neither hay nor mashes should be allowed, until two or three hours after it has been taken. Some practitioners, however, direct a small thin mash of bran only to be given about an hour after, for the purpose of dissolving or mixing with the physic. It is a good plan to give a moderate quantity of mash about two hours before the physic is given, as some horses refuse it altogether afterwards. If this is not done a little should be given about an hour after the physic, before nausea is created. This, however, is unnecessary, though supposed to render the effect milder and more expeditious: but this is not the case; physic should be given fasting. During the day the horse may have walking exercise for about half an hour, and once only, and be fed with bran mashes, and have the chill taken off his water. Grooms generally consider exercise unnecessary or improper on the day the physic is given: and on the following day, when the medicine generally operates, they are apt to give too much exercise. But as soon as the purging has taken place in a sufficient degree, which is generally the case about the afternoon of the day after it is taken, exercise is unnecessary or improper; and should the purging continue or be found to be going on the following morning, that is, on the morning of the third day, including that on which the medicine was given, it should be restrained by gruel made of arrow-root or fine wheat flour, with which the horse should be drenched if he refuse to drink it. Should the purging continue after this, about half an ounce of tincture of opium may be given with a hornful of gruel.

Horses sometimes appear sick, and refuse their food after taking physic, either during the afternoon or evening of the same day, or the following morning. This is generally caused by a neglect of the preparation above directed, by the stomach being loaded at the time the physic is given, or by the horse feeding improperly too soon afterwards; and not unfrequently by the physic being too strong. When this sickness is observed, the horse should have walking exercise; and if it be on the same day

the physic is taken, and the uneasiness be considerable, let a clyster be administered; nothing more is necessary. Should it continue, however, the following morning let him be again exercised, and have some water with the chill off: and if the purging does not come on, and he appears to make fruitless efforts to dung, let the clyster be repeated, which, with a repetition of the exercise, will generally produce the desired effect. A horse should be clothed and not exposed to rain or cold wind during the operation of physic; and when its operation has ceased, he should be gradually brought back to his usual diet and work.

Gibson, Bracken, and other veterinary authors, have prescribed jalap and cream of tartar in their purging balls. It has been proved, however, that jalap has but little effect on the horse, even in a large dose (see JALAP); and that cream of tartar, which was supposed to prevent griping, by correcting the acrimony of the aloes, is absolutely useless. The neutral salts, such as sulphate of soda, and sulphate of magnesia (Glauber's and Epsom salts), are sometimes employed by veterinary practitioners, especially in France; but the large dose required to produce a purgative effect (seldom less than 12 oz. or 1 lb.), and the difficulty and trouble in giving them, prevent their being much used in this country. When a horse can be brought to drink a weak solution of Epsom salts, suppose 1 lb. to a large pail full of water, a diuretic effect is generally produced, and the dung a little softened; but when purging is necessary, nothing of the sort should be depended upon. Common salt is an excellent cathartic for cattle, and sometimes requires to be strengthened by three or four drachms of aloes. The dose of common salt for cattle is the same as for the horse, that is, from four to six ounces in one quart, or more, of whey or water. Cathartics are a most important class of medicines: and of all cathartics Barbadoes aloes is the best. They improve digestion and chylification, by cleansing the intestines and unloading the liver, and if the animal is afterwards properly fed, will improve his strength and condition in a remarkable degree. Cathartics are always useful when the appetite and digestion are bad, and this is known by a voracious or depraved appetite, both for food and for water; rumbling of the bowels, and a frequent discharge of wind from the anus. This is the case in a remarkable degree with broken-winded horses, and generally in such as have chronic cough, or are crib-biters. Cathartics should not be given too strong or too frequently, as they may thereby weaken instead of strengthen the digestive organs, and produce the effect they were intended to remove. Cathartics may be made with soap, in the following manner, and then, if given upon an empty stomach, they will be carried off, and will not be dissolved until they get into the large

bowels, where their effect is intended to be produced: that is, carrying off all the excrementitious matter that may be lodged in them. When given in this way they never produce sickness or pain in the stomach, but always operate without pain or danger.

CATHARTIC BALL.

Barbadoes aloes, powdered.....	4 dr. to 7 dr.
Hard soap	2 to 3 dr.
Ginger.....	1 dr.
Water.....	1 dr.
Oil of cloves	10 drops.

Beat the soap, oil of cloves, and water together in a mortar, so as to form a paste; if necessary use more water. This being done, add the powdered aloes and ginger, and beat the whole into a ball.

I have seen much harm done by strong doses of physic, and have often found the weakest dose, even half an ounce of aloes with the other ingredients, produce an excellent effect.

Other formulæ for cathartics have been given in former editions, but they differ only from the above in containing some other essential oil, such as oil of caraways or anise-seeds, and in being made by means of syrup; some of them contained also soda, but soap is preferable, and the formula I have now given is the best that can be employed. When wanted as an anthelmintic, a drachm of calomel may be given the preceding night, or added to the ball. Stomachic purgatives are made by adding rhubarb, colombo, or cascarilla to a small dose of aloes; but I am inclined to believe that whenever the state of the stomach and bowels is such as to require a cordial or warm cathartic, opium is the best cordial that can be employed for the purpose.

Stomachics may be given, if required, after the operation of the cathartic. (See STOMACHICS.) Horses are more easily purged in the moulting season than at other times, particularly in September. At these times the bowels are weak, and a small dose should be given. Mr. Bracy Clark's method of mixing aloes for physic is most easy: and if ginger and some essential oil are not necessary, which he says is the case, his method may be the best; especially if the physic is wanted to act only on the large bowels. Soap as well as soda and potash promotes the solution of aloes, and causes it to act on the small bowels, and probably sometimes on the stomach also, as appears from the sickness it sometimes induces when thus mixed. This quickness of solution, however, is certainly desirable when there are worms in the small bowels, and in cases where a speedy operation is desirable. The method Mr. Clark recommends, is to put with

any quantity of aloes, broken into small pieces, one fifth part by weight of treacle, and keep the vessel containing it in boiling water, until the aloes are melted and incorporated with treacle. It is necessary to stir the mixture well after it has been in the boiling water a short time, and when perfectly melted and incorporated, Mr. Clark directs it to be poured into paper moulds. I have found, however, that by pouring the mixture upon a marble slab or plate, previously greased with butter, it soon acquires a proper consistence to be formed into balls.

[The following formula is recommended by Mr. Morton:—

Aloes in small pieces.....	8 parts.
Olive oil	1 part.
Treacle.....	3 parts.

The aloes and oil to be melted together in a water bath, and when removed from the fire the treacle is to be added, and the whole stirred together. When Cape aloes are used Mr. Morton withholds half the oil and substitutes water. I have been in the habit of making the cathartic mass in a similar manner, but substituting one part of powdered ginger instead of an equal portion of oil and treacle, which I found to form a mass of better consistence and less likely to run. I have also added a few drachms of powdered tartaric acid, the effect of which has been to assist the union of the mass, and prevent it adhering to the fingers. The Barbadoes extract is certainly more certain in its effects than the Cape, but the latter may be rendered equally so by the addition of croton oil, nine drops of which added to six drachms of Cape aloes, will render it of the same strength as an equal quantity of Barbadoes aloes. — ED.]

Under the head DRENCHES will be found directions for making liquid purgatives.

CAUSTICS are substances that burn or destroy parts to which they are applied. The most powerful is the red-hot iron, or *actual cautery*, which is often employed in veterinary practice to remove spavins, &c. (See FIRING.) Many of the other caustics are possessed of great strength, and speedily destroy those parts to which they are applied: such are the pure alkalies, *potash*, and *soda*; the *sulphuric* and *nitrous acids*, or a solution of *silver*, *quicksilver*, or *copper*, in *nitrous acid*. If a solid caustic is wanted, nothing is more convenient than the *lunar caustic* (*nitrate of silver*). The milder caustics are more frequently useful than those we have mentioned; such as blue vitriol (*sulphate of copper*), red precipitate (*nitric oxide of mercury*), burnt alum, verdigris, &c.

The strong caustics are employed to destroy unhealthy or diseased parts, such as warts and other excrescences, cleansing foul ulcers and sinuses, so as to bring them to a healthy state, and

curable by more simple applications. Caustics may be divided into liquid and solid, strong and mild. The mild caustics are also called escharotics, and are more useful than the stronger caustics, which are too violent in their action in many cases, and often require to be diluted with water, spirit, or unctuous substances, according to the nature of the case.

SOLID CAUSTICS, STRONG.

- No. 1. The red-hot iron. See FIRING.
- No. 2. Pure potash with lime.
- No. 3. Nitrate of silver, or lunar caustic.
- No. 4. Nitrate of copper.

MILD CAUSTICS, SOLID.

- No. 1. Acetate of copper, or distilled verdigris.
- No. 2. Sulphate of copper, or blue vitriol.
- No. 3. Red nitrated quicksilver, red precipitate, or nitric oxide of mercury.
- No. 4. Burnt alum.
- No. 5. Common verdigris.

Remark. — The strong caustics are generally sold in a convenient form for application; but the *mild* require to be finely powdered and sprinkled on the ulcer: they are sometimes mixed with digestive ointments to increase their power.

STRONG CAUSTICS, LIQUID.

- No. 1. The sulphuric and nitrous acids, which are very powerful, and must be used cautiously: they may be diluted with different proportions of water, so as to be applicable to many purposes.
- No. 2. Nitrous acid..... 1 oz.
Quicksilver $\frac{1}{2}$ oz. *

Place them in a large gallipot, or open phial, and take care to avoid the noxious fumes which arise. When the quicksilver is perfectly dissolved, and the mixture cold, it may be put into a small phial and corked.

Remark. — This is a strong and efficacious caustic; it is a certain remedy for the foot-rot in sheep, and often effectual in canker of the horse's foot, provided these complaints are properly managed in other respects. It is sometimes mixed with melted hog's lard to form a strong detergent ointment, or diluted with water.

* Red precipitate or nitric oxide of mercury may be substituted for quicksilver.

- No. 3. Nitrous acid 1 oz.
 Verdigris $\frac{1}{2}$ oz. — Mix.

This caustic is very little, if at all, inferior to the former, and applicable to the same purposes.

No. 4. Muriate of antimony, or butter of antimony.

- No. 5. Muriate of quicksilver, or sub-
 limate 1 dr.
 Muriatic acid 2 dr.

Remark. — This is a very powerful caustic, and always requires dilution. Yellow arsenic, mixed with lime and grease, or egyptiacum, or hog's lard, is sometimes used as a caustic to destroy warts, or cure fistula or poll-evil.

MILD CAUSTICS, LIQUID.

No. 1. Solution of blue vitriol.

No. 2. Any of the stronger caustics, except butter of antimony, diluted with an equal quantity, or more, of water.

No. 3. Muriatic acid.

No. 4. Muriate of iron.

CAYENNE PEPPER: See CAPSICUM.

CERATE. — *Ceratum.* A term given to certain ointments or salves, in which *wax* is an ingredient. It is necessary that the oils or fat with which they are composed be perfectly fresh, and preserved in this state.

CERUSE. — *Plumbi Subcarbonas.* This is a carbonate, or white oxide of lead, and is commonly called *white lead*. It is a very strong astringent, and is sometimes used in ulceration of the heels, when the discharge is thin and acrimonious.

It is generally made into an ointment with hog's lard and oil; but perhaps would be found more useful if used in the form of a fine powder. (See LEAD.)

CETACEUM. *Spermaceti.* This is demulcent and emollient, but is not used internally in veterinary practice. Its chief use is in the formation of ointments.

CHALK. — *Creta.* This is an antacid and absorbent. It should be finely levigated, or *prepared*, as it is termed, before it is administered internally. It may be given in diarrhœa, combined with opium and ginger, after the irritating matter has been removed from the intestines by purgatives. Externally it may be sprinkled upon sores which emit an excoriating discharge, in order to preserve the adjacent parts from its effects. The dose, internally, is from two drachms to several ounces. (See ASTRINGENTS.)

CHALK. See CARBONATE.

CHALK. — *Carbon Lapis.* A charcoal poultice has been recommended in its application to the heels when affected with ~~fungus~~ with a view, perhaps, to destroy the offensive smell if the matter is secreted from the heels; it is also useful for this purpose used as a powder if mixed with prepared chalk.

CHALKS. Adhesive plasters which are softened or liquored in a bath by a gentle heat, and then applied to the legs from the knee and hock joints to the foot, as a remedy for windgalls and hot swellings arising from strains or hard work, or to the back if straddled in that part. As soon as the plaster is applied the part is covered with short tow, and the horse sent to rest.

A CHARGE.

- No. 1. Yellow resin 2 oz.
- Surgimoly pitch 4 oz.
- Peruvian bark 2 oz.
- Bees-wax 3 oz.
- Red lead 4 oz.
- No. 2. Yellow resin 1 lb.
- Bees-wax 8 oz.
- Common turpentine 2 oz.
- Armenian bole powder 4 oz.

Mix.

The three first are to be melted together, and then the latter is to be added. The mixture is to be constantly stirred until sufficiently cold to be applied: and if it prove too thick when cold, it may be softened with a little oil or lard.*

Farriers generally mix dragon's blood (as it is commonly called), from an idea that it has a strengthening quality; others recommend bole armenic. It appears, however, that charges act as a bandage only, compressing equally, and for a considerable time, the joints, tendons, &c.†

CHEWING BALLS. These are composed of the wood of the bay and juniper tree, assafoetida, liver of antimony, and pelitory of Spain. The only modern writer on veterinary medicine, who has advised the use of chewing balls, is Mr. Wilkin-son, in his observations on catarrhal complaints.

CINCHONA. See BARK.

* These charges may be rendered more stimulating by the addition of a little blistering ointment. — Ed.

† It is customary in many hunting stables, at the close of the season, to apply to the legs of any horses that are stale what is called the mercurial charge. It consists principally of mercurial ointment applied to the legs and bound on with linen bandages closely embracing the leg: they remain on for six weeks or two months, and, on being removed, the legs are found much finer. — Ed.

CINNABAR, or RED SULPHURET OF QUICK-SILVER. (New name, BISULPHURET OF MERCURY.)

A heavy mineral of a dark red colour, sometimes prepared artificially. It is composed of quicksilver and sulphur, called red sulphuret of mercury, and has been employed as an alterative in obstinate coughs, and thickness of wind, in doses of half an ounce daily. Cinnabar is the least active of the mercurials.

CINNAMON. — *Cinnamomum*. The cinnamon tree is a native of the East. The bark is rolled into cylinders and exported in this state. This well-known spice is a powerful stimulant, and an excellent cordial: its high price, however, prevents its being used much in cordial preparations; so that when good cassia can be procured, it may be, on all occasions, substituted for it in veterinary practice (See **CASSIA**). Oil of cinnamon is made by macerating cinnamon in sea water for forty-eight hours, then distilling it with a gentle heat, and separating the oil from the water with which it comes over.

CLOVES. — *Caryophylli*. A stimulant of considerable strength, but seldom employed in veterinary medicine, on account of its high price. The essential oil of cloves is sometimes used, in the dose of ten or twenty drops, in cordial preparations, or in purgative medicine, to prevent sickness or griping. It is an excellent cordial.

CLYSTER or GLYSTER. — *Enema*. This useful remedy is not employed as often as it ought to be, and seldom properly or effectually. In flatulent colic it is essentially useful; and it is from this circumstance being too little known, or not attended to, that flatulent colic sometimes terminates in inflammation of the bowels, and death. (See **CARMINATIVES**.) In suppression or retention of urine, or in difficulty of staling, a clyster is the best remedy that can be employed. In short, there is scarcely a disease to which horses are liable, in which clysters may not be advantageously used, either as a principal remedy, or as an auxiliary to others. The clyster pipe and bladder is the only effectual apparatus I have seen. The pipe should be one inch in bore, and fifteen inches in length.* The quantity of liquid employed should be five or six quarts, and consist only of warm water or gruel, with half a pound of salt dissolved in it: or three or four ounces of senna leaves may be put into boiling water instead of the salt. There is sometimes difficulty in introducing the pipe, generally from hard excrement in the straight gut; sometimes, however, from the bladder being distended with urine. In such cases, patience and care are necessary to exhibit the clyster effectually, and it may almost always be accomplished without raking or drawing out the hard excrement with

* The apparatus invented by Mr. Read is decidedly the best and most convenient method of administering injections. — Ed.

the hand: there is no objection, however, to this operation, and when a sty is not at hand it must be employed as a substitute for a sty. (See RAKING.) The simple emollient sty should be made of milk, or warm water only. The anodyne sty should be composed of three or four ounces of mucilage of gum in two ounces of gruel, or warm water. GIBBER has had the success of solid opium dissolved in water, as a sty in a horse in locked jaw, with success. Nourishing clysters are composed of arrow-root, or wheat flour gruel with sugar, or honey thickened with flour. Tincture of opium is an useful addition to such clysters, especially in locked jaw. When clysters are intended to cause an evacuation of feces, they should be administered in large quantity, so as to distend and irritate the rectum: but if they are meant to be retained, the quantity injected should be but small.

COLLYRIUM, or EYE WATER. Any liquid preparation applied to the eyes is termed a collyrium. Those in most general use in veterinary practice are the following:—

- No. 1. Sulphate of zinc 2 dr.
 Super-acetate of lead 2½ dr.
 Water 1 pint. — Mix.

Should the eye be much inflamed, painful and irritable, this lotion may be further diluted with water, and should be applied in a tepid state: but if, after violent inflammation, the eye remain languid and inert, and vision seem to be impeded from a relaxed state of the vessels of the eye, it may be rendered stronger by the addition of one or two ounces of brandy, or an equal quantity of the vinous tincture of opium.

- No. 2. Sulphate of zinc 1 dr.
 Water 1 pint.
 Dilute sulphuric acid ... 2 drops. — Mix.

- No. 3. Super-acetate of lead ... 4 scr.
 Water 1 pint.
 Distilled vinegar 2 oz. — Mix.

After shaking the ingredients together, so as thoroughly to incorporate them, filter them through blotting paper. These lotions are astringent, and are useful in relaxations of the vessels of the conjunctiva.

- Nitrate of silver 1 to 2 gr.
 Distilled water 1 oz.

This is a very effectual stimulant, after the active inflammation has ceased.

Tincture of digitalis and extract of belladonna have both been applied to the eye with advantage.

By some, collyria are divided into dry and liquid; the dry are powdered salt or sugar, blown into the eye by means of a quill; crude sal ammoniac (muriate of ammonia), white vitriol (sulphate of zinc), powdered alum, &c.

COLOMBO.—*Columbæ Radix.* A good stomachic bitter, much used in human medicine; and though rarely employed in veterinary practice, seems to be worth a trial in cases of indigestion and flatulency. See COLUMBA ROOT.

The dose is three or four drachms or more: it would, perhaps, be more effectual if joined with ginger or cassia. See TONICS and STOMACHICS.

COPAIBA. See BALSAM OF COPAIBA.

COPPER.—*Cuprum.* This metal is a component part of blue vitriol (*sulphate of copper*) and verdigris, two valuable preparations. See BLUE VITRIOL and VERDIGRIS.

COPPERAS.—*Sulphas Ferri.* A term formerly employed, and still used in the arts, for sulphate of iron, or green vitriol, which has also, when purified, been named salt of steel (*sal martis*), and vitriolated iron. It is a very useful tonic in doses of from two to six drachms, and is thus given with vegetable tonics to promote condition. Sulphate of zinc has also been named white copperas, but more commonly white vitriol.

CORDIALS. There are no medicines more frequently employed than cordials and diuretics, and none, perhaps, speaking generally, that do more harm, though productive of temporary good when judiciously employed. But with respect to cordials, it is necessary to inquire what are the circumstances which render them necessary, and then we shall soon learn that it is immoderate work, and bad management in regard to feeding; by the latter is meant the bad quality, as well as the immoderate quantity, of the hay that is often given. This is the most prevailing error in feeding. Next to it is that of not allowing a sufficient quantity of *good* oats, or not properly proportioning the allowance to the horse's labour; and thirdly, by giving too much at a time, and hindering digestion by putting the horse to work immediately after feeding, or by feeding irregularly, or not observing a proper method of distributing the daily allowance of food. The use of cordials, on such occasions, is to give temporary energy to the stomach and bowels, and enable them to discharge their laborious duties. But how is this done? by an unnatural excitement of the nervous system. The other circumstance which renders cordials necessary is immoderate work, which is of a more serious nature than improper feeding. It is a moral evil; and, if duly reflected upon, will, I trust, be seen in that light. When we consider the form of the horse, it appears evident that he was intended for the service of man; and it is equally clear, in a moral light,

that it is the duty of man to treat him with kindness, and exact no more labour from him than is consistent with his health. Feeding him excessively is no excuse for working him unfairly, nor is there any advantage in it; for although we may thereby render him captive for a time of wonderful exertions, yet we shorten his life, and interrupt his abridged period of service by bringing upon him various diseases. It is often thought that a liberal allowance of oats and beans, a warm stable, good grooming, and a comfortable bed, will compensate for excessive labour: such management may enable the animal to do more than he otherwise could: but the power of the stomach is limited, and so is that of the muscular and nervous systems; so that, if we make an unfair demand upon them, and it is answered, their power is the sooner exhausted. About half a pint to a pint of good strong beer, or ale, with a little ginger grated into it, forms an useful cordial. A wine-glass full of brandy in half a pint of water is stronger, and may, on some occasions, be more useful, than beer; but I wish to impress on the reader, or rather to propose to him as a subject for consideration, that whenever a cordial appears necessary, we should give no more, or one of no greater strength, than is sufficient to produce the desired effect: and it will be found, I think, that a much better effect may be produced by three or four small doses or weak cordials than by giving only one large dose.

CORDIALS.

- No. 1. From half a pint to a pint of the best old mild beer,
with a little grated ginger.
- No. 2. Best Cognac brandy 2 to 4 oz.
Warm water..... 6 to 12 oz.
- No. 3. Anodyne carminative tincture. (See
ANODYNES) 2 oz.
Water..... 6 or 8 oz.
- No. 4. Allspice powdered 2 to 4 drs.
Caraway seeds (fresh) powdered..... 4 drs. to 1 oz.
Treacle enough to form the ball.
- No. 5. Ginger powdered 1 dr.
Allspice powdered 2 dr.
Caraway seeds powdered. 4 dr.

The cordials Nos. 4. and 5. may be given as a drench with a little water; and if the cordials 1, 2, and 3. were sweetened with treacle or sugar, they would be more palatable to the horse, and probably have a better effect. The above cordials are as well suited to cattle as to horses; and though much stronger drenches are often given, these will be found, I think, of sufficient strength. When we consider the immense size of the

rumen, or first stomach, of the cow, we may be led to think that these animals really require the Herculean doses often given, and prescribed by writers on cattle medicine. But the internal surface of the rumen has a cuticular covering, and consequently possesses but little, if any, sensibility to medicine; and it is evident, from the structure and disposition of the passage by which the four stomachs communicate with each other, as well as from the structure and economy of the stomachs themselves, that drenches pass quickly into the *fourth* stomach, and that it is through the excitement produced upon this stomach and upon the brain, that the muscular coat of the rumen, or first stomach, as well as the whole muscular system, is excited to more vigorous action.

CORNU CERVI. See HARTSHORN.

CORROSIVE SUBLIMATE. See SUBLIMATE CORROSIVE.

CREAM OF TARTAR. — *Potassæ Bitartras*. See TARTAR.

CREASOTE. — *Creasoton*. This substance is obtained by the destructive distillation of vegetable matters; hence it is found in pyroxylic oil, tar, and wood, smoke giving to those substances their antiseptic properties. Its preparation is exceedingly troublesome and tedious.

Properties and Uses. — Creasote, when pure, is a colourless fluid, oily, and of a peculiar odour, resembling smoked meat: it has a hot pungent taste; it acts powerfully on the animal system, quickly destroying small animals. Internally given it is a stimulant and tonic; and externally, when applied in an undiluted state, it is a caustic; otherwise it acts as a general excitant, and an antiseptic. It has also been resorted to as a styptic; indeed, its greatest use is as a topical remedy, being employed in the form of a lotion, a liniment, or an ointment, to foul ulcers, such as occur in farcy and glanders; to cancerous sores, such as foot-rot, canker, and thrushes; and some cutaneous affections, as herpes, mange, &c., also for the checking of caries, excessive suppuration, and the repression of fungous granulations. It is likewise occasionally dropped into the eye in chronic ophthalmia, when it operates as a counter irritant; and has been found effectual in removing nebulæ. The inhalation of its vapour has lessened the bronchial secretion; and as glanders in the human subject has yielded to it in the hands of Dr. Elliotson, and, still more recently, this formidable disease has been effectually combated by Mr. Ions, V.S., in the case of his son, it seems to be worthy of a trial for this affection in the horse, being both given internally, and applied locally. The dose has not yet been ascertained. I should think from ʒss to a drachm may be diffused in a weak mucilage of gum, and administered twice a day.

As a caustic, undiluted creasote may be applied by means of a camel's hair pencil. Injected into fistulous wounds, or those connected with exfoliation of bone, it quickly induces a favourable change acting in a twofold manner; — first, as a powerful stimulant; and, secondly, as an antiseptic. It may or may not be diluted with water, when used as a styptic; pledgets of tow being dipped into it, and applied to the bleeding part with a compress. Its action depends on its power of coagulating albumen, and contracting the mouths of the vessels. As a lotion to indolent and foul ulcers, or when thrown up the nostrils for chronic inflammation of its lining membrane, or when ulcers exist on it, from ten to fifteen minims may be diffused in one ounce of water; and of the same strength, it may be added to a poultice when we wish to destroy fætor.

LINIMENTUM CREASOTI COMPOSITUM.—Compound Liniment of Creasote.

Take of creasote 2 parts.

Oil of turpentine, and olive oil of each 4 parts.

Mix together so as to form a liniment.

This form has been successfully employed at the College in wounds that have taken an unhealthy suppurative inflammation, and particularly fistulous sores. In lesions connected with opened synovial cavities, I should think it would also prove beneficial.

UNGUENTUM CREASOTI. Ointment of Creasote.

Take of creasote 2 parts.

Lard 8 parts.

Mix together.

Used for the same purposes as the compound liniment of creasote. The foregoing account is extracted from Morton's *Manual of Pharmacy*.

CROTON SEEDS. — *Croton Tiglii Semina*. Croton is a native of India, China, and other places. Every part of the plant appears to possess medicinal properties; but the seeds alone are employed in Europe. The seeds are about the size of a small coffee bean, and abound with a fixed acrid oil, which is obtained by expression, constituting the croton oil of commerce. The oil has a bright straw colour, a faint odour, and a hot acrid taste, creating an uneasy sensation in the throat. It is soluble in alcohol and ether.

The oil is merely a vehicle for the acrid principle which is called *tiglin* and *crotonic acid*, a portion of which remains in the farina after the oil is extracted.

I believe that the veterinary profession is indebted to Mr. Field for the introduction of this agent as an article of its ma-

teria medica. He employs the farinaceous residue, and has found five grains of it equivalent in action to one drachm of aloes. Should the seed be given, about three grains, or perhaps a little less, may be considered an equivalent. The expressed oil has been said to create considerable irritation. Allowing this to be the case, surely some corrective may be conjoined, and thus a valuable agent be added to the list of veterinary therapeutics. The great value of croton certainly arises from the capability of administering it when no other cathartic can be given. It may be put into the animal's mash; or, if it is made into a tincture, as suggested by Mr. Field, it may be mixed with his water.

A form for this is as follows:—

Tincture of croton.

Take of bruised croton seeds 1 oz.
Rectified spirit..... 16 oz.

