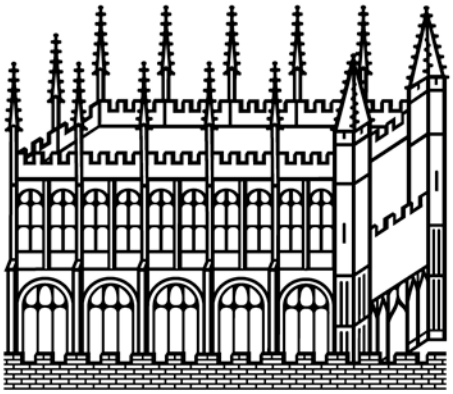


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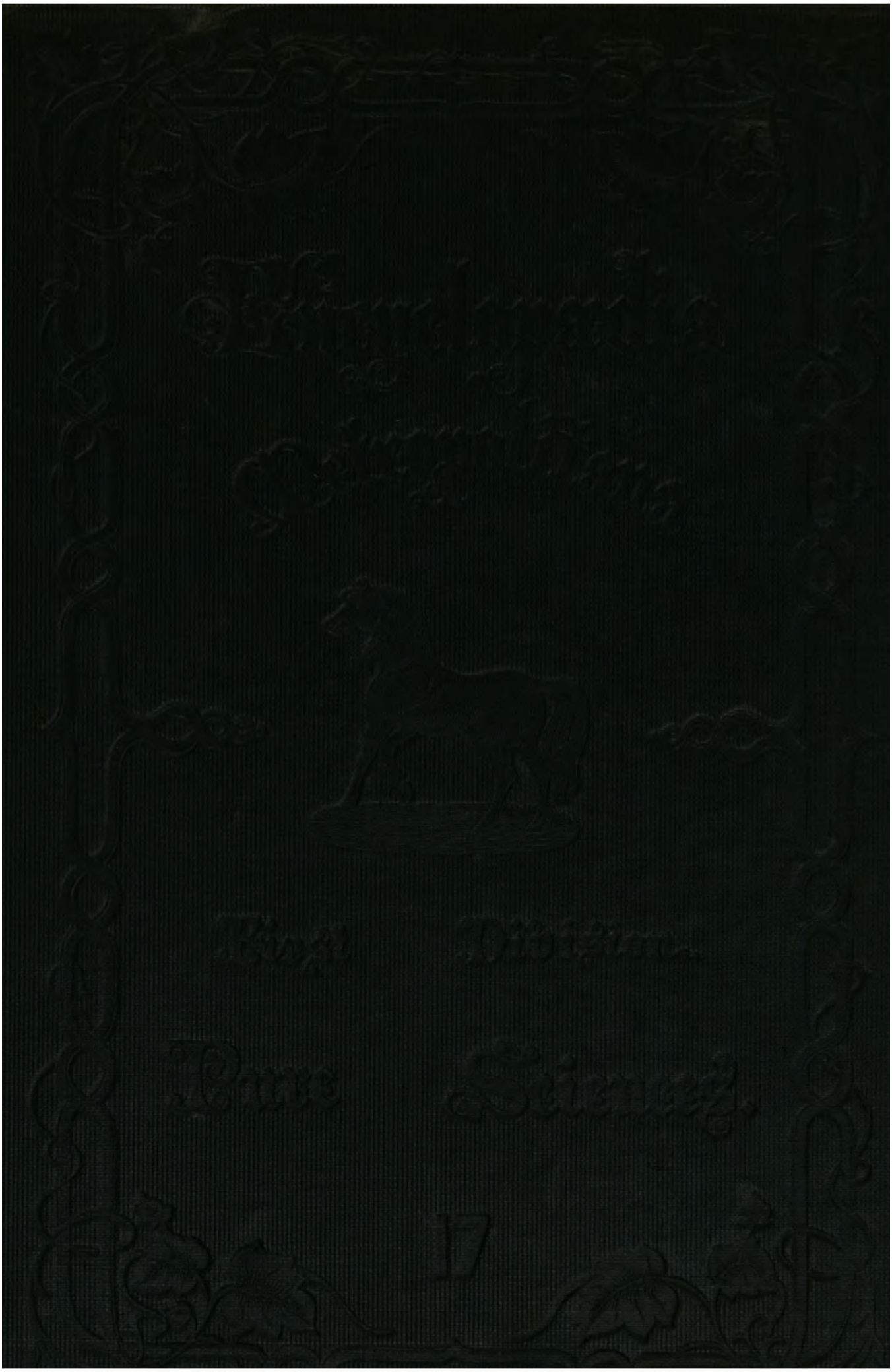
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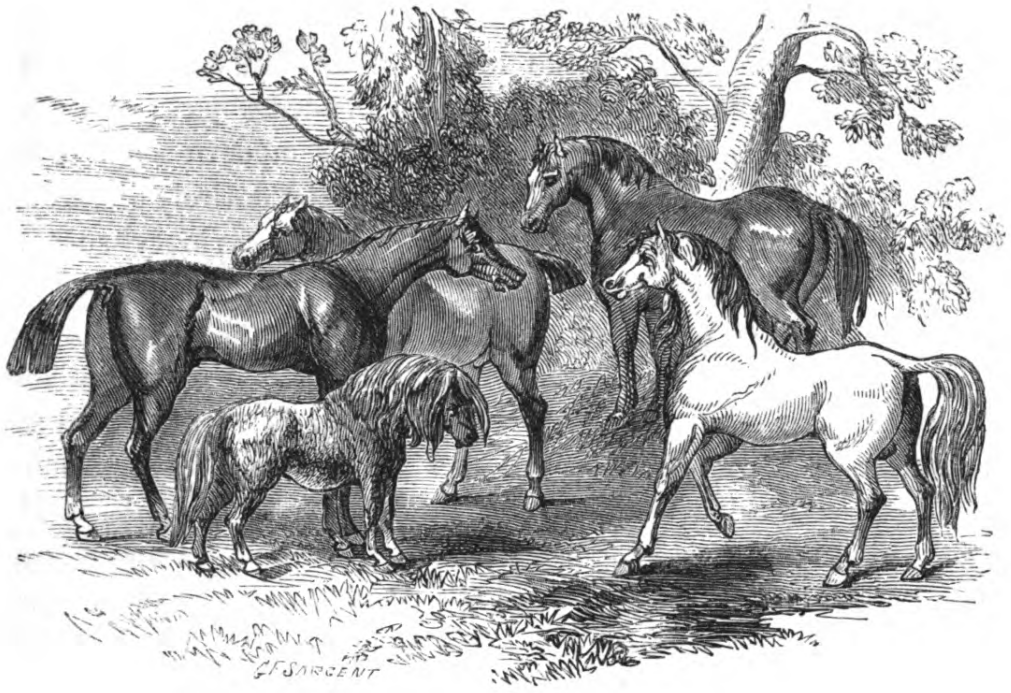
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Bones of the Foot and Pastern.

PLATE II.—Representation of the Skeleton of the Horse, and Nomenclature of the Bones.
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PLATE IV.—Representation of the Muscles of the Horse.
Muscles of the Head.
„ the Neck and Trunk.
„ the Fore Quarter and Leg.
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HISTORICAL INTRODUCTION.

EQUINE PATHOLOGY, under which term we comprehend a knowledge of the diseases to which the horse is liable, as well as of their proper treatment, is based on the same principles as those which regulate the art of healing in the human subject, and a surgeon may be said to possess three-fourths of the necessary knowledge required for the treatment of the diseases of this animal: the remaining one-fourth is, however, so important and essential, that without it his previous knowledge will not only be of little service, but calculated to lead him astray on some of the most important points, and produce dissatisfaction in his own mind, and death, or an increase of the disease, in the animal he may attend. It is essential to know the peculiarities in the structure and functions of various parts, the natural habits of the animal in all their minutiæ, and the peculiar action and effects of different medica-

ments, which a practical acquaintance with the animal alone can furnish.

In the classic ages of Greece and Rome, veterinary medicine was regarded with attention, and thought worthy of the utmost consideration. Xenophon, the leader of armies, and Virgil, the prince of poets, did not disdain to write on the subject; and even at the present day, with all the appliances of modern science, the precepts of these fathers of the art are not to be entirely discarded. With the downfall of the arts and sciences, veterinary surgery sank to the bottom of the pit of darkness, and was perhaps one of the last to approach the light of day. Worse than Egyptian was the darkness in which it was plunged through a long course of years. It was abandoned to the most ignorant of men, and got principally in the hands of those who were employed in shoeing horses, thence called farriers; and thus the treatment of the diseases of the horse was called farriery, which designation, though rather unmeaning, it has retained almost up to the present time. The knowledge of these rude professors consisted, for the most part, of some legendary lore, containing perhaps one truth with a dozen errors, and mixed up with the most absurd and cruel practices. Everything that was too barbarous and too *outré* for human medicine, even when it was at its lowest ebb, was enforced with the utmost rigour on the unresisting victim of man's ignorance and tyranny—the horse; and when kind Nature had herself performed a cure in defiance of counteractive treatment, it was at once ascribed to the potent agency of some ridiculous compound. After human medicine had emerged from barbarism, and some most important discoveries had been made in physiological science, the aid which the dissection of animals had afforded in arriving at these discoveries induced some of its professors to turn their attention to the pathology of animals; and the horse, as being the noblest and most valuable of quadrupeds, received the most prominent attention. During the last century, several surgeons pursued as their vocation the treatment of the diseases of the horse, particularly in the metropolis of this country; and various treatises were written by them on the subject. These were considerably in advance of the practices of previous years; but being too closely in accordance with human medicine, various serious mistakes were

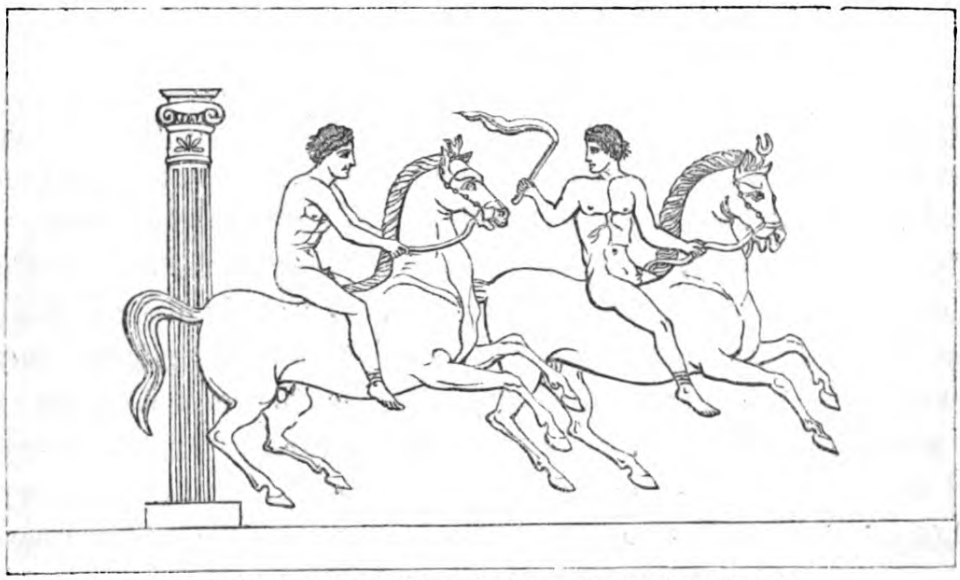
made, both in the anatomical and physiological arrangement, as well as in the pathological treatment.

At length, towards the close of the century, a Veterinary College was established in London, chiefly through the instrumentality of an agricultural society at Odiham, in Hampshire; and a Frenchman, of the name of St. Bel, who had studied at the veterinary schools in France, and had greatly assisted in forming the London College, was appointed its first professor. He entered with much zeal into his office, and produced a small work of some merit on the "Proportions of Eclipse." The London College, being supported by a great number of the nobility and wealthy gentry, who became subscribers, which entitled them to the privilege of having their horses treated gratuitously, may thus be said to be fairly established. St. Bel, however, did not long enjoy his new honours; he died about a year after his appointment to the office. With the establishment of the Veterinary College a new impetus was given to the science; a number of well-educated pupils became students; and, after the death of St. Bel, the professorship was held jointly by Mr. Morecroft and Mr. Coleman. The former, however, soon resigned, and for the space of nearly half a century the latter retained the office, making up in a great measure, by his talents and zeal, and medical knowledge, what, for some time, he lacked in practical ability. In this latter qualification, however, he was ably assisted by Mr. Sewell, one of the early pupils of the College, who became associated with him as a coadjutor, and succeeded, on the death of Mr. Coleman, in 1839, to the senior professorship, in which he continues, with the able assistance of Mr. Charles Spooner, Mr. Morton, and Mr. Simonds. Throughout the session, from November to May, lectures are delivered by these gentlemen in the various branches of their profession, the former taking up the anatomy, pathology, &c., of the horse; the second, chemistry; and the latter the structure and diseases of cattle and sheep. Amongst the pupils who have studied at the College, some have distinguished themselves as authors, by whom, and others, the art has been greatly improved and advanced; diseases that were formerly thought nearly incurable, now readily submit to scientific treatment; and a better system of management, which has been introduced through the medium of veterinary science, effects a

considerable saving in the cost of horses in this country, and prevents many diseases whose ravages were formerly considerable. This change is more particularly noticeable in the Army, where a veterinary surgeon is attached to each regiment, and holds the rank of a commissioned officer; and the value of his services are highly estimated.

A veterinary school has also been opened at Edinburgh, by Mr. Dick, where pupils are instructed in the various branches of the profession.

Though the Veterinary College has been under royal patronage for many years, the profession, which now consists of upwards of a thousand members, was not a chartered body till the year 1843; but it is now duly incorporated as such, under the designation of the *Royal College of Veterinary Surgeons*, and possesses the power of framing by-laws and electing a council and president for the governance of the profession. It is therefore to be presumed, from these salutary measures, that the science of veterinary medicine will continue to advance, and will become, in consequence, of more practical utility to the public.



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THE HORSE.

COMPOSITION OF ANIMAL BODIES.

Our object being to concentrate much information in a very limited compass, and to render this article as unique as possible, we commence with a brief outline of the various parts which compose the body of the horse. It consists of solids and fluids in different proportions, the weight of the latter being six or eight times that of the former. The organization of the frame is due to the solids which surround and contain the fluids. Animal bodies are composed of three forms of tissues,—the *fibrous*, the *lamellar*, and the *globular*. The former characterises the muscular and ligamentous tissues, and, united with the granular, is developed in the texture of the glands and in the medullary portion of the nervous system. Both the fibrous and the lamellar are exhibited in the composition of the cellular substance; and the globular is exemplified in the chyle, the blood, and several other secreted fluids. The combination, in different proportions, of these textures, form the various organs of which the body is composed.

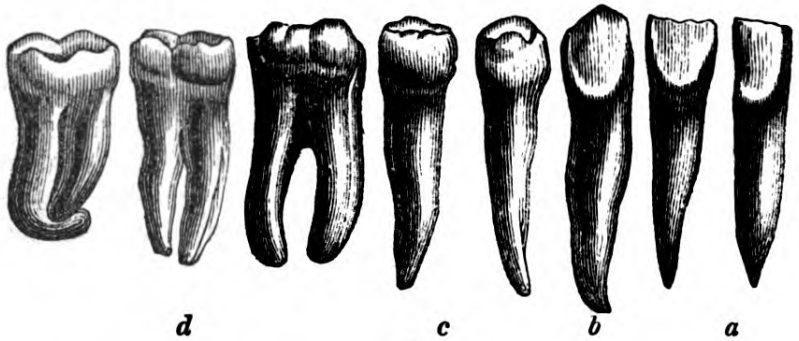
The Bones.—The *skeleton* of the horse consists of nearly two hundred bones, which are the most solid parts of the animal frame, to which they give support, and afford fixed objects for the attachment of the muscles and other parts. These bones are of various shapes and sizes, and are connected one to another by strong ligaments or bands, their ends being constructed in various ways so as to admit of motion, some resembling the structure of the hinge, and others that of the ball and socket. (Plates I. & II.)