Digest for seven days, and filter for use. Dose from half an ounce to an ounce. This solution is also an active counter-irritant. I am inclined to believe that croton requires nearly the same time to excite the bowels that aloes do, from which it differs in not creating so much nausea, and in producing a greater liquidity of the dejections. It is therefore well suited for anasarctous swellings. As a general cathartic, croton will never supplant aloes, but a combination of the two may be found of advantage.*

For cattle, the union of croton with the sulphate of magnesia in doses from twenty to thirty grains of the seed is useful in obstinate constipation.

The croton oil, if placed on the tongue of a horse, in quantities from twenty to forty drops, produces purging; but in this way it is apt to inflame the membrane of the mouth.—*Morton's Manual*.

DAFFY'S ELIXIR. A popular quack medicine, often given to horses as a remedy for flatulent colic, gripes, or fret, which it sometimes cures, being composed of proof spirit, in which senna, jalap, caraway seeds, and ginger have been infused. It is by no means an eligible medicine, and should never be employed in this complaint. When the remedies prescribed for this disorder cannot be obtained, a pint of warm beer, with grated ginger, or a glass of gin or other spirit, will be found a cheaper and a more effectual remedy than Daffy's Elixir; or, what is still more effectual, a pint of warm brandy and water;

* I am in the habit of combining croton oil with aloes with good effect. I find four drops of the oil added to five drachms of Cape aloes render it equivalent to five drachms of Barbadoes aloes.—ED.

Ginger, bruised $1\frac{1}{2}$ oz.
Water..... 1 qt.

Boil for ten or fifteen minutes; a good stomachic drench.

DECOCTION OF OAK BARK. — *Decoctum Quercus.*

Oak bark, bruised 2 oz.
Water..... 1 qt.

Boil gently for ten minutes; a good vehicle for tonic medicine.

DECOCTION FOR FOMENTATION. — *Decoctum pro Fomento.*

This is made by boiling bay leaves, camomile flowers, wormwood, and southernwood, in a sufficient quantity of water.

DECOCTION OF POPPY-HEADS. — *Decoctum Capsularum Papaveris.*

This is made by boiling the dry capsules, or heads, of the white poppy, without the seeds, and broken up in small parts, in a sufficient quantity of water; *i. e.* about two or three ounces to a quart of water. This decoction is used as an anodyne fomentation.

DECOCTION OF BARLEY. — *Decoctum Hordei.*

Barley water is made by boiling pearl barley in water. This may be used in fevers, either alone, or as a vehicle for nitre, or other medicine.

Various other decoctions are occasionally employed, and sometimes preferred on account of their cheapness, to more efficacious, but more expensive, medicines; yet, it must be recollected, that some vegetables, such as peppermint, penny-royal, &c., have their useful properties dissipated by much boiling, and should therefore be only simmered for a few minutes, or only infused, as it is termed. (See INFUSIONS.) It is a common practice with cattle doctors to boil their drenches in ale, by which the spirit of the ale, and sometimes the essential parts of the other ingredients are, in some degree, evaporated.

DECOMPOSITION is the separation of bodies which are combined by chemical affinity, and can only be effected by the agency of some substance or substances which have a stronger affinity for one or more of the constituents of the compound than these have for each other.

DELIQUESCENCE. When any solid possesses so great an attraction for water as to absorb from the atmosphere a quantity sufficient to dissolve it, it is said to *deliquesce*. Those, again, that part with their water of crystallization until they become dry and fall into powder, are said to *effloresce*.

DEMULCENTS. Medicines which have the power of di-

minishing the effect of acrimonious or stimulating substances upon the sensible parts of the body. There are two sorts of demulcents: the one, possessing an oily or mucilaginous quality, sheathes the sensible part, and thereby defends it from the action of the stimulus; the other, being a watery fluid, dilutes the stimulus, and diminishes, in a certain degree, its power. They are supposed to act when taken internally, not only by a direct application to the stomach and bowels, but also by being absorbed into the circulation, and through that medium on the lungs, kidneys, and bladder. Among the former may be reckoned gum arabic, gum tragacanth,* and marsh-mallow, with various oils; the latter consists principally of water.

DETERGENTS. A term employed in surgery for those applications which have the power of cleansing foul ulcers, and inducing a disposition to heal. They consist of caustics or escharotics, diluted or mixed with water, unctuous substances, essential oils, or absorbent powders.

DETERGENT POWDERS.

- No. 1. Blue vitriol (sulphate of copper)
 finely powdered 1 oz.
 Bole armenic 2 dr.—Mix.
- No. 2. Red precipitate (nitric oxide of
 mercury, or red nitrated quick-
 silver) finely powdered 1 oz.
 Burnt alum 2 dr.—Mix.
- No. 3. Crystallized verdigris (acetate of
 copper) finely powdered 1 oz.

DETERGENT OINTMENTS.

- No. 1. Ointment of nitrated mercury.
- No. 2. Yellow basilicum (ointment of
 yellow resin) 2 oz.
 Melt, and add oil of turpentine .. 2 dr.
 Blue vitriol, finely powdered $\frac{1}{2}$ oz.—Mix.

DIACHYLON. Litharge, or lead plaster, is made by boiling together olive oil nine parts, litharge five parts, water two parts, over a slow fire, and constantly stirring, until the oil and the litharge unite, and acquire the consistence of plaster. The water is intended to prevent burning or discolouration of the plaster, and must be replaced as it evaporates. Diachylon is an ingredient in sticking plaster, and charges, and is useful when spread on leather for defending a tender part from pressure.

DIACODIAN or DIACODIUM. A syrup made from a decoction of the heads of white poppies, or more readily by dis-

solving the extract of white poppies in water, and forming it into a syrup by the addition of a sufficient quantity of sugar.

DIALTHEA. Marsh-mallow's Ointment. An ointment made from marsh-mallow's root, fenugreek seeds, palm oil, linseed oil, and resin. Sometimes lard and turpentine are added.

DIAPHORETICS. Medicines that increase the natural discharge by the skin; which, when they act in so considerable a degree as to occasion sweating, are termed *sudorifics*.

It is extremely difficult to produce any visible effect upon the horse's skin by means of medicine alone; but when it is assisted by proper exercise and warm clothing, we can generally give a fine glossy appearance to the coat, though it is very difficult to produce sensible perspiration, unless it be by violent exercise, and immoderately warm clothing. The most effectual diaphoretics in the horse, are medicines of the hot stimulating kind, combined with antimonial preparations and opium; these, however, cannot be employed with propriety in fevers, which are generally an effect of internal inflammation; they are useful only when horses are hide-bound, have a rough dry coat, and appear in a state of debility. The effects of this class of medicines are so very uncertain in the horse, and so rarely succeed unless assisted by exercise, that it seems probable that exercise, a proper diet, and good grooming, form the only effectual diaphoretics.

Emetic tartar and other preparations of antimony, Minde-
rerus's spirit, or water of acetate of ammonia, and camphor are the diaphoretics which are employed in febrile complaints. See **FEBRIFUGES.** *

DIGESTIVES. Medicines which promote suppuration in ulcers, and cause them to discharge a white healthy matter. This term is commonly applied to ointments and other preparations which improve the state or condition of ulcers or sores, and cause them to discharge good matter. Medicines that promote the digestion of food are named tonics, stomachics, and cordials.

DIGESTIVE OINTMENT.

No. 1. Hog's lard and strained turpen-
tine, of each 4 oz.
Verdigris 1 oz.—Mix.

* Spirit of nitrous ether in doses of from one to two ounces is one of the most effectual and useful diaphoretics, and will frequently produce perspiration. It is highly useful in inflammatory diseases when the surface and extremities feel cold; it then rouses the circulation, and enables a greater portion of blood to be taken away. — Ed.

- No. 2. Hog's-lard and Venice turpentine,
of each 4 oz.
Sulphate of copper (blue vitriol)
finely powdered 1 oz.—Mix.
- No. 3. Ointment of yellow resin 4 oz.
Oil of turpentine 1 oz.
Nitric oxide of mercury (red pre-
cipitate,) finely powdered 1 oz.—Mix.

DIGITALIS. See FOXGLOVE.

DILUENTS. Weak liquids employed as a common drink, such as barley-water, bran-water, &c., supposed to cool and dilute the blood in fevers, and inflammatory complaints.

DISTILLATION. An operation by which, through the agency of heat, the fixed and volatile principles contained in any body are separately obtained.

DIURETICS. Medicines that increase the secretion of urine; an effect more readily produced in the horse than in the human body. There is a great variety of medicines that act as diuretics: the principal are, the various kinds of turpentine, balsam, soap, the fixed alkalies, nitre, &c.

Diuretics are much used in veterinary practice, particularly in diffused swellings of the legs or other parts, and grease: when given in moderate doses, they may be continued for several days; and a horse may work without danger during their operation. The diuretic alterative in our Pharmacopœia is an excellent medicine for horses that are subject to swellings of the legs, and in slight cases of grease; but in more violent complaints we must employ more active remedies, these being adapted only to mild cases which do not prevent a horse from working. However paradoxical it may appear, there is truth in the assertion that diuretics are among the most useful, and likewise the most mischievous medicines, that are given to horses. They are extremely useful in carrying off the impurities and superfluous serum from the blood, thereby producing the best effects in many diseases.

Horses that have good appetites will take a diuretic in the form of powder with their food, and this form should then be preferred.

DIURETIC POWDER.

Powdered resin and nitre, of each 4 dr.

Mix for one dose, and let it be repeated daily, until a sufficient effect is produced.

DIURETIC BALL.

Hard soap and common turpentine, of each 4 dr.

Powdered caraway seeds enough to form the ball. Mix for one dose.

CORDIAL DIURETIC BALL.

Hard soap and common turpentine, of each 4 dr.
 Ginger 1 dr.
 Opium $\frac{1}{2}$ dr.

Powdered caraways enough to form the ball.

Diuretics should not be kept till they become hard, as they often are, but be given in rather a soft state, and recently made. They should also never be so given as to operate while a horse is in work, as he may thereby be prevented from staling when he has occasion: from neglecting this precaution, and from their frequent and immoderate use, arise those mischievous effects before alluded to. The kidneys are often materially injured by them, as well as the bladder.

DRAGON'S BLOOD. — *Sanguis Draconis*. A resinous substance of a dark red colour, which, when pure, is entirely soluble in spirits of wine. Dragon's blood was formerly employed as an astringent and styptic, in fluxes and internal bleedings; but modern practitioners scarcely ever use it. It is still employed by farriers, in the complaint of horned cattle, which they term *red-water*, or bloody urine, but without effect; nor is there any disease of the horse in which it is likely to be useful.

DRASTIC. A term applied to those medicines that, by the violence of their action, produce liquid purges. Their use is particularly indicated in dropsy, in which disease, by determining a large quantity of the fluids of the body, to the intestinal canal, and subsequently causing it to be voided, the symptoms of this complaint are greatly mitigated. Diuretics are chiefly used in dropsy, but when the kidneys, either from disease or want of tone, do not act with sufficient vigour, drastic cathartics are of the greatest utility.

DRAUGHTS. See **DRENCH**.

DRENCH. A medicine in a liquid form. This is an inconvenient method of giving medicine to horses, some part of the dose being generally wasted. It is preferable, however, on many occasions, to every other form, on account of the medicine acting in much less time than in a solid form: in flatulent colic, or gripes, for example, where the symptoms are extremely urgent and alarming, a proper drench will soon relieve the animal, while a ball, unless soft and very soluble, would not produce any effect. Farriers commonly compose their drenches with ale, whatever the qualities of the other medicine may be, which is often improper, since the properties of the liquid

should always correspond with the virtues of the other ingredients. *Cordial drenches*, therefore, may with propriety be made with ale, but those of a contrary tendency should be mixed with gruel or water.

The best instrument for giving drenches is the horn of an ox; the opening being cut obliquely in the form of a spout. Bottles are sometimes used on an emergency to give drenches; but they are attended with danger, and should be handled cautiously. In giving a drench, the horse's tongue should be held with the left hand; and when the head is sufficiently elevated, the medicine is to be carefully poured into the throat, immediately letting go the tongue, while the head is kept up until the drench is swallowed. Drenches are very seldom given with dexterity, and great part of the medicine is sometimes wasted. Every groom should learn to give them with facility, and always keep a proper instrument in the stable. In giving a drench, the head should not be kept so high as it generally is, nor should the throat be pressed or rubbed, as it often is, with a view to make the horse swallow, as it is apt to excite coughing. In severe colds or strangles, there is often some degree of soreness or inflammation of the throat, by which swallowing is rendered difficult and painful. In such cases, no attempt should be made to give either a drench or a ball, as the complaint would be increased by it; and if at any time a horse happens to cough or appear distressed, while taking a drench, his head should be immediately let down. Hot stimulating medicines, or such as are very nauseous, are better given in the form of balls than drenches. Drenches should always be given with as much gentleness as possible; the horn may generally be introduced with ease, merely by pressing down the tongue with the fingers of the left hand, instead of dragging it out, as is commonly done. A small quantity only of the liquid should be given at once; about six or eight ounces, or even less, when tincture of opium, or any powerful medicine is given; and it is of importance to be accurate in the dose, and not give either more or less than a certain quantity.*

In locked-jaw, it is very difficult to give a drench, unless a small horn be kept for the purpose, and even then a good deal of dexterity and perseverance are often required to effect it. In some cases, the jaws are so completely closed, and the muscles of deglutition so affected, that a drench cannot be given; and

* In giving medicine, a flat pint bottle with a long neck is the most convenient means; there is much less danger of any being wasted than by the use of a horn, and there is no fear of the bottle breaking if common care and attention is exercised. For administering gruel or anything of a thick consistence, a horn is preferable, or a copper or tin vessel made for the purpose. — ED.

then the only method of conveying liquid medicine into the body, is in the form of clyster. See **CLYSTER**. *

Markham's drench for Anasarca, or general dropsy, consists of a decoction of wormwood in ale, boiled down to two quarts, and skimmed. In this, 1 oz. of Castile soap is to be dissolved; and into this mixture, 6 drachms of powdered Grains of Paradise (greater cardamom seeds), and a similar quantity of long pepper, are to be stirred. The whole of this drench is to be given fasting, and the horse to be clothed, and exercised until he sweats and stales profusely. This is a most powerful medicine.

CORDIAL DRENCH.

Good beer or ale $\frac{1}{2}$ pint to a pint.
 Ginger, powdered 1 dr.
 Allspice, ditto. 2 dr.
 Caraways, ditto. 3 dr.

Let the ginger, allspice, and caraways simmer for ten minutes in a small quantity of the ale, and then add the rest. When it is requisite to render this drench astringent, two drachms of catechu may be added.

PURGATIVE DRENCH FOR CATTLE.

No. 1. Epsom salts, or common salt ... 6 oz. to 1 lb.
 Warm gruel..... 1 quart.
 Ginger 1 dr.
 Magnesia, or carbonate of soda ... 1 oz. — Mix.

No. 2. Castor oil..... 1 pint.

DRESSING. An operation of some importance in the management of horses; and consists in currying, brushing, and wiping them, when kept in the stable. This is done, not merely with a view of removing the dust that may be collected on the coat, but to keep up a healthy degree of action in the perspiratory vessels, or pores of the skin. When this is neglected or improperly done, the perspirable matter hardens or thickens, and remains about the roots of the hair, and has the appearance of a whitish dust or small scales, which often cause an itching, and make the skin feel dry, and the coat appear coarse or wiry, instead of being soft and shining, as it is in a horse that is properly dressed or groomed. Horses that are not properly exercised have the more occasion for good dressing; and the operation is more easily and more effectually performed when a horse has been previously exercised until he perspire moderately. Notwithstanding the improvement which regular and careful dressing makes in a horse's appearance, it is not

* Read's injecting apparatus will be found convenient in administering medicine and gruel in this disease. — Ed.

improbable that the skin may be thereby brought to a degree of delicacy or sensibility which is not consistent with the employment for which the animal is wanted, and may render him very liable to diseases. Yet, on the other hand, it is to be considered that the artificial manner in which horses are generally kept and fed, may render the skin or perspiratory organ a much more essential emunctory than it would be were they kept and fed in a manner more conformable to nature.

In India, our cavalry soldiers, instead of using a brush, dress their horses with a coarse glove, made of the same material as a horse's nose-bag. This, I should think, although not so good as a brush, may be advantageously employed for rubbing the legs. The term *dressing* is likewise used to denote any application made to a wound or sore.

EGYPTIACUM. — *Linimentum Æruginis.* Liniment of Verdigris. A preparation made by boiling together five ounces of powdered verdigris, one pound of honey, and seven ounces of vinegar, until they are incorporated. This is a good remedy for thrushes or diseased frogs.

ELDER. — *Sambucus.* This tree is commonly found in England growing in hedge-rows. Some preparations of elder have cathartic qualities, but are not deserving of attention by the Veterinarian. The chief use of elder is to form an oil, of a greenish hue, and of little or no use; and an ointment, which serves the same purpose as hog's lard in the composition of unguents. The oil is prepared from the leaves, the ointment from the blossom of the tree. There is also a distilled water made from it, which is often employed in the composition of eye-waters, but does not appear to possess any medical qualities that do not exist in simple or distilled water.

ELECTRICITY.—The operation of electricity is performed on the human being in those disorders which require stimulant applications, as in paralysis. It likewise rouses the action of the absorbent system in a very remarkable degree, and on that account is sometimes employed in cases of indolent tumours. I am not aware that this remedy has been adopted by veterinary practitioners, but can see no objection to its employment.

EMBROCATIONS. — External applications in a liquid form that are rubbed on a diseased part, as in strains and indolent swellings, and as an auxiliary in the treatment of internal inflammation. They are of a stimulating nature, and are greatly assisted by friction. Of this kind are opodeldoc, soap liniment, &c.

MUSTARD EMBROCATION.

For inflammation of the lungs.

Flour of mustard.....	4 oz.
Liquid ammonia.....	1½ oz.
Oil of turpentine.....	1 oz.

Water, a sufficient quantity to bring it to the consistence of cream. Flour of mustard mixed into a thin paste with water only is a powerful stimulant, and may be employed with good effect in cases of internal inflammation either of the bowels or lungs.

Embrocations for hard indolent tumours.

No. 1. Olive oil.....	4 oz.
Camphor.....	4 dr. — Mix.
No. 2. Mercurial ointment.....	2 oz.
Olive oil and camphor, of each....	2 dr.

Embrocations of a more stimulating kind are sometimes employed in swellings of the joints, old strains, or other local affections, such as soap liniment with liquid ammonia, olive oil, oil of turpentine, and liquid ammonia; but blisters in such cases are generally more effectual.

Embrocations are often improperly employed, as in recent strains, or inflamed tumours, and other cases where emollient or cooling applications are required. Both strains and bruises are at first attended with a degree of inflammation proportionate to the violence of the injury, and the susceptibility of the injured part; therefore they require, at first, such treatment as is calculated to subdue inflammation, that is, bleeding and purging with a suitable diet, and, in strains, *rest*. The local or topical remedies in the inflammatory stage are poultices; but in these cases bleeding and purging, immediately after their occurrence, are an essential part of the treatment.

EMETICS. Medicines that excite vomiting. It is very generally believed that horses are incapable of vomiting: I have met with one instance, however, where it occurred spontaneously, and was soon after succeeded by purging.

Medicines that are considered as the most violent emetics in the human system are generally inert in the horse. A remarkable example of this may be noticed in white vitriol (*sulphate of zinc*), of which a horse has taken twelve ounces at a dose, without much effect being apparently produced. This experiment has not, I believe, been repeated, and it is desirable that it never should be; nor should any experiments of a similar kind be made, as no advantage can possibly result from them, while much pain may be endured by the unfortunate animal who is subjected to them, unperceived by the practitioner or his assistants. It was

asserted at one time, that vomiting may be produced by inserting hellebore under the skin. This experiment was said to have been made at the Veterinary College of Copenhagen, but it does not appear to have succeeded with other practitioners. See HELLEBORE.

In a work on hydrophobia, by Dr. R. Pearson, of Coldfield, near Birmingham, in which he suggests the propriety of injecting medicinal substances into a vein, when exhibition by the mouth or fundament is impracticable, it is asserted that "this is frequently practised upon diseased horses at the Veterinary College of Copenhagen." This, perhaps, is the new method of treating locked-jaw, hinted at by Mr. Sewell, and is worth a trial, when medicine cannot be given by the mouth, and opiate clysters have proved ineffectual; and if, as they state, hellebore, when applied under the skin, is absorbed, and causes sickness, why may not a solution of opium be also absorbed when applied in a similar manner? It is surely worth a trial in locked-jaw. It must be remembered that, when a solution of any medicine, or any liquid whatever (except when blood is transfused from the veins of one animal into those of another), is thrown into the veins, it is first necessary to take away a quantity of blood equal to the medicine to be injected, otherwise too great a pressure of the brain will be the consequence; because the brain, receiving a large supply of blood, is of course distended; and as it is contained in an unyielding bony case, pressure must be the result; and this, carried to any great extent, will produce every symptom of apoplexy. Ipecacuanha and emetic tartar have no emetic power in the horse; and though hellebore appears to excite a painful sensation in the stomach, it has not, even in the dose of one ounce, caused vomiting.

EMETIC TARTAR. — *Antimonium Tartarizatum*. New name, Potassio-Tartrate of Antimony. A preparation of antimony (see ANTIMONY) and cream of tartar (see ACID, TARTAREOUS). This is a violent emetic in the human subject, even in the quantity of one or two grains: but in more minute doses is used as a febrifuge.

In the horse it is a very safe medicine, and useful in fevers: it is generally given in doses of one or two drachms, which may be repeated every day, or even twice a day, should the case require it. Emetic tartar seems to be the best of the antimonial preparations, though others are occasionally preferred: but there is some difficulty in deciding this point; for all the preparations of antimony have so little activity in the system of the horse, that their effects are not often perceptible: we know them to be useful, however, from their frequently subduing or mitigating the disease for which they are employed. When antimonials are given to remove surfeit, or relax the skin, they may be mate-

rially assisted by exercise and moderately warm clothing. I have lately successfully employed, as an alterative, the common sulphuret of antimony, finely levigated, or brought to an impalpable powder by washing, as chalk is. M. Volpi, an eminent Italian veterinary author, and one of the Professors of the Veterinary School at Milan, frequently prescribes emetic tartar in doses of four or five drachms for horses, and much larger doses for cattle. To a sheep he gives thirty-six grains, to a pig a scruple, to a large dog six grains, and observes, that "when the nature of the disorder is well known, and the attack is severe and dangerous, we may begin with much larger doses, even four times the quantity above prescribed."

[These large doses of emetic tartar are to be reprobated, for instances have been known of inflammation of the stomach and intestines having been produced by the too large exhibition of the medicine medicinally. We are less surprised at this when we consider the irritating effects of this medicine, when applied externally. In the form of an ointment, or in a liniment, with oil and spirit of turpentine, it has been found to produce great counter-irritation, and to succeed in doing so when cantharides has failed. In these cases it is very useful, particularly as it causes less pain. It does not raise watery bladders, but pustular swellings; and it is objectionable on account of its tendency to produce extensive sloughing and blemishes. — ED.]

EMOLLIENTS. Medicines or applications that soothe and allay irritation, by relaxing or softening the parts to which they are applied. They consist chiefly of oily and mucilaginous fluids, which are used either internally in inflammations of the gullet, windpipe, intestinal canal, or urinary bladder, or externally as fomentations or poultices (see FOMENTATION and POULTICE), at a temperature that is most agreeable to the feelings of the patient, and best adapted to the purpose for which they are employed, that is, to assuage pain, subdue inflammation, and, in tumours tending to suppuration, to hasten or promote that process. Emollient fomentations are generally made with marsh-mallows, and other mucilaginous plants or herbs; and poultices are composed of bran with oatmeal, linseed powder, lard, or oil, and some of the bulbous roots, such as the white lily, or turnip, with linseed meal, or bread and milk. Internal emollients consist also of oily and mucilaginous fluids, or decoctions of marsh-mallow root, liquorice root, linseed, solution of gum, emulsions, &c. Their action is the same as *demulcents*. (See DEMULCENTS.)

EMULSIONS. A term given to preparations, in which oil is blended with water, by means either of mucilage, the yolk of an egg, or a small quantity of some alkali (see ALKALI). Emulsions have a milky appearance, and are a convenient vehi-

cle for pectoral medicines. Medicine in this form, and for this purpose, are now rarely employed.

These mixtures of oil and water, by the intervention of an alkali or mucilage, are sometimes given alone in coughs.

SIMPLE EMULSION.

Olive oil	2 oz.
Clarified honey	3 oz.
Soft water	1 pint.
Sub-carbonate of potash	2 drs.—Mix.

PECTORAL EMULSION.

Camphor..... 1 to 2 drs.

To be rubbed into a powder by means of a few drops of spirit of wine.

Oil of anise-seed..... 12 or 15 drops.

To this add, gradually, from twelve ounces to a pint of the simple emulsion. To this may be added occasionally nitrate of potash, and tincture of opium.

An elegant and pleasant emulsion is made by rubbing blanched almonds (that is, almonds that have had the skin taken off by steeping them in hot water) in a mortar with sugar, and mucilage of gum arabic. When these have been well rubbed, water is to be gradually added.

ENEMA. A clyster. See CLYSTERS.

EPSOM SALTS. See SULPHATE OF MAGNESIA.

ERRHINES. Powders that cause sneezing by being blown up the nostrils. They are composed generally of hellebore, snuff, asarabacca, turpeth mineral, &c.

ESCHAROTICS. Mild caustics, generally in the form of powder. Such are nitric oxide of mercury (*red precipitate*), exsiccated sulphate of alumine (*burnt alum*), acetate of copper (*crystallized verdigris*), sulphate of copper (*blue vitriol*). These are applied, either separately, or two or more of them are mixed together, and finely powdered; sometimes they are mixed with bole armenic or chalk, or with lard or digestive ointment, by which they are rendered milder.

ESCHAROTIC POWDERS.

- | | |
|--------------------------------------|------------------------|
| No. 1. Exsiccated or burnt alum..... | 2 dr. |
| Nitric oxide of mercury | $\frac{1}{2}$ oz.—Mix. |
| No. 2. Sulphate of copper | 1 oz. |
| Bole armenic | 1 oz.—Mix. |

(See CAUSTICS, ASTRINGENTS, DIGESTIVES, and DETERGENTE.)

ESCHAROTIC LINIMENT.

Honey	8 oz.
Muriatic acid	1 oz.
Verdigris	1 oz.

Mix, over a slow fire.

This liniment may be made stronger by substituting nitrous acid for muriatic, or by retaining the muriatic, and substituting for the verdigris one drachm of sublimate. A weaker liniment is made, and a very useful one, by using two ounces of vinegar instead of the muriatic acid (see *EGYPTIACUM*). Escharotics are applied to foul ulcers, and are employed to destroy fungous or proud flesh.

ESSENCE. This term is applied to essential oils, and very properly, since they generally contain all the medical virtues of the substance from which they are extracted.

ESSENCE OF PEPPERMINT. The preparation sold in the shop by this name is made by dissolving a small proportion of oil of peppermint; one ounce, for instance, in three ounces of rectified spirit of alcohol, that has been previously tinged with some green colour.

ESSENCE OF MUSTARD appears to be composed of mustard, camphor, oil of rosemary, and oil of turpentine, which form a good stimulating embrocation. See *EMBROCATION*.

ESSENTIAL OILS. The smell, taste, and other qualities of vegetables, frequently reside in a volatile oil, particularly in those vegetables, or certain parts of vegetables, that have a strong odour and taste; as mint, penny-royal, peppermint, lavender, caraway-seeds, anise-seeds, juniper-berries, lemon-peel, sandal-wood, &c. This oil, being volatile, may be extracted, and procured in a separate state, by distillation; and as it often contains the useful qualities of the substance it was obtained from, is termed an *essential oil*. See *ESSENCE*.

ETHER, SULPHURIC.—*Æther Sulphuricus*. This is the most volatile liquid we are acquainted with, and evaporates readily in the common temperature of the atmosphere; it must be given, therefore, with great expedition, or a considerable part of the dose will be lost by evaporation. Sulphuric ether is a powerful stimulant, and must be given with caution. I have known a dose of two ounces destroy a horse, but it was given in a case that was supposed to be the flatulent or spasmodic colic, but which was probably inflammation of the bowels. [It is a valuable medicine for flatulent colic, in doses from four drachms to an ounce combined with tincture of opium.—*ED.*]

ETHIOP'S MINERAL.—*Hydrargyri Sulphuretum Nigrum*. Black sulphuret of mercury. A preparation made by

rubbing equal parts of quicksilver and flour of sulphur together, until the mixture becomes black, and the quicksilver invisible.

Ethiop's Mineral, though generally considered as a medicine of little power, or nearly inert, is, I am inclined to believe, possessed of considerable virtue, and will be found, probably, as good a mercurial as can be employed, in all cases where it is necessary to introduce mercury into the circulation, as in farcy, glanders, obstinate cases of mange, &c. It should be given in a dose of two or three drachms in the horse's corn, once or twice a day, until an offensive smell is perceived in the animal's breath, or he is found to stale more than usual; for these symptoms indicate that the mercury has got into the circulation. The disorder for which it is given may, at this period, be expected to yield to the mercurial influence, and may not require a further continuance of the medicine. I would advise a trial being made of *Ethiop's mineral* in the early stage of glanders. M. Volpi, one of the Professors of the Veterinary School at Milan, has published an account of sixteen horses that he cured of the glanders, by means of *Ethiop's mineral*, given internally, and by syringing the nasal cavities with lime water. One of them, a cast horse from the 1st Regiment of Chasseurs, had been glandered eight months, and when M. Volpi had cured him, he sold him to an officer of the same regiment, to whom the horse had formerly belonged, and who knew that he had been glandered. He gave half an ounce every day until the appetite was affected, and there was a slight salivation. Lime water was then given for a short time until the salivation ceased, and the appetite returned. The *Ethiop's mineral* was then given as before, and continued in this manner until the disease was cured. The time in which the cures were accomplished was from two to five months.

Ethiop's Mineral, mixed with an equal quantity of sulphuret of antimony, forms the antimonial *Ethiop's*, and is a good remedy for cutaneous complaints. The dose, two drachms in the horse's corn. This is the preparation which M. Malouin employed for glanders. He gave from half an ounce to an ounce every morning, and a handful of periwinkle, chopped up in the horse's mash, every night. He also administered a purgative once in eight days. M. Malouin's method of making the antimonial *Ethiop's* was different from the simple process above mentioned. He mixed common antimony with quicksilver, either by trituration or by fusion. Bourgelat, however, in his *Matière Medicale*, says, "The character given of this preparation in the public papers, as a remedy for glanders, induced us to give it a trial; it was administered to several glandered horses, with periwinkle as directed by M. Malouin, but it never effected a cure, and I may add, that in many complaints it appeared to be inferior to antimony given alone."

EUPHORBIAE GUMMI-RESINA. Euphorbium. A gum resin, that exudes spontaneously from a large oriental tree. It is brought to us in small drops of a pale yellow colour, which are generally mixed with woody and other extraneous matter.

Euphorbium is used in veterinary practice as an external application. It is generally employed in the form of tincture; sometimes it is mixed into an ointment with hog's lard, mercurial ointment, oil of origanum, oil of bay, &c., being previously reduced to a fine powder. It is also frequently an ingredient in strong blisters, to which it proves a powerful auxiliary. In whatever form euphorbium is employed, it proves extremely acrimonious and stimulating, and is therefore employed to reduce callous swellings of the back sinews, or other parts; curbs, windgalls, &c.

The tincture is made by digesting, or steeping, one ounce of the powder in four or six ounces of rectified or proof spirit; frequently shaking the bottle which contains the mixture, and keeping it in a warm place: after eight or ten days it is to be strained off, and kept well corked. Some add to this a little sublimate and oil of origanum, or camphor. There is another kind of tincture, made by digesting the powder in a strong solution of potash, which also acts very violently. In powdering euphorbium, the mortar should be placed where there is a current of air, so that the dust which arises may be blown off; otherwise it would get into the nostrils or throat, and prove excessively troublesome, sometimes causing bleeding at the nose and swelling of the integuments of the head. I do not consider euphorbium an eligible ingredient in blisters, as there is some danger of its causing ulceration of the skin.*

EXERCISE. We have observed, under the article diet, that the horse's exercise should be always proportionate to the quantity and quality of his food; or rather, that the latter should be adapted to the former, in order to preserve him in health. We have further to remark, that in other points of view exercise is of great importance. In training a horse for the turf or the chase, it is by *exercise* properly conducted, and a well regulated diet, that we enable him to perform those wonderful exertions that are required from him, and bring his wind to the highest degree of perfection which it is capable of attaining. In training a horse, whether he be designed for the turf, the chase, or the army, this precaution must always be observed, — that his exercise never exceeds his strength. Many horses have been destroyed by neglecting this precaution, particularly in the army, where we too often see horses recruited of three years old. When first brought to the regiment (perhaps from a considerable

* As this medicine produces so much irritation, it is better to avoid its use altogether, as we have other stimulants that will supply its place. — Ed.

distance), they are weak and out of condition, often suffering from strangles, which, from their weak state, do not come forward properly, but affect chiefly the internal parts, causing pain and difficulty in swallowing. At this time they are unfit for any kind of work, and require two months to be brought into proper condition for the riding school. However, they are not, in general, allowed half that time, but are brought too hastily into the school, where, being unaccustomed to that, or, indeed, to any kind of work, they become excessively fatigued; and to young horses in a state of debility, particularly if they are not immediately attended to, and taken great care of when brought sweating from the school, this exercise, I am convinced, is often attended with destructive consequences. Exercise, therefore, should always be moderate at first, and adapted to the animal's strength; by increasing it gradually, and in proportion to his condition, he may soon be brought to bear, without inconvenience, that degree of exertion, and velocity of motion, for which he is wanted. Exercise not only prevents disease, but materially assists in the cure of many: thus, in swellings of the heels and legs, grease, inflamed eyes, &c., medicine, without proper exercise, seldom effects a cure.

EXPECTORANTS. Medicines that increase the discharge of mucus from the lungs, and thereby relieve cough and difficulty of breathing. There are many medicines which produce this effect in the human body; but in the horse the action of *expectorants* is not so perceptible. Some of the medicines, however, termed expectorants, prove serviceable in the horse, by relieving or curing cough and difficulty in breathing, or what is termed thickness of wind; among these are squill, and gum ammoniacum; both which I have often found beneficial in those complaints. But the medicines I have found most useful in chronic cough and asthma, or broken wind, are mild diuretics joined with cordials. I have known the occasional use of cordial diuretics, when the horse's diet is carefully attended to, not only relieve but apparently cure broken wind; but the horse's work should be moderate, and so conducted as not to interfere with digestion.

Gum ammoniacum	2 oz.
Powdered squills	1 oz.
Powdered opium	$\frac{1}{2}$ oz.
Powdered ginger	1 oz.
Powdered allspice	1 oz.
Oil of anise-seeds	$\frac{1}{2}$ oz.
Balsam of sulphur	4 oz.
Castile soap, softened by being beaten up with a little syrup	2 oz.

To be beaten into a mass fit for making balls. The dose from one ounce to one ounce and a half daily, or twice a day.

EXTRACTS. — *Extracta.* These are made by boiling the substance whose virtues are to be extracted, in distilled water, pressing out the decoction, straining it, and setting it aside in order that the fæces may subside; after which it is again boiled in a water bath, saturated with sea salt, until it acquire a proper consistence. In this manner are made the extracts of aloes, gentian root, white poppy heads, liquorice, &c.

EYE-WATER. See COLLYRIUM.

FEBRIFUGE. A term given to medicines that moderate or lessen the violence of fever.

Camphor 1 to 2 dr.

Nitre 3 to 6 dr.

Tartarized antimony. ... 1 dr.

Flour and treacle or syrup enough to form the ball.

FENUGREEK. — *Fœnum Græcum.* The seeds only of this plant are employed for medicinal purposes: on account of their mucilaginous quality they are used in making poultices, and sometimes emollient glysters. Farriers often give them internally, with what view I cannot pretend to say; since they do not appear to be adapted to the cure of any complaint. They are eaten in the Levant, and considered stomachic. The powdered fenugreek sold in the shops contains a large proportion (generally one half) of pea meal. It is supposed, especially by waggoners, and the servants of large horse proprietors, to promote condition.

FIRING. A severe operation, often performed on the horse, and on some occasions highly useful. It consists in the application of a red-hot iron to the skin, so as to burn without penetrating through it. The violent inflammation this occasions rouses the absorbent vessels into action, by which callous or even bony swellings are sometimes dispersed. The diseases in which it is most efficacious are spavins, ring-bones, and old callous swellings about the back sinews, in consequence of strains and windgalls. Firing draws blood to the affected part, thickens and strengthens it, and makes the skin act as a permanent bandage. A blister is often applied to the part, immediately after firing, or on the following day, to render it more effectual. It is necessary to observe that the milder remedies should be tried before this severe operation is resorted to.

It has been asserted, that when firing is employed for old callous swellings of the back sinews, the swelling should be previously reduced by blistering, and that firing will then prevent any return of the complaint; whereas, if the firing be performed in the first place, it will tend to fix the swelling, and

render it incurable. I do not believe there is any ground for this opinion. It is certain, however, that when a part is in a state of inflammation, which is indicated by its being hotter and more tender than other parts, firing will do harm. The inflammation should be first removed by the frequent application of some cooling lotion, such as diluted vinegar, in which a little sugar of lead has been dissolved.

The hot iron is the most effectual remedy for those ulcers of the skin which depend upon *farcy* or *glanders*. It is improperly employed to remove that swelling of the roof of the mouth next the upper front teeth, which is named *lampas*. See LAMPAS.

FLAX-SEED. See LINSEED.

FLIES, SPANISH. See CANTHARIDES.

FLOUR. See WHEAT FLOUR.

FLOWERS, OR OXIDE, OF ZINC. — *Oxidum Zinci*. These, also, are obtained by sublimation from the metal named zinc. The medicine is said to possess a considerable tonic power.

Should any one be inclined to try the flowers of zinc, he may safely begin, I think, with the dose of two drachms or half an ounce, and gradually increase it until some effect is observed. The diseases to which it is adapted are those arising from debility.

FOMENTATIONS. — *Fomenta*. This term is applied to various kinds of decoctions, or medicated liquids, which are employed externally to bathe or foment any inflamed or painful part, or to improve the condition of wounds when they are very irritable, and discharge unhealthy offensive matter, or when approaching to a state of gangrene or mortification. Fomentations are therefore divided into the following kinds, viz. *emollient* and *anodyne*.

EMOLLIENT FOMENTATION.

Boil marsh-mallows in water for some time, then strain off the liquor, and bathe the affected parts with it while warm.

ANODYNE FOMENTATION.

- No. 1. White poppy heads broken, two dozen.
Hemlock, two handfulls.

Boil for two hours gently in six quarts of water.

- No. 2. Wormwood dried, and camomile flowers,
of each 4 oz.
Rue 3 oz.
Bay leaves 2 oz.

Boil them for one hour in a gallon of water.

Remark.—The efficacy of a fomentation depends on its being properly applied; I have therefore to observe, that the liquid should be only as hot as the part can bear without pain. Large flannel cloths are to be dipped into the fomentation, then lightly wrung out, and spread over the affected part; by the time one cloth gets a little cool, another should be got ready, and applied in the same manner. This operation ought to be continued for half an hour at least, and repeated three or four times a day. The emollient fomentation is adapted to inflamed swellings, from whatever cause they may arise; and when it cannot be procured, warm water alone will be found an useful substitute. The anodyne fomentation, No. 1., is of great service in wounds or swellings which are accompanied with great pain and irritability: it tends to correct putridity and gangrene, in larger wounds of the lacerated kind, where the matter is thin, ill-coloured, and offensive; but in such cases, the assistance of internal remedies cannot be dispensed with.

It is probable that warm water is as good an emollient fomentation as can be employed, if used assiduously, and at a proper temperature, which should be regulated by the state or irritability of the part to which it is applied. In inflammation of the eye, for example, it should not be above 98°, or blood heat; in inflamed and painful swellings, it should seldom exceed 100°. In strains of the back sinews, vinegar, either alone or diluted, is considered a good fomentation; and as the injury is rather deeply seated, and not in the skin, the fomentation may be applied rather hotter than where the cuticle is affected.

When a fomentation is employed for inflammation of the bowels, it should be still hotter; indeed so hot as that the hand cannot be dipped into it without pain. The best mode of applying it is by means of a long piece of woollen-cloth, with the two ends joined, that it may be wrung out of the hot fomentation, by placing a stick through each end; for the liquor makes the cloth too hot to be handled and wrung out without this contrivance. When thus applied, it may be considered as a steam fomentation, and will be found very beneficial. Two men, one on each side the horse, are required to apply this fomentation effectually. In some cases, where the swelling or injury is not extensive, the fomentation may be applied with a large sponge in others; by a thick woollen cloth, such as an old rug or blanket.

[Mr. Mavor has introduced some apparatus for the topical application of steam, which is noticed in a previous part of the present work. — ED.]

FOXGLOVE. — *Digitalis.* This is an indigenous biennial plant, which grows plentifully in this country, and flowers during part of the months of July and August. The leaves were

formerly employed as an application to ulcers and scrofulous tumours; but from their deleterious quality were seldom used as an internal remedy. Foxglove was found to possess remarkable power in diminishing the frequency of the human pulse, therefore it was expected to be found a valuable medicine in those internal inflammations which so frequently occur in horses, their most dangerous fevers depending on this cause; and when the inflammation attacks an important part, such as the lungs or bowels, it generally terminates fatally, unless that most powerful remedy, bleeding, be employed at an early period. Foxglove, on these occasions, it was thought, would greatly assist this remedy, particularly in inflammation of the lungs. It was, therefore, introduced into veterinary practice. The other complaints in which it has been chiefly employed, are chronic cough, or imperfect wind, and swelling of the legs.

Foxglove is an active medicine in the horse, and cannot be given with perfect safety in larger doses than a drachm; the horse must be carefully watched, that the effect may be seen; for, if too much be given, the stomach is sometimes materially injured. The most frequent effect of foxglove is to take off the appetite: and that effect, when it has been given in a full dose, generally continues two or three days; it should, therefore, be given with caution.*

FUMIGATIONS. These consist of substances which emit fumes or vapours by the application of heat or other means. They are generally employed to destroy contagion; and though the fumigations recommended in books of farriery, as well as those in common use, are inadequate to that purpose, yet there are certainly some which may be productive of great advantage.† Fumigations are employed to prevent the spreading of epidemic distempers, or to destroy the contagion of glanders.

The following is one of the most effectual fumigations, and may be used in influenza, or other infectious diseases: —

* The usual dose of foxglove is a scruple to a drachm once, twice, or thrice a day with tartarized antimony and nitre. It has certainly a singular effect on the pulse, rendering it at first intermittent, and then less frequent. With this view it is given in inflammation of the lungs after blood-letting. It must not, however, be too much relied on, or employed to the exclusion of other medicinal agents.

It has been employed in broken wind, when it has been found to tranquillise the respiration for a time. — ED.

† Fumigating the nostrils has been tried in glanders with occasional advantage. Carbonic acid gas has been thus applied, and chlorine gas is much recommended. Mr. Morton advises it to be thus administered: "Chlorine gas is to be liberated from muriatic acid by the action of peroxide of manganese upon it. For this purpose a Florence flask, a stand, and lamp are all that is required. As much gas is to be disengaged into the loose box in which the animal is placed as the assistant can bear to inhale, he then retires with the apparatus. Thus the atmosphere will be sufficiently impregnated with the gas, which may be repeated the next day." — ED.

Take of

Common salt	8 oz.
Manganese powdered	6 oz.

Let these be well mixed, and placed in an earthen dish; then pour on the mixture, gradually, of sulphuric acid, four ounces. As soon as the latter is added, the operator should leave the stable, shutting both the door and windows. The fumes which arise from this mixture, are highly injurious to the lungs, and must be carefully avoided; therefore this fumigation can be performed only in an empty stable. During the whole day the stable-door and windows are to be kept shut; but at night they may be thrown open, that there may be no danger on entering the stable next morning. I believe this to be the only efficacious fumigation, having found that when glanderous matter is exposed to it a short time, it is rendered perfectly harmless. The fumes which are generated by pouring oil of vitriol, or vitriolic acid, on powdered nitre, are said to be very effectual in destroying human contagion; how far it may be serviceable in veterinary practice remains to be ascertained; but, as the fevers of horses do not appear to be infectious, there is no great probability of its proving useful. The term *fumigation* is applied, by French veterinary writers, to the vapour arising from boiled herbs, or bran and hot water.

[Mr. Read has invented some ingenious apparatus, by which a simple or medicated fumigation may be conveniently applied to the nostrils. (See p. 127.) — ED.]

GALBANUM. — *Galbanum.* This plant is a native of Syria and some parts of Africa, and affords a gum-resin, similar in its medicinal qualities to ammoniacum; that is to say, antispasmodic, deobstruent, and expectorant. It is, however, inferior to the latter medicine in efficacy, and may be said to hold a middle place between it and assafœtida. The dose is about three drachms.

GALLS. — *Gallæ.* An excrescence from the oak tree, produced by the puncture of an insect. Galls are powerfully astringent, but not often employed internally; they may, however, prove useful, in conjunction with other remedies, in suppressing obstinate diarrhœa.

The dose from two drachms to four.

GALVANISM. It has been discovered within these few years, that an effect somewhat like electricity may be produced on the body by means of different metals and an acid liquor; and that a short time after death, the muscles may be excited to action by the same means, producing the most curious phenomena. From the name of its discoverer, Galvani, it is termed *Galvanism*. It has lately been employed for the cure of certain

diseases, and, it is said, with considerable success; therefore it may be worth a trial in those disorders of the horse for which at present we have no remedy; such as gutta-serena, and other diseases of the eye.

GAMBOGE. — *Gambogia*. The tree from which this gum is obtained is a native of Siam and Ceylon. Gamboge is perfectly inodorous, and has an insipid taste. In man it acts as a violent cathartic, often producing nausea and vomiting; but it is very rarely used for veterinary purposes, as its effects are uncertain, and it is liable to produce griping.

The dose is from two drachms to half an ounce; or two drachms of gamboge may be combined with three of aloes.

GARLIC. — *Allium*. This is often employed by farriers as a remedy for coughs and thickness of wind; and I believe that in coughs of the chronic kind it has sometimes been found efficacious.

The dose is from one to two ounces.

The cloves are separated and pounded in a mortar until they form a sort of paste, which is formed into balls with liquorice powder; sometimes they are boiled in milk, and given in the form of a drench. Gibson speaks highly of garlic.

GENTIAN; the Root. — *Gentiana lutea*. A perennial plant, found in Switzerland, Austria, the Pyrenees, and North America. It possesses no particular odour, and its taste is extremely bitter, on which account it is very generally employed in the same manner as bark and other bitters, to give vigour to the stomach and improve digestion. It generally requires to be joined with stimulants; such as ginger, cassia, myrrh, cascarilla, &c.; and when any acidity is suspected to exist in the stomach, a small quantity of soda is an useful addition. Gentian is the basis of that famous horse powder termed *diapenté*. Gentian root sometimes becomes rotten and useless: the purchaser should therefore examine before he buys, and choose such parts as are sound, rather tough, and extremely bitter. It is to be feared that the powdered gentian of the shops is not so good as it should be; and it is to be lamented that druggists in general think any thing good enough for horses.

The dose of pure gentian is from two to four drachms. See **TONICS** and **STOMACHICS**.

GEUM URBANUM; *Radix*. The root of Avens. This is an indigenous perennial plant, flowering from May to August. Its odour is fragrant and spicy, and its taste bitterish and astringent. Its properties are astringent, tonic, and anti-septic, and it may be advantageously employed in those diseases which depend on a relaxed state of the system, or of any particular part; as in diarrhœa, red-water (where no fever exists), &c. This medicine has been much more extensively used on

the Continent than in this country; and I am not aware that it has yet been introduced here into veterinary practice; but it certainly deserves a trial, especially as it is an indigenous plant, and should therefore be sold at a low price.

GINGER; the Root. — *Zingiber officinalis*. This plant is originally a native of the East Indies, but is now very extensively grown in the West Indies also. The root only is used in medicine, and this is prepared in two ways, producing two sorts of ginger, the white and the black. The former is generally employed for culinary purposes, and the latter, being the cheapest, is most frequently used as a horse medicine.

I consider ginger as the most useful stimulant in the veterinary materia medica; when joined with aromatics, such as allspice, caraway-seed, anise-seed, cummin-seed, &c., or their essential oils, it forms an efficacious cordial; and with emetic tartar and opium an excellent diaphoretic, for giving gloss to the coat, and relaxing the skin.

Ginger is extremely beneficial in weakness and flatulency of the stomach; and assisted by other remedies, such as warm beer, it seldom fails of curing the flatulent colic or gripes. (See **CARMINATIVES**.) It is generally added to aperients, in order to correct their liability to produce griping.

The dose is from one drachm to three drachms.

It should be recently powdered when used; but in a well-stopped bottle the powder may be kept a considerable time without losing its strength.

Ginger is frequently thrust whole, after being chewed, up the fundament of a horse, in order to make him carry his tail high, and give him a sightly appearance. It is certainly a very improper practice, and, though it may very rarely happen, I can easily conceive that a very considerable degree of irritation of the *rectum*, and tenesmus, may be produced by a frequent repetition of this operation. Many horses belonging to dealers are frequently shown to customers a dozen times a day, or oftener, and are invariably *figged*, as it is termed, prior to being led out of the stable. After a short time, the irritation produced by the ginger causes them to make violent efforts to dung, and the ginger is generally expelled; but these very efforts prove to what a stimulus the poor animals have been subjected; and stimulants, especially strong ones, frequently repeated, may eventually produce inflammation.

GLAUBER'S SALT. See **SULPHATE OF SODA**.

GLYSTER. See **CLYSTER**.

GOLDEN SULPHUR OF ANTIMONY, now named **PRECIPITATED SULPHURET OF ANTIMONY**. — *Sulphuretum Antimonii Precipitatum*. This is an orange-coloured powder, insoluble in water, and inodorous. It is said to increase the

febrifuge power of antimonial powder. (See FEBRIFUGE.) This preparation of antimony is scarcely known to farriers, and, I believe, seldom used by veterinarians. It may be found useful, however, in obstinate diseases of the skin, either alone or joined with mercurials, such as Æthiop's mineral.

The dose is from one drachm to two: perhaps even more may be given with safety; but it is advisable to begin with a small dose.

When pure, this preparation of antimony readily catches fire: it is frequently adulterated with chalk, which fraud may be detected by mixing it with an acid, and if any chalk be present effervescence will take place.

GOULARD'S EXTRACT. — *Liquor Plumbi Subacetatis*. New name, *Liquor Plumbi Diacetis*. This is made from litharge and vinegar, by simmering them together over a gentle fire, until the vinegar has dissolved as much as it is capable of doing. Goulard, therefore, is nothing more than a solution of litharge in vinegar. It is a very useful application in cases of external inflammation, and may be used either as a lotion or in the form of poultice. Goulard lotion is made by mixing half an ounce of the extract to a pint of rain or river water: some add to this a little camphorated spirit, or some distilled vinegar; but when the lotion is intended for the eyes, there must be a much larger proportion of water, not less than a quart, and the lotion should be filtered.

Goulard poultice is made by mixing as much of the lotion, with bran, linseed meal, or any proper materials for a poultice, as will give them a proper consistence. (See POULTICES and LOTIONS.)

Goulard is never used undiluted, nor is it given internally.

GRAINS OF PARADISE. — *Cardamomum*. A warm stimulating seed, often used in the diseases of horned cattle as a cordial; and where medicines of that kind are required, it is certainly very proper.

The dose is from three to six drachms, or one ounce.

GRUEL is an useful drink for horses on many occasions; and when made carefully, or sweetened with sugar or treacle, and sometimes seasoned with salt, they will often drink it, and save the trouble of drenching. It is a good vehicle for such medicines as are of a stimulating or acrimonious nature, such as oil of turpentine. Gruel is made either with oatmeal or groats, barley-meal or pearl-barley, fine wheat flour or arrow-root; it may be made also with sago, salep, or tapioca; either of these is to be boiled in water, and, for some purposes, in milk or broth.

Gruel is often made merely by stirring some oatmeal into warm water, but it is better when boiled; and when groats or

pearl-barley are employed, it should be boiled a short time, and the first water thrown away; the gruel will then be free from an unpleasant taste which these substances contract by keeping; when they are first crushed or bruised the gruel is richer, and more expeditiously made. Gruel is an useful restorative for weak or convalescent horses, being very nutritious and easy of digestion; perhaps nothing is more nutritious than wheat-flour gruel, made with milk, and sweetened with sugar. In India it is a common practice to give horses strong broths, thickened with grain or flour, and seasoned with pepper or other spices, when they work hard, or as a restorative cordial. Infusion of malt makes a good nutritive drink for horses; but good sweet groats make an excellent gruel. Oatmeal is sometimes musty, and gruel made with it has often some degree of bitterness. When gruel is given as a cordial restorative after hard work, a little beer and ginger may, on some occasions, be added. Horses that are exhausted by long fasting and fatigue are soon recruited by taking such gruel. Horses are very nice in their drinking; therefore the gruel should be made in a clean saucepan, free from the smell of meat, smoke, or fat. For some purposes, or where it is inconvenient to boil the gruel, a little oat, barley, or wheat meal may be stirred into warm or cold water.

It is a good practice to accustom horses to drink gruel, as, after a hard day, many hunters show a disinclination to eat, but will drink with avidity; and if they will drink gruel instead of water, it is not of much consequence if they fast for some time. No horse, it should, however, be remembered, is fit for hard work if he be not a good feeder; but the best horse may refuse his food if forced to over-exertion.

GUAIAAC. — *Guaiacum officinale*. This tree is a native of Jamaica, Hispaniola, and some parts of America. Every part of it possesses medicinal properties, but the wood and gum alone are used. The former is sometimes employed in human medicine, as an ingredient in alterative decoctions, but never in veterinary practice. The resin, commonly called *gum guaiacum*, is sometimes used as an alterative. Farriers employ it also in what they suppose to be rheumatic lameness, but, I believe, without any advantage.

The dose of gum guaiacum is from half an ounce to six drachms.

When guaiacum is adulterated with common resin, if a portion of it be thrown into fire, an odour of turpentine will immediately be emitted.

GUINEA PEPPER. See **CAYENNE PEPPER.**

GUM. — *Gummi*. There are various kinds of gum, which may be distinguished by their solubility in water, and by forming therewith a mucilage. The principal are, gum arabic, gum

tragacanth, and Indian gum. The first two are the best. Gum dissolved in water makes a useful drink in inflammatory complaints of the bowels, kidneys, bladder, and lungs.

GUM RESINS. — *Gummi Resina.* These seem to be compounds of resin with extractive and essential oil, and probably some other hitherto undiscovered principles. Those which are officinal are gum ammoniac, scammony, galbanum, assafœtida, myrrh, gamboge, sagapenum, olibanum.