Bones owe their solidity principally to phosphate of lime, the other part of their structure consisting of gelatine and cartilage. When two bones meet together and form a joint, their ends are covered with cartilage, which again is lined by a delicate membrane which secretes the synovial fluid. This fluid prevents friction by lubricating the joint, and is prevented from escaping by the capsular ligament which is attached to the edges of each bone. When this cavity is opened, great pain, irritation, and fever, are the consequence. The strength of the joints is still further secured by other ligaments, which run from one bone to another in different directions. (Plate IV.) The bones of the extremities are mostly long and cylindrical, and of great compactness and strength in the horse. The spinal column is formed by a great number of small bones of very irregular shape, having a hole through their centres for the spinal marrow and joint-like connections with the ribs: they are connected to each other by elastic cartilage, which permits the great flexibility which the spine possesses (though with greater strength) much less in the horse than in man or carnivorous animals. (Plates I. & II.)



1.

The Head and Teeth.—The head of the horse, consisting of about thirty separate bones, is of great size, the principal part of which is devoted to the face, enabling the animal to reach the ground readily, and affording ample space and a secure holding for the particularly large teeth with which the horse is furnished. (Plates I. & II.) This space is afforded without increased weight, by the face forming several large cavities. There are six *molar* teeth on



2.

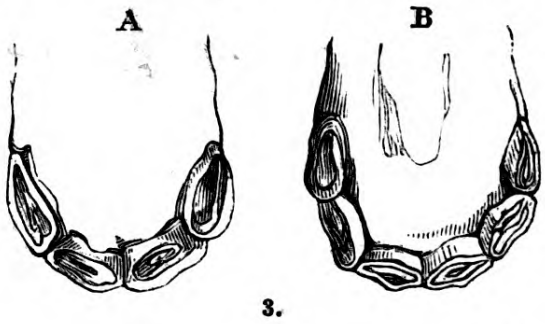
each side of each jaw possessed by the full-grown horse, three of which replace the three temporary ones which the colt alone possessed, and the other three gradually appear as the jaws lengthen and enlarge. There are six *incisor* teeth in each jaw, and two

Fig. 1. Human Spine. Compare with Plates I. and II.

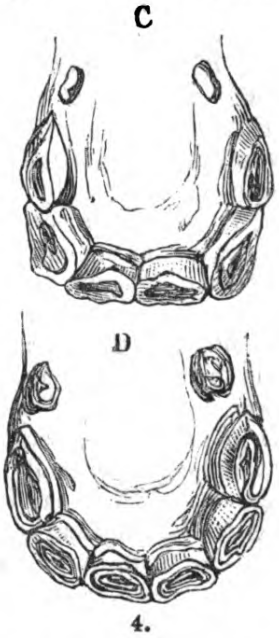
Fig. 2. Human Teeth, showing the general form of the several classes of teeth—*a*, Incisives; *b*, Canine; *c*, Lesser Grinders; *d*, Larger Grinders.

cuspidati, or tushes, which, however, are absent in the mare. The incisor teeth replace a similar number of colts', or temporary, teeth, which may be distinguished as being much smaller, shorter, and whiter than the permanent ones.

Mode of judging the Age of a Horse.—The appearance and changes which these teeth, particularly those of the lower jaw, undergo, enable us to judge pretty accurately the age of the horse for some years. A two-year old colt has six temporary incisor teeth in the lower jaw; before he reaches three years, the two central ones are replaced by permanent teeth; between three and four, the two next are similarly replaced, so that a four-year old mouth has two corner temporary teeth alone; these likewise are lost and replaced before the horse is five years old, at which age the mouth is said to be perfect, the tushes having also now appeared. The inner edges of the corner teeth are, however, lower than the outer at five years old. The substance of the teeth is bone, or rather ivory, whilst all the surface that is exposed is covered with a still harder material, called enamel, which, after casing the outside, dips down on the crown or face of the tooth, forming a deep cavity, which becomes black from being filled and stained with the food. This cavity, or *mark*, as it is termed, serves as another guide to the age for several years longer; for the teeth, gradually wearing from attrition, take about three years to wear to the bottom of the cavity. Thus the mark in the centre teeth disappears at six years old, in the two next at seven, and in the corners at eight, when the horse is said to be aged.[1] As fast as the teeth wear, or faster, they grow from the roots, and their shape alters, so that by the time the horse becomes fifteen, the oval crown becomes triangular; and, as he ap-



3.



4.

Fig. 3. A, Mouth six weeks old; B, Mouth a year old.
Fig. 4. C, Mouth three years old; D, Mouth six years old.

[1] The progressive development of the incisor and cuspid teeth is shown in the figures A, B, C, and D; while in the figure E we have a general sectional view, not only of the teeth—molar, cuspid, and incisor—but also of the principal bones of the head. About a week after birth the foal developes the two front

proaches twenty, the oval is reversed: the teeth likewise become longer, and spring from the jaws almost horizontally.

E

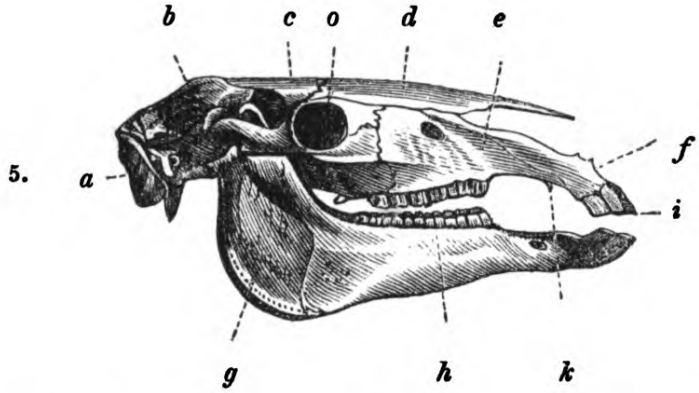


Fig. 5. Section of the head of a full-grown horse—*a*, occipital bone; *b*, temporal; *c*, frontal; *d*, nasal; *e*, upper maxillary; *f*, inter-maxillary; *g*, lower maxillary bone; *h*, molar teeth; *i*, incisor teeth; *k*, cuspids or tushes; *o*, orbit.—See also Plate II.

or centre incisors, figure 3, A; in the short period of six weeks two additional incisors, both above and below, make their appearance, one on either side of the centre pair, figure 3, A. Two further additions are made when the animal is about nine months or a year old, thus completing the six incisors or *nippers* of the colt, figure 3, B. About the third year the cuspids shoot forth from the gums, figure 4, C, and in the sixth year are fully developed, figure 4, D. Of the grinders, or molar teeth, it will be sufficient here to observe that at birth the first and second are found to have appeared, at the end of a month a third perforates the gum, and within a year a fourth is begun to be developed; thus the animal is furnished with sixteen molar teeth, four on each side above and below. At the expiration of the second year a fifth grinder is added on each side, above and below, and from the fourth to the fifth year the sixth and last grinder on each side makes its appearance, completing the number twenty-four, as found in the full-grown animal. Dr. South's observations respecting the mode of ascertaining the age of horses correspond generally with those in the text: that gentleman says—"The age of the horse can be ascertained by the teeth till eight years, after which the distinguishing marks wear out. Within a few months after being foaled, the incisive teeth, or *nippers*, as they are technically called, make their appearance, and are twelve in number, six in each jaw; they are small and white, and easily distinguished from the second or permanent teeth, which are commonly cut about two years and a half, but sometimes three years, after foaling, the two middle nippers above and below being shed to make room for them; they are larger and stronger than the foal teeth, and are often called *gatherers*; when these are perfectly cut the horse is said to be three years old. At three and a half the other four foal teeth are shed, two in each jaw, on the outer side of the new teeth, and others soon come up in their place, which determine the horse's age to be about four years. Nearly at the same time, the *tushes*, or cuspid teeth, begin to make their appearance: when first cut they have a sharp edge round the top, and on both sides, the insides being rather grooved, and flattish; and this sharpness, with their small size, is to be esteemed as one of

The Muscles.—The flesh, though apparently a homogeneous mass, is readily separable into a number of distinct bodies of various forms and sizes, which are called *muscles*. These muscles, which are made up of numerous fibres, possess the power of contracting their length, and being attached to two fixed objects, such as bones, draw them together, and thus the motion of the limbs is effected. They are generally attached to these bones through the medium of *tendon*, a strong white substance, which possesses no power of contraction, but merely serves to communicate the contractile force to the object to be acted on. When the distance is great between the two objects of attachment, it is principally occupied by tendon, by which means strength is preserved, whilst unnecessary size is avoided: thus it is that the legs of horses below the knee are small from the substitution of tendinous instead of muscular substance. Muscles are for the most part voluntary, but some, as the diaphragm and heart, are independent of the will, and therefore involuntary. They are abundantly supplied with vessels, such as arteries, for their nourishment and support, and veins for the return of the blood after this function has been performed. They are likewise extensively furnished with nerves, which communicate sensation as well as the mandates of the will. These nerves arise either from the brain or its continuation, the spinal chord, so that sensation is first sent from the extremities to the brain by the nerves, and then, quick as the lightning's flash, the will is conveyed from the brain by another class of nerves (though bound up with the others), commanding the muscles to move the limbs.

the surest indications that the horse is four years old. In the spring previous to the animal becoming five years old, the *corner teeth*, four in number, two in each jaw, are cut; these grow very slowly, so that, when the horse is full five, they do not rise more than the thickness of a crown-piece above the gums; and as in the centre they are hollowed like a shell, and contain a kind of fleshy substance, called the 'mark,' they are sometimes called *shell teeth*. At six they are full half an inch above the gums, the hollows are visibly filling up, the fleshy substance becoming dried in a brownish spot, which remains till seven years, and after that time becomes paler, so that the hollow is filled up by eight years, when the horse is said to be *past mark*. After this period it is impossible to tell the animal's age by his teeth. It may, however, be observed, in addition, that in old animals the gums separate from the teeth, which are left very long, and become of a yellow or brown colour."

"Dealers are apt," says Professor South, "to play tricks with horses, in order to make them appear older or younger; in the former case they pull out the foal teeth, so as to bring on a quick succession, but as the tushes (cuspids) may be felt, under ordinary circumstances, coming up before the corner teeth are cut, if we find these teeth cut, and the tushes not forward, it may be presumed that there is some deceit; with regard to the latter, when the mark has worn out, they often hollow the tooth with a graver, and then burn it in the middle with a hot iron."

The Brain.—The *Brain* is a soft pulpy substance contained within the cranium, and the spinal marrow, which somewhat resembles it in appearance, extends through a hole in the bones of the spinal column from the head to the tail.

The Chest and Abdomen.—The body of the horse is divided into two principal cavities, the chest and the abdomen, which are separated from each other by a muscular partition, called the *diaphragm*. The *Chest* contains the heart and lungs, whose offices are to purify and distribute the blood by means of the respiration and the circulation; whilst the *Abdomen* contains the stomach and bowels, in which the functions of digestion, &c., are carried on with the assistance of the liver and the pancreas, besides the kidneys and other supplementary parts.

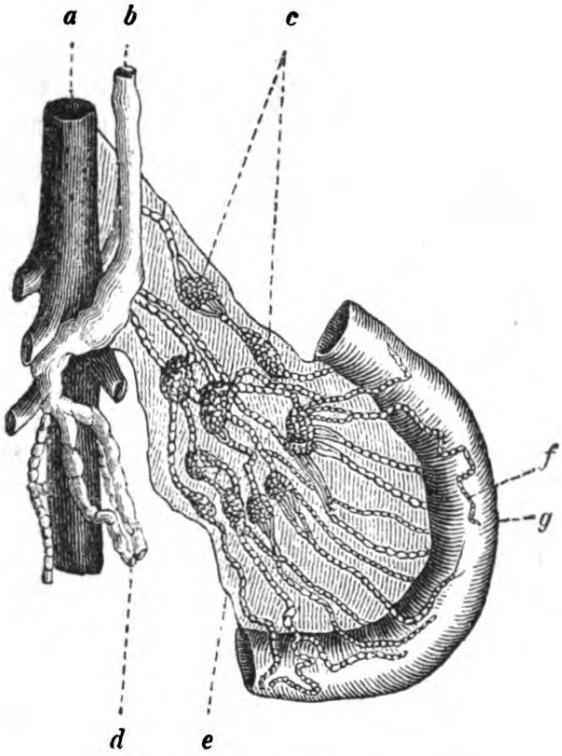
Digestive Organs.—Mastication is performed by the molar teeth, whose faces are broad, so as to grind corn and hay as in a mill. The tongue, which is a muscular organ attached at its roots to a singularly shaped bone called the os hyoides, which connects it with the larynx, serves both to gather the food and submit it to the action of the teeth, and, when properly masticated, carries the morsel into the pharynx or food-bag, a muscular cavity situated immediately above the larynx. The food having been well ground by the teeth, and lubricated with a proper quantity of saliva, which is secreted by several glands, the principal of which are the *parotid*, situated in the angle just below the root of the ear, is then conveyed from the pharynx into the stomach by means of the *œsophagus*, a long muscular tube, which takes its course down the neck, between the two first ribs, through the chest, and, piercing the diaphragm, enters the stomach in the cavity of the abdomen. The food having entered the stomach, is submitted to the chemical action of a peculiar fluid, called the gastric juice, secreted by the lining membrane of this organ. This having been accomplished, the *chyme*, as the food is then called, is passed into the small intestines, and is there mixed with two fluids, one of a watery nature, resembling the saliva, secreted by the pancreas or sweetbread, and the other a yellow bitter fluid, called the *bile*, which is formed by means of the liver, from which it is conveyed to the intestines by means of the hepatic duct.



6. Molar Teeth.

The Intestines.—The *Intestines* are fastened to the spine by means of a strong membrane, called the *mesentery*, which serves as the channel for the communication of the arteries, veins, nerves, and absorbent vessels, to and from the intestines. The latter are called the *lacteals*, and open into the inner surface of the bowels, and there absorb the nutritious portion of the food, a milky fluid called the chyle, and convey it to a vessel running

along the course of the spine, and emptying itself into a large vein just previous to its joining the heart.



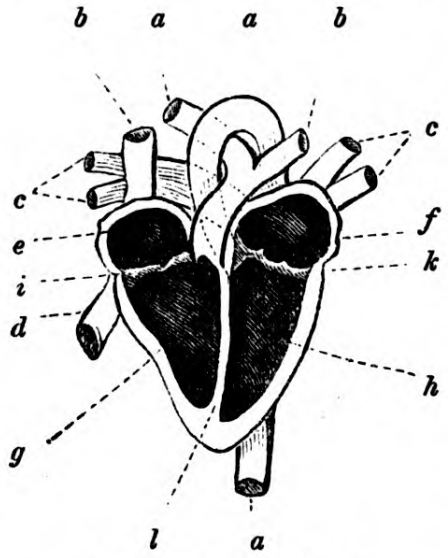
7.—Chyle Vessels.