HARTSHORN. — *Cornua Cervi.* The horns of stags do not materially differ from bone, except in containing a larger quantity of cartilage. On boiling they yield a great deal of jelly, which is more readily extracted when they are crushed or cut into shavings: by distillation they yield ammonia and animal oil.

HARTSHORN, SPIRIT AND SALT OF. See AMMONIA.

HELLEBORE, BLACK AND WHITE. — *Helleborus Niger. Veratrum.* Black hellebore is a native of Austria, the Apennines, and Italy; white hellebore of Greece, Italy, Switzerland, and Russia. They both act as drastic cathartics and emetics on the human frame, producing, in large doses, vertigo, inflammation of the stomach, and convulsions. The root of this plant, particularly of white hellebore, is extremely acrimo-
nious; for if wounded while fresh it emits a juice capable of blistering the skin.

Powdered white hellebore is often employed as an ingredient in blisters. It is used also in ointments for the mange, and other cutaneous diseases. A decoction of white hellebore is frequently used for the same purpose; but other medicines are generally added to it; as *sulphur vivum*, turpentine, white vitriol, or alum. Hellebore has been tried, as an *internal* remedy, in the small dose of half a drachm, and has been declared to be a dangerous medicine.

However, I have lately had an opportunity of trying the effect of white hellebore, and did not find it so violent or so dangerous as it was said to be, after an experiment made at the Veterinary College. To a glandered horse I gave half an ounce of the powder of white hellebore, expecting it would destroy him, but it produced no effect; an ounce was then given, which caused an appearance of sickness, and a copious discharge of saliva from the mouth. It was given afterwards to several horses; and was uniformly found in the dose of half an ounce, given daily, to produce the effect above described. In some, the first dose caused an appearance of sickness and salivation; others took several doses before any effect was observed. It was given daily in a case of farcy, in the dose of half an ounce, and the horse got well: no other remedy was employed except blisters. In none of the experiments did it cause any dangerous symp-

toms, but it certainly caused a very painful sensation in the stomach. (See CATHARTICS, remarks on.) The general effect of hellebore is nauseating, by which it lowers the action of the heart very considerably, and may, therefore, be advantageously employed in inflammatory diseases.* This, however, has been denied by some veterinarians.

Black hellebore is seldom used in horse medicine. Sticks of black hellebore are sometimes inserted under the skin, particularly in cattle, in order to produce an issue. [Black hellebore has also been used by Mr. Stanley of Banbury, for poll evil, and fistulous withers. The mode of applying it may be found under these diseases.]

HEMLOCK. — *Conium Maculatum*. This is an indigenous plant, growing generally in moist shady places, and flowering in June and July. It is a strong narcotic; but supposed to be, on some occasions, an useful medicine, possessing, like opium, an anodyne quality, but not so certain in its effect. It is said, however, not to produce costiveness, like opium. The complaint in which it has been chiefly employed in veterinary practice is obstinate cough, depending upon irritability.

The leaves are to be carefully dried and powdered. The powder must be kept in a well-stopped bottle, from which the light should be excluded. The dose is about a drachm; but it may be gradually increased to a much larger quantity.

There is an extract made from hemlock, which, when prepared, is a very convenient form, and not less efficacious than the powder. The dose is about a drachm; but this also, may be gradually augmented to a considerable quantity.

A decoction of green hemlock is said to be an useful fomentation in painful wounds and tumours. Since writing the above, I gave about half a pound of green hemlock to a young ass; he ate it readily, but it did not produce any sensible effect. It has been said that goats eat hemlock, and are nourished by it.

It should be remarked that, as the powers of the powder are often impaired by keeping, whenever a fresh parcel or quantity of the herb is used, it should first be administered in small doses, in order to ascertain its strength. Vinegar is said to be the best antidote for an over-dose of hemlock, after bleeding and purging have been employed.

HEMLOCK, WATER. — *Cicuta Virosa*. This was discovered by Linnæus to be a violent poison to cattle.

HENBANE. — *Hyoscyamus niger*. This is a biennial plant, found in great abundance in most parts of Britain. Like hemlock,

* White hellebore, in scruple doses, is strongly recommended by Mr. Percivall for inflammation of the lungs, and by the late Mr. John Field for pleurisy. It may be repeated two or three times a day, but requires careful watching.—Ed.

it is a powerful narcotic, and free from the constipating effect of opium. It has not hitherto been used in veterinary medicine.

The seeds are said to be the most powerful part of the plant: but the powdered leaves and the extract are more commonly employed in human medicine.*

HEPAR SULPHURIS. Liver of Sulphur. An old name for sulphuret of potass. This medicine has been found efficacious in some cutaneous diseases, as mange, for instance, and has also been recommended as an antidote to some poisons, as arsenic, lead, and mercury; but it has been too seldom tried to ascertain its powers of counteracting the effects of these metals. Sulphuret of potass is deliquescent, and is decomposed by exposure to atmospheric air. It likewise suffers decomposition by being added to water, part of the sulphur taking up the oxygen of the water, and becoming acidified, thereby forming sulphate of potass; while the hydrogen of the water, combining with another portion of the sulphur, is given off in the form of sulphuretted hydrogen gas. Hydroguretted sulphuret of potass is also formed by the remaining sulphur uniting with the alkali. Sulphuret of potass is decomposed by acids, the acid forming a neutral salt with the potass, and the sulphur being liberated. It is very necessary to remember this fact when prescribing sulphuret of potass, otherwise its action may be entirely changed.

The dose is from a scruple to a drachm or more.

HOG'S LARD.—*Adeps Suillus.* An article of some importance in veterinary surgery, being the basis of almost every ointment.

Hog's lard possesses a laxative quality, and may be given to the extent of half a pound, melted and mixed with warm water or peppermint water, as a substitute for castor oil, olive oil, or linseed oil, when neither of these can be procured. Fresh hog's lard melted, and mixed with a little salad oil, forms a good softening ointment for horses' heels that are subject to cracks.

HONEY.—*Mel.* A small quantity of honey, dissolved in linseed infusion, is often used in those troublesome coughs which arise from irritation, and serves in this way as a good auxiliary to more important remedies. Honey is sometimes added to a solution of alum, as a lotion for the mouth, when it is inflamed and sore.

Honey is nutritious and rather laxative, and may be occasionally given as a restorative mixed with milk, or with gruel made of wheat-flour and milk. (See GRUEL.) With vinegar it forms an oxymel; and when squills, garlic, &c. have been pre-

* This medicine has been given by Mr. St. Clair with success in tetanus, in doses of three drachms once a day with prussic acid.—*Set Vet.* vol. 12.

viously infused in the vinegar, it forms with it oxymel of squills, garlic, &c., which are considered good medicines in chronic cough. Honey is a convenient substance for forming balls. It is sometimes used also as a basis for liniments or ointments (see EGYPTIACUM); and when made into a syrup with an infusion of roses, it forms honey of roses, which, with alum, forms an useful wash for soreness of the mouth, lampas, &c.

HOOF OINTMENT, is prepared from

Tar and tallow, of each equal parts.

When melted, let the mixture be removed from the fire, and stirred until it is cold.

This ointment is applied to the coronet and heels, when dry and cracking; and is also an useful application to thin weak feet.

HOP. — *Humulus*. A decoction of hops is a good stomachic bitter and anodyne, possessing a weak narcotic quality. It forms also a good anodyne and discutient fomentation.

HORSE-RADISH. — *Armoracia*. The root of horse-radish, when fresh, is a powerful stimulant. All its virtues may be extracted by distilling the root with water or spirit; in which state it may be kept a long time without losing its strength. It is said to possess also a diuretic and diaphoretic quality. Its acrimony is destroyed by boiling; it is therefore given either as an infusion, or beaten into a mass with flour, as a ball. If beaten into a mass, and formed into a paste, with flour of mustard and water, it is capable of blistering the skin.

HYDRAGOGUES. This appellation is given to those medicines that act on the kidneys, increasing the secretion of urine. The real derivation of the word, however, would imply anything which produced an evacuation of liquids, and therefore the epithet may be and is very justly applied to drastic purgatives, which induce liquid motions.

HYDRARGYRUM. MERCURY; which see.

HYDRARGYRI SUBMURIAS. Submuriate of quicksilver. Calomel. New name, Protochloride of Mercury. See CALOMEL.

HYOSCYAMUS. See HENBANE.

INFUSIONS. — *Infusa*. Medicated liquids, made by pouring boiling or cold water on any vegetable or medicine, whose virtues it is capable of extracting. When the medicinal principles of a vegetable are of a volatile nature, and liable to evaporate by boiling, they are extracted by being steeped in hot or cold water. The liquid thus obtained is termed hot or cold infusion. Chamomile flowers, peppermint, and other aromatic herbs, are to be infused in hot water; logwood, guaiacum, and bark, require to be boiled, the latter a short time only, the two former much longer. (See DECOCTION.) The menstruum of

infusions is water; if alcohol be used instead, the preparation is then called a tincture, and, when wine or vinegar are employed, it is termed a medicated wine or vinegar.

INJECTIONS. — *Injectiones.* Liquids (generally medicated) which are injected into any cavity of the body, by means of a syringe, gum-bottle, or other instrument.

IODINIUM. Iodine. [This substance is found in a state of nature in many marine plants. Its properties are stimulant, and its chief action seems directed to the absorbents, which it excites in a very high degree.

Iodine is now extensively employed by scientific veterinarians. It is thus described by Mr. Morton: —

“ Although iodine and its compounds have not yet come into general use amongst veterinarians, I have little doubt but that they soon will. Iodine is obtained from the mother-water, after the procurement of carbonate of soda from kelp. Its action is that of a stimulant to glandular structures, and the forms in which it is employed externally are those of a liniment and ointment. Internally it may be given in doses from five to ten grains twice in the day, although there are objections to its being administered uncombined, as iodine only enters the circulation in the form of hydriodic acid, or an hydriodate, and it is apt to accumulate in the system.

“ **LINIMENTUM IODINII COMPOSITUM.** Compound liniment of iodine.

“ Take of iodine 1 part.

“ Soap liniment 8 parts. — Dissolve.

“ **UNGUENTUM IODINII.** Ointment of iodine.

“ Take of iodine 1 part.

“ Lard 8 parts. — Mix.

“ Some substitute for lard the milder ointment of mercury, by which a far more active compound is formed. Others add half a part of cantharides in powder, or tartar emetic, by which absorption is promoted. Administered internally, the form of tincture is advocated by many. If, however, it is long kept, it is apt to undergo decomposition.

“ **TINCTURA IODINII.** Tincture of iodine.

“ Take of iodine 1 part.

“ Rectified spirit 8 parts. — Dissolve.

“ The dose of this is from 1 to 2 drs. given twice a day.”

Iodide of Potassium is a preferable form of administering iodine

internally, as it is not liable to accumulate in the system like iodine. It is a salt containing 40 parts of potassium to 126 of iodine. The dose for internal use is twenty to thirty grains in the horse. It may be used in the form of an ointment with eight parts of lard, or being rubbed down with an equal portion of quicksilver, with the addition of a little spirits of wine, the lard may then be added, thus forming a compound ointment very serviceable in promoting the absorption of glandular and other swellings.

Dinioidide of Copper. — Mr. Morton has formed a new compound by the chemical union of iodide of potassium and sulphate of copper, two ounces of the former and four of the latter, with a pint and a half of boiling distilled water; the copper to be dissolved in two thirds, and the iodide in one third of the water. When cold the solutions are mixed, and the precipitate falling is to be separated and pulverised.

The action of this medicine is that of a tonic and a stimulant to the absorbent system. The dose from 1 to 2 drs. daily, combined with vegetable tonics, and sometimes small doses of cantharides. It has been given successfully by Mr. C. Spooner and Mr. Daws for farcy, and is to be recommended for nasal gleet and glanders, its double action being so desirable in these cases. I have employed the sulphate of copper, rubbed down in a mortar with iodide of potassium, with success in cases resembling glanders, giving vegetable tonics at the same time. Mr. Morton also recommends, for the same purpose, the iodide of iron, a chemical combination of iodine with iron, in doses of one or two drachms. — ED.]

IPECACUAN. — *Ipecacuanha.* Ipecacuanha is sometimes employed as an expectorant in chronic cough, and asthmatic affections, and I believe with good effect when joined with squills, ammoniacum, &c. (See EXPECTORANTS.) According to Vitat, from half an ounce to an ounce given to a horse, makes him snuffle and sneeze for some minutes; at the end of an hour he appears agitated, the belly tense, but the arteries and flanks beat with violence for four or five hours: these appearances gradually go off. Given to the extent of three ounces, it distresses the horse greatly; he lies down and soon gets up again, his flanks beat, he sighs and groans, and unless water be given him he dies convulsed. On these symptoms going off, his dung is a little softened, but it does not purge. I once gave an ounce to a young ass, but it did not produce any perceptible effect. Bourgelat says, it is employed in chronic bowel complaints, in molton grease, and dysentery, with success, either as an infusion or decoction. He also observes, that though it does not cause any sensible evacuation in large animals, it purges the sheep; and in the pig, the dog, and the cat, it causes vomiting or

purging, according to the quantity given, and the state of the stomach and bowels. He has given it to broken-winded horses, but without success. He states the dose for a horse to be from 72 grains to 1 ounce; for a dog, from 4 grains to 20.

IRON. — *Ferrum*. This is one of the most abundant metallic productions of nature; its ores are found in almost every part of the globe in the soil and often in the water, and as a constituent of vegetable and animal bodies. The only preparation of iron commonly used in veterinary medicine is sulphate of iron, or salt of steel, a useful tonic in doses of two or four drachms.

JALAP, the Root. — *Ipomœa Jalapa*. In the human body, the root of jalap is a certain and efficacious purgative; and there is scarcely an old book on farriery in which it is not recommended for horses as an ingredient in purgative balls or physic; which practice is still followed by farriers, who generally put two or three drachms of jalap into every dose of physic. It was tried, however, first at the Veterinary College, and was found to have no purgative effect on the horse, though given in considerably larger doses than even farriers employ; but I have observed that in a very large quantity it occasions sickness, and some degree of purging, though its effects in this way are by no means sufficient to induce any one to employ it as a purgative alone.

I once gave eight ounces of jalap at one dose to a glandered horse, that was in other respects healthy, and had not been taking any other medicine: in about six hours the horse appeared sick, and in pain; he refused both food and water; during the night he appeared to have had some small watery stools, several of which were perceived also the next day; but they were in very small quantity, and accompanied with pain. The sickness continued all the second day, and on the following he recovered.

JAMAICA PEPPER, or ALLSPICE. — *Myrtus Pimenta*. This is a good carminative and cordial, and may be given in doses from half an ounce to an ounce, in flatulency of the stomach and bowels. It may also be used as an ingredient in cordial medicines.

The following tincture is strongly recommended by Mr. Bracy Clark, as an excellent remedy for the flatulent colic, gripes, or fret.

Jamaica pepper 1 lb.
Proof spirit 6 pints. — Mix.

Let the allspice be powdered, and mixed with the spirit; the bottle to be well corked, and frequently shaken. In two or three weeks the tincture will be fit for use. The dose about

four ounces diluted with water, and repeated every hour until the horse is relieved. See CORDIALS and CARMINATIVES.

JAMES'S POWDER. — *Pulvis Jacobi*. Though the preparation of this medicine has been hitherto kept secret, there is no reason to doubt its being composed chiefly of antimony, and nearly the same thing as that which is sold in the shops by the name of *Antimonial Powder*. (See ANTIMONY.) I can venture to assert that, as a horse medicine, this is as useful and efficacious as *James's Powder*. It is said to be an excellent medicine in fevers of every kind; and, though usually given in the small dose of a scruple, or half a drachm, may be exhibited with perfect safety and better effect in a much larger quantity. I never give less than two drachms, and sometimes three; and I have seen even one ounce given at a dose without the least inconvenience. It seems to act on the skin like emetic tartar, and promotes insensible perspiration; but I do not think it is so certain in its effects as emetic tartar; it is sometimes joined with opium, camphor, nitre, or ginger, according to the nature of the disease: with ginger, it forms a good medicine for horses that are hide-bound; but this compound is not proper in fevers, or any complaint arising from inflammation, and the fevers of horses are almost always inflammatory. It is most commonly given with nitre or with nitre and camphor; and some practitioners prefer it, as a fever medicine, to tartarised antimony (*tartar emetic*). It has been asserted that it is much improved as a diaphoretic in the human subject, by the addition of one fourth of its weight of precipitated sulphuret of antimony. (See FEBRIFUGES.) James's powder is insoluble in water, and should therefore not be administered in a drench. According to the analysis of this medicine, it has been found to contain antimony, phosphate of lime, and potass.*

JAPAN EARTH. See ACACIA CATECHU.

JOHN'S-WORT. — *Hypericum*. There is an oil of John's-wort kept by druggists, which appears to be nothing more than common oil coloured with verdigris. The herb was formerly employed in fomentations, but is now thought unworthy of notice.

JUNIPER BERRIES. — *Juniperi Baccæ*. The juniper shrub is an indigenous evergreen; and is found generally growing on downs and heaths. It flowers in May, and bears berries, whose medicinal properties are diuretic, carminative, and stomachic. They should be allowed to remain on the tree for two years before they are gathered, as they do not come to maturity

* This medicine is scarcely ever used in the horse, being now regarded as powerless in this animal. In the dog, however, it is commonly used, particularly for distemper, where, from the great irritability of the dog's stomach, emetic tartar is inadmissible. — ED.

before that time. Juniper berries generally form a part of diuretic balls and drenches; they are recommended also in flatulency of the stomach and bowels.

The dose is from one to two ounces.

Juniper berries are often injured by keeping; becoming dry, shrivelled, or nearly rotten. The purchaser should choose such as are plump, rather heavy, and moist internally.

An oil is obtained from juniper by distillation, which seems to be the part on which the virtues of the berry depend. Oil of juniper is carminative and diuretic: the dose is from one drachm to two or three. It is generally highly adulterated with oil of turpentine; but this admixture does not injure it materially, oil of turpentine being very similar to it in its medical qualities, though more powerful.

KERMES MINERAL.—*Sulphur Stibiatum Fuscum*. A red powder prepared from antimony, nearly the same as the golden sulphur of antimony, and recommended as an alterative, in doses from one to two or three drachms. See **ANTIMONY**, and **GOLDEN SULPHUR OF ANTIMONY**.

KINO.—*Kino*. The greater part of the kino used in this country at present comes from the East Indies. It is a most powerful astringent, and is often successfully employed to combat obstinate diarrhœa, red water, and other diseases dependent on a relaxed state of any organ or viscus. The dose, in substance, is from two to four drachms. A tincture of kino is likewise made, which may be administered in doses of from three or four to six drachms, or more. In prescribing the tincture, it is necessary to recollect that nitrate of silver, muriate of mercury, sulphate of iron, acetate of lead, the alkalies, and strong acids are incompatible with it.

KRAMERIÆ RADIX. *Krameria*, or *Ratanhy Root*. This plant is a native of Peru, and flowers throughout the year. It is but little known in this country as a medicine, but has been very successfully used on the continent in all cases requiring astringents. It is also accounted stomachic, and its astringent qualities are such, that it has frequently been employed as a styptic. It may be exhibited in the same doses as kino.

LARD. See **HOG'S LARD**.

LAUDANUM.—*Tinctura Opii*. A popular term for tincture of opium. See **OPIUM**.

LAURUS CAMPHORA. See **CAMPHOR**.

LAURUS CASSIA. See **CASSIA**.

LAURUS CINNAMOMUM. See **CINNAMON**.

LAURUS NOBILIS. The Bay Tree. Laurel. This tree, although a native of the south of Europe, bears the winter of this country with impunity. Both the leaves and berries contain an essential oil. The latter are generally brought to us from the

Mediterranean, and are more pungent than the former, which are principally used in fomentations. A considerable quantity of oil is obtained from the berries by expression, and is sometimes used as a stomachic in veterinary medicine. The dose is from half a drachm to a drachm.

[Oil of bays forms a useful stimulating and digestive ointment. — ED.]

LAXATIVES. Medicines that open the bowels moderately, so as to increase their secretions, without greatly stimulating or irritating them. They consist of castor oil, olive, or linseed oil, the neutral salts, such as Epsom or Glauber's salts, or even common salt, and small doses of aloes, as in the following formulæ:—

LAXATIVE DRENCH.

- No. 1. Castor oil..... 1 pint.
 No. 2. Sweet oil, or linseed, or rape oil 1 pint.
 No. 3. Epsom salt 6 to 12 oz.
 Whey or gruel..... 1 quart.
 Castor oil..... 6 to 12 oz.

Mix.

BALL.

- Aloes 3 to 4 dr.
 Soap 3 to 4 dr.
 Syrup enough to form a ball.

LEAD. — *Plumbum*. Many useful preparations are made from this metal; among which are the following:—

LEAD, ACETATE OF, or super-acetate of lead, commonly called sugar of lead, is much used in making cooling lotions and eye-washes. Liquid sub-acetate of lead is commonly named Goulard's Extract, and is used for similar purposes. See GOULARD, LOTIONS, COLLYRIA or EYE-WASHES, and OINTMENTS.

LEAD, RED, or Minium. This is a red powder, made by keeping lead in a high degree of heat: it is used in the composition of plasters, and charges.

LEAD, WHITE, is commonly made by exposing thin sheets of lead to the vapour of vinegar, by which it is converted into a white powder. White lead is often employed in the composition of healing and softening ointment, for horses that are subject to cracked heels. See ACETATE OF LEAD.

LIME. — *Calx*. This earth is rarely found in a pure state, but is easily prepared from any of its carbonates by the action of fire. When mixed with 700 times its weight of water, it is completely dissolved, and forms lime-water, the properties of which are tonic and antacid. Lime-water is recommended in

the disease termed diabetes, which consists in a profuse discharge of limpid urine, causing weakness, emaciation, and hectic fever.

I have seen it used, however, in two cases without success. Lime-water may be made by mixing lime with a large proportion of boiling water, stirring the mixture for some time, and afterwards pouring off the transparent liquor, which is to be carefully excluded from the air.

Chlorinated Lime. — *Calx Chlorinata.* “This term is applied by the College of Physicians to the compound of chlorine and lime, long known in the arts by the name of chloride of lime, or bleaching powder.

“It is a valuable disinfectant. In order to understand its action, it is necessary to bear in mind that the foetid gases given off during the decomposition of vegetable and animal substances are mostly compounds of hydrogen with certain bases. When chlorine is brought into contact with these, it decomposes them, in consequence of the great affinity it has for hydrogen, with which it unites, and sets the bases free.

“Mr. Youatt, in 1828, and afterwards Mr. Simpson, Mr. Holford, and Mr. Kerr, in the pages of the *Veterinarian*, have drawn the attention of veterinary surgeons to this valuable compound in fistulous affections, open joints, canker, and in cases of grease. But it will be found serviceable in many other diseases. To Mr. Youatt we are indebted for its introduction as a remedy in hoven in cattle, and tympanitis in the horse, being given in doses of from two to four drachms suspended in water. A solution of it, in the proportion of a pound to a gallon of water, is recommended as an application for mange by Mr. Lucas of Liverpool; and in slight attacks it will be found of service.

“This solution may be employed as an ordinary excitant of wounds, and particularly in such as have taken on unhealthy action. In fact, I feel assured that the more this compound is known, the more highly it will be prized.

“It will be found extremely useful for purifying stables rendered foul by the virus of glanders, mange, or any other contagious disease, the walls being washed with a diluted solution of it.

“The common practice of merely whitewashing the walls serves only to cover the infectious matter, and, perhaps, to preserve it for an indefinite length of time, so that, when the lime scales off, disease may be again engendered by the exposed virus.

“In phagedenic and farcy ulcers, the chlorinated lime sprinkled over them has quickly induced a healthy condition, and the healing process has soon been perfected.

“The pharmaceutical compounds are,—

SOLUTION OF CHLORINATED LIME.

Take of Chlorinated lime 1 pound.
 Distilled water 1 gallon.

Set aside, and filter for use as required.

“Of this strength it is used for mange, and as a stimulant and mild erodent to ill-conditioned wounds and fistulous sores. Diluted with from ten to fifteen times its bulk of water, it may be employed to form an antiseptic lotion for virulent grease, exfoliating bone, &c.; also for the formation of poultices, and as a disinfectant for foul stables.

OINTMENT OF CHLORINATED LIME.

Take of Chlorinated lime..... 1 to 2 parts.
 Hog's lard 8 parts.

Mix together, so as to form an ointment.

“This compound has been had recourse to with very beneficial results in cases of grease, particularly when the fœtor has been considerable.”—*Morton's Manual of Pharmacy.*

LINIMENT. — *Linimentum.* A term generally given to external applications of the oily kind, but of a consistence rather thicker than oil: sometimes it is applied to more liquid and transparent preparations, such as soap liniment. The following formulæ are given as examples: —

SOAP LINIMENT.

Hard soap..... 1 oz.
 Camphor..... 1 oz.
 Oil of rosemary 1 oz.
 Rectified spirit 1 pint.

Cut up the soap, and let it stand with the spirit until dissolved, then add the rest.

LINIMENT OF AMMONIA, OR VOLATILE LINIMENT.

Strong solution of ammonia 1 oz.
 Olive oil 2 oz.

Mix.

To this, camphor or oil of turpentine is sometimes added; and the solution of ammonia is joined, for some purposes, to the soap liniment. The soap liniment is the same as the celebrated opodeldoc, and may be either solid or fluid, according to the proportion of soap used; but it may be made also with soft soap, and is then fluid, with a larger proportion of soap. *Liniment of Verdigris* is noticed under the head EGYPTIACUM.

LINIMENT OF CAMPHOR, COMPOUND.

Camphor	2 oz.
Spirit of lavender	1 pint.
Solution of ammonia.....	6 oz.

Mix.

Solution of ammonia is named also liquid ammonia, and strong spirit of sal ammoniac. (See EMBROCATIONS.)

LINIMENT FOR BAD THRUSHES AND CANKER.

No. 1. Tar	4 oz. — Melt, and add
Muriatic acid	6 dr.
Verdigris	4 dr.

Mix: continue stirring until it is cold. (See article THRUSH.)

No. 2. Tar, melted	1 lb.
Strong sulphuric acid, by weight	2 oz.

Stir them well together for some time, and immediately before the mixture is used.

LINSEED, or FLAX SEED. — *Lini Semina.* These seeds abound with oil and mucilage, and are well adapted to the composition of those emollient drinks that are so useful in inflammations of the bladder and bowels, or complaints of the urinary passages. A strong mucilaginous drink may be made without bruising the seeds, either by decoction or infusion. See EMOLLIENTS and PECTORALS.

LINSEED CAKE. That part of the linseed which remains after the oil has been pressed out. It is sometimes employed to fatten cattle, and may be given occasionally to horses. When ground it is sold as linseed meal and linseed powder, and often used in the composition of poultices.* It is an ingredient also in most of the horse and cattle powders, and serves to adulterate, on account of its cheapness, many of the medicines sold in powder, as drenches for horses and cattle. It is chiefly used for making poultices.

LINSEED OIL. — *Oleum Lini.* This oil is sometimes employed as a laxative.† It is used also in making pectoral emulsions, and in the composition of liniments.

LIQUOR POTASSÆ. Solution of Potass. See LEY, CAUSTIC.

LIQUORICE; the Root and Extract. — *Glycyrrhiza Glabra; Radix et Extractum.* The extract made from liquorice-root is supposed to be of use in relieving cough. In the horse it is not

* The best linseed meal for poultices is that ground before the oil is extracted. — Ed.

† Linseed oil is a very useful aperient in inflammatory diseases where aloes is inadmissible. It occasions no irritation, although it is apt to produce nausea. — Ed.

applicable to this purpose, as its good effect depends upon its gradual solution in the mouth, so as to be constantly lubricating the throat. Many writers, however, recommend liquorice in their pectoral and cordial drenches, probably with a view to render them more palatable.

LITHARGE, or SEMI-VITRIFIED OXIDE OF LEAD.—*Lithargyrus*, vel *Oxydum Plumbi Semi-vitreum*. This oxide is obtained by the simple action of heat and air upon lead. It is employed in making Goulard's extract and diachylon plaster.

LITMUS. This is a species of lichen. Litmus-paper is used in medicine as a very delicate test of the presence of acid, by which its blue or violet colour is changed to red. It is generally by means of litmus-paper that the urine is tested, when, if a great quantity of acid is found to prevail, alkalies must be administered, and *vice versâ*.

LIVER OF SULPHUR, or SULPHURET OF POTASS.—*Hepar Sulphuris*, vel *Sulphuretum Potassæ*. See **HEPAR SULPHURIS**.

LOGWOOD.—*Hæmatoxyli Lignum*. An extract made from logwood possesses a considerable astringent power. It is often employed by medical practitioners in diarrhœa depending upon relaxation of the bowels; and though it has not yet been introduced into veterinary practice, it would probably be found an useful medicine in similar complaints of the horse, and deserves a trial in cases which have resisted the common remedies.

It may be given in doses from two to three drachms. Alum, opium, and some aromatic, such as cassia, and sometimes chalk, are often joined with the extract. See **HÆMATOXYLI LIGNUM**.

LUNAR CAUSTIC. See **ARGENTI NITRAS**.

LYTTÆ. See **CANTHARIDES**.

MACERATION differs from infusion only in being continued for a longer time, and can only be employed for those substances that do not quickly spoil.

MADDER.—*Rubia*. This is a perennial plant, and a native of the Levant, the South of Europe, and Africa. The root was formerly used in medicine as a remedy for jaundice. Farriers still employ it for the same complaint (which they term the *yellow*s) both in horses and horned cattle.

The dose is about one ounce.

Madder has the singular property of turning the bones red, provided its use be persisted in for some time.

MAGNESIA.—*Magnesia*. A white powder, so extremely light, that a sufficient dose could not be given to a horse without inconvenience. It is a very useful absorbent in the human body, and well calculated to remove heartburn, by destroying any acidity that may exist in the stomach; it has also the advantage,

in this complaint, of acting as a gentle laxative. In the horse, chalk, or either of the fixed alkalis, answers the purpose equally well: and if a laxative effect be required, a small dose of aloes may be added.

MAGNESIA, SULPHATE OF.—*Magnesia Sulphas.* Epsom Salts. See SULPHATE OF MAGNESIA.

MALLOWS, COMMON.—*Malva Sylvestris.* This is an annual, indigenous plant, and, from the mucilage it contains, is useful in the composition of emollient drinks: fomentations, clysters, and poultices may also be made with it. See EMOLLIENTS, FOMENTATIONS, and CLYSTERS.

MALT is very serviceable to horses that are recovering from fever. It is useful, also, when the system is weakened by large abscesses which discharge copiously, and in almost every case depending on debility.

It appears to be easy of digestion, and very nutritious, though not so stimulating as oats. Green malt has been recommended for improving the condition of horses, and giving them a smooth, glossy coat. Infusion of malt is sometimes given with advantage to sick horses; but they generally require to be drenched with it, which is a great inconvenience.

MANGANESE. A metallic oxide used principally in bleaching. It has been employed for fumigating glandered stables. See FUMIGATION.

MARJORAM.—*Origanum.* Sweet marjoram is an annual plant, which is principally cultivated for culinary purposes. Wild marjoram yields an essential oil (*oleum origani*), which is much used by farriers as a remedy in strains, bruises, &c., but always mixed with other oils or spirits, such as oil of elder, camphorated spirit, &c. A strong infusion of marjoram may be employed as a vehicle for carminative or cordial medicine.

MARSH MALLOW.—*Althæa.* This plant contains rather more mucilage than common mallows, and is, therefore, better calculated for making mucilaginous or emollient drinks, clysters, or fomentations.

The root is the best part, and, if carefully dried, may be kept a long time. These mucilaginous drinks are very useful when the bowels or bladder are inflamed or irritated by too strong physic, or when there is any pain in the urinary passages. They should be given frequently in the course of the day, and may occasionally be made the vehicle of more active medicines. Any thing which contains mucilage in sufficient quantity may be employed for the purpose of making emollient drinks. See EMOLLIENTS.

MASHES. A kind of medicated diet, and generally composed either of bran or malt. Bran mashies are made by pour-

ing boiling water on fresh sweet bran, in a pail, so that the mixture, when stirred, may be about the consistence of a soft poultice: it is then to be covered over, and not given to the horse until sufficiently cold. When it is thought necessary to steam the head, as it is termed, that is, for the horse to inhale the vapour as it arises, the mash is put into the manger while hot; and some even put it into a nose-bag, and secure it to the head, which is a bad practice, as it impedes respiration. *Steaming the head* is recommended in strangles, colds, and sore-throats.

BRAN MASHES form a very proper diet in fever, and all inflammatory complaints; they are useful, also, as a preparative to physic, serving to remove any indurated fæces there may be in the bowels, whereby the operation of the medicine is rendered more safe and effectual.* Mashers are a necessary diet, also, while the physic is operating. In making malt mashers, the water should be below the boiling point, otherwise the malt will clot and be spoiled. These are given for the purpose of recruiting strength, when a horse is debilitated from fever, or any other cause. (See MALT and RESTORATIVES.) When a horse has been fed high for some time with oats and beans, a change to a diet of bran mashers for two or three days will often do a great deal of good. The bran should be fresh, and perfectly free from any unpleasant or musty smell. There is a finer kind of bran, named gurglings or pollard, which, though much more nutritious, is not so fit for medicinal purposes.

MEADOW SAFFRON. — *Colchicum Autumnale*. This is an indigenous perennial plant, generally found growing in rich meadows, and flowering in September. The root is a powerful diuretic in the human system, but its effect on the horse is not known. An account was published in the New Monthly Magazine some time since, of seven yearling cattle having been poisoned by eating meadow saffron.

MERCURIALS. Preparations of quicksilver or mercury.

MERCURIAL OINTMENT. — *Unguentum Hydrargyri*. This is made by rubbing together, in a mortar, quicksilver and hog's lard, in various proportions, according to the strength required, until the former disappears, and the mixture assume a dark blue or lead colour.

In the strongest mercurial ointment of the shops, there are equal parts of quicksilver and lard: these are the best proportions in which it can be made, as it is easily rendered weaker afterwards, by the addition of lard. In medical practice, this ointment is employed chiefly for the purpose of introducing the quicksilver into the system, which is done by rubbing it for some

* Bran is in itself a mild laxative from the silicious particles which it contains acting mechanically on the intestines.

ever, is as likely, and perhaps more likely, to arise from a damp cold atmosphere, and bad stables, than from drinking brackish water. M. Collaine, Veterinary Professor at Milan, has observed, that cavalry corps, after being some months near the sea, have been afterwards much affected with farcy.

MINT. — *Mentha*. This is a valuable herb, and grows here very abundantly. There are two kinds used in medicine, viz., Spearmint (*Mentha Viridis*), and Peppermint (*Mentha Piperita*). The former is an excellent carminative, and generally affords relief in flatulence of the stomach and bowels, and that complaint which arises from it, termed gripes, fret, or flatulent colic.

Peppermint, however, is considerably stronger, and, I think, more certain in its effect. All the virtues of mint reside in an oil, which it affords plentifully by distillation; and this is the most convenient form in which it can be employed for veterinary purposes; but it requires to be highly diluted with water, with which it mixes very readily, if previously dissolved in a small proportion of rectified spirit, or rubbed in a mortar with mucilage and sugar. See **ESSENCE**.

The dose of oil of peppermint is from twenty drops to half a drachm; of spearmint from forty drops to one drachm.

This is generally found a sufficient quantity, but it may be increased if it prove ineffectual.

A solution of oil of peppermint, in rectified spirit, is sold under the name of Essence of Peppermint; one part of the oil to three of spirit is the strength of which I prescribe it. A strong infusion of the dried herb is a good vehicle for more active medicine; and, with a glass or two of gin may be given for flatulent colic or gripes, when other medicine cannot be procured.

MOXA. A light fibrous substance, somewhat like very fine tow. In eastern countries it is employed to remove deep-seated pains, being set on fire on the affected part, so as to burn and produce an eschar; it is, therefore, nothing more than the actual cautery, which is much more conveniently applied in veterinary practice by means of the hot iron. See **FIRING**.

MUCILAGE. — *Mucilago*. The mucilage commonly employed is made by dissolving gum arabic in water. There are other cheaper gums, however, that will answer the same purpose; mucilage may be made also from quince seeds and starch. For internal use, it is most cheaply and abundantly obtained from flax seed (mixed, however, with oil), or as it is more commonly named, linseed. Eight ounces infused in two or three quarts of boiling water form a good mucilage. See **ACACIA VERA**.

MURIATES. Combinations of muriatic acid, with alkalies, earths or metals.

MURIATE OF AMMONIA. *Ammonia Murias.* This is commonly named crude sal ammoniac, and when dissolved in vinegar has been found a useful application. I have employed the following formula for splents when in a state of inflammation : —

Muriate of ammonia, powdered	2 dr.
Vinegar	1 oz.
Alcohol	1 oz.
Water	2 oz.

Mix.

MURIATE OF COPPER. — *Cupri Murias.* A solution of verdigris in muriatic acid or spirit of salt. This is a good mild caustic, and may be diluted occasionally with water.

MURIATE OF LIME. See **CALCIS MURIAS.**

MURIATE OF MERCURY, OXY and SUB. — *Hydrargyri Oxymurias et Suburias.* Oxymuriate of mercury is more commonly known by the name of corrosive sublimate (see **SUBLIMATE**), and submuriate of mercury by the name of calomel. See **CALOMEL.**

MURIATE OF SODA. — *Sodæ Murias.* Common salt, or the salt employed with food. This is an excellent laxative for cattle, and in small doses promotes digestion. Mow-burnt hay, or bad hay of any kind, is made more palatable to horses and cattle by being moistened with water in which a small quantity of salt has been dissolved, and it is, perhaps, rendered more easy of digestion also.

MUSTARD. — *Sinapis.* Though chiefly employed for culinary purposes, mustard deserves a place in our *Materia Medica* both as an internal and external medicine. When flour of mustard is made into a thin paste with water, and carefully rubbed on the skin for some time, it excites considerable inflammation and swelling. This property renders it useful in cases of internal inflammation, particularly when the bowels or lungs are affected. This paste is rendered stronger by the addition of oil of turpentine. See **EMBROCATIONS.**

Mustard may be given internally, with good effect, in cases which require strong stimulants.

MUTTON SUET. — *Adeps Ovillus.* The principal use of this fat is in the formation of ointments.

MYRRH. — *Myrrha.* This is a gum resin, produced by a tree or plant that is found principally in Arabia Felix and Abyssinia. It has a pleasant odour, and a bitter pungent taste: is much used in medical practice, as a tonic and stimulant, and may probably be employed with good effect for horses in weak-

ness of stomach, diminished appetite, and imperfect digestion; in such cases it may be given in doses from one to three drachms, with about two drachms of aloes and a little soap; some ginger also may be occasionally added; it is often joined with preparations of steel or iron.

There is a *simple* and a *compound* tincture of myrrh sold by druggists. The former is thus made:—

Myrrh 3 oz.
Rectified spirit..... 2 lbs.

Macerate fourteen days, and strain.

The compound tincture is thus prepared:—

Aloes 4 oz.
Myrrh 2 do.
Rectified spirit 2 lbs.
Water..... 1 do.

Macerate fourteen days, frequently shaking it.

The first tincture is useful in ulcers in the mouth, but the latter is more commonly employed with horses, being an excellent application to all wounds.

NARCOTICS. Medicines that stupify and produce sleep; such as opium, &c.

NIGHTSHADE. See BELLADONNA.

NITRATE OF POTASS.—*Potassæ Nitras.* Nitre, or saltpetre. A neutral salt, formed by the combination of nitrous acid and potash. This is a medicine of great utility in veterinary practice, and highly esteemed by veterinarians. It possesses a cooling and diuretic property, which renders it extremely useful in fevers, and all inflammatory complaints.

In fevers, it is often joined with emetic tartar and digitalis with good effect. In catarrh, or cold, nitre is a useful remedy; and in troublesome coughs it often gives relief.

The usual dose of nitre is about one ounce, though farriers often give double that quantity, or more: but in such large doses it is apt to irritate the stomach, and do mischief; therefore, in urgent cases, half an ounce may be given every fourth hour, in which way there will be less danger of its producing that effect, particularly if it be given in a mucilaginous drink, or in water gruel.* If nitre be given in the form of a ball, it is advisable to offer some water immediately before or after, or to wash it down with a horn full of water gruel.

NITRATE OF SILVER. See ARGENTI NITRAS.

NITRIC AND NITROUS ACIDS. See ACID, NITROUS.

NUX VOMICA. A poisonous vegetable; the fruit or the

* Even in this dose it should not be continued beyond a single day; in such short periods it will greatly irritate the urinary organs.—ED.

seed of the *Strichnos Nux Vomica*. A small quantity will destroy dogs, rats, or mice. It has been given to the human subject in epilepsy and dysentery, but is now rarely used, being considered a dangerous medicine.* M. Collaine, Professor of the Veterinary School at Milan, in a treatise on glanders, says, "I determined on making a final experiment on two farciéd horses with the *nux vomica*, which I gave to the extent of two ounces a day to each of them, beginning with a dose of half a drachm, morning and evening.

"The ulcers on the skin became stationary, and assumed a red healthy appearance, but about the ninth day one of the horses was attacked with spasms nearly of the whole body, which induced me to put an end to my experiments and the sufferings of the animal by causing him to be shot. It is necessary to observe that these two horses, before they took the *nux vomica*, had taken the extract of *Aconite* or Wolf's Bane (see *ACONITUM*), which, in the dose of one ounce and a half daily, caused considerable depression and weakness without lessening the disorder (*farcy*), although the same medicine had, in less than ten days, removed the disease in a horse belonging to another regiment, that had the hind leg much swollen, and covered with

* *Strychnia* is the form in which *nux vomica* is usually exhibited medically. It is prepared, by an elaborate process, from the *nux vomica*, the active principle of which it contains. It is thus spoken of by Mr. Morton:— "*Strychnia* is in the form of minute crystals, which are colourless and inodorous; possessing an intensely bitter taste, requiring between 6000 and 7000 parts of cold water for its solution, and insoluble in absolute alcohol; but by diluted alcohol, specific gravity .835, it is dissolved readily. It acts like the alkalis on vegetable colours, and unites with the acids, forming salts.

"*Strychnia* has been found of service in cases of paralysis in the horse and chorea in the dog. Its action is very powerful, and its use calls for caution. The dose for the horse may be from 1 to 3 grains twice in the day, combining it with the vegetable tonics; that for the dog from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain. Its influence is conjectured to be on the motor tract of the spinal chord, which it powerfully stimulates, and thus restores the lost power of the muscular system.

"When long exhibited, or if given in too large a quantity, the limbs will be seen to tremble, and convulsive paroxysms will be induced by the slightest noises. Sometimes, in the dog, all power of retaining the erect position during the period of its influence is lost; the kidneys are also excited into increased action by it, and the urine is voided involuntarily. On the horse, when injudiciously given, it is also very powerful in its operation: fifteen grains have proved sufficient to destroy life in that animal.

"The potency of this agent, and the long protracted, and often incurable diseases in which it has been found to afford relief, warrant its introduction as a veterinary therapeutic."

I have exhibited this medicine with much advantage in cases of paralysis of the hind extremity in a dog. Assisted by setons on the loins, it was followed by the restoration of muscular action. I have found, however, that the sixteenth part of a grain produced much too violent an effect on a small dog, and would recommend the thirtieth part of a grain to begin with, repeating it alternate days, and gradually increasing the dose.—ED.

farcy sores. This horse, however, was in consequence affected with great difficulty of breathing, which continued ten or twelve days, or until the swelling and farcy appeared again."

OAK BARK. — *Cortex Quercus*. A decoction of oak bark is a good vehicle for tonic and astringent medicines. When finely powdered and given as a drench with ginger, it may be of service in those complaints, the continuance of which depend upon debility. It is said, however, to be much less efficacious than Peruvian bark, yet when that cannot be procured, it may be found a useful substitute. The dose is about two ounces.

OATS. — *Avena Sativa Semina*. In the choice of oats for horses, such as are perfectly free from unpleasant or musty smell should be preferred; also such as are heavy and clean. New oats are injurious, rather difficult of digestion, and apt to scour, but this quality may be, in a great measure, corrected by drying them gradually on a kiln, or by giving with them a small proportion of split beans, and some clover cut into chaff: when this cannot be had, a small quantity of wheat flour may be given in the horse's water, especially if the horse already scours, and then the chill of his water should be taken off; a small cordial ball may be necessary on such occasions if the animal has any extraordinary work to do, but, under such circumstances, even moderate work might be hazardous. Nothing is more liable to produce diseases in horses than being fed on musty oats, that is, oats that have been heated by being kept on board a ship, or in large heaps, without being frequently turned. I have known coach and post horse proprietors suffer the most serious losses from this cause; it cannot, therefore, be too carefully guarded against. Food should be so given that digestion may go on without interruption, as many horses have been destroyed by taking them out and putting them to quick work upon a full stomach. Bruising oats, as well as beans, for horses is a great advantage; and, upon emergencies, oatmeal or wheat flour mixed up with a little water will be found to afford nutriment and vigour without encumbering the stomach. I am satisfied that those cases of gripes or flatulent colic which so often occur among post and coach horses are brought on by indigestion; and what is so likely to cause indigestion as violent exercise upon a full stomach, especially when the food is of a bad quality, and the stomach in a morbid or weakened state, which is often the case with post and stage-coach horses? When there is a necessity for using new oats, and especially when any stock of such oats is to be kept, they should be dried on a kiln very gradually. They may then be much improved, and, probably, that process may be completed which had been put a stop to by removing them from the mow.

OILS. — *Olea*. Oils are either *fixed* or *volatile*. The former

are procured from various animal and vegetable substances, generally by means of pressure and heat, from which circumstance, they have also been named *expressed oils*; and are termed fixed, because they do not evaporate, except at a very high temperature, when they are decomposed. *Volatile oils*, on the contrary, evaporate very readily, and are generally obtained from vegetables by distillation; and as they commonly contain all the essential qualities of the substance they are procured from, have also been named *essential oils*. The various oils are noticed under the name of the substance from which they are obtained.

The numerous officinal oils, directed in the old dispensatories, are still highly esteemed by farriers; among which are, Oil of Swallows, Earthworms, John's-wort, Spike, Petre, &c.; and we frequently meet with receipts for "strain or bruise oils," in which more than a dozen different oils are ordered! Perhaps it may be an acceptable piece of information to those who place any confidence in these oils, that only three kinds are kept in the shops, from which this great variety is furnished; which are, oil of elder, oil of turpentine, and Barbadoes tar. Oil of spike is made by colouring oil of turpentine with alkanet root; oil of petre, by dissolving Barbadoes tar in the same oil: for all the other kinds, oil of elder is sold; and this is often made by colouring common oil with verdigris.

OIL OF ALMONDS. — *Oleum Amygdalæ*. A very sweet and pure oil, obtained either from sweet or bitter almonds, by expression.

OIL OF BAY. — *Oleum Lauri Nobilis*. This is more like an ointment than an oil, is of a light green colour, and smells like bay berries, from which it is procured. It is used chiefly as an external application in cutaneous complaints, such as the mange. Oil of bay is sometimes substituted for hog's lard in making mercurial ointment, and is supposed to render it more active. When to this mixture are added cantharides and oil of origanum a strong blister is formed, which is recommended for the removal of splents and spavins.

[This oil derives its stimulating effects from the prussic acid which it contains. It assists the effect of blisters, and may be used to dress rowels or setons.—ED.]

OIL OF CAJEPUT. — *Oleum Cajeputæ*. See CAJEPUT OIL.

OIL OF CARAWAYS. — *Oleum Carui*. See CARAWAY.

OIL OF CASTOR. — *Oleum Ricini*. An useful laxative.

The dose is about a pint. (See CASTOR OIL.)

OIL OF ELDER. — *Oleum Sambuci*. See ELDER.

OIL OF JUNIPER. — *Oleum Juniperi*. See JUNIPER.

OIL OF LINSEED. — *Oleum Lini*. This also has a laxative

quality; the *cold-drawn oil* is preferred; *i. e.* that which is expressed from the seed without the assistance of heat.

OIL OF OLIVES. — *Oleum Olivæ.* This also is a very pure and sweet oil; and in the dose of a pint generally operates as a laxative. When castor oil cannot be easily procured, this may with great propriety be substituted for it. It is used also in making emulsions, liniments, and ointments.

OIL OF PALM, or PALM OIL. — *Oleum Palmæ; Oleum Coci Butyraceæ.* This, though termed an oil, is of the consistence of hog's lard, and very similar to it in its medical qualities. It is of a yellow colour, and has rather an agreeable smell. It is prepared from the fruit of the *Cocos Butyracea*, or Mackaw tree, a native of South America. The fruit is of a triangular shape, yellow, and as large as a plum, and its kernel yields the substance known by the name of Palm Oil. It is frequently imitated by axunge coloured with turmeric, and scented with Florentine Iris root.

Palm oil forms a useful substitute for lard in the composition of ointments.

OIL OF TURPENTINE. — *Oleum Terebinthinæ.* See TURPENTINE.

OIL OF VITRIOL. — *Acidum Sulphuricum.* See ACID, SULPHURIC.

OINTMENTS. — *Unguenta.* External applications composed generally of lard, suet, tallow, bees' wax, oils, resins, and turpentine. The following are those most frequently wanted, and commonly kept ready prepared; —

SIMPLE OINTMENT.

Olive oil	1 lb.
Bees' wax	3 oz.
Palm oil	2 oz.

Melt over a slow fire, and continue stirring until cold.

For common purposes, hog's lard makes a good simple ointment, but is apt to become rancid by keeping. The simple ointment may be readily converted into a detergent, a digestive, or an astringent, by the addition of red precipitate, verdigris, or blue vitriol finely powdered, finely powdered alum, superacetate of lead (*sugar of lead*), or a solution of subacetate of lead (*Goulard's extract of lead*). The following is a very useful ointment for chopped heels, harness galls, &c.

GOULARD OINTMENT.

Simple ointment	1 lb.
Solution of sub-acetate of lead, commonly called Goulard's extract (by measure)	3 oz.
Olive oil	1 oz.

Melt the ointment by a very gentle heat, and when melted add the oil, then let it be removed from the fire, and stir in the Goulard's extract: continue stirring until cold.

SULPHURIC OINTMENT.

Oil of turpentine 6 oz.
Sulphuric acid (by measure) 2 oz.

Mix cautiously in the open air, or in a chimney, in a vessel large enough to hold one pound and a half; stir the mixture, and, when perfectly combined, add one pound and a half of hog's lard: continue stirring until cold.

DIGESTIVE OINTMENT.

Hog's lard 1 lb.
Common turpentine 1 lb. —Melt, and add
Verdigris 2 oz.

Continue stirring until cold.

HOOF OINTMENT.

Tallow 1 lb.
Tar 1 lb.

Melt, continue stirring until cold.

In concluding this article, it is right to observe, that ointments are not so commonly applied to wounds or inflamed parts, as they were formerly; and that powders, lotions, or washes, and fomentations are often found more efficacious. See ASTRINGENTS, DIGESTIVES, DETERGENTS, ESCHAROTICS, CAUSTICS, EMOLLIENTS, BLISTERS, &c.

OPIUM. The inspissated juice of the White Poppy.

This is one of the most important articles of the *Materia Medica*.

It is classed among the narcotic sedatives, of which it is undoubtedly the most useful.

Opium is brought to this country in chests from Turkey and India. The Turkey opium is in flat pieces, covered with leaves and the reddish capsules of some species of dock, which is considered an indication of its goodness, as the inferior kinds of opium have none of these capsules adhering to them. Turkey opium generally contains about one fourth part of impurities. Indian opium is less pure; is in round masses, covered with leaves to the thickness nearly of one fourth of an inch. Mr. Kerr relates that, at Bahar, it is frequently adulterated with cow-dung, the extract of the poppy procured by boiling, and various other substances. It is made also from lettuces in India.

In Malava it is mixed with oil of sesamum, which is often

one half of the mass; ashes, and the dried leaves of the plant, are also used. Opium is regarded as bad, when it is either very soft or friable, of an intensely black colour, or mixed with many impurities.

In flatulency or spasm of the bowels it is an excellent remedy, particularly if joined with aromatic powder, ginger, or some other stimulant. In diarrhœa it is an effectual remedy, but must be given cautiously. In diabetes I have found it very beneficial, when joined with bark and ginger. Sometimes it is given with emetic tartar, and some cordial composition, with good effect, and in this way it proves a good diaphoretic.

I have given opium and squill, in obstinate coughs, with success; but the effect is not permanent.

Opium is very apt to produce costiveness in horses; but this tendency may be in a great measure counteracted by exercise; when it does take place, it may be removed by clysters, bran mashes, or a laxative ball.

The medium dose of opium is half a drachm, to a drachm; but if given in the form of clysters, which it sometimes is with the best effect, two drachms will not be too much.

The diseases of the horse, in which opium is most beneficial, are locked-jaw and flatulent colic; in the former it has been given in large doses, with the best effect, generally joined with camphor, and sometimes with assafœtida and other antispasmodics. In flatulent colic smaller doses have been found sufficient, which have generally been joined with sweet spirit of nitre, and other carminatives. The medium dose of the tincture, prepared according to the London Dispensatory, is one ounce, and of solid opium, *purified*, a drachm. Half an ounce of purified opium, according to Boardman, was given to a horse at one dose; he slept through the day-time for eight or nine hours, and could not be easily roused. In locked-jaw, the same author prescribes three drachms of purified opium every three or four hours, with camphor and salt of hartshorn, of each half an ounce. But Mr. Wilkinson, who has succeeded in twenty-four cases of locked-jaw, gave only one drachm of common opium, with the same quantity of camphor and assafœtida: but he gradually increased the dose, and went, in some cases, so far as to two or three drachms.* In the human body opium is sometimes employed externally, and is said to be almost as efficacious as when taken into the stomach, producing its narcotic effects without affecting the head, or causing nausea; but in the horse it is not likely to be useful in this way. Of late years I have generally

* In inflammation of the bowels opium has been employed with great advantage in doses of one drachm.

Combined with calomel it has been given in diseases of the liver, and in this combination is useful in dysentery.—Ed.

used opium in the form of a spirituous tincture, as kept in the shops, in preference to the watery solution or mixture* ; there may be cases, however, in which the spirit may be improper, and then the watery mixture should be preferred. Opium is decomposed by ammonia, potash, and soda, and their sub-carbonates, morphia being precipitated, also by most metallic salts and infusion of galls; such combinations should therefore be avoided: but, in combination with vinegar, the vegetable acids, and oil, its strength or narcotic power is said to be rather increased, being thoroughly extracted.

The mode of purifying opium, prescribed in the London Dispensatory, is to dissolve it in proof spirit, then filter the solution, and evaporate in a water bath to the required consistence; but a more ready way, though not so effectual, is to dry it carefully by a moderate heat, powder and sift it. The sieve will keep back many of the impurities, when this is carefully done. Opium is an article of so much importance, that it appeared necessary to notice it particularly, and at some length. There is a vinous tincture of opium sometimes used in diseases of the human eye. I have found it very useful in chronic inflammation of the horse's eye, applied undiluted. If, however, ten parts of distilled water be added to six parts of tincture of opium, the strength of wine of opium will be obtained, and the mixture will be applicable for the same purposes in the horse.