CIRCULATION OF THE BLOOD.

It is thus that the blood is continually supplied with nutritious elements to supply the waste which the system is constantly undergoing. Although thus furnished with nutriment, the blood is black and impure, and requires to be purified before it is adapted for circulating through the system. It therefore enters the right side of the heart, and, by the muscular contraction of this organ, is pumped into the lungs, and being divided and subdivided by a multitude of vessels, is exposed to the action of the atmospheric air drawn in by respiration, and by it undergoes a rapid and remarkable change from a dark to a light colour. Being thereby divested of its impurities, it re-enters the heart by its left cavities and division, and from thence is sent, by means of the arteries, to all parts of the system, supplying every part with nourishment and the means of maintaining the temperature of the body. It furnishes also the various glands, not only with their proper nourishment, but also with means for the secre-

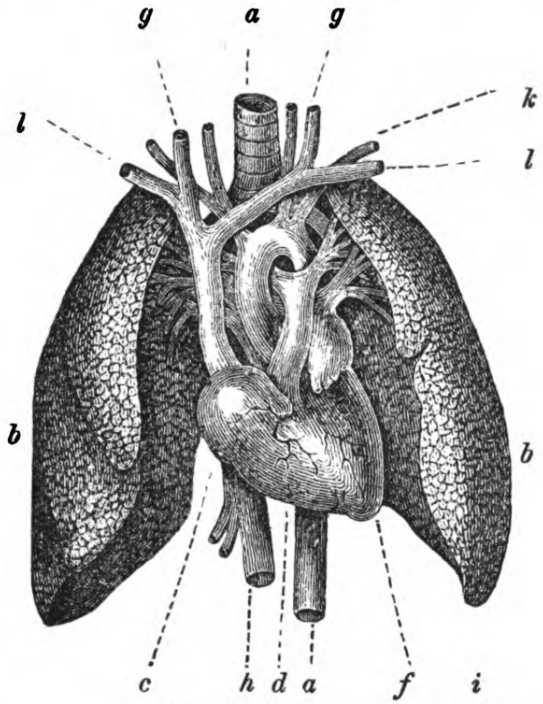
Fig. 7. *a*, aorta; *b*, thoracic canal; *c*, lymphatic ganglions; *d*, lymphatic vessels; *e*, mesentery; *f*, roots of the chyliferous vessels; *g*, intestine.

tion of their peculiar fluids. Each gland separates its peculiar fluids, and no other, although the same fountain is employed for each, viz., the blood. The *urine* is separated by the *kidneys* from the arterial blood, and is conveyed through long tubes, called the ureters, to the bladder, whence it is excreted from the body. The *bile*, however, is separated by the liver from the impure venous blood, although this organ is supplied with arterial blood for its own nourishment.



8.—Section of the Heart.

The circulation is carried on by two sets of vessels, the *arteries* and the *veins;* the former conveying the purified blood to all parts of the body, and the latter returning the impure blood to the

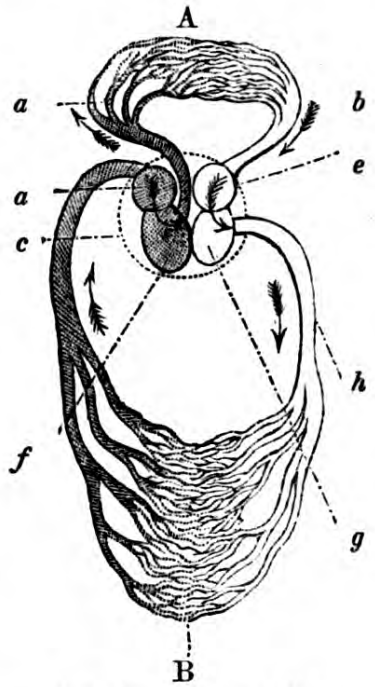


9.—The Heart and Lungs.

Fig. 8. *a*, *a*, the aorta; *b*, *b*, pulmonary arteries; *c*, *c*, pulmonary veins; *d*, inferior, and *e*, superior veins; *e*, right auricle; *f*, left auricle; *g*, right ventricle; *h*, left ventricle; *i*, tricuspid valve; *k*, mitral valve; *l*, division between the lobes of the heart.

Fig. 9. *a*, trachea; *b*, *b*, lungs; *c*, *d*, right auricle and ventricle; *e*, left ventricle; *f*, aorta; *g*, *g*, carotid arteries; *h*, lower vein; *i*, jugulary veins; *k*, brachial artery; *l*, *l*, brachial veins.

heart again.[1] The arteries are much stouter than the veins, and possess considerable elasticity; they terminate in minute capillary vessels, by which nutrition is carried on and the animal heat developed, and this being accomplished, and the blood rendered black, it enters the capillary veins, which coalescing, the blood is conveyed by the veins to the heart to be again purified. After death there is no blood found in the arteries, but only in the veins, owing to the contractile power of the former, which the latter do not possess; they likewise possess no pulsating power, being too far removed from the heart to be so affected by its action.



10.—Circulation of the Blood in mammiferous animals.

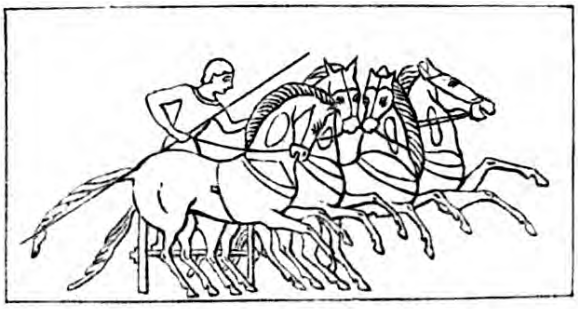
The Membranes of the Body.—There are several important membranous substances, whose offices are very important in the body; first, we have the *cellular membrane*, which is an elastic material, connecting together the various glands and vessels, and existing in the form of cells communicating with each other. It also frequently covers the muscles, and is then condensed and thickened, and possesses much strength. The *adipose membrane* is that which secretes the fat; it is found in various parts of the body, arranged in circumscribed bags, into which the fat is deposited in an oily state. The *mucous membrane* is that which lines all internal cavities and passages having an external opening; it thus continues from the mouth and nostrils, through the intestines to the anus, and also lines the urinary passages, secreting a mucous fluid for their lubrication and protection. Cavities having no external outlet, such as the chest and the abdomen, are lined with a *serous membrane*, which secretes a watery liquor, enabling the parts to glide on each other without injury. These membranes are of great importance, not only in an anatomical, but also in a pathological point of view, being very frequently the subjects of severe disease.

Fig. 10. A, lesser circulation; B, greater circulation; *a*, pulmonary artery; *b*, pulmonary veins; *c*, the heart; *d*, right auricle; *e*, left auricle; *f*, right ventricle; *g*, left ventricle; *h*, the aorta.

[1] Figures 8 and 9 are representations of the human heart and lungs: they are introduced here as being the most perfect organization, and therefore the best calculated to illustrate the general description contained in our text.

The various organs and tissues which we have briefly noticed are connected together in a manner at once the most beautiful and economical. The contents of the chest and the abdomen are so disposed, that while each organ has sufficient room for the discharge of its peculiar functions, there is yet no vacant space to be found. There is, to use a well-known axiom, "a place for everything, and everything in its place."

The foregoing engravings illustrative of the theory of the circulation of the blood, and of the principal organs by which that circulation is effected, are added for the purpose of rendering familiar to the unscientific reader the important subjects treated of in the text.



GENERAL PRINCIPLES

BY WHICH

THE DISEASES OF THE HORSE

ARE TO BE

COMBATED AND OVERCOME.

DISEASE may be defined as a departure from health, or, as Liebig observes, it exists when the vital force is weaker than the chemical forces opposed to it, whilst death occurs when all resistance to these forces ceases. It may be either *structural* or *functional;* that is, it may be owing to an alteration of the structure of an organ or part, or merely a derangement of its functions: inflammation of a part, such as the foot or eye, is an instance of the former, whilst simple fever is an example of the latter. We may have both these states combined: for instance, a part may be in a state of inflammation; its structure may be thereby either temporarily or permanently altered, and at the same time, fever being excited in the system, the heart may send the blood with double rapidity through the body, and be thus diseased in its functions, whilst its structure may continue unchanged.

FEVER.

Simple fever is an example of diseased function, though it often produces local inflammation. It is, however, very rare in the horse, as an independent disease, there being generally some local affection when fever is present in the system, and when it does occur local inflammation more rapidly supervenes than in the human subject. Though less subject to fever, however, the horse may be considered as more liable to—

INFLAMMATION.

The symptoms which usually attend an inflamed part, though all of them are not present in every case, are swelling, redness, pain, and heat. The swelling is in the first instance owing to the distended

state of the vessels of the part; but afterwards effusion from the surfaces of these vessels takes place: the redness is to be attributed to the greater quantity of blood contained in the vessels, and often to the presence of the red particles of the blood in minute vessels, which, in a state of health, are too small for their admission. The pain is produced by the pressure of the enlarged vessels on the nerves of sensation: this symptom, however, is not so invariably present as the others, and depends partly on the amount of the swelling, and partly on the sensitiveness of the affected organ. Heat is an invariable symptom, and is owing to the development of a more than ordinary quantity of caloric (the principle of heat), from the presence of an unusual portion of arterial blood. An inflamed part, therefore, is more abundantly supplied with blood than when in a state of health; and if the inflammation continue, the blood-vessels become enlarged, and sometimes new ones are formed; permanent enlargement of a part takes place. We have frequent instances of this in the horse, as, for instance, in the thickened state of the flexor tendons of the legs, which often remains after inflammation has subsided.

Inflammation is subject to much variety, depending on the nature, and situation, and importance of the organ, and the degree of severity in which it may exist. It may attack an unimportant part, and produce no constitutional derangement, or it may affect the brain, the bowels, or the lungs, and excite in the system symptomatic fever to a most formidable extent. In the former instance the inflammation is usually called local, its effects being confined to a particular part; though, strictly speaking, inflammation is always local, the symptomatic fever which often attends being owing to the irritation diffused through the system by means of the nerves, and acting on the heart so as to cause its increased action. Thus local inflammation often produces fever in the system, and, on the other hand, general fever sometimes produces local inflamation.

Inflammation may be either acute, sub-acute, or chronic. The former is inflammation in its most active state—an *actual* flame—and is frequently, though not always, attended with symptomatic fever; the second is inflammation of a mild or subdued character—a sort of smouldering fire—and is less frequently attended with constitutional irritation; the third denotes a long-continued and settled inflammation—the smouldering embers of the conflagration which the first kind had established.

Inflammation, although a disease, is yet but the result of the too active existence of a process which is most essential to the system, and without which wounds would not heal, or the loss of parts be restored. It may be excited by various causes: bruises, strains, and injuries, may produce it externally; and internally it

may be occasioned *directly* by the actual contact of an irritating object, such as a drastic purgative or poisonous substance; or by the too great action of a particular part, as the lungs in over-exertion, or otherwise indirectly, as when catarrh is produced by the application of cold to the skin. Inflammation is much governed and directed by the idiosyncrasy, or peculiar susceptibility of the animal. It is rare that every organ is formed equally strong: in some the lungs are the weakest, and in others the liver may be the most vulnerable; and thus the same cause will produce different attacks in different animals. This, too, is much influenced by the season of the year, and the age of the animal: diseases of the abdominal organs are more frequent in the summer, and those of the air-passages in the winter; and young horses are more susceptible to the latter, and old animals to the former.

Plethora.—Plethora, or a redundancy of blood in the system, is not unfrequently the cause of inflammation, though not so frequently as in cattle and sheep, from the circumstance of the horse being in some measure relieved by active exercise. When every vessel of the body is loaded with blood of the richest and most stimulating character, we cannot be surprised that inflammation of the most susceptible organ, or that most exposed to disease, should arise. In human pathology, inflammation is spoken of as being either *phlegmonous* or *erysipelatous;* in the horse it is nearly always of the former character, and very seldom of the latter; the eruptive affection of the skin called *erythema*, being almost a singular instance.

Effects of Inflammation.—The results of inflammation under disease are simply those carried to excess which occur in a state of health, and are necessary and natural processes for the repair of the effects of an injury. When the inflammation gradually subsides, without any of the other effects—a result which in disease we are always desirous of accomplishing—it is termed *resolution*. When the fibrine or adhesive portion of the blood is deposited, it is termed *adhesion:* this is often the result of inflammation of a *serous* membrane, such as in pleurisy, and it is likewise exemplified in the healing of a wound by the first intention. *Suppuration* is the termination of inflammation to which mucous membranes are most disposed, and it is best illustrated by the formation of pus or matter in an abscess. Adipose tissue is more disposed to suppuration, and the cellular membrane to adhesion. *Ulceration* is the absorption or removal of substance, a sequel of inflammation, also illustrated by an abscess, and which always takes place before it bursts, the substance between the matter and the skin being gradually removed at some particular part, where the abscess is said to point. It may occur, however, either with or without suppuration, and it may be either in a healthy or an unhealthy state. In

the former, the ulcer, as a running sore is called, soon heals, and in the latter it will gradually spread and increase. It sometimes attacks the cavity of a joint, and then it is very rarely attended with suppuration, but usually with adhesion. *Mortification* or *Gangrene*, as the death of a part is called, is a less frequent termination of inflammation in the horse than in the human being. Bone and cartilage, and parts whose circulation are inactive, are most liable to this process. A bone when much injured often becomes carious; a portion becomes dead, and exfoliates, as casting-off is termed.

THE BLOOD.

Before we can speak of the pulse as the best indicator of inflammatory action, or of those remedies which we find most available, it will be essential to notice the peculiar properties of the blood, and the phenomena which obtain with regard to it.

The *Blood* is not only the most abundant, but also the most important fluid in the animal economy. It furnishes every part of the body with nutriment for its growth, and affords the material from which the various fluids are secreted, and influences considerably the strength and disposition of the animal. Formerly its derangement was considered as the sole cause of disease, whence the term humoral pathology; but this theory has in great measure given place to another, in which the solids are considered the principal agents, and seats, of disease. We find, however, that there is some truth in both these doctrines: the solids are subject to morbid affections; and that the blood is occasionally both altered in its composition and impaired in its quality has been satisfactorily proved by late research, and is, for example, the primary cause of the symptoms of fever.

Composition of the Blood.—Three-fourths of the blood is composed of water, which is essential in order to preserve it in a liquid state, and enable it to flow freely through the intricate labyrinths and minute and circuitous channels which nature ordains it to take. The other elements have each their distinct office to perform, and the whole is essential to preserve it, whilst in the vessels of the body, in an apparently homogeneous state. When, however, it is removed from the body, it soon separates into different portions. After some hours we observe a division between the solid and fluid parts; the former floats in the latter, and is called the *crassamentum*, whilst the liquid is termed the *serum*. The serum is composed principally of albumen and water, which can be separated by the application of heat, and the crassamentum chiefly consists of fibrine and the colouring substance or red globules, with which are mixed various salts. These parts may be separated by washing; and

they also appear when the blood is long in coagulating; the red portion, being the heaviest, falls to the bottom, whilst the fibrine remains at the top, constituting what is usually termed the buffy coat of inflammation. These particles of the blood do not nourish, but convey oxygen, for the purpose of heat.

Changes of the Blood effected by Respiration.—The blood, it is well known, is considerably darker in the veins than in the arteries, being in the latter of a bright scarlet, and in the former of a dark purple hue. The red tinge of arterial blood is considered to be owing to the presence of various salts, and the dark colour of venous blood to that of carbon, which is prevented from rendering it quite black by the salts. The blood becomes, by means of respiration in the lungs, in great measure freed from "carbonaceous principles," which being removed, it acquires, through the salts, its scarlet colour. The air, by being respired, loses a great portion of its oxygen, and acquires carbonic acid gas in its place. This gas is produced by the chemical combination of the carbon of the blood with the oxygen of the atmosphere; but the greater portion of the lost oxygen is absorbed by the blood, enters into the circulation, and conveying with it a considerable quantity of caloric in a latent form, is the medium by which the body is supplied with animal heat: this caloric becoming sensible in the capillary vessels, obedient to a law of chemistry, that when carbon is formed heat is elicited. Thus in cold countries a greater quantity of animal heat is required than in hot climates: to supply which, more oxygen is inhaled, more nutritious food consumed, and more carbon extricated. It should be observed, that the lungs are greatly assisted in the removal of carbon from the blood by means of the liver, which for this purpose is largely furnished with venous blood. Thus, when one of these organs is diseased and unable to perform its functions, the other likewise becomes deranged, having a double duty to perform. The blood, although composed of various substances which readily separate when removed from the body, yet appears as a simple fluid whilst circulating in it. It has been discovered by the aid of the microscope to contain an immense number of small globular bodies, computed to be about 3,500th part of an inch in diameter. The globules of the blood are suspended in the serum by means of the vital influence derived by the blood from the vessels and organs through which it passes; which also is supposed to give them a rotatory motion and a mutual repulsion towards each other, whereby they are kept asunder. As the blood, however, enters the capillary arteries, its globules are attracted and appropriated as required for the purpose of nutrition. The blood is thus preserved by its vitality from coagulating or disuniting whilst circulating; but when removed from the body, and thus deprived of vitality, it both coagulates and separates; and thus

coagulation is longer or shorter in taking place in proportion to the vitality possessed. Thus, when the animal is weak and low, it quickly congeals; and when full of vigour and excitement, it often takes a quarter of an hour to do so, and gives full time for the fibrine and the red particles (which have no longer any vital influence to keep them together) to disunite and follow the influence of gravity.

We have alluded to the vital influence which the blood derives from its vessels. These vessels or arteries are abundantly furnished with a peculiar class of nerves, developed by modern science, which have nothing to do with conveying sensation or the motive will, but are devoted to the superintendence of organic life. They arise neither from the brain nor spinal chord, but from various knots or ganglions, which receive numerous branches from other nerves; thus keeping up an intimate communication between all parts of the nervous system. The heart is controlled by nervous influence in a still greater degree; it holds direct and powerful communication with the brain, and it is influenced with the speed of lightning by most of its sensations, and is instantaneously affected by mental emotion. If we approach a nervous horse we well know how greatly the pulse is increased, and it is sometimes several minutes before it is reduced to its natural standard.

The Pulse.—The *Pulse* is felt in any part of the body in which an artery approaches sufficiently near the surface to be felt. It appears like a jerking action of the artery; but if we lay bare the vessel, as in the nerve operation, we cannot perceive any of the action, although it may be felt by slightly compressing the vessel. It is therefore principally owing to the powerful muscular contraction of the heart, which thus sends the blood with greater force and by successive jerks into and through the arteries; so that if we slightly compress the latter, the impetus is felt constituting the pulse. The circulation of the blood is, however, supposed to be assisted by the elastic and muscular coats of the arteries. The pulse, our principal and best indicator of disease, may be felt either at the heart or the arteries; the beating of the former, however, slightly precedes the latter, though not perceptible to common observation. In health, the degree of strength, as well as quickness, corresponds both in the one and the other; but sometimes in disease the artery can scarcely be felt, whilst the heart at the same time beats hard and with apparent force against the side. It is, therefore, often necessary to examine the pulse both at the side and at the jaw. The different varieties of force, &c. &c. with which the heart beats has been characterized by various terms, such as hard, soft, full, small, intermittent, irregular, quick, slow, &c.; but sometimes these distinctions have been in equine pathology carried further than practical examination will warrant or justify.

Variations in the Pulse.—The *average pulse* of a horse may be considered to be about 35 in a minute; in some we find it as low as 26, in others as high as 42: under disease it has often greatly increased,—sometimes, indeed, much exceeding a hundred. An increased state of the pulse is in itself an evidence of much derangement of the system, unless it be merely owing to exertion or temporary excitement. It shows that the blood is hurrying through its vessels much quicker than it ought. A *quick pulse* may be produced by exertion and mental excitement, as before observed; or it may be owing to pain, local inflammation of a part, or disordered state of the blood, as in fever. Though pain is not an unfrequent cause, yet it does not invariably produce a quick pulse; but when it does so it is by irritating the nervous system, and then the pulse is not only quick but strong, as in the case of an open joint, and the blood seems to possess an increased vitality. Local inflammation is one of the most frequent causes of quick pulse in the horse, and its agency in producing it depends very much on the importance and magnitude of the organ so inflamed. The eye or the foot may, for instance, be affected without producing an increased pulse; but the lungs, the brain, or the kidneys, are never acutely inflamed without exciting greatly the action of the heart. Inflammation is an increased action of the capillaries of a part—more blood is contained by such part; but this is not all, for more blood may be possessed when the part is *congested*, the distinction being that the former is an active, and the latter a passive state of the vessels. It is thus essential either that a local inflammation should occasion pain, or that it should cause an interruption to the flow of blood or other fluid, or at any rate that it should be of a certain magnitude and importance, in order to produce a quick pulse. A *quick hard pulse* is often termed an inflammatory pulse, but such term is by no means appropriate, for we may have this so-called inflammatory pulse without inflammation, and inflammation without an inflammatory pulse. Such pulse does not in many instances so much depend on the local inflammation present as on the condition and the idiosyncrasy of the animal. Another variety of quick pulse is that found in fever and influenza: it is usually soft, and when greatly accelerated, small and weak; there is an increased quickness of the heart's action, but a decreased power; and though the system is disturbed, there is often no local inflammation present of any consequence. Such pulse is usually attended with an incapability of bearing much depletion, and a rather dark state of the blood, which soon coagulates and never has a buffy coat.

We rarely find an unnaturally *slow pulse* in the horse, but when present it often denotes some affection of the liver; or it may be owing to sluggishness or debility of the system, though debility is oftener attended with a quick weak pulse. A *full strong pulse*

generally denotes an abundance of the circulating fluid, and a capability of bearing blood-letting, if required. If quick as well as strong, it betokens excitement of the system, and perhaps local inflammation. We usually find such pulse in acute rheumatism or chill, as it is commonly termed, and sometimes in chronic rheumatism. It also accompanies most diseases attended with much pain, and is found in cases of open joint: it denotes great irritation of the organic nerves. A *soft pulse*, if not quickened, betokens a state of health, though sometimes a too great languor of the system. A *hard pulse* generally attends inflammation; it may accompany a full pulse or not. A wiry pulse is one of its varieties, being small and hard, feeling indeed much like a wire. A *small weak pulse* denotes a low state of the vital functions, and is generally attended with dark blood, and forbids blood-letting to much extent. It accompanies the absence of nervous energy, and the want of excitement, and is often present when the body is cold. In the early stages of inflammation it bespeaks an incapability of bearing much depletion; and in the latter stage, an exhaustion of the nervous energy and the vital powers. When it attends inflammation, it is always very quick.

An *intermittent* pulse is sometimes met with in an apparently healthy horse, though it is somewhat doubtful whether there may not be some latent disease present. When it follows a quick pulse in inflammation, and particularly after the exhibition of digitalis, it is a favourable type, and appears to be a method of nature for lowering the heart's action. An intermittent pulse may be either regular or irregular; the former is much more favourable than the latter. Indeed, an irregular vacillating pulse, whether intermittent or not, is a very unsatisfactory sign, and often appears as the precursor of death. The nature of the pulse requires these observations, for it is one of the best and surest guides in the treatment of disease, and particularly in the practice of blood-letting.

Blood-letting.—Amongst the remedies for inflammation, the most prominent, and in the horse decidedly the most important, is *blood-letting;* and it is most essential to know when to practise it, and when to abstain. The history of blood-letting in the human subject is almost coeval with the practice of physic, and in animals its antiquity is almost as great. In the former its effects were found so considerable when first introduced, that it became very generally adopted, and indeed far more extensively than at present, for the now widely extended *materia medica* furnishes the scientific practitioner with numerous medicaments that enable him to dispense with bleeding in many diseases in which it was formerly practised. Till very recently it has been the practice to carry bleeding to a great extent in the horse, to adopt it on each and every occasion; and even at the present time it is the custom of

farriers to resort to it in every case, no matter what the symptoms may be, satisfying their consciences by the ignorant *placatio*—that if it does not do good, it can do no harm.

Mode of performing the Operation.—Bleeding is performed either with a lancet or a phleme; the former is the more difficult, and requires a skilful hand, and a sharp point to the instrument. The right side of the neck is the most convenient situation. The head being elevated so as to put the vein on the stretch, the latter should be pressed with the fingers of the left hand, and the skin and vein opened with the same incision, about six or eight inches below the angle of the jaw. In using the phleme, the left side is the most convenient: the instrument being held in the left hand, which presses the vein at the same time, it should be struck smartly on the back either with the side of the right hand, or an instrument called a blood-stick. In bleeding from the arm or the thigh, the phleme is the most suitable instrument.[1]

Effects of Bleeding.—In a case of simple plethora, the first gush of blood appears of a dark colour, which is owing to its detention in the vein, by pressing with the finger in order to make it swell or rise. As the operation proceeds, the blood becomes lighter, and this is in proportion to the rapidity of the current, which, if very great, as it often is, if the horse will eat hay or grass at the time, the blood is of a red or arterial hue. After several quarts have been removed, the blood generally becomes darker, and does not flow so rapidly, and the pulse, at first strong and full, becomes softer, less full, and sometimes quicker; and if the bleeding is carried to a considerable extent, almost or quite imperceptible, the horse hangs his head, shifts his weight from one foot to another, and exhibits other symptoms approaching to *syncope*, though it is very rare that actual fainting is produced. During the operation, the membrane of the nostril and the eyelids gradually change from a red to a pale colour; and the mouth, at first hot, becomes by degrees cool. Some little time after the bleeding, the pulse is increased in quickness, though still comparatively weak, which may be in great measure attributed to re-action. The immediate effect of bleeding, then, is to diminish the supply of blood to the

[1] After bleeding, a swelling sometimes takes place round the part, from the escape of blood under the skin. This *thrombus* generally disappears, either without treatment or by means of cold applications. Inflammation of the vein, however, sometimes follows; the swelling, if in the neck, extends upwards, feels hard; the passage of the vein is obliterated, suppuration occasionally appears with sinuses, and sometimes hæmorrhage. The head should be tied up for a week; soft food only should be given, fomentations and cold lotions employed topically and succeeded by repeated blisters. If there is bleeding, a styptic or caustic may be applied to the wound, but by no means injected into it.

right side of the heart: that organ has less to send to the lungs—a smaller quantity is reddened and purified—less oxygen is absorbed from the atmosphere, and a diminished quantity of purified blood is conveyed to the left side of the heart, and thence through the system. The supply of arterial blood being diminished, the small vessels become less distended, and thus the various membranes are rendered pale; and there being less blood supplied, there is less caloric given off, and thus the mouth and other parts become cooler. The stomach quickly sympathises with the general depression, and a sense of nausea and loss of appetite is induced. The brain and nervous system are very early affected by the loss of blood, occasioning a want of energy, weakness and depression of spirits; and it is probably in great measure through the nervous system that the sedative effect on the heart is produced. The quantity of blood in the vessels, though temporarily reduced, is very soon restored by means of absorption of watery fluid that would otherwise have passed off by other channels, but the blood is rendered considerably weaker; the fibrine and the red globules that have been removed are by no means restored—this can only be done by means of the chyle, and in the course of time. When the loss of blood by bleeding is rapid and considerable, the pulse can scarcely be felt; and if depletion is carried further, the brain is deprived of its supply, and thus fainting is produced, which may take place earlier or later, according to the rapidity of the current, and the ability of the animal for losing blood: it is therefore very important that the blood should flow as rapidly as possible, and from a large orifice.

If the blood has previously been too stimulating, abounding too much with fibrine and albumen, and thereby exciting too much the heart and blood-vessels, we obtain relief by rendering the blood poorer by venesection; but if the blood was previously poor, we produce by bleeding a state of debility difficult to overcome. Another effect produced by bleeding, and perhaps more important than any yet considered, is the powerful sedative influence it has upon the heart and arteries. This it is that we seek to obtain in cases of inflammation: when an important viscus is actively inflamed, and the heart is pumping the blood with double rapidity and force through the frame, and keeping up general irritation and local inflammation, by abstracting a large quantity of blood we depress the action of the heart, and cause a less quantity of blood to be sent to the inflamed part, in common with other parts of the body: we do so not only by diminishing the quantity of blood, but still more by lessening the force with which this quantity is sent, thereby giving the part time to relieve itself from its superabundance of blood. Thus by the loss of blood three important effects are produced in the animal economy—a diminution in the quantity

of the blood, an alteration in its quality, and a sedative effect on the heart and arteries.

Cases in which Blood-letting is required.—A plethoric state of the system requires bleeding, and particularly in the spring of the year: when the horse has been highly fed, and little worked, full of flesh, and heavy and sluggish in consequence, the abstraction of a few quarts of blood will be useful, and perhaps prevent inflammation of some part. It should not, however, be carried to a great extent. If a greater reduction is required by the system than this will produce, a dose of physic should be given, which will lessen the quantity of blood, by the removal of some of its serum, and it will in some measure diminish the supply of chyle. The plan of periodical bleeding is to be deprecated, for the desired effect can be obtained by abstinence and physic.

Inflammmatory diseases in the horse are more frequent than in the human subject, and blood-lettimg is demanded in the greater number of them. It is not, however, sufficient merely to ascertain that inflammation exists in order to practise bleeding, particularly to a large extent; for inflammation may exist, and yet the pulse be so feeble that bleeding will be injurious, and perhaps fatal, and be the means of throwing away what chances we possess of saving the animal. It is still less sufficient to determine on bleeding merely because the pulse is quick; for this state may exist without any inflammation, and without requiring or benefiting by the operation. If in an inflammatory case we have reason to expect a superabundance of fibrine in the blood, then bleeding will be demanded, and to a free extent. We may anticipate this state of the blood when we find a strong, full, and quick pulse; and we shall then perceive the blood a long time coagulating, and presenting afterwards a thick buffy coat: we may ascertain this, even while the blood is flowing, by touching its upper surface in the vessel with the finger, on which it will leave no stain. The proportionate quantity of buff is much greater at first, and gradually diminishes, which may be ascertained by receiving a little in different glasses at the commencement, the middle, and the end of the operation. It is also much greater if the orifice is large, and if it is caught in a narrow vessel, the influence of gravity causing the heavier red particles more readily and abundantly to separate. The extent of the bleeding must be regulated not only by the appearance of the blood, the readiness of its flow, and the strength of the pulse, but also by the severity of the inflammation and the importance of the organ affected. If, for instance, the above symptoms exist in a case of acute inflammation of the lungs, we can scarcely take too much or take it too rapidly. We should, if possible, knock down the disease by the first blow; and we shall generally succeed in so doing, for the appearance in such severe

cases of buffy blood not only shows the propriety of blood-letting, but also the capability for bearing it. The pulse in this, as in almost every instance, should guide us as to the quantity to take: the bleeding should be continued until it becomes almost, if not quite imperceptible. In all cases of rheumatic inflammation—and these cases are by no means so rare as is generally supposed—and in almost all instances of inflammation of a fibrous part, such as the cavity of a joint, the fibres of a muscle, and also in most cases where acute pain is present, we shall find a full, strong, and quick pulse. Indeed, this is the true pulse of irritation, and not a quick weak pulse, as used to be supposed.