[Opium contains two peculiar vegetable compounds, in which its power resides: one of these is an alkaline substance, called morphia; the other does not possess similar chemical properties, and has received the name of narcotine. Morphia exists in opium, in combination with a peculiar acid, called the meconic acid; and the salt is termed meconate of morphia. The acid has no narcotic power.

Morphia may also be obtained by adding a solution of ammonia to one of opium in acetic acid; the acetate of morphia formed is decomposed, and the morphia is immediately precipitated of a brownish colour, which may be removed by boiling in water with animal charcoal.

Although it seems sufficiently proved that morphia possesses the characteristic properties of opium, yet its strength is not commensurate with its apparent concentration; and, when uncombined, it exerts but little action, in consequence of its insolubility.

* The tincture of opium or laudanum may be thus prepared:—

Solid opium .....	..... 2½ oz.
Proof spirit .....	..... 2 pints.

Macerate 14 days, frequently shaking it, after which it may be strained or not. Dose, one ounce.

It is supposed that the excitement which opium produces is owing to narcotine, and the subsequent sedative effect more particularly to morphia.—ED.]

OPODELDOC.—*Linimentum Saponis Compositum.* This is made by digesting three ounces of soap in a pint of spirit of rosemary until it be dissolved, and then adding one ounce of camphor. It is either liquid or solid. The former, when made with soft soap; the latter, when with hard soap. In the solid state it seems to be the same as the celebrated *Steer's Opodeldoc.* See art. EMBROCATIONS and LINIMENTS.

It is employed for strains and bruises, after the inflammation, which always accompanies those complaints at first, has subsided.

LIQUID OPODELDOC, OR SOAP LINIMENT.

Soft soap	4 oz.
Water	8 oz.

Mix, and add to the mixture one pint of rectified spirit of wine, in which there has been previously dissolved

Camphor	2 oz.
Oil of rosemary	1 oz.

STEER'S OPODELDOC.

Hard soap	$\frac{1}{2}$ oz.
Rectified spirit of wine	8 oz.
Camphor	$\frac{1}{2}$ oz.
Oil of rosemary	2 dr.
Oil of lavender, or oil of origanum	2 dr.
Compound spirit of ammonia	4 oz.

Digest in a moderate heat, so as to dissolve the soap, which should be cut up in thin shavings. These preparations are expensive; therefore the following may be substituted for them:—

VETERINARY OPODELDOC.

Soft soap	4 oz.
Water	8 oz.

Mix over the fire; when cold add

Rectified spirit	1 pint.
Oil of rosemary	2 oz.
Strong liquid ammonia	4 oz.

Mix.

(See EMBROCATIONS and LINIMENTS.)

ORIGANUM. Marjoram. The essential oil of wild marjoram is much used by farriers, as an ingredient in their strain

oils, or mixtures for bruises. It is a very powerful stimulant, and capable of doing much harm in those complaints: it is sometimes mixed with mercurial ointment, oil of bay, and cantharides, to form strong blisters. See BLISTERS.

ORPIMENT. This is a combination of arsenic with sulphur and iron. (See ARSENIC.) In "Markham's Master Pieces" and some other old books on farriery, the nostrils of glandered horses are directed to be fumigated with yellow arsenic made into pastils or cakes, with frankincense and elecampane: some apparent cures are said to have been effected in this way, but probably the running was only suspended a short time; and we know enough of the disease to be satisfied that the cases, supposed to have been thus cured, either were not really the glanders, or that it was only a temporary removal or stoppage of the discharge from the nostrils. The fumigation of the nostrils with yellow arsenic is not only ineffectual in glanders, but likely to prove injurious both to the patient and the operator. Yellow arsenic, made into an ointment with lard, has been recommended for warts, but it is a very dangerous application; and besides, warts can always be effectually and safely removed by the knife from any part of the body.

There is a secret method of curing fistula, poll-evil, and quittor, employed by certain farriers, which often cures, and often does much injury. Their remedy is orpiment mixed with lard. The cures they make are always made known, but the mischief they do escapes notice, or is concealed. Lunar caustic, or blue vitriol, and the knife, will accomplish, with safety and certainty, all that can be accomplished in those diseases.

OXIDES. Any simple substance, in combination with a smaller quantity of oxygen than is requisite to form an acid, is termed an oxide.

OXIDE OF ZINC. — *Oxydum Zinci*. See FLOWERS OF ZINC.

OXYGEN. A constituent part of atmospheric air, without which it would be unfit for respiration. In breathing, the air is rendered impure by the exhalations from the lungs, and, at the same time, we deprive it of this pure and vital principle: it is, therefore, unfit for the purpose a second time: and if an animal be confined in air deprived of its oxygen, life is almost instantly extinguished. Hence may be inferred the necessity of ventilating stables; for although in close stables the air is not wholly deprived of oxygen gas, yet its proportion is diminished; and it is well known, that when there is a deficiency of this animating principle, the system is debilitated, and all its functions imperfectly employed.

OXYMELS. Syrups, when made with honey and vinegar only, are termed *simple oxymels*; when squill, garlic, or meadow saffron, has been previously infused or digested in the vinegar,

it is named oxymel of squill, of garlic, or of meadow saffron. They are sometimes employed in chronic cough. The dose about four ounces mixed with water, or infusion of linseed, or marsh-mallows.

OXYMURIATE OF QUICKSILVER. — *Hydrargyri Oxymurias*. See CORROSIVE SUBLIMATE.

PALM OIL. See OIL OF PALM.

PEAS are sometimes used as food for horses, but beans are generally preferred. Pea meal is employed to adulterate horse powders, particularly liquorice-powder, anise-seed, fenugreek, &c.

PECTORALS. Medicines that relieve cough, and disorders of the lungs. See EXPECTORANTS, EMOLLIENTS, EMULSIONS, and DEMULCENTS.

PEPPER, BLACK. — *Piper Nigrum*. This is often used by farriers in the colic, but is by no means an eligible remedy, and is often given very improperly. I once knew a farrier give two ounces, in half a pint of Daffy's Elixir, to a mail-horse that was said to be attacked with gripes: he gave me the following explanation of the manner in which it was to act: — “*The pepper is to break the wind, and the Daffy's Elixir is to drive it out.*” In the evening the horse died. I mention this circumstance as a caution to those who are too fond of giving these very hot remedies in pains of the bowels, without inquiring into the nature of the complaint.

PEPPER, CAYENNE; the berries. *Capsicum annum*. See CAPSICUM.

PEPPER, CUBEBS. — *Piper Cubeba*. See CUBEBS.

PEPPER, LONG. — *Piper Longum*. This is much stronger than black pepper, and may be used for the same purposes.

PEPPER, JAMAICA. *Pimenta Bacca*: *Myrtus Pimenta*. See JAMAICA PEPPER, or ALLSPICE.

PEPPERMINT. — *Mentha Piperita*. See MINT.

PHOSPHATE OF SODA. — *Sodæ Phosphas*. This is similar in its effects to sulphate of soda or Glauber's salts.

PHOSPHORUS. A very combustible substance, made either from bones or urine. Experiments, have been made at the Veterinary College to ascertain its medical qualities: it proved to be a dreadful poison, inflaming the stomach in small doses.

PHYSIC. See CATHARTICS.

PIMENTO. See ALLSPICE and JAMAICA PEPPER.

PITCH. — *Pix*. A black and impure resinous substance, obtained by boiling or distilling tar to the desired consistence, and used by farriers in making *charges*. See BURGUNDY PITCH.

PLAISTER, or PLASTER. — *Emplastrum*. A composi-

tion of wax, resin, &c., or of oil boiled with the oxide of lead or litharge. See DIACHYLON and CHARGE.

PLAISTER, ADHESIVE. — *Emplastrum Adhæsivum*. This is made with diachylon and a small portion of resin, and still less of common turpentine, or with diachylon and galbanum. Sticking-plaster is sometimes employed, to keep the edges of a fresh wound together; but in horses this is generally done more effectually by suture, that is, by sewing up the wound.

POISONS. These are noticed in a *Materia Medica* for the purpose of showing the means we are acquainted with of counteracting their baneful effects. Poisons are of three kinds, viz. mineral, vegetable, and animal. Of the first kind are arsenic, corrosive sublimate, and certain preparations of lead. The best antidotes to arsenic are oily and mucilaginous liquids, sulphate of potash, soap, and castor oil in a solution of sulphate of magnesia.* The same means may be employed to counteract the effects of sublimate.† When there is much purging, give linseed tea, tripe liquor, or thin gruel, or gruel made of arrow-root. Such immense doses of sugar of lead have been given by way of experiment to glandered horses without producing any effect, that the preparations of lead are not considered poisonous; certain it is, however, that a great number of horses and cattle have been poisoned by grazing near those places on the Hill of Mendip, where lead ore is smelted. Great mischief has thus been done in a village named Wookey, through which a small river or rather brook, runs. After very heavy rains, the water that flows down the hill seems to be impregnated with lead; for at such times it overflows certain meadows, and on the water retiring these meadows have poisoned horses, cattle, and other animals. This fact is well known in the village and its neighbourhood; and animals thus poisoned are said to be *mindered*, or *moindered*. Animals very seldom recover from it, though they

* Mr. Morton recommends lime water and liquids in large quantities, also large doses of the hydrated peroxide of iron precipitated by ammonia from a solution of the sulphate of iron. Avoid bleeding, but use other measures to subdue inflammation, and afterwards give vegetable tonics.

When death ensues the stomach and bowels are highly inflamed and ulcerated.

The presence of arsenic may be discovered by various tests. The contents of the stomach should be boiled in distilled water and filtered. The ammoniacal sulphate of copper being added causes a precipitate of an apple green colour.

There are other tests employed, the most delicate of which is by means of Marsh's apparatus. — ED.

† The best treatment for poisoning by corrosive sublimate, consists in administering the albumen, or white of eggs suspended in water, which renders the sublimate insoluble. In addition to this, wheat flour, gruel, or milk may also be given.

The presence of sublimate may be discovered by lime-water, which causes an orange-yellow precipitate. — ED.

sometimes linger a considerable time. I have been informed that one farmer in Mendip lost fifteen head of cattle in consequence of their breaking down the fence which surrounded the smelting place, to get at the grass which grew within. They suppose that it is the fine particles of the lead ore which does the mischief; but I think it more probable that it depends upon the fumes or volatile parts that are carried up in smelting, which being condensed, fall gradually down in the form of a light powdery oxide or carbonate of lead.*

Sulphate of copper † is poisonous if given in too large a dose.

The most powerful of the vegetable poisons is *Woorali* or *Ti-cunus*, which destroys small animals in a few minutes if applied to a wound in the skin. I have seen a rabbit die in about five minutes after it was inoculated. In the horse, its effect has been on the nervous system, producing a sort of trance.

Cicuta Virosa, Long-leaved Water-hemlock, or Cowbane, is a strong poison, and has been the means of destroying a great number of cattle. Its deleterious property, with respect to cattle, was first discovered by Linnæus, in a country where a great number of cattle had been destroyed by it. It is seldom found, I believe, in England.

The leaves of the yew tree are a strong poison, and have often destroyed horses and cattle. I once gave five ounces to a young donkey, and it killed him within an hour. ‡ Professor Viborg, according to Mr. Bracy Clark, gave twelve ounces of the green plant to a horse, of which he ate eight

* The best antidotes are Epsom and Glauber's salts with croton or linseed oil, and followed by opium. The salts of lead may be discovered by iodide of potassium, which causes a yellow precipitate.

The effects of copper smoke have been also found exceedingly detrimental to the health of horses, and producing considerable swellings of the joints in animals exposed to its influence near the mines; an immediate change of locality should be resorted to in such cases. — ED.

† The best antidote is soap and oily purgatives with gruel, &c. — ED.

Under mineral poisons should be included sulphuric, nitric, and muriatic acids, which produce the most rapid and intense inflammation and excoriation of the coats of the mouth and stomach, &c., attended with great agony, and soon followed by death. The antidotes are large quantities of liquids with chalk, magnesia, or soap, so as to dilute and neutralise the poison, and afterwards exhibiting opiates. Blood-letting may also be employed.

Oxalic acid has been sometimes given in mistake for Epsom salts; it is a very powerful poison, producing effects similar to the mineral acids. Chalk, magnesia, &c. may be given in large quantities, with solution of gum, linseed tea, &c., but water should not be given freely.

Most powerful medicines become poisons in large doses. — ED.

‡ There are a number of instances of death being produced by the yew tree. I imagine it is much more poisonous in its dry state, when it will be eat with avidity by sheep and cattle. I have known forty or fifty sheep destroyed in one day from eating the withered leaves of the yew tree. We know of no antidote for this poison, but recommend large doses of oily purgatives with a view of expelling it. — ED.

ounces, and fell dead, without any indication of suffering, at the end of one hour from his swallowing it. The same effect was produced by six ounces in an experiment of MM. Bredon and Henon, of Lyons. A mule died in five hours after taking six ounces with some hay. They all died suddenly and without convulsions. The only effect observed, on examination after death, was, that the intestines of the mule had a small spot of extravasated blood. But it is remarkable, that eight ounces of the yew plant with twice as much oats did not kill or produce any sensible inconvenience; and the same result took place in three or four experiments of Professor Viborg. A farmer near Exeter lost several cows, by eating the leaves of some yew trees which grew in the hedge of the field where they were kept. The following circumstance, also, was related in Woolmer's Exeter Paper: "A yew tree having been felled in a field at Warley, Somerset, belonging to Farmer Hiscox, in the course of the ensuing night, six out of seven cows, that were with calf, died in consequence of eating its branches." We know of no antidote to this poison, but we can certainly prevent our cattle from eating it.

Common Hemlock is said to be poisonous, but I have given eight ounces to a young ass, which he ate readily, and suffered no inconvenience from it. I once gave two drachms of Stavesacre to a glandered horse; he died in great pain the following night.* It is probable that more horses have been killed by aloes than by any other vegetable preparation; that is to say, by strong physic, or by neglecting the horse during its operation. The animal poisons are the stings of venomous reptiles, for which stimulating embrocations seem to be better remedies than fomentations. The saliva of a mad dog is a deadly poison to man, and to all animals, and one for which, as yet, we know of no remedy, but its effects may be prevented by the knife or cauterly. † — Ed.]

POMEGRANATE. — *Punica Granatum.* The dried fruit is a moderately strong astringent; and is sometimes employed in diarrhœa, particularly in horned cattle, but generally improperly. The bark and flowers possess the same properties.

The dose is from half an ounce to an ounce.

* Amongst vegetable poisons we must include hydrocyanic or prussic acid, which in a sufficient dose produces sudden death, acting as a powerful sedative on the nervous system; its effects in lesser doses are violently spasmodic. As antidotes Mr. Morton recommends cold affusions over the body, blood-letting, diffusible stimulants, and tonics.

The vomic nut and strychnia are powerful narcotic poisons. Purgatives and chlorine and iodine are the best antidotes.

Croton seed, foxglove, water parsley, dropwort, most of the different species of ranunculaceæ, hellebore, tobacco, and opium are also powerful vegetable poisons in sufficient doses. — Ed.

† For a full and particular account of the various poisons, with their tests and antidotes, I have much pleasure in referring to a Toxicological Chart published by Mr. Morton. — Ed.

POPPY, RED or CORN, and WHITE. — *Papaver, Rhæas et Somniferum*. The heads of the white poppy dried make a good fomentation for wounds and tumours that are in a painful or irritable state; for which purpose they are to be broken in pieces, and boiled in water, so as to make a strong decoction. This decoction proves very serviceable in irritability of the bladder, if used as a glyster, the bowels having been previously emptied: for this purpose the decoction should be made stronger, by boiling it for some time. Although the capsules of the red poppy contain opium, yet it is in such small quantity, that they are rarely, if ever, used as an anodyne.

It seems very probable that the good effect of this decoction depends in a great measure upon the opium which is extracted from the poppy heads: it may be better, therefore, to dissolve in gruel a proper dose of opium, when an anodyne glyster is required, as we cannot be accurate in respect to quantity when the decoction of poppies is employed. It has been ascertained that the anodyne or narcotic qualities of opium are diminished by long boiling, and that the extract of poppies, however carefully prepared, is very inferior in every respect to opium. No hesitation, therefore, should be felt in preferring opium to the extract or decoction of white poppy heads, whether it be wanted for a clyster, a drench, or a fomentation.

POTASH. — *Potassa*. (New name, PROTOXIDE OF POTASSIUM.) There is a great variety of preparations of potassa used in medicine, as the *liquor potassæ*, or solution of potassa, which is diuretic and antacid; the *potassa fusa*, or fused potassa, a caustic deliquescent salt; the *potassa cum calce*, or potassa with lime, a milder caustic; the *potassæ bitartras*, or bitartrate of potassa. With sulphuric acid it forms vitriolated tartar, or sal polychrest (*Sulphate of Potash*); with nitrous acid, that very useful medicine termed nitre (*Nitrate of Potash*), which, contrary to what we have just observed, is a diuretic in a moderate dose (see NITRE); and with vinegar, or acetous acid, it makes soluble tartar (*Tartarised Potash*). The pearlash of commerce is the carbonate of potash, and is in a very impure state, and not applicable to chemical or medical purposes. When sufficiently purified, it is joined with diuretics, purgatives, and tonics, with advantage. In those cases which require the use of tonics there is sometimes an acidity in the stomach, which potash corrects; and it renders purgative medicines more easy of solution. Given alone it acts as a diuretic. When neutralised with acids, it has a laxative property, but requires to be given in large doses. The purified potash is named in the shops *Sub-carbonate of Potash*; formerly called Salt of Tartar, or Prepared Kali, or Salt of Wormwood. When potash is deprived of the carbonic acid with which it is naturally combined, it becomes a strong

caustic; and when diluted is sometimes employed as a wash for the mange. In this state it is termed *Pure Potash*, or *Kali*, and is seldom used internally. (See ALKALIES.) With carbonic acid it is named *Carbonate of Potash*.

POULTICE, or CATAPLASM; of LINSEED; of BEER-GROUNDS; of CARROT. — *Cataplasma*; *Lini*; *Cerevisiæ*; *Dauci*. Cataplasms are useful applications for promoting suppuration in inflamed tumours, and in those diseases of the horse's heels, named grease, scratches, cracks, &c., consisting in inflamed swellings of the heels, fetid discharge, painful and troublesome ulcers, or cracks generally under the fetlock or bend of the heel. The poultices commonly employed on those occasions are of the emollient kind.

EMOLLIENT POULTICE.

No. 1. Linseed meal	$\frac{1}{2}$ lb.
Bran	2 quarts.
Hog's lard	4 ounces.
Boiling water enough to make a soft poultice.*	

No. 2. Turnips, thoroughly boiled and mashed; any quantity. Linseed meal enough to form the poultice.

A poultice made of carrot, grated very fine, is detergent and stimulating.

Either of these simple poultices may be converted into an anodyne poultice by the addition of opium; into a fermenting poultice, by the addition of yeast, and by substituting oatmeal for linseed meal; into an astringent poultice, by the addition of Goulard's Extract, sugar of lead, or powdered alum; and into a detergent poultice, by the addition of white or blue vitriol.

In obstinate cases of virulent grease, where there is much pain, and a stinking dark-coloured discharge, and especially when emollients are found ineffectual, the detergent poultice has quickly cured the disease: and, in such cases, even a solution of corrosive sublimate has been used with the best effect. But emollients should always be first fairly tried, and some diuretic medicine given.

For poulticing the foot, a leathern boot affords the most suitable method, as a bag or a stocking will be soon worn through by the edge of the crust. A stocking, however, with the foot part cut off, affords a convenient mode of applying a poultice to the knee or leg.

POWDERS. — *Pulveres*. These are sometimes convenient forms for giving medicines, as many horses will take them in their corn without reluctance. It is by no means proper, how-

* The best poultice is made with linseed meal ground with the oil. It keeps soft, and can be medicated as we may wish.—ED.

ever, for such as have a delicate appetite and are remarkably nice in feeding; for although they may, after some time, eat their food, yet the reluctance with which it is taken would prevent its being readily digested, or proving so nutritious as it would do, were it not so medicated.

Some horses, however, eat their corn very readily when mixed with powder; and to such it may be given without inconvenience. There is another objection to this mode of giving medicine, which is the difficulty of ascertaining whether the whole or a part, and how much of the powder that is mixed with the corn, is taken. But this may in a great measure be done away, by sprinkling the corn with water, and mixing the powder with it very carefully. As we have before observed, whenever a horse appears unwilling to eat his corn thus medicated, the medicine should be given in some other form. The medicines best suited to this purpose are antimony, sulphur, resin, emetic tartar, nitre, caraway seeds, anise-seeds, &c. Medicines that are given in the form of powder should be finely sifted, or levigated: and when kept in that form, should be preserved in a well-corked bottle.

PRECIPITATE, RED (by *nitric acid*). — *Hydrargyri Nitrico-Oxydum*. This is the nitric oxide of mercury, or red nitrated quicksilver, and is useful as a mild caustic or detergent, and has a good effect in foul ulcers. It may be used either alone, finely powdered and sprinkled on the affected part, or mixed with various ointments. (See **DETERGENTS**.) It is made from quicksilver and nitrous acid, but is considerably weaker than a solution of that metal in nitrous acid. It becomes, however, a strong and very efficacious caustic, when dissolved in nitrous acid. This solution may also be mixed with unctuous substances, forming with them good detergent ointments; or it may be diluted with water, so as to form a detergent lotion of considerable efficacy.

PROOF SPIRIT. — *Spiritus Tenuior*. Equal parts of rectified spirit of wine and water. See **ALCOHOL**.

PURGATIVES. See **CATHARTICS**.

QUASSIA. — *Quassia*. There are two species of quassia; the *quassia simaruba* and *excelsa*. The first is a native of South America and the West Indian Islands; the last of Surinam, Jamaica, and the Caribbean Isles. The bark of the former and the wood of the latter are generally employed in medicine. Both of them are powerful bitters and extremely efficacious in cases of weakness of the stomach and bowels. They may be given in powder, in doses from one to two drachms, joined with ginger, or some other stimulant, and a small quantity of carbonate of soda or potash.

QUICKSILVER. — *Hydrargyrum*. This metal and its preparations have been noticed under the head *Mercury*.

QUININE, SULPHATE OF. — *Quinina Sulphas*. See **BARK**.

RAGWORT. A flowering plant that grows principally on moors and other moist situations. I have been informed that it causes lethargy or sleepy staggers in horses, and that sheep eat it freely without injury; but there is no probability in this opinion.

RAKING. A term employed for an operation which consists in introducing the hand into the horse's *rectum*, and drawing out any hard excrement that may have lodged there. This may generally be effected more to the purpose, and with greater ease to the animal, by means of clysters.

In some cases, however, the straight-gut is so loaded with hard dung that raking is a necessary operation; and it is sometimes difficult or impossible to throw up a clyster before it is done. The operation is useful also for the purpose of ascertaining the state of excrement when none can be found about the litter: whether it be soft, hard, or slimy. The only method of knowing whether the urinary bladder is full and distended, or empty, is by introducing the hand into the straight-gut, where the bladder can be easily felt, as it lies immediately beneath the gut next to the belly or abdomen. The nails should be pared smooth, and the hand oiled or smeared with hog's lard or soft soap, before the operation is performed. See **CLYSTERS**.

RATTLESNAKE-ROOT. Seneka-Root. — *Polygala Senega*. Seneka is a perennial plant found in North America. The root is inodorous, and is, on being first chewed, of a sweetish and mawkish flavour, but, after being chewed for a short time, has a hot and pungent taste. It is thought to possess considerable power as a tonic and stimulant, and may be employed in the dose of three or four drachms.

RECTIFIED SPIRIT. Alcohol or Spirit of Wine. — *Spiritus Rectificatus*. See **ALCOHOL**.

REPELLENTS. A term given to applications or medicines that are supposed to have the power of causing tumours or eruptions to recede from the surface of the body.

RESINS are distinguished by their inflammability, and by combining readily with rectified spirit and oils. They are generally solid, and incapable of being mixed with water. See **ROSIN**.

RESOLVENTS. Medicines that disperse tumours, either external or internal.

RESTORATIVES. Medicines that restore the strength of the body after violent fatigue or illness. For this purpose a light and nutritious diet, assisted by good grooming, and voluntary

exercise, is generally the only thing necessary: sometimes, however, it may be proper to give also some cordial or tonic medicine. (See TONICS, CORDIALS, and STOMACHICS.) The food on such occasions should consist of bruised oats, gruel, mashes of fine sweet bran and malt, gruel of wheat-flour, or boiled barley. In India strong broths, or soup, thickened with barley or some other grain, and rendered stimulating by spices, are frequently given as restoratives to horses when worked hard; perhaps good mild beer or ale, mixed with good gruel made of groats or oatmeal, or, what is still better, fine wheat-flour, would be found on some occasions equally effectual. But it will be found, that when a horse has for some time been worked hard and fed high, there is nothing that will so completely restore him as rest in a large box, or well-ventilated stall, with a diet of bran mashes, and only a moderate quantity of hay for two or three days. This will empty the large bowels, and afford that rest to the stomach and bowels, which, in such cases, they always require. Three or four drachms of aloes, with a little ginger and soap, may sometimes be useful in such cases.

RHUBARB; the Root.—*Rheum Palmatum*. This is a native of China and Tartary. Turkey or Russian rhubarb is obtained from the last mentioned place, besides which a great quantity is sent to this country from the East Indies, but it is not prepared with the same care as that imported from Turkey, which has a peculiar aromatic odour, and a bitter, slightly astringent, and subacid taste; is easily pulverised, and produces a powder of a light yellow colour. Rhubarb is stomachic, astringent, and purgative, according to the dose in which it is exhibited. It is not, however, employed for the latter purpose as a horse medicine, but is not unfrequently administered as a stomachic, in doses from half an ounce to an ounce, combined with aloes and ginger.

ROSEMARY.—*Rosmarinus officinalis*. This plant is cultivated in Britain, but is a native of the south of Europe, Greece, and Barbary. It flowers in April and May in this country, and the leaves and flowers yield an essential oil, which appears to contain camphor, and which is frequently used as an embrocation for strains and bruises, mixed with rectified spirit and soap. This mixture is nearly the same as the celebrated *Opodeldoc*; and by the addition of camphor it becomes the same thing.

ROWELLING. An operation often performed in veterinary practice. It consists in making an incision in the skin, about an inch in length, with a pair of short and strong-bladed scissors. The finger is then introduced, in order to separate the skin from the subjacent parts all round the incision, that the cavity may contain a circular piece of leather about an inch and a half or two inches in breadth. Before this leather is introduced, a

hole is made in the centre about half an inch in diameter; it is then covered with tow (the hole being left open), and smeared with digestive ointment: when the rowel is put in, the hole in the middle of the leather is plugged up with a little tow.

In this situation it is left until matter forms, which generally happens in three or four days; the plug of tow is then withdrawn, the rowel moved, and the matter suffered to flow out, in which state it remains as long as is thought necessary. Thus we see that a rowel is an artificial issue or abscess, the leather first causing inflammation, which ends in suppuration or the formation of matter; and the matter continuing to be formed so long as the extraneous body or leather remains under the skin. The rowel must be moved every day.

The intention of rowelling is to divert inflammation from any important organ or part of the body. Thus, when the lungs are inflamed, the animal certainly dies, unless it is put a stop to; but the skin may be inflamed to a considerable extent without danger: we therefore put a rowel in the chest, which, though not sufficient of itself to stop the inflammation of the lungs, contributes materially to this purpose, and, with the other necessary remedies, often effects a cure. In large swellings of the hind legs, and obstinate cases of grease, rowels in the thighs are good remedies.