Let us take, for example, a horse with a bad open joint; there is great irritation of the whole system, and the pulse is strong, full, and accelerated. The horse is bled, and we find a buffy coat on the blood: the joint is not closed—the irritation continues; the pulse soon acquires its former character; the animal is again bled, and the buffy coat is again exhibited. This may be repeated again and again; the poor animal loses flesh, is almost a skeleton, can scarcely stand, and at length dies; but almost to the last he exhibits a strong pulse, and buffy blood. We well know that nothing produces so rapid a loss of flesh as acute pain. In such case the whole nervous system is in a state of irritation; the organic nerves which supply the blood-vessels equally participate, and the blood-vessels are irritated, if not inflamed. The fibrine of the blood, instead of being attracted by the coats of the capillaries, and thus contributing to the growth of the body, is hurried forwards into the veins, and thus the venous blood becomes loaded with fibrine, whilst the solids are almost exhausted from its absence, and of course the animal is considerably and rapidly impoverished. Although a single bleeding or two may be useful in such case, yet it is clearly evident that its frequent repetition will fail both in altering materially the character of the pulse, as well as the appearance of the blood. Both the blood and the pulse can often be restored to a state of health by other means, either by medicine, or, as in the case of an open joint, by closing the cavity, and removing the cause of irritation.

Sometimes a strong full pulse, and its usual concomitant, buffy blood, is principally owing to the idiosyncrasy of the animal which may possess such pulse, but which may be increased by the irritation of disease, contrary perhaps to the usual character of such disease. Thus, when influenza has been prevalent, perhaps in one case out of twenty, instead of the usual soft pulse there has been a hard strong pulse and buffy blood, contrary to the usual indications of the disease; therefore, though as a general rule inflammatory cases require blood-letting, there are exceptions that should always be borne in mind.

Cases forbidding Blood-letting.—Let us suppose that a horse is overrun in the chase—is exhausted and can scarcely stand—his flanks heave laboriously, and if a vein is opened, the blood is black and flows with difficulty, and the lungs are congested with black blood: should we bleed in such a case? When an animal is exhausted with exertion, the blood becomes much darker than usual, and the flesh decomposes more rapidly than otherwise. When the circulation is thus hurried by exertion, the demand for arterial blood in every part is so great that the lungs cannot purify it with sufficient rapidity, and consequently it is imperfectly done; and this imperfection increases until, loaded with carbon, it is no longer fit for the purposes of life: impure blood is sent to the brain, and the animal dies. It would at first sight seem that the removal of some portion of this dark impure diseased blood must be desirable, and calculated to relieve the loaded lungs. But let us look a little further: the powers of life are greatly reduced, the system is exhausted, and the vitality of the blood and its vessels is considerably impaired: by removing, then, any portion of blood, impure as it is, we substract from the system the vitality which it possessed, and reduce still further the nervous energy, and thus hasten a speedier dissolution. The exhausted system requires assistance; the waning powers of vitality need support; the nervous system demands a stimulant.

Treatment of Over-exertion.—An ounce of laudanum, and two of spirits of nitrous ether, with a pint or less of water, or a pint or more of brandy and water of the usual strength, or a bottle of port wine, will often restore the vital powers, and enable the system to contend effectually against the approach of death; and as the pulse becomes perceptible, and the dark colour of the blood changed, blood-letting may be practised, if required, with safety and success. In all cases in which the pulse is low and feeble, the treatment should commence with a diffusible stimulant; and bleeding should not be practised until the stimulant has strengthened the pulse, and re-action has commenced. If we bleed in the latter stages of inflammation, within perhaps 12 or 24 hours of death, we assuredly hasten the period of dissolution, and perhaps produce almost sudden death, although we only remove a few quarts of this dark impure blood, which appears so unfit for the purposes of life. The repetition of bleeding is often resorted to empirically, and without principle. It is not uncommon, in severe inflammation, if the horse appears no better in the course of 6 or 12 hours, to bleed, and again a third or a fourth time for the same reason, regardless alike of the actual state of the case, or the ability of the horse for bearing depletion. By such practice a fatal termination is not only greatly precipitated, but what chance there may be of recovery is altogether thrown away. The propriety of repeating the bleed-

ing should be regulated by the principles we have endeavoured to establish: it should be practised with caution, and with the finger on the pulse.

Local Bleeding.—Local bleeding is a practice to which we are very favourably inclined. We can seldom abstract blood from the inflamed part itself, but as near to it as possible, taking care that if we open a vein it shall be between the heart and the seat of inflammation. We can rarely resort to local bleeding in the horse for severe internal inflammations, the thickness of the skin and the presence of the hair precluding the application of both leeches and the cupping-glass; and we are compelled to limit our practice almost entirely to the opening a vein or an artery. From the size of our patients, and their consequently large veins, we can open them in various situations with convenience and good effect. For severe *strains* of the flexor tendons we may open the brachial or the saphena veins with much advantage, and remove a large quantity of blood. For *Laminitis* we may bleed from the foot, opening the circular artery and abstracting blood in a large and copious stream. For various diseases of the foot, or near it, we may also bleed from the toe or the coronet, placing the foot afterwards in a pail of warm water to encourage the bleeding. For inflammation of the gums we can bleed from the mouth: for ophthalmia or injuries of the eye we can abstract blood locally, by scarifying the lids, lancing the bars of the mouth, and opening the angular facial vein, or the jugular. Each spot has its peculiar advantage, and deserves a preference in particular circumstances. One important rule should be observed in local bleeding in severe cases, such as acute strains; that is, to abstract blood enough locally to affect the system generally: by so doing we gain the advantage of both local and general bleeding. If we do not carry it to this extent, and the pulse is strong, the little blood we abstract locally will soon be supplied by the system almost as plentifully as before: therefore, if we cannot obtain in such case sufficient blood, it will be desirable to bleed generally at the same time.

Re-action.—There is another point that deserves particular attention, and that is, the tendency of bleeding to produce a re-action. We bleed for internal inflammation, and appear by so doing to subdue it altogether, but in the course of 12 or 24 hours perhaps it rages as strong as ever. The disease, it is said, is returned; but no! it is re-action, as Dr. Copland well shows, and produced sometimes by the excess of bleeding. How desirable, then, is it to guard against this re-action; and for this reason, after bleeding, we employ sedatives,—our belladonna, our digitalis, or white hellebore, and by their means prevent the fire in a great measure from again flaming forth; and this, we take it, is the chief use of these medicaments.

When the blood abounds with fibrine, as in many inflammatory and rheumatic diseases, we may assist the bleeding, and prevent perhaps the necessity of a second operation, by administering medicines calculated to attenuate the blood; such as tartarized antimony, calomel, cream of tartar, digitalis, the carbonates and salts, with plenty of diluents. When the blood is very dark, there appears to be a deficiency of its saline constituents, and we shall then probably find much advantage in employing the chlorides and fixed alkaline salts.

When the clot is very loose and coagulates rapidly, indicating considerable debility of the system, tonics, vegetable and mineral, camphor, and the alkalis, are called for. When the blood is very deficient of fibrine, acids are found the best restorative of this constituent, and prevent attenuation of the blood. In dysentery and profuse diarrhœa, where the watery portion of the blood is considerably diminished, diluent liquids should be given, with astringents, mild tonics, and saline matters.

It should not be forgotten that blood-letting greatly promotes absorption. In cases, therefore, of inoculation with morbid matter, the bites of venomous reptiles, a local disease that may become constitutional, abscess, and unhealthy ulcers—in such cases bleeding should be carefully avoided.

Purging.—*Purging*, as an agent in the treatment of inflammation, is not so available in the horse as in the human subject, in consequence of the greater danger that attends the operation, and more particularly in inflammatory affections of the air passages. In these cases the utmost caution is required, for numbers of horses have been destroyed by the injudicious administration of physic. For local inflammations of the limbs and other parts, purgatives are still in requisition, and are also generally employed in getting a horse into condition. The *modus operandi* of a purge is by stimulating the internal coat of the bowels, and causing a greater flow of blood to it, and consequently a greater secretion of the watery fluids: it excites also the muscular coat, and causes a greater peristaltic action of the intestines, by which means their contents are rapidly hurried onwards and discharged. Its immediate effects on the system are—firstly, the depression it causes in the nervous system, and thereby on the action of the heart and arteries, giving time for an inflamed part to recover its natural tone during the existence of this depression; and secondly, the removal of a portion of the circulating fluid from the body. It is by this latter effect that a horse is got into condition; he comes up perhaps from grass loaded with flesh and fat, but is unable to perform active work, and sweats readily from the slightest exertions. Nothing assists so much in altering this state of things as a dose of physic: the superfluous serum and fat are removed from

the system, and exercise being added, the horse becomes lighter and stronger, in better wind, and fitter for the performance of exertion.

A Purgative Ball.—The best purge that can be given to a horse is Barbadoes aloes; an ordinary dose is from five to six drachms melted in a water bath, and mixed with one drachm of ginger and two drachms of treacle. Although this may be considered as a medium dose for a full-sized horse, yet some are purged with three drachms, and others require upwards of an ounce, depending on the strength of constitution and the susceptibility of the intestines. Light heron-gutted horses are much easier purged than animals with a good carcase.

Treatment of the Horse in physic.—Before administering a dose of physic, it is desirable to know exactly the quantity the animal requires to act properly on him; and if this knowledge cannot be obtained, it is better to give under than over the amount he may appear to require. From the length and extent of surface of the intestines, a dose of physic, if given in a solid form, as it usually is, takes about twenty-four hours before it begins to purge: it is therefore better to give it in the morning, the animal having had for one or two days previously bran mashes, no corn and but little hay. When a horse is well mashed, a less dose of physic is required; it will also act better, and with less danger or inconvenience. After the physic has been administered, the mashes should be given warm, and lukewarm water to drink *ad libitum*. The following morning the horse should have walking exercise; but if the motions are soft and frequent, he should be put in the stable again; and if the physic does not act, the animal may be trotted. So that in fact we can control the operation of the physic by the amount of exercise; care, however, being taken that it is not too severe, and that the animal does not take cold, as from the weakness and depression of the nervous system there is a chilliness and a greater susceptibility to the influence of cold air. The warm bran mashes should be continued during the action of the physic. A little corn may be given in the evening; and on the second day after the administration of the ball the horse should remain quietly in the stable,—having, however, his usual food; and he should not be worked till the next day, and then very moderately. When it is desirable to administer another dose, an interval of a week should elapse between the first and second ball.

Laxatives.—When merely a relaxed state of the bowels is required, and this in many diseases is the safer course, a half dose of physic or laxative may be given, so as to produce a pultaceous state of the fæces without active purging.

Diuretics.—*Diuresis* is the increased action of the kidneys, from more blood being determined to these glands, causing more urine

to be secreted by them. It thus acts in somewhat the same manner as a purgative, by diverting blood from an inflamed part and getting rid of superfluous water in the system; but it can be employed with greater safety, and is, therefore, more available, in internal inflammations; and is particularly useful in dropsical swellings of the legs. The following is a useful formula:—

Powdered yellow resin	4 drs.
Nitrate of potash	2 „
Powdered ginger	1 dr.

To be beat up with sufficient soap to form a ball.

A diuretic acts much more quickly than a purge; it should therefore be given early in the evening, and its effects will have passed off in a great measure by the morning. The horse will not imperatively require any alteration in the diet, or cessation from his usual work.

Sedatives.—*Sedative medicines* are often administered in inflammations: their effect is to lower the action of the heart and arteries, and this is accomplished in various ways: some, such as the *white hellebore*, in doses of a scruple, or small quantities of *aloes*, produce nausea in the stomach, and this depresses the nervous system in the same manner as emetics act in the human subject. From the peculiar conformation of the stomach, and curvature of the œsophagus as it reaches it, the horse is unable to vomit, though he may feel sickness or nausea. *Digitalis* or *foxglove*, in doses of half a drachm to a drachm, appears to act specifically on the heart, lowering its action, and producing, temporarily, an intermittent pulse. *Belladonna*, or the deadly nightshade, seems to act directly on the nervous system, the action of which it lowers. About two drachms of the extract of belladonna is an ordinary dose. *Opium* is also a valuable sedative, in doses of a drachm, and, combined with the *protochloride of mercury*, in a similar dose, its assistance is often very valuable.

Sudorifics.—*Sudorifics*, as a remedy for inflammation, are much less available than in the human subject. We cannot, as in man, throw a horse into a profuse prespiration; and a warm-water or vapour bath, from the size of the animal and his hairy covering, is a very inconvenient remedy. When, however, the skin feels chilly, and we wish to determine blood to the surface, we may produce this effect by giving a drachm of camphor and one or two ounces of spirit of nitrous ether, suspended in gruel, or with water thickened with linseed meal so as to suspend the camphor, which will not dissolve in water.

Fomentations.—In the treatment of local inflammation, in addition to the foregoing remedies, which act on the system at large, as

well as local bleeding, which has also been noticed, we have several other resources. *Warm fomentations* act by relieving the inflamed vessels by means of perspiration or the escape of fluid externally through the pores of the skin. In applying them, a thick flannel should be used, not too wet, but kept closely to the part for some time. *Warm poultices* act in the same manner, but, of course, produce a more constant effect.

Lotions.—*Cold applications* relieve inflammation by means of *evaporation:* heat is thereby abstracted from the inflamed part, and the action of its vessels is lowered with its temperature.

Counter-irritation.—*Counter-irritation* is another method of removing inflammation; it is most available after other treatment, and when the disease becomes sub-acute. It acts by exciting artificial inflammation in another part, and thereby diverting the blood from the old mischief. Blisters, setons, and rowels, are the principal remedies of this class employed in the horse.

DISEASES OF THE CHEST

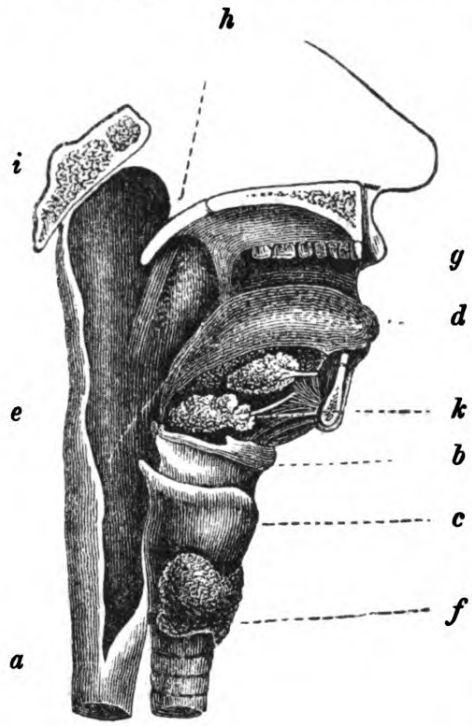
AND

AIR PASSAGES.