In shoulder-strains, a rowel may sometimes be put in the chest with good effect. In short, when inflammation attacks an essential and important part of the system, much benefit will often be derived from inserting a rowel in some contiguous part that is of little importance. When a rowel is removed, the part generally heals of itself; if not a little Friar's balsam may be applied.

Many practitioners consider blistering the sides extensively as a more effectual means of diverting inflammation from the lungs than rowels; and I am inclined to think they are right. The rowel is sometimes smeared with blistering instead of digestive ointment: but there is danger of the cantharides being absorbed and causing inflammation of the kidneys. I have known a horse destroyed in this way. In cases of very severe internal inflammation, very little can be accomplished either by rowels or blisters.

Whenever it is thought necessary to make the ointment which is used in rowelling more stimulating, it may be easily done by adding oil of turpentine to it.

RUBEFACIENTS. A term in human medicine, applied to compositions or simples that redden or inflame the skin. Of this kind are mustard, turpentine, and liquid ammonia. See **EMBROCATIONS.**

RUE. — *Ruta Graveolens.* This is a perennial evergreen, a

native of the southern parts of Europe, but cultivated in this country. Its properties are stimulant and antispasmodic. It has been recommended in locked-jaw as a vehicle for opium, camphor, and assafoetida, in the form of decoction. It may possess some power as an antispasmodic, but certainly is very inferior to many others. Gibson often prescribes it, but generally as a vehicle for other more active medicines. Many farriers still employ rue in farcy with soap and other diuretics, which they give in large doses; it is used also as a fomentation, and is by some thought to possess considerable power as a preventive of hydrophobia, but it has no such effect.

RYE, SPURRED. — Ergot of Rye. — *Secale Cornutum*. [This substance is found on other grain as well as rye, and it is a matter of dispute whether it is a disease of the grain, produced by insects, or a fungous plant growing upon it. When partaken of in the form of bread it has been known to produce the most poisonous and fatal results; and its effects on deer and swine have been to cover the body with ulcers, and produce dreadful and fatal convulsions. Its medicinal effect is that of a powerful stimulant to the uterus, and is therefore very useful when parturition is greatly delayed by a want of activity in the womb. It has been given to cows with good effect, in doses of from two to four drachms, in powder, combined with some carminative, and given in beer every hour until a proper effect is produced. The same dose is proper for a mare; and in the dog from five to ten grains. This medicine should be administered carefully, and only when absolutely required. — Ed.]

SACCHARUM, *ejusque* **SYRUPUS EMPYREUMATICUS**. Sugar and Molasses. The dust of sugar is sometimes blown into the eye in some diseases of that organ. A small quantity of molasses, mixed with a horse's water every day, will speedily fatten him.

SAGO. A farinaceous substance, which, when boiled in water, is a proper drink for sick horses that are incapable of feeding. See **GRUEL**.

SAL AMMONIAC, or **MURIATE of AMMONIA**. — *Ammoniae Murias*. A neutral salt, composed of muriatic acid and ammonia, which, when dissolved in vinegar and water, forms a good embrocation for strains and bruises. Mixed with nitre it lowers the temperature of water.

Osmer, an old veterinary author, prescribed it for a distemper or epidemic catarrh in horses, that prevailed in the year 1750, in a dose of one ounce, joined with one ounce of nitre, half an ounce of Castile soap, and two drachms of camphor, to be given three times a day. This, I should think, would operate not only as a powerful diuretic, but would be liable to irritate the stomach in a dangerous degree. It is a medicine I have never

given internally, not considering it either so safe or so efficacious as nitre.

SAL POLYCHREST. — *Sulphas Potassæ cum Sulphure.* This is made by mixing together equal weights of powdered nitre and sublimed sulphur, and throwing the mixture, in small portions at a time, into a red-hot crucible. As soon as the deflagration is finished, the salt is to be allowed to cool, and then put into a close-stopped glass vessel. Its properties are similar to those of sulphate of potass, and it is sometimes combined with aloes as a laxative or cathartic. It passes through the kidneys undecomposed.

SAL VOLATILE. This term is indiscriminately applied to compound spirit of ammonia, and prepared ammonia, or smelling salts; but the former is often distinguished by the name of *spirit of sal volatile.*

SALIX CAPREA. The Willow. There are three varieties of willow, the barks of which are tonic and astringent, and have been successfully substituted for Peruvian bark. A preparation called salacine is now made from willow-bark, which possesses its tonic principle in a concentrated state, in the same manner as quinine does that of cinchona. The dose may be from ten to thirty grains, or perhaps more in some cases, twice or thrice a day.

SALT, COMMON. — *Sodæ Murias.* See MURIATE OF SODA.

SALTPETRE. — *Potassæ Nitræs.* See NITRE.

SALT OF STEEL, SULPHATE OF IRON, or VITRIOLATED IRON. — *Sulphas Ferri.* A combination of sulphuric acid and iron. This is by no means so remarkable for its tonic power in the horse, as in the human subject; but it is said to possess this quality, and is often given in doses from one or two, to four drachms. See IRON.

SALT OF TARTAR, or WORMWOOD. Pure carbonate of Potash. *Potassæ Carbonas Purissimus.* See POTASH and ALKALIES.

SALTS. When an acid combines with an alkali, earth, or metallic oxide, it is termed a salt. The alkali, earth, or metallic oxide is denominated the base, and when neither the acid nor the base predominates, it is called a neutral salt. When, on exposure to atmospheric air, it is either reduced to powder or becomes covered with a white crust, it has received the appellation of an efflorescent salt; but if it absorb moisture from the atmosphere, it is termed a deliquescent salt.

The name of each salt is compounded of two words; the one indicating its acid, the other its base. Thus Glauber's salt, which is composed of sulphuric acid and soda, is called sulphate of soda. Nitre, which is compounded of nitric acid and potass, is termed nitrate of potass.

When a salt is formed with an acid not completely oxygenised, it terminates in *ite* instead of *ate*, as phosphite of soda; but if the salt contain acid in excess, the word *super* is prefixed to its name, as super-acetate of lead. Should, however, its base not be fully saturated with oxygen, the word *sub* is substituted for *super*, as sub-carbonate of potass.* See ACIDS and ALKALIES.

SATURNINE LOTION. — *Lotio Saturnina*. This is made by dissolving two ounces of superacetate (sugar) of lead in one pint of vinegar, and three or four pints of water, and is considered an useful application to recent strains, bruises, and other injuries attended with inflammation.

SATURNINE OINTMENT. — *Unguentum Saturninum*. This is made by incorporating Goulard's extract of lead, or sugar of lead (super-acetate of lead) with hog's lard or wax ointment. See GOULARD, ASTRINGENTS, and OINTMENTS.

SATURNINE POULTICE. — *Cataplasma Saturninum*. See POULTICE, ASTRINGENT OINTMENTS, ACETATE OF LEAD, and EMBROCATIONS.

SAVINE. — *Juniperus Sabina*. This shrub is a native of the South of Europe and the Levant. Farriers often employ the leaves in a green state as an anthelmintic; but I have never seen them do any good. Savine is recommended by Mr. Blaine as a principal ingredient in an ointment for the removal of warts; its effect, however, is doubtful.

SCAMMONY. — *Convolvulus Scammonia*. This plant is a native of Syria and Cochin China. The scammony of commerce is a gum-resin obtained from the root of the plant. It should be light, friable, and resembling a honey-comb. Its colour is blackish, or dark grey. It is a strong purgative, but is scarcely ever employed in veterinary practice when aloes can be procured.†

SEA-WATER. Some horses will drink a sufficient quantity of sea-water to excite purging, which may be useful, should such horses be affected with swollen heels, inflamed eyes, or other inflammatory complaints. Sea-water is useful as a cooling application to an inflamed part.

SIALOGOGUES. Medicines that cause an increased secretion of saliva; the principal of which are the preparations of mercury.

Local means were formerly employed to effect this in the

* The terms *bi* and *proto* are employed instead of *super* and *sub* in modern nomenclature. — ED.

† I have lately tried scammony in various doses; it produced scarcely any effect until six drachms were given at one dose, which was followed by moderate purging. This experiment was made only on one horse: should another trial be made of it, a smaller dose of two or three drachms should be first given.

horse; that is, by bridling him, wrapping round the bit some linen that had been soaked in vinegar, in which garlic, assafœtida, pellitory of Spain, &c. had been steeped; also by putting balls between the grinders, composed of similar ingredients, or others capable of stimulating the salivary glands, and bringing on a discharge of saliva: these were called masticatories or chewing balls. A late writer (Mr. Wilkinson) has recommended chewing balls, composed of antimonial powder, gum, &c. in epidemic catarrh or distemper, when attended with sore throat and difficulty of swallowing.

SILVER. — *Argentum*. The only preparation this metal affords is the lunar caustic, or nitrate of silver; an application of great importance in surgery, whether human or veterinary. See **CAUSTICS**, **LUNAR CAUSTIC**, and **ARGENTI NITRAS**.

SINAPISMS. — *Cataplasma Sinapis*. Stimulating poultices, or liniments, in which mustard is a principal ingredient. See **EMBROICATIONS** and **MUSTARD**.

SNAKE-ROOT. — *Polygala Senega*. This, which is a perennial plant, is a native of North America. It is inodorous, of a sweetish taste on being first chewed, and afterwards hot and pungent. It is a stimulant and diuretic, increasing the action of the absorbents, and occasionally producing ptyalism. The idea that this root counteracts the bites of serpents is now disregarded; but it is considered a useful medicine in cases of weakness, and may probably be employed with advantage in veterinary practice.

The dose is from two to four drachms or more, and is generally given with carbonate of ammonia, or salt of hartshorn, camphor, and bark; in some cases opium is added. See **TONICS** and **ANTISEPTICS**.

SOAP. — *Sapo*. The various kinds of soap have all a strong and diuretic quality; and these are Castile, Spanish, and pure white soap. Soap is a useful ingredient in purgative as well as diuretic preparations.

The dose is from two or three drachms to an ounce, but it is sometimes given in larger doses.

Soft soap is very useful in cleansing foul heels; and when mixed with oil of turpentine and spirit of wine, forms a good embrocation for indurated tumours, or callous swellings. See **EMBROICATIONS** and **LINIMENTS**.

SODA; *Natron*, or the Mineral Alkali. This is procured chiefly from the ashes of marine plants. Its medicinal properties are nearly the same as potash, but the prepared natron or soda is sometimes preferred as an ingredient in purgative and tonic medicines.

The dose is from two to four drachms.

There are various preparations of soda, as the carbonate of

soda (*sodæ carbonas*), which is antacid and deobstruent; the dried subcarbonate (*sodæ subcarbonas exsiccata*), which is perhaps more conveniently administered than the carbonate, and answers the same purpose: it is extremely useful in painful affections of the urinary organs arising from acid in the urine: the sulphate of soda (*sodæ sulphas*), or Glauber's salts (see SULPHATE OF SODA); and the tartarized soda (*soda tartarizata*), which is cathartic, but not often prescribed by veterinarians.

SOILING. By this term is meant feeding horses with grass, clover, lucern, vetches, or other green food, in the stable, instead of turning them to grass in spring or summer. Some horses are so restless at grass, and so apt to stray, that turning them out is attended with danger and inconvenience. Horses also that are lame, or just recovered from a lameness, sometimes injure themselves at grass by taking too much exercise. In such cases, soiling for about a month in a large airy box is exceedingly useful. I consider vetches the best vegetable for soiling. Some people are advocates for keeping a horse all the year round upon hay and corn, and only allowing them green food in the spring now and then in sufficient quantity to open the bowels, and no more, and assert that by this mode of management they are able during the winter to go through a greater degree of labour than they otherwise would, and to keep in much better condition. This method of feeding hunters is now very extensively adopted.

SOLUBLE TARTAR, or TARTRATE OF POTASH.—*Tartar Potassæ.* This is a laxative saline preparation, composed of cream of tartar and potash. It is sometimes given with infusion of senna, and is supposed to correct the griping so frequently induced by resinous cathartics. The dose may be from four to eight ounces, according to the proportion of aperient medicine with which it is combined.

SORREL.—*Rumex Acetosa.* An acidulous plant, sometimes prescribed by the veterinary practitioners of France in dysentery and molten grease; but not used by English veterinarians.

SPANISH FLIES. See CANTHARIDES.

SPEARMINT.—*Mentha Viridis.* See MINT.

SPERMACETI.—*Cetaceum.* An unctuous substance, procured from the head of a certain species of whale. In medical practice it is often employed as a demulcent to allay irritation, as in cough, but is rarely employed in veterinary practice, and appears to differ very little in its medical properties from hog's lard or suet. It has been lately discovered that the muscular parts of all animals may be converted into a substance resembling spermaceti by maceration in water.

SPIKES, FLOWERING; of Lavender.—*Lavandula Spica.* A volatile oil, termed oil of spike, is made from lavender, and is

much used by farriers; it appears, however, to be often nothing more than oil of turpentine coloured with alkanet root.

SPIRIT OF AMMONIA.—*Spiritus Ammonia.* See AMMONIA.

SPIRIT OF MINDERERUS.—*Spiritus Mindereri.* See ACETATE OF AMMONIA.

SPIRIT OF NITROUS ETHER.—*Spiritus Ætheris Nitrici.* See ACID, NITRIC, and NITROUS.

SPIRITS. Brandy, rum, gin, or cordial liquors; but in medicine the word spirit is applied to alcohol, either pure or diluted. See ALCOHOL.

There are various kinds of spirits used in medicine; such as spirit of nutmeg, spirit of juniper, &c. which is made by distilling the medical substance with dilute spirit.

SQUILL, or SEA ONION.—*Scilla Maritima.* This is a native of Sicily, Syria, Barbary, and Spain. The bulb is extremely large, and is in one variety white, in another reddish. It is inodorous, bitter, and acrid. The best preparation of squill for veterinary purposes is the powder of the dried root, which, in the dose of one drachm or more, is considered a good expectorant, and useful in chronic cough: in larger doses it generally acts as a diuretic, but is not a desirable medicine for that purpose, there being many diuretics more certain in their effect. *Gum ammoniacum* is an eligible addition to squill; and I have sometimes seen camphor and opium joined to it with good effect. One drachm of the dried squill is equal to about five drachms in its fresh state. There are three other preparations of squill made, viz. the spirituous and acetous tincture, and the oxymel; but these are not so well calculated for veterinary purposes. See EXPECTORANTS.

STARCH.—*Triticum hybernum.* Starch glysters with opium are sometimes employed in obstinate diarrhœa or irritation of the rectum. In no other way is starch useful in veterinary practice, while the cheaper mucilages, such as linseed, marsh-mallow, &c. can be procured; but when these are wanting, it is capable of making a good mucilaginous drink. See EMOLLIENTS and DEMULCENTS.

The preparation named *Arrow-root* is a pure starch, and when made into gruel is the best and safest preparation that can be employed in diarrhœa, or to restrain the effect of purging medicine when it has been given too largely. Mixed with a watery solution of opium it forms a good anodyne glyster.

STAVESACRE; the seeds.—*Delphinium Staphisagria.* This is a species of larkspur, and is a native of the south of Europe, flowering from June to August. The seeds of stavesacre are recommended as a topical application in cutaneous complaints, and for destroying those animalcules which are sometimes generated

upon the horse's skin. They are used either in the form of a decoction, or finely powdered and mixed with train-oil, turpentine, &c.

Two drachms of stavesacre were given to a glandered horse; he died during the night following in great pain.

STEEL. The medical properties of steel are not supposed to differ from those of iron. See **IRON**.

STIMULANTS. A term of very extensive signification, and which may with propriety be applied to the greater part of the articles of the *Materia Medica*. According to the celebrated Dr. John Brown, every medicine was considered as a *stimulant*; but it is probable that some, particularly the narcotics, have an opposite effect; especially the distilled laurel water. The term *stimulant* is generally applied to those substances which perceptibly increase the motion of the heart and arteries. Under this head a great variety of remedies are included, both internal and external; among the former are cordials, cathartics, diuretics, &c.; the latter consists of embrocations, ointments, liniments, &c.

STOMACHICS. Medicines that strengthen the stomach and excite appetite.

The term is nearly synonymous with cordials in veterinary medicine; though from *stomachics* we generally expect a more permanent effect than from those preparations denominated *cordial*, as they approach more to the nature of *tonics*. A few receipts will be given under this head, which are intended for horses that feed badly without any apparent cause, and such as are subject to flatulent colic and indigestion. Horses of this description are generally lean and in bad condition.

STOMACHIC BALL.

- No. 1. Powdered gentian..... 2 dr. to $\frac{1}{2}$ oz.
 Powdered ginger..... 1 dr. to $1\frac{1}{2}$ dr.
 Carbonate of soda..... 1 dr.
 Treacle enough to form the ball for one dose.
- No. 2. Cascarilla, powdered 2 dr.
 Myrrh..... $1\frac{1}{2}$ dr.
 Castile soap 1 dr.
 Syrup enough to form the ball for one dose.
- No. 3. Powdered colombo root $\frac{1}{2}$ oz.
 Powdered cassia..... 1 dr.
 Powdered rhubarbfrom 2 dr. to $\frac{1}{2}$ oz.
 Syrup enough to form the ball for one dose.

Before stomachics are given, a mild cathartic ball is generally required. Improper management with regard to food and water is most commonly the cause of this disordered state of the digestive organs; too often assisted by immoderate work and general ill-treatment.

STOPPING, for the feet. A mixture of clay and cow-dung, or either of these separately, is commonly used for this purpose; and, by keeping the bottoms or soles of the feet moist and cool, often do good. In soles that are too thin and soft, or for the frogs when in that state, the following composition is more proper —

Tallow and tar, of each..... 1 lb.
To be mixed by melting together.

Mr. Goodwin has contrived a kind of boot for keeping the feet cool and moist, as well as for applying the above composition; and Mr. Cherry, of Clapham, has recommended a piece of firmly compressed felt or sponge, to be cut to the size of the sole of the foot, and inserted within the shoe, after which it is to be wetted with cold water; this, by causing it to expand, will prevent it from falling out. Linseed meal forms a good stopping.

STRYCHNIA. See *NUX VOMICA*.

STYPTICS are medicines which constrict the blood-vessels when wounded, so as to stop an effusion of blood. Many preparations have been recommended for this purpose: but when the size of the wounded vessel is at all considerable, an adequate degree of pressure by means of bolsters and bandages should rather be depended upon; and when that cannot be done, the vessel must be tied up above the wound and below, by which the bleeding will be effectually suppressed. No danger is to be apprehended from slight bleedings in the horse, as they always cease spontaneously.

The styptics commonly employed are oil of turpentine, diluted vitriolic acid, muriate of iron, absorbent earths, and flour.

SUBLIMATE, CORROSIVE. Oxymuriate of Quick-silver. *Hydrargyri Oxymurias*. (New name, **Bi- or PER-CHLORIDE OF MERCURY**.) This is by far the strongest of the mercurial preparations, and requires to be used with great caution. It has been employed with success in farcy: and in one instance I have seen it cure the glanders; but the horse was shot soon after, therefore it is uncertain whether the cure was permanent or not. In many cases of farcy that were supposed to be cured by sublimate, aided by external applications, I have seen the glanders break out after an interval of a few weeks or even months. The dose of sublimate is from eight to ten, twelve, or fifteen grains, given daily, until the desired effect is produced, or until the mouth becomes sore, or the horse stales

profusely, and then it should be discontinued a short time. Whenever sublimate makes a horse sick, or causes any uneasiness in the bowels, it should be immediately discontinued. In the various experiments that have been made upon glandered horses, it has been given in very large doses, even to the extent of two drachms twice a day. No good, however, has ever resulted from such large doses, and the poor animals have often been dreadfully tormented by them. I am now decidedly of opinion, that in glanders and farcy the milder preparations should be preferred, especially Ethiop's mineral, and the mercurial or blue pill. M. Dupuy injected a solution of sublimate into the jugular vein of a glandered horse. It caused almost immediately severe colic pains, and a continual shaking of the tail. It produced also a remarkable effect upon the kidneys, causing the horse to stale frequently, even twelve times in the space of a quarter of an hour. The following day he injected a stronger solution, which caused still more distressing symptoms; the next day a still stronger solution, which, after tormenting the poor animal for some time, put an end to his sufferings. The symptoms of glanders were not at all diminished by it. Another glandered horse took sublimate for a month, without receiving any benefit from it. M. Houba, a French veterinarian, gave an ounce of sublimate in a mucilaginous decoction, to a colt of one year old affected with farcy. He increased the dose of sublimate until it amounted to 2 ounces, 3 drachms, 21 grains, or 64 grammes (a gramme is 18 grains). This immense dose, he says, after some days, made the ulcers look red, the discharge lost its offensive smell, and became whiter and thicker, and some of the ulcers cicatrised; the colt also fed well and appeared cheerful, but after a short time he began to discharge at the nostrils, and had a swelling under the jaws; in short, he became so badly glandered that it was thought necessary to destroy him. (See *Dupuy de l'Affection Tuberculeuse, vulgairement appelée Morve*, p. 188.)

Sublimate is often used externally, either in powder or solution. It is a useful caustic and external stimulant, and is sometimes an ingredient in blisters; but its employment in this form is not to be recommended.

In virulent cases of chronic grease I have seen a solution of sublimate effect a cure in a very short time.

In obstinate cases of mange a solution of sublimate is sometimes employed; but in three instances I have known inflammation of the bowels take place very soon after.

Sublimate is difficult of solution in water only; it is usual, therefore, to rub it first in a mortar with a little proof spirit, or with a little muriate of ammonia; but the most ready method of dissolving it is to rub it with an equal weight of muriatic acid,

and then to add as much water as is required. This last solution is much stronger than any other.

SUBMURIATE OF MERCURY. — *Hydrargyri Submurias*. New name, PROTOCHLORIDE OF MERCURY. See CALOMEL.

SUCCINUM. See AMBER.

SUDORIFICS. Medicines that cause sensible perspiration or sweating. In the horse there is no medicine that will, with certainty, produce this effect, and it is only by exercise or warm clothing that it can be produced. In locked-jaw a horse has been kept in a state of perspiration for a considerable time by being covered with sheep-skins. Vinegar and acetate of ammonia will sometimes cause perspiration; and opium, with emetic tartar, camphor, and cordials, are said to have a sudorific effect; also ipecacuanha, with opium, camphor, and salt of hartshorn. [Spirit of nitrous ether will more frequently produce a sudorific effect than any other medicine, particularly if joined with camphor. — ED.]

SUET, MUTTON; BEEF. — *Sevum Ovillum; Bovinum*. Prepared suet is used in the composition of ointments and plasters. Suet boiled in milk has been recommended in the scouring rot of horned cattle.

SUGAR OF LEAD. Acetate and Superacetate of Lead. — *Saccharum Saturni. Plumbi Acetas et Superacetas*. See LEAD.

SULPHATE OF ALUMINA. — *Aluminæ Sulphas*. See ALUM.

SULPHATE OF COPPER. — *Cupri Sulphas*. Blue vitriol, or blue stone. This preparation of copper is much used in veterinary practice as an external application; it is a mild caustic or escharotic, and, when dissolved in water, forms a good detergent or astringent lotion. The addition of a little sulphuric, nitrous, or muriatic acid to this lotion increases its strength as a detergent, and, when the proportion is considerable, makes it a strong caustic. A solution of sulphate of copper in vinegar, or vinegar and water, makes a good wash for the foot rot in sheep. Sulphate of copper should be finely powdered when sprinkled on ulcers, or when mixed with lard or other unctuous matter into an ointment. When a solution of sulphate of copper is sufficiently diluted, it may be used as a mild astringent, and, when very weak, may be applied even to the eye. Sulphate of copper has been given internally as a tonic in diabetes, and in farcy; the dose from half a drachm to a drachm.*

SULPHATE OF IRON. Salt of steel. *Ferri Sulphas*.

* Mr. Sewell recommends sulphate of copper in doses of three to six drachms with linseed meal, in the form of a draught for glanders. Thus combined, it can be administered in much larger doses than in a ball, without irritating the coats of the stomach and intestines, being immediately diffused over a much larger surface. See GLANDERS. — ED.

A preparation composed of sulphuric acid and oxide of iron. It is sometimes used as a tonic. The dose from one to three or four drachms.

SULPHATE OF MAGNESIA, or EPSOM SALT. — *Magnesia Sulphas.* A mild laxative that may be given with advantage in catarrhal disorders. The dose from four to twelve ounces, dissolved in a sufficient quantity of water. When a small dose is given, it should be repeated every four or six hours, until some effect is produced.

From four to eight ounces of castor or olive oil is sometimes added to a dose of the solution of sulphate of magnesia.

SULPHATE OF POTASH. — *Potassæ Sulphas.* Vitriolated tartar, or Sal-polychrest.

This neutral salt is a more powerful laxative than the sulphates of magnesia and soda, and more sparingly soluble in water. On this account it is most commonly employed in human medicine, in powder; and, when joined with rhubarb, makes a good purgative. It is seldom used, I believe, for horses or cattle, though it may, perhaps, make a good laxative if well rubbed in a mortar with aloes, and then formed into a ball.

SULPHATE OF QUININE. — *Quinine Sulphas.* See BARK.

SULPHATE OF SODA. — *Sodæ Sulphas.* Vitriolated soda, or Glauber's salt. This is a good laxative, and rather stronger than sulphate of magnesia. I have been informed by a correspondent in Ireland, that he employed it with great success in an epidemic catarrh, and without losing a single patient, while a great number died under a different treatment. He gave about four to six ounces three times a day, in a quart of water or gruel, until the bowels were opened. It is a good laxative for cattle: the dose from six to twelve ounces.

SULPHATE OF ZINC. — *Zinci Sulphas.* Vitriolated zinc, white vitriol, or white copperas. This is a strong astringent application, but may be dissolved in water, and so diluted as to make a useful wash for the eye. It is sometimes given internally as a tonic; and, though very large doses have been given to glandered horses as an experiment, without causing much inconvenience, and half an ounce or more as a tonic, I am inclined to think, by giving daily one or two drachms, it is more likely to do good. A strong solution of sulphate of zinc is an excellent application to quitters and other ulcers.

SULPHATES. Neutral salts composed of sulphuric acid and alkalies, earths, or metals.

SULPHUR. Brimstone. Roll sulphur is chiefly obtained from the sulphuret of copper. It is purified by fusion, and is cast into moulds. It is insoluble in water.

Sublimed, or, as it is commonly called, flower of sulphur, is procured from the former by heating to a great heat and collecting the vapour, which is the flower, whilst the dregs is the sulphur vivum.

Flower of Sulphur is generally given in the dose of one ounce: it is commonly joined with nitre and antimony, or nitre and resin; and is then thought to improve the coat and general condition of the horse, or remove swellings of the heels, and surfeit. I have given sulphur in a variety of doses; but the only effect I could perceive was that of a mild laxative, and that did not take place until four ounces were given at a dose. From the observations I made on this occasion, I do not conceive that *sulphur* is of much use as an internal remedy in the horse, nor that it possesses any diaphoretic power. As a topical application in mange, it is certainly very efficacious, particularly if mixed with other remedies. See article MANGE.

Sulphur is very serviceable to young dogs, when they have any appearance of plethora or cutaneous disease, generally acting as a mild laxative: it may be given to them in milk, from one teaspoonful to two or three.

A few years ago, M. Collaine, Professor of the Royal Veterinary School of Milan, published an account of some successful experiments he made on glanders. The medicine he employed was sulphur, beginning with a dose of four ounces, and increasing it gradually until he gave two pounds daily, mixed into an electuary with honey; he also took away about two quarts of blood once in two or three days. A dose of six ounces caused purging; ten or twelve ounces griping pains and purging. Six ounces of *sulphur vivum* were then given, which produced a similar effect, and some of the horses became so exceedingly weak that they lay down, and were unable to rise for three or four days. When they recovered a little from these alarming symptoms, he found the discharge from the nostrils much lessened, as well as the swelling under the jaws. In some, the disease entirely disappeared, but after a few days returned, and was not permanently cured till it had fluctuated in this way several times. After they had got over the effect of the sulphur, on giving it again he found that a dose even of twelve ounces produced no effect; he therefore increased it to eighteen ounces, and from that to twenty-four ounces; but it no longer caused either purging or griping. Having continued the use of the medicine in this large dose for some time, and finding the disease remain stationary in some of the horses, he discontinued it for eight or ten days, in order to restore the susceptibility of the animal to the action of sulphur. On recommencing the treatment, he joined to six ounces of sulphur an equal quantity of antimony, which pro-

duced a considerable effect for about fifteen days, when it became inactive; he then gave from twelve to fifteen ounces of sulphur, with six ounces of liver of antimony, and in less than fifteen days all the horses that had not a very severe local affection were perfectly free from the disease. Similar trials have been made in France since M. Collaine's Report appeared, but the result was very different. According to M. Dupuy, in his work on glanders (*Traité de l'Affection Tuberculeuse, vulgairement appelée MORVE, &c.*), lately published, sulphur has been fairly tried at the Veterinary School of Alfort, near Paris, and has not succeeded in any one instance: in large doses it causes very distressing symptoms, viz. colic, purging, and great debility; and some of the horses died under the treatment. It is probable that sulphur may sometimes have caused a temporary cessation of the discharge from the nostrils, and as M. Collaine has not published anything further on the subject, he is probably become less sanguine in his expectations from this mode of treatment. He observes in his Report, that *sulphur vivum* (*soufre brut*) produced a greater effect than flowers of sulphur; and I am inclined to believe that *sulphur vivum*, when finely powdered and sifted through a fine sieve, will do just as well, if not better, for mange ointment or liniment, than the flower of sulphur, which is more expensive. When flower of sulphur is given internally, for mange or other cutaneous diseases, it may be joined with levigated antimony, or tartarized antimony, as in the formula under the head Alteratives.

SULPHURETS. Combinations of sulphur with alkalis, earths, or metals. The preparations of this kind used in veterinary medicine are sulphuret of antimony (see **ANTIMONY**), sulphuret of arsenic (see **ORPIMENT**), sulphuret of mercury, black and red (see Ethiop's mineral and cinnabar), sulphuret of potash, or liver of sulphur. This last is a good remedy for diseases of the skin, such as mange, and may be given inwardly as an antidote to certain poisons, as arsenic, lead, and preparations of mercury.

SULPHURIC ACID.—*Acidum Sulphuricum.* Vitriolic acid, or oil of vitriol. See **ACIDS**.

SWEET SPIRIT OF NITRE. See **ACID, NITRIC** and **NITROUS**.

SYRUP.—*Syrupus.* For all veterinary purposes treacle is a good and a cheap substitute for syrup.

TALLOW. A mixture of equal parts of tar and tallow is a good application to brittle hoofs.

TAR.—*Pix Liquida.* This is a good remedy for thrushes, and other diseases of the *frog*. It appears to promote the growth of horn, by gently stimulating the secretory vessels of that part.

The rotten parts of the frog having been carefully removed with a knife, and the rest well cleansed, the tar is to be melted and poured into the cleft or cavity: a pledget of tow is then to be laid on the part and confined by some proper contrivance. In bad cases, a small proportion of sulphuric acid should be carefully mixed with the tar; and when a thrush has degenerated into the disease termed *canker*, a large proportion of the acid should be employed. See LINIMENTS.

Tar mixed with oil of turpentine and cantharides forms a strong blister. It is sometimes employed as a remedy for cough.

Tar, when mixed with verdigris or finely powdered blue or white vitriol, forms a good liniment or ointment for canker or thrushes. It may be occasionally employed with alum, and, when mixed with tallow, is an excellent stopping for flat thin soles. In the latter form it makes a good hoof ointment; and, when rubbed about the coronet and hoof, is said to render the hoof tough.

TARTAR. — *Tartarum*. An acid substance, found about the sides and bottoms of casks in which wine is fermented; when purified, it is termed *crystals*, or *cream*, of tartar. Farriers generally employ it in their purging medicines, upon the authority of some old writers, who supposed it to have the property of correcting aloes. See CATHARTICS.

TARTAR, VITRIOLATED. See SULPHATE OF POTASH.

TARTARIZED ANTIMONY. See EMETIC TARTAR and ANTIMONY.

TARTRATE OF POTASS. See SOLUBLE TARTAR.

TEREBINTHINA. See TURPENTINE.

TIGLII OLEUM. Croton oil, which see.

TIN. — *Stannum*. This metal is a good anthelmintic for dogs; and though not employed in veterinary practice, appears to be worth a trial. I have known great numbers of worms discharged from dogs, by giving filings or scrapings of pewter, which is composed principally of tin and lead. The dose about a drachm. See ANTHELMINTICS.

TINCTURES. — *Tincturae*. Medical preparations made by infusing or digesting vegetables, &c. either in rectified or proof spirit. Examples: — Compound tincture of benzoin, commonly named Friar's or Traumatic balsam, is made by digesting gum benzoin, aloes, &c. in rectified spirit. Tincture of opium is made by digesting opium in proof spirit. There are also tinctures made with vinegar, such as squill and meadow saffron. Compound spirit of ammonia, likewise, is sometimes employed as a menstruum, as in the volatile tincture of guaiacum, and foetid spirit of ammonia.

TOBACCO. — *Nicotiana*. This is sometimes given to horses by grooms, for the purpose of keeping their legs fine.*

TOLU, BALSAM OF. See **BALSAM OF TOLU.**

TONICS. Tonics, according to Murray, are those substances whose primary operation is to give strength to the system. Their operation is not mechanical, as was once conceived; they act not on the simple solids, increasing their tension or tone, but on the living fibre, and are merely powerful stimulants permanent in their operation. By producing a gradual excitement, they give vigour to the actions of the system; and as that excitement is gradually produced, it is in like manner gradually diminished, and the habitual stimuli continuing to operate, diminished action does not succeed. Where tonics, however, are given in excess, are used unnecessarily, or for too long a time, they weaken the powers of life. Tonics act primarily on the stomach, the action they excite in that organ being communicated generally by the medium of the nerves to the rest of the system; some of them, however, are received into the mass of the blood. The immediate effects of a tonic, given in a proper dose, are to increase the force of the circulation, to augment the animal heat, promote the various secretions, or moderate them when morbidly increased, quicken digestion, and render muscular action more easy and vigorous. By some of them these effects are very slowly induced. The affections of the system in which tonics are employed must be obviously those of debility. But previously to their being employed, it is necessary to inquire on what that debility depends; if it be simply on want of tone, as it is termed, in the stomach, and consequently in the system in general, the use of tonics is clearly indicated; but if it arise

* A short time since an infusion of about two ounces of tobacco, in a quart of beer, was given to a horse merely for the purpose of keeping his heels fine. He died immediately after taking it.

I was not present when this circumstance occurred, but am satisfied of the truth of it. I am inclined to believe, however, that there must have been something in this case that was not discovered;—the stomach may have been previously diseased. I have, within a short period, given an infusion of tobacco, as well as the tobacco that the infusion had been made from, in the dose of two, three, and four ounces. The only perceptible effect was a shivering, and an appearance which indicated a considerable affection of the stomach, not altogether like nausea, yet approaching towards it; but the effect was transient. According to Boardman, an infusion of three pounds of tobacco has been given without effect. In Bourgelat's "*Matière Médicale Raisonnée*," it is said to make an efficacious clyster in obstinate costiveness; and is prescribed also in chewing-balls or masticatories. Muriate of ammonia, dissolved in a decoction of tobacco, is said to be a good remedy for the mange; rubbing the affected parts with the fresh leaves of tobacco is said to have the same effect. It is also employed for the mange in sheep and dogs, and in the latter serves to kill fleas and ticks.

[The smoke of tobacco has been employed as an injection in obstinate constipation with good effect. — ED.]

from unwholesome, or an insufficient quantity of food, hard labour and exposure to the inclemencies of the weather, or the exhalations of a damp, close, filthy stable, tonics will avail nothing until the situation, treatment, and food, are materially improved; that such cruel and abominable treatment is frequently, if not always, the cause of debility in horses is well known; therefore no further comment upon the folly and cruelty of such treatment is necessary in this place. Before tonics are given, it is generally necessary to give some warm purgative medicine. While the horse is taking tonics, great attention should be paid to his diet; and it would not be going too far, I believe, were I to assert, that by judicious management with regard to food, grooming, and exercise, and the occasional use of mild physic, horses would seldom require tonic medicine.

Tonics may be divided into minerals and vegetables; the former are generally considered the most powerful, and, I believe, are at this time generally preferred, not only on account of their supposed superior efficacy, but likewise, probably, from their being less expensive, and the dose less bulky and inconvenient.

In the former editions of this work, I have generally given them a preference, but subsequent experience and reflection have led me to employ them with more caution, and with less confidence in their reputed innoxious qualities; for, notwithstanding the immense doses of arsenic, and blue vitriol (sulphate of copper), that have been given without producing any immediate ill effect, it is highly probable that the stomach suffers materially, especially when the use of such medicines is persisted in. I have examined a horse's stomach that had been taking these mineral tonics, and thought they had not diminished the animal's appetite or altered his appearance; on the contrary, he was in high condition, and did his work well, yet, being glandered, was destroyed. The stomach, however, had been greatly injured, and would, no doubt, had the animal lived much longer, have produced some serious disorder.

This question naturally arises:— In what respects are those mineral tonics, so well known as powerful poisons in the human body, preferable to those obtained from the vegetable kingdom? In the first place they are considered as the only medicines capable of curing the glanders and farcy, and are therefore prescribed for those diseases. I have never seen a single case of glanders permanently cured, either by arsenic or blue vitriol, notwithstanding the numerous trials I have witnessed during a period of more than twenty years. Farcy has certainly disappeared in many instances while taking those medicines, but at the same time some local remedies were employed, that is, the farcy sores were dressed with some caustic, escharotic, or deter-

gent composition; and it is well known that farcy, *i. e.* the sores, buds, and all the external symptoms or appearances, may generally be removed by external applications alone; therefore it is uncertain what share the tonic, whether it be arsenic or blue vitriol, has had in the cure of the disease. Another circumstance to be considered is, that farcy, though apparently cured by means of those strong medicines, is often not really or permanently eradicated, but frequently is succeeded by glanders; and, though the interval between the disappearance of farcy and the appearance of glanders is sometimes considerable, there are circumstances which render it extremely probable that they are connected, and depend on the operation of the same cause. But whatever share arsenic, blue vitriol, or sublimate may have had in the cures that have been effected, whether permanent or only temporary, small doses have generally been found sufficient; that is, of arsenic, from ten to fifteen or twenty grains; sublimate, from ten to fifteen grains; blue vitriol, from half a drachm to one drachm, or, at most, two drachms; white vitriol, from one to three drachms. The experiments, therefore, in which large doses have been given, such as two drachms of arsenic or sublimate once or twice a day, and continued for some time, should never be repeated, as they are really more likely to defeat the purpose for which they are given than to promote it; and there can be no doubt that, notwithstanding the little immediate effect they appear to have on the stomach, this important organ is often most seriously and permanently injured by them.

The following are formulæ for tonics:—

- No. 1. Arsenic.....from 5 to 10 gr.
 Sulphate of copper..... $\frac{1}{2}$ dr.
 Opium $\frac{1}{2}$ dr.
 Powdered caraways $\frac{1}{2}$ oz.
 Treacle enough to form the ball.

- No. 2. Arsenic..... 5 to 10 gr.
 Opium $\frac{1}{2}$ dr.
 Sulphate of zinc..... 2 dr.
 Caraway seeds..... $\frac{1}{2}$ oz.
 Treacle enough to form the ball.

- No. 3. Powdered cantharides 6 to 12 gr.
 Sulphate of iron..... 2 dr.
 Gentian 2 dr.
 Ginger..... 1 dr.
 Treacle to form a ball.

The opium in these balls is intended to enable the stomach to

bear the mineral preparations better than it otherwise could; but by many practitioners it is thought unnecessary.

In farcy, sublimate (oxymuriate of mercury) may be added to either of the balls; but this medicine cannot, with propriety, be classed with tonics in veterinary medicine, for its effect, when given for several days, is that of producing debility, and an increased flow of urine. The dose is the same as arsenic. The vegetable tonics I consider as an important class of medicines. A description of each, as well as of each mineral tonic, will be found under its respective name.

VEGETABLE TONICS.

- No. 1. Peruvian bark 1 oz.
 Opium $\frac{1}{2}$ dr.
 Ginger $1\frac{1}{2}$ dr.
 Oil of caraways 20 drops.

Treacle enough to form the ball. — One dose.

- No. 2. Cascarella 2 dr.
 Gentian root 2 dr.
 Opium $\frac{1}{2}$ dr.
 Oil of caraways 20 drops.

Treacle enough to form the ball.

- No. 3. Gentian root 3 dr.
 Opium $\frac{1}{2}$ dr.
 Cascarella 1 dr.
 Myrrh 1 dr.
 Carbonate of soda 1 dr.

Treacle enough to form the ball.

- No. 4. Colombo 3 to 4 dr.
 Opium $\frac{1}{2}$ dr.
 Cassia 1 dr.
 Powdered allspice 2 dr.

Treacle enough to form the ball.

These formulæ may be considerably varied, or given as drenches in warm ale, or in an infusion of some aromatic or bitter herb, and if preceded by a mild purgative, and assisted by a light nutritious diet, will often do much good, more perhaps than the mineral tonics.

TORMENTIL ROOT.—*Tormentilla officinalis*. This is an indigenous perennial plant, growing chiefly in dry heathy spots. It is a powerful astringent, and is sometimes employed in diarrhoea in horses and horned cattle.

One ounce, or one ounce and a half, being boiled in three pints of water to one pint and a half, with a little cassia and caraway seeds, makes one dose, which may be repeated if necessary.

TRAGACANTH GUM; or GUM DRAGON. — *Astragalus verus*. The shrub from which this gum is obtained is a native of Persia. When good, tragacanth should be whitish, semi-transparent, inodorous, and leaving a slightly bitter taste in the mouth when chewed. Its properties are demulcent, and, as it yields a strong mucilage, it may be employed instead of gum arabic in the formation of emollient drinks.

TRAUMATIC, or FRIAR'S BALSAM. — *Tinctura Benzoini Composita*. Traumatic balsam is the compound tincture of benzoin, and is made in the following manner:—

Benzoin	3 oz.
Strained storax balsam.....	2 oz.
Balsam of tolu.....	1 oz.
Extract of spiked aloes.....	$\frac{1}{2}$ oz.
Rectified spirit.....	1 qt.

Digest for fourteen days, and filter or strain.

As the name of this balsam implies, it is generally employed as an application to wounds which require a slight stimulus. It is rarely prescribed as an internal remedy, although it has been deemed useful in chronic cough, and some other pulmonary affections. As it is decomposed by water it must, when administered internally, be first triturated with mucilage or yolk of egg, in order to suspend it in aqueous fluids. See **BENZOIN**.

TRITICUM; FARINA; AMYLUM. Wheat; wheat-flour; starch. Wheat is never given to horses as food in this country, both on account of its price, and because it is apt to produce colic. Wheat-flour gruel is occasionally given in diarrhœa, and starch is sometimes used in the composition of clysters in the same disease.

TURNIPS. Boiled turnips make an excellent poultice for the heels when affected with grease.

TURPENTINE. — *Terebinthina*. This term is applied to the resinous juices of certain trees. There are four kinds, viz. Chio, Strasburgh, Venice, and common turpentine; the two last only are employed in veterinary medicine. They are effectual diuretics, and possess a considerable carminative power. Common turpentine is a principal ingredient in digestive and detergent ointments.

In speaking of the turpentines, Dr. Paris says, they all possess the same chemical as well as medicinal properties; viz. Canada turpentine, or Canada balsam, as it is sometimes improperly

called, is obtained from the *Pinus Balsamea*. 2dly, Chian or Cyprus turpentine, from the *Pistachea Terebinthinus*. 3dly, Common, or horse turpentine, from the *Pinus Sylvestris*, or Scotch fir. 4thly, Venice turpentine, from the *Pinus Larix*: from the twigs of which species of fir the essence of spruce is made. True Riga balsam is made from the shoots of the *Pinus Cembra*, previously bruised and macerated for a month in water. The same fir affords also Briançon turpentine.

By distillation we obtain the oil, or, as it is sometimes termed, the spirit of turpentine, a medicine of great utility. In doses of two, three, or four ounces, it frequently cures the flatulent colic, or gripes; and, when combined with camphor and other stimulants, makes a good embrocation for indurated swellings, strains, and bruises.* When properly mixed with mustard, it forms an embrocation that has been found serviceable in counteracting *internal* inflammation. I have seen it applied to obstinate ulcers with good effect. It is an useful ingredient in blistering-ointment, and liniments.

It is also if properly managed, the most efficacious medicine that can be employed for expelling worms from the bowels. In large doses it generally acts as a purgative, especially when the bowels are previously relaxed by bran mashes, or a small dose of aloes. In small doses it is a powerful diuretic. Mr. Coleman considered it almost a specific in flatulent colic in a dose of four ounces, mixed with gruel. It has been given to the extent of eight ounces at a dose, without injury; but in one case a dose of four ounces produced a fatal inflammation of the stomach and bowels: in this case, however, a dose of physic had been given the day before, and the horse had a considerable purging at the time the turpentine was exhibited. In the human body two drachms of oil of turpentine may so excite the kidneys as to produce bloody urine, whereas six or eight drachms will stimulate the bowels, and purge without affecting the urinary organs, or only in a moderate degree. It is said to be almost a specific remedy for tape worm, in the human body, always discharging it dead; and in obstinate constipation, depending on affections of the brain, Dr. Paris says he has several times witnessed its beneficial effects.

Dr. Latham considers it a valuable medicine in epilepsy. As a veterinary medicine it is certainly of great value; and though in a few cases, when given internally, it has produced violent effects, merely, I believe, from bad management, yet when judiciously administered, it may be employed in a dose of four ounces, with advantage and safety.

* Oil of turpentine, when applied to the skin of the horse undiluted, produces an excessive degree of irritation: it should therefore always be mixed with oil when so applied.—ED.

I have long discontinued the use of oil of turpentine in my practice as a remedy for flatulent colic, gripes, or fret, finding the preparations of *opium* far more effectual. (See OPIUM.) With respect to worms, I consider it is of more importance to prevent worms than to expel them from the bowels. When the stomach has been weakened or disordered, worms will be generated in the bowels, and even in the arteries, on whatever food the animal is kept. To expel them, therefore, from the bowels is doing but little for the cure of the disorder; and those medicines which do expel them, such as oil of turpentine, and large doses of calomel, may increase that morbid state of the stomach on which their existence depends. See article WORMS.

Venice turpentine is generally made by mixing the oil with the common turpentine, which is easily done when the latter is melted.

Venice turpentine is sometimes employed as an ingredient in cough medicines. The dose is about half an ounce. But if given as a remedy for flatulent colic, or as a diuretic, a larger quantity is necessary. It makes a good detergent ointment, if mixed with about a fourth or a third part of red precipitate, finely powdered.

TURPETH MINERAL, or YELLOW SUB-SULPHATE OF QUICKSILVER.—*Sub-sulphas Hydrargyri Flavus*. This mercurial preparation is seldom used in veterinary practice, being apt to irritate the stomach and bowels, and bring on violent purging; but it has been recommended as a remedy for farcy.

The dose is from half a drachm to a drachm.

It is given as an emetic to dogs, when they have swallowed any poisonous substance, or at the commencement of *the distemper*; but it should give place to better treatment.

UNGUENTS or OINTMENTS.—*Unguenta*. See OINTMENTS.

VALERIAN ROOT, WILD.—*Valeriana officinalis*. This is an indigenous perennial plant, the root of which has a strong unpleasant odour, and a bitter and rather acrid taste. The dried root is employed by medical practitioners in spasmodic and nervous complaints. Tincture of valerian is employed for spasmodic colic. The dose is an ounce.

VERATRUM ALBUM. White hellebore. See HELLEBORE.

VERDIGRIS.—*Ærugeo, Subacetate Cupri impura*. Impure subacetate of copper. This is made in wine countries, by burying thin copper plates in the refuse parts of the grape, after the juice has been pressed out. It is employed externally as a mild caustic or detergent, and is frequently mixed with common turpentine, or ointments, for the same purpose. See DETERGENTS

and DIGESTIVES. Common verdigris has been recommended as a remedy for the farcy; but I have never seen it do any good in that complaint, though I have several times given it a trial. It has been fairly tried in the glanders; half an ounce was given daily for a considerable time, but it had no effect on the disease, nor did it occasion any inconvenience to the animal. This is rather remarkable, as verdigris is considered as a poison in the human body, and is the substance which causes the deleterious effects which copper vessels, when employed for culinary purposes, have sometimes occasioned.

VESICATORIES. A term synonymous with blisters.

VINEGAR.—*Acetum*. Though medical practitioners prefer distilled vinegar, yet for veterinary purposes the best undistilled vinegar is just as proper. It makes an useful embrocation, with about a tenth part of *sal ammoniac* or muriate of ammonia, for inflamed swellings; and when neutralized with prepared ammonia, or salt of hartshorn, forms a preparation, sometimes employed in fevers, and termed Mindererus's spirit.

Vinegar is sometimes used alone as an embrocation for strains, bruises, or inflamed swellings of any kind, and often with success; it may be made more effectual, however, by the addition of sal ammoniac and proof spirit, or by being mixed with a small quantity of sugar of lead and water, according to the circumstances of the case. A solution of honey in vinegar is termed an oxymel, and is sometimes used as a remedy for coughs: this is said to be nearly the same preparation as Godbold's vegetable syrup, which has been sometimes recommended by farriers to cure broken wind, an incurable disease! See ACETATES and EMBROCATIONS.

VINUM. See WINE.

VITRIOL, BLUE and WHITE. See SULPHATE OF COPPER, and SULPHATE OF ZINC.

VITRIOLIC ACID.—*Acidum Sulphuricum*. This, which is more commonly named *oil of vitriol*, is now in all modern dispensaries named sulphuric acid, and its combinations are therefore named *sulphates*.

WATER.—*Aqua*. Much has been written respecting the different qualities of water, some having been considered as very injurious to horses, while others have been said to promote health and condition. Dr. Bracken thought hard or pump water liable to produce the gravel or stone; and other authors have had still more whimsical notions on this subject. It appears probable that transparent and sweet water, that is, such as is most grateful to man, is most wholesome for horses, whether it be taken from a well or from any other situation. The ill effects that have sometimes resulted from drinking certain kinds

of water may depend upon its being drank too largely, or at too cold a temperature, at a time when the stomach was not in a condition for receiving so much, or upon its being so ill-tasted that the horse does not take a sufficient quantity for the purposes of digestion; or, if he does, it may create that degree of nausea, which proves injurious to the stomach. In deep wells the water is generally about the same temperature, both in winter and summer, that is, about 40° of Fahrenheit's thermometer. If a horse, therefore, in a hot summer day, after being heated by exercise, should drink freely of such comparatively cold water, it would probably do him a serious injury; for the water of ponds or running streams may at that time be fifteen degrees warmer. In winter, however, the water of deep wells is generally to be preferred, being considerably warmer than that of ponds or streams. As to the small quantity of sulphate of lime that hard water may contain, it is not probable that it contributes in any degree to the formation of stones either in the bowels or bladder. It is certain, however, that the temperature of water, the quantity taken at a time, the state of the body when taken, and especially the state of the stomach, are circumstances that ought to be carefully attended to. The practice of medicating water, that is, of mixing nitre, salts, &c. with it, may be proper when horses require only a moderate quantity of water; but when dilution is considered necessary, their water should be as free from taste or smell as possible.

Horses under the operation of cathartic medicine, or physic, sometimes refuse warm water, often because it is too warm, or of an unpleasant or smoky smell or taste; in such cases it should be offered a little colder, and free from any offensive smell. Horses are often watered only twice a day, and then suffered to drink as much as they have an inclination for; this is particularly injurious to such as have voracious appetites, or worms, chronic cough, imperfect or broken wind. Such horses should have a small or moderate quantity three or four times a day, and their hay and corn should be moistened; this would diminish their appetite for water, which is generally inordinate; and if they are allowed to drink much, they are the more inclined to eat immoderately of hay, if they are restrained in which they will often devour even their litter, however foul it may be, and therefore greatly aggravate their complaint.

WAX, BEES'.—*Cera Flava.* Bees-wax is used only in the composition of ointments and plasters.

WHEAT. See **TRITICUM.**

WHITE-WATER. This is a mixture of oatmeal and water, and is a good nourishing drink for horses that have done a hard day's work. It is a good thing to accustom horses to drink

white-water, as, when greatly fatigued, a horse will generally drink, but cannot sometimes be induced to eat.

WINE.—*Vinum*. In French books on farriery, wine is generally recommended, not only alone, but as a vehicle for other cordials. This probably has led some farriers of this country to prescribe port wine in liberal doses, both to horses and cattle. There is a great difference, however, both in the quality or strength, as well as in the price of port, and the French wines; and it is not probable that the best French wines are ever given to horses or cattle. The port wine of this country contains a large proportion of alcohol (see **ALCOHOL**), no less indeed, according to Mr. Brande, in some specimens he examined, than 25 per cent. That is to say, taking the alcohol naturally contained in the wine, or rather the quantity produced by the fermentation of the juice of the grape, with the brandy added to it previous to exportation, it amounts to one-fourth part of alcohol, or one-half of proof spirit; but, when the wine is of sufficient age, the spirit is so intimately blended with the other constituent parts, that the strength of the liquor is not manifest to the taste. The French wine commonly employed for horses and cattle is not stronger, perhaps, than our cider. In M. Volpi's veterinary work, which I have before spoken of (see **ETHIOP'S MINERAL**), he directs no less than two or three bottles of generous wine to be given at one dose, in a disease he terms *fièvre pernicieuse*. With regard to wine in this country, I know of no disease in which it is really necessary; as a little warm beer and ginger, or diluted brandy, will effect every thing that can be accomplished by wine. A bottle of port has been occasionally given with good effect after severe exhaustion from hunting.

WINTER'S BARK.—*Winteræ Aromaticæ Cortex*. The tree from which this bark is obtained is a large evergreen, a native of the Straits of Magellan. The bark has an aromatic odour, and a hot spicy taste. It is a pleasant stimulant; and though not commonly used in veterinary practice, may be given with good effect in cases of indigestion and weakness of stomach.

The dose from three drachms to one ounce every morning.

WOLF'S BANE, or ACONITE.—*Aconitum*. A dangerous medicine in the horse, and never employed, its effect having been ascertained upon glandered horses. See **Remarks on FLOUR OF SULPHUR and ACONITUM**.

YEAST.—*Cerevisiæ Fermentum*. Yeast may be used to form a poultice with linseed-meal for the purpose of correcting the offensive discharge from foul ulcers.

YEW TREE. The leaves of this tree are poisonous to horses and cattle. See **POISONS, VEGETABLE**.

ZINC.—*Zincum*. A metallic substance, or rather a semi-metal, the oxide of which is named *Flowers of Zinc* (which see). It affords other medicinal preparations, the most useful of which is sulphate of zinc, or white vitriol. This is employed in making astringent lotions and eye waters, and is sometimes given internally as a tonic. See EYE-WATER, ASTRINGENTS, TONICS, and FLOWERS OF ZINC.

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