HAVING gone at some length into the general principles by which the diseases of the horse are to be combated and overcome, we shall now proceed to notice these diseases *seriatim;* but our limited space will only permit us to adopt the most concise method, and point out the principal symptoms that belong to each malady, without attempting to detail the almost endless variety in the order as well as the severity with which these symptoms appear. We select, in the first place, the *diseases of the chest* and air-passages, as being some of the most frequent and important; first, however, making a few observations on the structure of the parts.

The Windpipe.—The passage for the air to and from the lungs is effected by a long tube, called the *trachea* or *windpipe*, composed of a great number of cartilaginous rings, connected together by strong elastic membrane. Thus constituted, the channel is preserved in whatever position the neck may be placed. The upper part of this tube is called the *larynx*, and is formed of various singularly shaped cartilages, guarded by a valve, called the *epiglottis*, which is always open except in the act of swallowing. These cartilages are moved by numerous small muscles, and are connected by them with the *pharynx*, or food-bag, immediately above, so that the entrance to the stomach and that to the lungs, though distinctly separate, are yet situated close together, and are often involved in the same disease. The horse breathes only through his nostrils, which are wide and capacious for the purpose; and there is a fleshy membrane, called the *velum palati*, which, attached to the palate-bone above, falls down on the dorsum of the tongue,

and closing the back of the mouth, is only raised in the act of swallowing. In man and carnivorous animals this soft palate is shorter, and does not prevent breathing through the mouth.[1] All these parts, in common with the mouth and the nostrils, are very liable to disease, and are lined with a mucous membrane, which, at the larynx, is endowed with a high degree of sensibility by means of several nerves.



9.—The Windpipe and Gullet.

CATARRH.

Catarrh, or *cold* as it is usually termed, consists of inflammation of the mucous membrane just spoken of: that lining the nostrils is generally first affected, and thus sneezing is one of the earliest symptoms. Cough and sore throat follow, with fever, either slight or more severe. Catarrh may either be very slight or very severe, but it is usually more serious than in the human subject: very frequently it becomes epizootic, and attacks many animals at the same time. In the first stage, the discharge from the nostrils is watery, but sometimes there is none at all; it afterwards becomes thick mucus, which is sometimes very considerable, and gradually ceases as the animal gets better.

Treatment.—Bleed moderately, unless the symptoms are very slight or the horse very weak; rub some blistering liniment on the throat and between the jaws.

Liquid Blister.

Cantharides, powdered	3 drs.
Hartshorn	4 oz.
In a fortnight strain and add Olive oil . .	4 oz.

Keep the body warm and the stable cool; give bran mashes, carrots, or green food, and a little walking exercise daily, unless a

Fig. 9. The windpipe and gullet (human) are here laid open. *a*, œsophagus; *b*, larynx; *c*, thyroid glands; *d*, salivary gland; *e*, pharynx; *f*, tracheal artery; *g*, tongue; *h*, palate; *i*, base of the skull; *k*, the os hyoides.

[1] The above representation of the organs of deglutition and respiration in the human subject will sufficiently illustrate the general description of those organs contained in the text. See Note, page 14.

loose box can be afforded. If the bowels are anywise costive, give two or three drachms of aloes, and the following cough-ball daily :—

Cough Ball.

Digitalis	½ dr.
Camphor, powdered	1 "
Tartarized antimony	1 "
Nitrate of potash	3 drs.
Linseed meal	1 dr.

To be made into a ball with Barbadoes tar.

Repeat the blister if necessary, and, in severe cases, insert a seton under the throat, and steam the nostrils by means of a hot mash and a nose-bag. In epidemic cases the treatment should be pretty nearly the same as above advised: but, as there is generally greater debility present, the depletive measures must be practised with caution, and it will often be advisable to give a few tonic or condition-balls after the inflammatory symptoms are removed.

Tonic Condition-ball.

Powdered ginger	1 dr.
" gentian	2 drs.
" camphor	1 dr.
" sulphate of iron	2 drs.

To be made into a ball with linseed meal.

STRANGLES.

Strangles is a disease to which most young horses are liable between the ages of two and five. The symptoms are, in addition to those of catarrh, a phlegmonous swelling under the jaws, which generally terminates in an abscess, and which it is essential to open as soon as it points. This disease is generally more severe in horses that have been in work some time before it appears, but it is usually followed by an improvement of the health and spirits.

Treatment.—We should avoid bleeding if possible, but in other respects adopt the same treatment as in catarrh, repeating the blister several times. When the glandular swellings remain hard and do not suppurate, it is called, in horseman's phraseology, bastard strangles, and the ointment of iodide of mercury should be repeatedly rubbed into the part.

Iodide of mercury	1 dr.
Lard	1 oz.

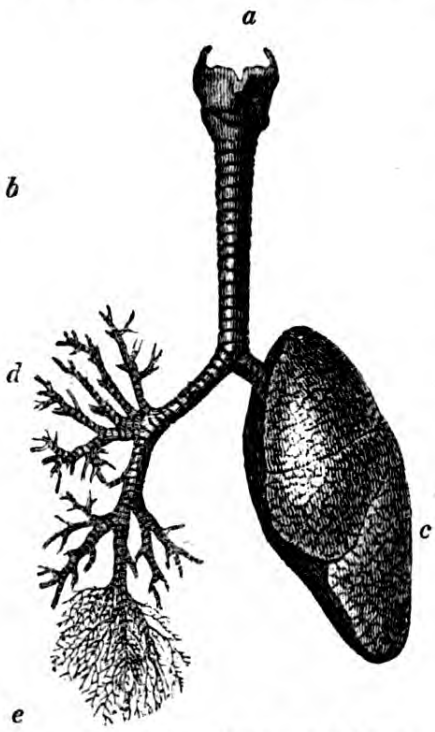
To be well incorporated.

Sometimes there is a disposition to form abscesses in various

parts of the body, and the disease proves tedious and troublesome; and if abscesses form internally, death is occasionally the result. Shivering fits are often present, and the symptoms are very deceptive. Tonics are here demanded. Catarrh unsubdued often brings on—

BRONCHITIS.

Bronchitis is inflammation of the air-passages of the lungs. This disease may arise from extension of the inflammation along the course of the mucous membrane, or it may be the primary disease; for it should be observed that the windpipe, on reaching the chest, divides and subdivides into numerous ramifications, which terminate in minute air-cells. These air-passages are cartilaginous in their structure, and lined with the same mucous membrane as the throat and windpipe.[1] Bronchitis is a severe and dangerous disease, and its symptoms are often very deceptive. We have most of the symptoms of catarrh, but the cough is weaker, the pulse is increased in frequency, and the respiration somewhat disturbed; the appetite is considerably impaired, and the membrane lining the eyelids and nostrils inflamed. The discharge from the nostrils is copious, and white, or sometimes yellow; the legs are usually of their natural temperature; and the horse does not refuse to lie down, although he prefers a standing posture. If the case gets worse, the pulse becomes quicker and weaker; the breathing short, quick, and catching; the discharge from the nostrils somewhat offensive, and occasionally of a dark colour, or streaked with blood. Sometimes this disease is so severe from the first that the membrane lining the air-passage becomes of a dark red, and afterwards of a green colour, and the discharge is entirely suppressed: all the symptoms are of the



10.—Windpipe, lung, and bronchial arteries.

Fig. 10. *a*, larynx and upper extremity of the tracheal artery; *b*, trachea or windpipe; *c*, the lung covering the bronchial arteries; *d*, divisions of the bronchia; *e*, bronchial ramifications.

[1] It will be seen that in the above engraving, one of the lungs is removed for the purpose of showing the divisions and ramifications of the bronchial arrangement, in illustration of the text. See Note, page 14.

worst character, and death marks the animal as its own from the very onset of the disease; and afterwards the membrane of the air-passages is found of a deep green colour.

Treatment.—Avoid aloes or other purgatives as we would poison. If the bowels are really costive, give carefully half a pint to a pint of linseed oil; bleed according to the state of the pulse and the principles we have laid down under the head of blood-letting; repeat the bleeding once or twice in twelve or twenty-four hours, but venesection must not be too copious; blister the throat and the brisket, and sometimes the sides, and insert setons in the chest; steam the head; keep the body warm and the stable cool; bandage the legs; give the fever-ball twice a-day for several days, and when convalescent, the condition-ball a few times.

STRUCTURE OF THE LUNGS.

Pneumonia, or inflammation of the substance of the lungs, is not a rare disease in the horse. The *lungs* are composed of the air-tubes and cells we have spoken of, and a vast number of veins and arteries, both large and small, the whole being connected together by cellular membrane called *parenchyma*, and covered externally by a serous membrane, which also lines every other part of the chest. These light spongy bodies are divided into several lobes, and fill accurately every part of the chest not occupied by other organs, expanding and contracting with that of the thorax. They float readily when placed in water, and are but a few pounds in weight, and of a pale pink colour. Their office is, as we have seen, to admit simultaneously a large quantity of air and of blood, and by exposing them to each other, separated only by a very thin membrane, a mutual change and exchange takes place in both the air and the blood: the latter acquires oxygen, loses carbonic acid gas, and becomes red; the former loses oxygen, acquires carbonic acid gas, watery vapour, and becomes warmer and lighter.

CONGESTION OF THE LUNGS.

The horse being an animal whose utility is owing, to a great extent, to his capability of performing great exertions, and thereby calling largely on the lungs for the extra performance of their natural functions, we cannot be surprised that these organs, so often unduly exerted, should be liable to derangement and disease. We notice two varieties of inflamed lungs: one, which can scarcely be so called, as it is rather *congestion* than inflammation, arises from over-exertion, or a plethoric state of the system. When it becomes fatal, the lungs are found quite black, from every vessel being loaded and distended with impure blood, thus producing

suffocation. The *symptoms* can scarcely be mistaken: the breathing is rapid and distressed in the extreme; the pulse very rapid, small, and weak; the limbs cold; the appetite lost; and the membrane of the nostrils very highly injected; and it is often fatal in twenty-four hours, or less.

Treatment.—Give a diffusible stimulant, hand-rub and bandage the legs, and as soon as the pulse becomes stronger and more perceptible, bleed with the finger on the pulse. Employ counter-irritation and febrifuge medicine. We sometimes meet with cases in which, with the most rapid and distressed respiration, the pulse is strong and hard, as well as rapid. In such instances we shall be able to employ with advantage very copious venesection; six or seven quarts of blood will not be too much to abstract. These cases seem to border between that we have described and the true—

PNEUMONIA.

Pneumonia may be produced by over-exertion, or the heated body being suddenly or too quickly cooled, producing re-action, or exposure to cold; or, still more frequently, by a stable too hot and confined. It may also follow the congestive pneumonia previously spoken of.

The *symptoms* sometimes are very obscure, leaving it somewhat doubtful whether the lungs are really affected, and which can only be positively ascertained by means of *auscultation*, or applying the ear to the chest. In these obscure cases the inflammation is usually confined to a portion of the lungs; the ear will detect the absence of the usual respiratory murmur in the affected part, which thus gradually becomes condensed and impervious to the passage of air. This disease is frequently preceded or attended at its commencement by a cough, which, however, does not increase, but rather diminishes. The appetite becomes impaired, the animal appears out of sorts, and, if the pulse is examined, it will be found somewhat accelerated, and the respiration perhaps doubled, and attended with a sort of catch. In this stage it may be considered as *sub-acute*, and so it may continue until relieved by treatment; but more frequently in a few days it assumes a new form, in which the appetite is nearly or totally gone, the respiration treble or quadruple that of health, being from thirty to sixty in a minute, the pulse from sixty to ninety, and sometimes full and distinct, at others small and weak, presenting in different cases very different characteristics. The legs feel cold, the mouth hot and clammy, and its secretions often offensive. If the animal gets worse, these symptoms are all increased, the pulse becomes quicker and weaker, and the respiration rivalling it in rapidity; and thus the disease may go on,—occasionally, perhaps, presenting slight

gleams of hope, which prove delusive; and, in the course of five or six days, terminates fatally. The *post-mortem* appearances are those of *hepatization*, or condensation of the greater portion of the lungs, which are impervious to the air, and sink in water. White lines and knots are often found, and sometimes tubercles and abscesses. In cases where death supervenes in a very few days, and there is yet considerable hepatization, it denotes previous disease, either of a chronic or acute character. In some instances we find the lungs in a state approaching to gangrene, the smell very offensive, and the parts still pervious, full of a brown sanious fluid: some portion of the lungs is usually black, like that in the previous disease, which part is generally that last attacked, for this congestion or black state of the lungs, instead of denoting long-standing disease, as used to be supposed by farriers, actually proves the contrary.

Treatment.—Bleeding is certainly the sheet-anchor; and for the principles by which it should be regulated we must refer to the article on Blood-letting, contenting ourselves with observing here that it should be as copious as possible, the first bleeding particularly. If the pulse is, at the outset, weak or small, we cannot do better than administer two ounces of spirit of nitrous ether in half a pint of water, or, if the bowels are costive, half a pint to a pint of linseed-oil; and if this should have been delayed till after the bleeding, and the blood should appear of a dark colour, it may then be given with advantage. We may afterwards resort to sedative and febrifuge medicine, administering a ball two or three times a-day. White hellebore, digitalis, extract of belladonna, calomel in combination with opium, have all been recommended and employed. They have each their peculiar advantages, which must govern their selection. The first, perhaps, is one of the most powerful, but requires very careful watching, so as not to push it too far.

Sedative Ball.

White hellebore, powdered	½ dr.
Or extract of belladonna	2 drs.
Or digitalis	1 dr.
Or calomel, 1 dr., with opium	½ dr.
Nitrate of potash	2 drs.
Tartarized antimony	1 dr.
Linseed meal	2 drs.

Treacle to form a ball, and one to be given twice a-day.

Counter-irritation is an important addition to our treatment, and the blister is most useful, as producing the most speedy effect.

In a very severe case it is difficult to get a blister to act properly, but it is more likely to produce a proper effect on the brisket than on the sides. Setons and rowels may be also conjoined, and, in subacute cases, preferred as producing a more lasting effect; and they will be found particularly useful if the case has become chronic. If we have reason to fear that hepatization has commenced in the lungs, it will be advisable to employ the preparations of iodine both externally and internally; half a scruple of the iodide of potassium may be added to the sedative or other ball, and the ointment of iodide of mercury may be employed externally. When the inflammatory action appears pretty well subdued, and much debility remains, it will be advisable to administer a few tonics, the best combination for which will be the sulphate of iron, ginger, and gentian, a drachm and a half of each, made into a ball with treacle, and given once or twice a-day.

PLEURISY.

Pleurisy or pleuritis, which is inflammation of the pleura or lining membrane of the chest and lungs, used to be considered as never occurring but in connection with pneumonia. More accurate and extended observation, however, has satisfactorily shown that, although not so frequent as the latter, and though often combined with it, it yet does occur in many instances as a pure disease. Though many of the symptoms resemble those of pneumonia, it may be readily distinguished from it by the much stronger and harder pulse, the occasional exhibition of acute pain, causing the horse to paw and even lie down, and the tenderness evinced on pressing the sides. The inflammatory type is more strongly marked, but there is much less external coldness and less debility. The breathing is less difficult, but painful and variable; the inspiration is quick, but the expiration slow; the membrane of the nostrils is not injected, as in pneumonia, and the symptoms altogether are more changeable. The appearances after death (which, when the case is fatal, often takes place in seven or eight days, unless the disease becomes chronic) are those of extensive derangement of the membrane affected, which is often in a gangrenous state; portions of the lungs adhere to the chest, and flakes of lymph are thrown out. Sometimes there is no deposition of fluid, but more frequently there is a considerable quantity secreted, amounting to many gallons, in one or both cavities. When there is much water, the other diseased appearances are less considerable, as this *hydrothorax*, as it is called, is the result of the inflammation, and the effect of the expenditure of its force. When water is forming, the symptoms are moderated, purging sometimes comes on, and, on applying the ear to the chest, the

usual respiratory murmur cannot be heard, but sometimes, on moving the horse, the gurgling of the water can be detected, and the chest, when gently struck, gives out a dead sound.

The treatment must be somewhat similar to pneumonia—bleeding must be employed, if possible, to a still greater extent, and it will be found that there is a greater ability for bearing it. It must be repeated if required. Counter-irritants and sedatives should also be employed. Scruple doses of opium will be a useful addition to the sedative ball, and the other treatment must resemble that which we have advised for pneumonia. If hydrothorax is strongly suspected, or proved to exist, we should abstain from further bleeding, as this is calculated to encourage the watery secretion. Tonics should then be given with diuretics, such as sulphate of copper, one to two drachms, with ginger and gentian, in similar quantities, made into a ball with Venice turpentine. If the water appears to exist to a large amount, the operation of *paracentesis*, or tapping, should be employed. The trochar being plunged into the chest, between the eighth and ninth ribs, as low down as possible, the water will escape through the canula, which is left in the wound till all is evacuated. The operation should be performed on both sides, unless it is evident that the water is confined to one cavity; and generally requires to be repeated. Its success will depend very much on the amount of disease that may exist independent of the water on the chest; for, when confined to the deposition of serum, it is much more likely to be successful.

PLEURO-PNEUMONIA.

Pleuro-pneumonia is the complication of inflammation of the lungs with that of the pleura, and, though not so common as the former, it is more so than the latter disease. The symptoms are more obscure than either, though partaking of the character of both, and the result is still more frequently fatal. The treatment must be in great measure similar to that we have advised,—regulated, however, by the peculiar symptoms, and the predominance of those of the one disease or the other.

DISEASES OF THE HEART.

The heart is rarely the subject of inflammation, and fortunate is it that it is not so, for, as it is the organ which is called upon for increased exertion in all cases of fever or inflammation, were it much disposed to inflammation itself, the more serious diseases would then be far more dangerous than they really are.

Carditis.—Carditis, as inflammation of the heart is termed, is always connected with other disease, and seems to arise from the

undue exertion of the organ. When the heart is affected, it increases the danger of any other co-existing disease.

Pericarditis.—Pericarditis, or inflammation of the heart-bag, is much more common; it often accompanies pleurisy, and occasionally pneumonia, and sometimes rheumatism; it nearly always terminates in the deposition of water and lymph in the pericardium (*hydrops pericardii*), which, by pressing on the heart, oppresses it considerably, and at length chokes its action. The presence of water in the heart-bag considerably modifies the other symptoms, and renders the pulse weak, vacillating, and sometimes intermittent. It is very important to detect the existence of pericarditis when it occurs in conjunction with pleurisy or pneumonia, as the same amount of blood-letting cannot be borne, nor is it advantageous.

Hypertrophy.—Hypertrophy, or enlargement of the sides of the heart, occasionally exists either with or without dilatation of its cavities. Sometimes there is simply an increase of its muscular parietes, at others an enormous growth of a cancerous structure, which may chiefly appear on the exterior, or, as in a case which has occurred in the writer's practice whilst writing the present article, in one of the cavities.

Cancer of the Heart.—In the case referred to, that of a thoroughbred filly, a fungous substance actually occupied three-fourths of the right ventricle, and, after occasioning some constitutional derangement for some time, at length produced sudden death. The disease is usually accompanied by a peculiar pulse, quick, full, and strong, but with a laboured action: the carotid arteries may often be seen to beat as they rise from the chest; the heart palpitates, and is often irregular and intermittent in its action. The disease, though frequently fatal, is best treated by moderate bleeding and sedatives, of which opium is the best; and if the horse apparently recovers, his work should be very moderate.

Rupture of the Heart.—Rupture of the heart sometimes, though rarely, occurs. In most affections of the heart, the appearances are very deceitful; there being no pain of any amount, or threatened suffocation, the appetite is often but little impaired, and the respiration by no means hurried. Thus, though there is a somewhat haggard appearance of the horse, the attendants are disposed to disregard it, or ascribe it to temporary causes, and the animal is often not considered to be ill until he is actually at the brink of death.

SPASM OF THE DIAPHRAGM.

Spasm of the diaphragm has often been mistaken for disease of the heart: a loud thumping noise has been heard, which appears to come from the heart; but it is found that it can be heard and

felt at other and different parts of the body, and the noise does not synchronize with the pulse, being less frequent; it appears on examination to correspond with the breathing, and to be owing to the violent spasmodic action of the diaphragm. It is generally produced by over-exertion, and particularly if taken on a full stomach. The treatment should consist in administering an ounce of tincture of opium, and two ounces of spirit of nitrous ether, in a pint of warm water: after which it will be proper to bleed more or less severely, according to the strength of the pulse. If the bowels are costive, oily laxatives should be given with injections. The antispasmodic may be repeated in a few hours. This treatment will generally prove successful.

RUPTURE OF THE DIAPHRAGM.

Rupture of the diaphragm now and then occurs: it is produced by excessive exertion or coughing, and is attended by great distress, rapid and very peculiar respiration, and is invariably fatal in a few hours, or in several days, according to the extent of the rupture.

BROKEN WIND.

Besides the diseases of the respiratory organs which we have noticed, there are several others which, though not fatal in the result, are yet so serious in their nature as greatly to interfere with the utility of the animal, and considerably impair his value. The first we shall notice is broken wind, as it is popularly and expressively designated. The symptoms of this disease are a peculiar and well-marked breathing, which is not only quick, but attended with a prolonged expiration, and a double action of the abdominal muscles. The appearances of the lungs of broken-winded horses sufficiently explain this peculiar respiration, for we find that they are much larger than usual, but without increased weight; the size being occasioned by air, which has escaped from the air-cells, and become infiltrated under the membrane. The disease then consists of a rupture of the air-cells, and though the air can be drawn in with ease, yet there is a difficulty in expelling it, as might be expected, and thus the double expiratory effort. Broken-winded horses are of course incapable of performing the same amount of exertion as before; but their ability depends on the amount of the injury, and the mode and nature of the feeding. The lungs being to a certain extent at all times inflated with air, much of which is in a situation where it cannot be usefully employed, it is evident that the horse must breathe quicker than usual in order to inhale in a given time the requisite amount of

atmospheric air, which, distending still more the inflated lungs, is with much difficulty expelled, and requires a double and long-continued effort to accomplish it. When the case is very bad, the horse rarely appears in good condition, and there is often much external coldness manifested: the latter symptom may arise from a less quantity of oxygen, one of the sources of heat, being absorbed, and the former from the indigestion which is generally present, and which also occasions the great flatulency that is often exhibited. A peculiar short dry cough is usually present, which is greatly increased if the horse eats foul or dusty food. There is generally an unusual dryness, and sometimes a thickening of the membrane that lines the air-passages, and which appears to be the immediate cause of the cough. Though broken wind is not curable—though it is impossible to restore the ruptured air-cells—yet very much can be done in the way of treatment; and this must principally consist in avoiding all dusty and unwholesome provender, and giving the horse nutritious food in a small compass, in order that the stomach may never be overloaded so as to press too much on the chest. It is more particularly essential that the horse should not work on a full stomach. Green food may be given in the summer, and carrots in the winter; but he should not be turned out to grass or straw-yard, but kept in as high condition as possible. Broken wind usually comes on gradually, but it sometimes occurs suddenly; and the writer has several times been requested to attend cases supposed to be inflamed lungs, but which he found was broken wind, unexpectedly produced: sudden and severe exertion, on a full stomach, was in each case the exciting cause.

THICK WIND.

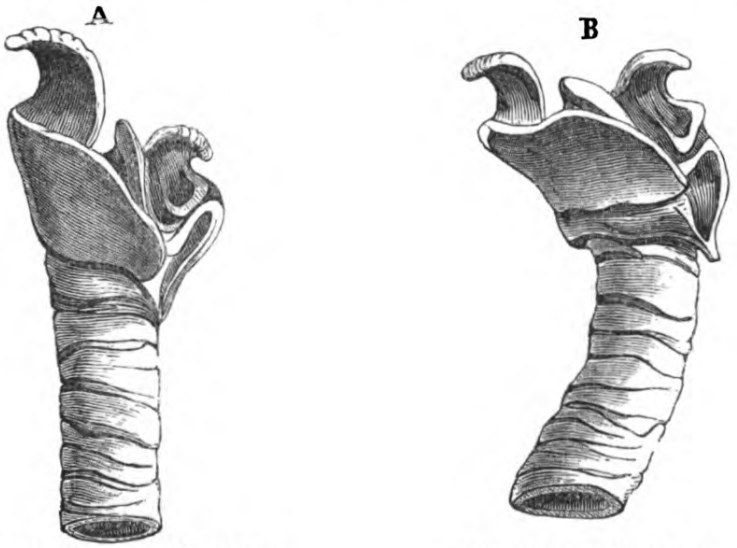
Thick wind, though frequently confounded with, is yet very different from, that just described. The respiration is greatly increased, but without the distress of pneumonia, or the double action of broken wind. It is occasioned by a partially impervious state of the air-passages, which may be caused either by the condensation of the lungs from pneumonia, or a thickening of the parietes from chronic or sub-acute inflammation, which may have been mistaken for a common cold, and passed unheeded. The space for the air being thus limited in extent, more frequent respiration is necessary, and which is more particularly the case after and during exertion. It is often, though not always, attended with a cough; but there is not such dryness of the membranes as in broken wind. The same mode of management should be adopted as in the former disease.

CHRONIC COUGH.

Chronic cough is closely connected with the two diseases last described; it often accompanies, and frequently precedes them, but it may occur altogether unaccompanied by any impairment of the wind. In such instances it is the effect of catarrh and sore throat, and such horses are more subject to take cold than others, and then the cough becomes increased. In many cases it is impossible to decide merely from hearing it that the cough is chronic; but the horse, when it is not very bad, usually coughs several times on first being trotted in the morning, and sometimes it does not return throughout the day. It appears to arise from a thickening of the mucous membrane of the larynx or other air-passage, and a consequently altered state of its secretions, which become thicker and more viscid. The advice we have given as to the previous diseases is in most respects applicable to this; but we may in addition derive some benefit from stimulating the throat externally, and administering occasionally a cough ball. It is very requisite to adopt the most active measures whenever a horse with chronic cough becomes affected with catarrh or sore throat, in order to prevent further alteration of structure.

ROARING.

Roaring is another disease of the larynx of frequent occurrence, and of serious import, affecting the most valuable horses, and often reducing their value 80 or 90 per cent. It derives its appellation



11.—A, Healthy Windpipe. B, Curved Windpipe.

from the peculiarity of the noise made in breathing, this noise being occasioned by the air rushing through a contracted channel.

Anything, therefore, which diminishes the natural calibre of the larynx or wind-pipe may occasion roaring; and thus we find it proceeds from a variety of causes,—such as a contraction of the wind-pipe itself, bands thrown across it, thickening of the membrane of the larynx, ossification of its cartilages, absorption or attenuation of the muscles which open the larynx, and distortion of both wind-pipe and larynx, or either. The noise is not heard when the horse is at rest, or at moderate work, but only when the respiration is increased by exertion. There is, of course, a great variety in the degrees of roaring; some horses make a noise as soon as they are trotted, others not until they are put to the top of their speed. This depends to a great extent on the amount of impediment that may exist, and partly on the condition and capability of the horse for performing fast exertion. Thus the same degree of obstruction that would make a heavy horse roar in the trot, will perhaps only occasion the noise in a thorough-bred horse during a gallop. Different degrees of obstruction occasion variations in the sound produced; and thus we have the names, whistlers, wheezers, and high-blowers, given by horse-dealers to horses that roar. Independent of the nuisance occasioned by the disagreeable noise, there is an incapability of performing the same exertion as before, in consequence of the obstruction preventing a sufficient quantity of air from entering the lungs in a given time; and sometimes suffocation is produced in consequence.

Treatment.—As a general rule we may state that there is no cure for roaring. It is only when there is actual sore throat, or inflammatory action going on in the larynx, or morbid changes very recently formed, that we can afford relief; but in such instances we often can do so, to a considerable extent, by the continued application of iodine combinations externally at the region of the larynx, assisted by the administration of hydriodate of potash internally, at first perhaps combined with calomel, and afterwards with vegetable and mineral tonics. The horse should be kept in the highest condition, and not allowed to overload his stomach previous to exertion. It is customary sometimes to place a strap, so as to press on the nostrils, which diminishes the noise in bad roaring. This, however, does not enable the horse to perform more labour, but it merely lessens the noise by preventing the admission of more air than can readily pass through the contracted larynx. In the greater number of cases there is neither cough nor imperfection of the wind attending roaring: when the former exists, it denotes that the roaring proceeds from the morbid depositions produced by sore throat, &c., or laryngitis.

DISEASES

OF

THE ABDOMINAL VISCERA.

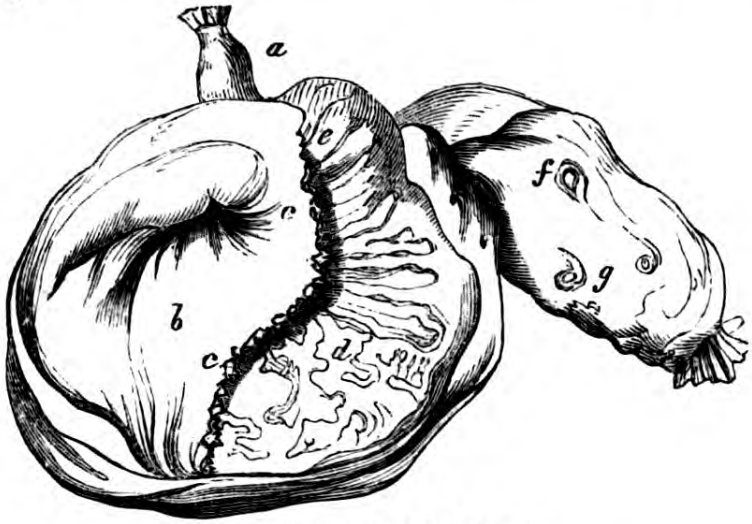
COMPARATIVE STRUCTURE OF THE ABDOMINAL VISCERA.

It will be convenient to preface this part of our subject by a few observations on the comparative structure of the organs, of the diseases of which we intend to speak. Compared with man and carnivorous animals, the *abdomen* of the horse is of large volume, though, for evident reasons, comparatively smaller than that of the ox or sheep. The nature of his food requires considerable size in the intestines, and these of course demand a corresponding cavity for their reception; and thus we find that horses with very small bellies, though willing and free, are incapable of long-continued exertions, and carry very little flesh in their work.

The abdomen is lined by a dense, strong, and elastic cellular membrane, called the *peritoneum*, which is also reflected on the viscera, and secretes a watery vapour or fluid, which lubricates every part, and enables the almost continual motions of the bowels to be executed without injury. The lower part of the abdomen is occupied by the large intestines when the horse is in a standing posture, and the small guts are above them.

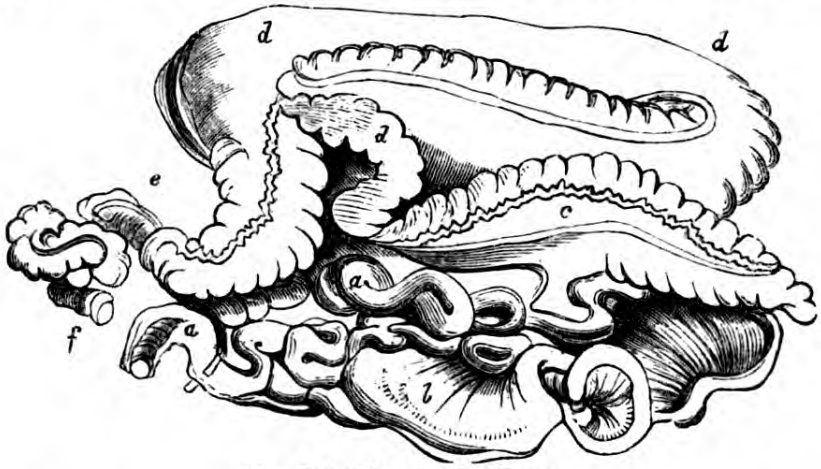
The *stomach* of the horse is very small compared with most other animals, and usually contains about three gallons; it is, however, a strong muscular cavity, capable of considerable distension: it is situated on the left side, and, when full, presses on the diaphragm, and mechanically impedes its action. On cutting into the stomach, we find that one half is lined by a white cuticular and almost insensible coat, and the other half by a red villous and very sensitive membrane, which secretes the gastric juice by which digestion is in a great measure effected. It has two openings,—one in the cuticular coat, called the cardiac orifice, which receives the food from the œsophagus, and the other in the villous coat,

called the pylorific orifice, through which the food passes into the intestines.



12.—Stomach of the Horse.

The *intestines* of the horse are very spacious and of great length, being no less than ninety feet, the greater part of which length is formed of the small intestines. They are composed of three coats: the peritoneal, which we have spoken of; the muscular, by which its snake-like movements are effected, and the mucous, which secretes a mucous fluid for its protection. The small intestines contain about eleven gallons, and the large eighteen: the chyle is principally absorbed in the former by the small vessels called lacteals, whose mouths open on the inner coat of the intestines.



13.—Intestines of the Horse.

Fig. 12. *a*, the œsophagus; *b*, part of the stomach covered by the cuticle; *c*, *c*, margin of separation between the cuticular and villous or mucous (*d*) coatings; *e*, point of communication with the first intestine; *f*, pyloric orifice for the passage of the bile and pancreatic secretion into the first intestine; *g*, is a smaller opening for the passage of the pancreatic secretion.

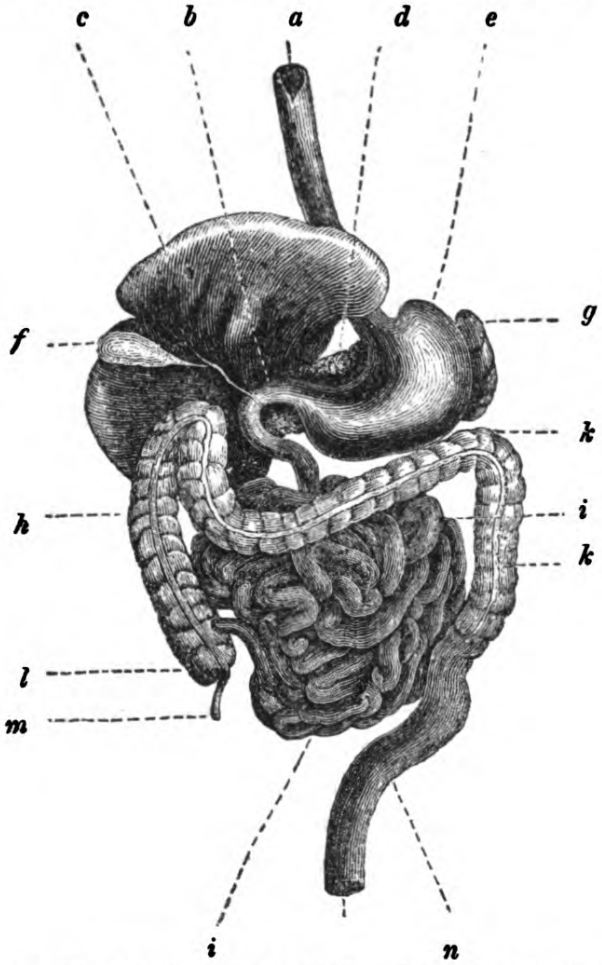
Fig. 13. *a*, *a*, small intestines; *b*, portion of the mesentery; *c*, the cœcum; *d*, *d*, *d*, the colon; *e*, the rectum; *f*, termination of the rectum.

The *bowels* are fastened to the spine by a strong membrane, called the *mesentery*, which serves as the medium of communication of the numerous vessels and nerves which pass to and from them. The inner surface of the intestines is of vast extent, exceeding that of the surface of the body: the large intestines are puckered by strong bands, which serve to give support, and, at the same time, increase the interior surface. The small intestines are called the *duodenum*, the *jejunum*, and the *ileum;* but the distinction is quite arbitrary. The large ones are, however, with greater reason distinguished as the *colon*, the *cæcum*, and the *rectum:* the former is the largest, containing no less than twelve gallons; the second is the chief receptacle for fluids, and has a blind extremity which first appears on opening the abdomen; the last is the smallest and most posterior, from which the fæces are expelled by its strong muscular coat.

The *liver*, the largest gland in the body, is of a reddish-brown colour and irregular figure, being divided into lobes. It is fastened to the diaphragm, and kept in its situation towards the right side by strong portions of peritoneum. It is supplied with arterial blood for its own nourishment, but it separates the *bile* from impure venous blood, with which it is furnished by some large veins. The bile thus formed passes into the intestines at once, there being no gall-bladder in the horse, through the hepatic duct. The quantity secreted by the horse is relatively much greater than in man, being no less than 37 lbs. in the course of 24 hours. We are indebted to Professor Liebig for some new and important ideas with regard to the use of the bile. It used to be supposed that its office was confined to the digestion of the food, and that it stimulated the intestines to the performance of their functions; but it appears that its principal use is to separate the carbon of the transformed tissues from the venous blood, and convey it to the bowels, where the greater portion is again absorbed and taken into the system: it thus furnishes carbon for uniting with the oxygen of the atmosphere, by which union the heat of the body is supplied and maintained. The bile contains 90 per cent. of water, the remainder consists for the most part of carbon, besides which there is soda, which also reappears in the blood, and finally escapes from the system with the urine. Thus it is that diseases of the liver generally occur in hot weather, when the system is loaded with carbon, for then, there being less demand for heat in the body, there is less oxygen inspired, less carbon excreted by the lungs, and more conveyed and re-conveyed to the liver; and thus in inflammation of the liver the blood is often loaded with fat and oil.

The *pancreas*, or sweetbread, lies close to the spine, and near the left kidney: it secretes a fluid resembling saliva, which is dis-

charged into the intestines close to the hepatic duct. It serves to dilute the contents of the bowels, and furnish them with soda.



14.—The principal organs of digestion and secretion.

The *spleen* is a peculiar organ loosely attached to the stomach: it does not secrete any fluid, but appears to be a reservoir for blood.

The *kidneys* are two glands closely attached to the lumbar vertebræ and the psoas muscles. They are largely supplied with arterial blood, from which they separate the urine, which is conveyed to the bladder by long tubes called the ureters. The urine, it is well known, abounds with ammonia, a compound consisting largely of nitrogen, which is derived from the transformed tissues arising from the waste the body is continually undergoing. Its properties are alkaline, whilst that of carnivorous animals possesses acid properties.

Fig. 14. *a*, œsophagus; *b*, pylorus; *c*, liver; *d*, pancreas; *e*, stomach; *f*, biliary duct; *g*, spleen; *h*, large intestine, *i*, *i*, small intestines; *k*, *k*, colon; *l*, cæcum; *m*, extremity of the cæcum; *n*, rectum. This figure is from the human subject, and is introduced here for the reason assigned in the foot-note on p. 13.

GASTRITIS.

Gastritis, or inflammation of the stomach, is a rare disease in the horse, and when it does occur it is most frequently produced by poison: it now and then, however, appears as a natural disease. Its usual symptoms are a dull, heavy appearance, loss of appetite, hot mouth, swollen eyelids, abdomen enlarged, bowels rather costive, pulse oppressed and ranging from fifty to sixty. This stage is sometimes followed by one of excitement, in which the pulse is increased in frequency, and the febrile symptoms are more marked; and this stage may be again succeeded by stupefaction. There is not the acute agony of inflammation of the bowels, but it is evident that there is a constant pain of a more subdued character. The disease may be produced by anything that disturbs the digestive functions, and it is attended with considerable danger.

The *Treatment* must consist of copious blood-letting, oily laxatives, injections, plenty of diluents, such as linseed tea, and stimulating externally the region of the stomach, and afterwards administering vegetable tonics.

Poisons.—If there is reason to suspect that the animal has had poison administered, we must endeavour to ascertain the nature of the poison, and apply without delay the best antidote. If arsenic has been taken, lime-water and mucilaginous liquids, in large quantities, should be given, and bleeding avoided, as being calculated to encourage absorption; but endeavours should be made to subdue the inflammation by other means. If Corrosive Sublimate has been taken, the white or albumen of eggs should be given suspended in water, as this renders the sublimate insoluble. If the preparations of Lead have been given, Epsom salts with linseed oil and gruel should be administered. For Sulphate of Copper the best antidotes are soap, oily purgatives, and gruel. For the strong Acids, Chalk, Magnesia, and Soap, and large quantities of liquids, should be given. When death takes place, we usually find, if a mineral poison is the cause, that the stomach as well as the intestines are eroded, ulcerated, and inflamed. If gastritis proceeds from natural causes, and terminates fatally, the stomach is greatly inflamed, and a thick coat of blood is sometimes effused under the mucous membrane.

Inflammation of the stomach may exist in a sub-acute form, but very rarely; and cancer and scirrhus in this viscus are still more seldom met with.

STOMACH STAGGERS.

Stomach Staggers, or the mechanical distension of the stomach with food, is now a very rare disease compared to what it once

was. This favourable alteration may be attributed to the much better system now pursued in the feeding of horses; they are not kept without food so long as used to be the case with agricultural and waggon-horses. Indigestion may either be the cause or the consequence of the distension. When the stomach is empty, and a large quantity of food half masticated is hastily consumed, indigestion is the natural consequence; but the powers of the stomach may be sufficient to overcome the indigestion, or it may induce the torpor and other symptoms of stomach staggers. On the other hand, indigestion occasioned by deleterious substances may precede, and render the food productive of distension. Some years since this disease proved dreadfully fatal in Wales, and produced great havoc amongst the horses employed in the mines; but in England the attacks have usually been solitary, or confined to a few cases. It was, however, of somewhat frequent occurrence on undrained moors, and was there ascribed to eating the weed called ragwort, or stagger-wort, as it was locally denominated.

The *Symptoms* are, great heaviness and drowsiness: the horse rests his head against the manger, or forces it against the rack or the wall, standing with his fore legs much under him. These symptoms would appear to denote disease of the brain, but there is such an intimate nervous communication between this organ and the stomach, that it becomes affected by sympathy. The bowels are costive, the abdomen greatly distended, the urine high coloured, the membranes of the nostrils and the mouth often of a yellow tinge; and sometimes there is a twitching of the muscles of the chest. The breathing is not increased, and the pulse for some time does not greatly exceed the natural standard. There is little or no appetite, but the food is taken and partly masticated, and dropped again from the mouth. These symptoms go on increasing, and the animal may die paralysed or convulsed, or tetanus may supervene; and sometimes the symptoms of the most violent brain fever may carry off the animal.

The *Treatment* must be regulated by the symptoms and condition of the horse. If the abdomen is greatly distended and feels hard, we may rightly conjecture that the stomach is loaded with food; if, on the other hand, the abdomen is of moderate size or tucked up, then the cause may be in the brain, or there may be indigestion, but without much mechanical distension. In the former case our utmost efforts must be employed in relieving the overloaded viscus. Croton oil, 30 drops, may be given with a pint of linseed oil and 2 drachms of ginger; and moieties of the two latter medicines may be repeated several times. Injections should be thrown up frequently so as to relieve the bowels. Bleeding may be practised, but in moderation, and the abdomen may be fomented externally. Spirits of nitrous ether and the liquor

ammoniæ acetatis, an ounce of the former and two of the latter, should be given twice a-day; and when the bowels are relaxed, vegetable tonics will be found advantageous. If the symptoms of excitement should succeed those of torpor, profuse blood-letting may be had recourse to. If indigestion appears to be present, but without distension, we must then endeavour to restore the tone of the stomach by mild laxatives, diffusible stimulants, and vegetable tonics.

SPASMODIC AND FLATULENT COLIC—FRET—GRIPES.

These various terms are employed to designate a disease which is very common in the horse. It may proceed from indigestion, drinking cold water, or eating green food. There are several varieties of the disease: for instance, *Flatulent colic*, which is the most frequent, is distension of the stomach or bowels with the gases produced by the fermentation of the ingesta, and often arises from eating green food. *Spasmodic colic* is violent spasms or contractions of the muscular coat of the bowels, and often proceeds from a large draught of cold water, particularly if it be hard. *Stercoral colic* arises from indigestion, and the mechanical interruption caused by an accumulation of food. The *symptoms* of the two former are pretty much alike, and are characterized by the exhibition of the most violent and acute pain; the horse paws his litter, lies down, rolls on his back, looks round on his sides, rises again, and continues suffering the most violent agony for some time, with occasional intermissions of ease. In flatulent colic the abdomen is distended; in spasmodic, it is not. There is generally an incapability of passing the urine, which induces the attendants to suppose that the pain arises from this inability to stale; but this is not the case, for sometimes the horse is relieved from the most violent pain in a very few minutes, and then, the stomach and bowels being eased, the horse stales readily, and this is one of the earliest and most decided symptoms of improvement. The neck of the bladder probably sympathizes with the bowels. The pulse for some time is but little, if at all, increased in frequency, and if it is so during a paroxysm, it quickly subsides on its remission. This is very essential to observe, as it affords the most important means of discriminating between colic and inflammation of the bowels; but, in addition, we may observe, that in the latter disease there are no intervals of ease, and there is often coldness of the extremities. In stercoral colic the symptoms are by no means so violent, but more constant and long continued.

The *Treatment* must consist in the immediate administration of an anti-spasmodic; some give spirits of turpentine with linseed oil, but, though often successful, there is some danger of producing

inflammation, which it is better to avoid, or of inflaming the throat if the horse retains it there for some time, as is frequently the case in this disease. Hartshorn is subject to the same objections; in the absence of other agents, however, they may each be given, and then the dose of the former is from two to four ounces; and the latter one or two. In the same manner a quarter of a pint of brandy or gin, or one ounce of ginger dissolved in water, may be often successfully employed. A better remedy than any of these, however, is the tincture of opium, an ounce of which may be combined with one of tincture of myrrh or valerian and two of spirit of nitrous ether; or, if there is flatulency, six drachms of sulphuric ether, and given with a pint of tepid water. If relief is not obtained in the course of an hour, the dose should be repeated, and the horse bled, and that and any subsequent doses had better be given with a pint or more of linseed oil. In stercoral colic we must not expect immediate relief, and it is better to bleed early and give large doses of linseed oil with tincture of opium, repeating the dose every three or four hours, and assisting the action of the oil by frequent and copious injections of warm water. By this treatment we shall generally succeed in removing the obstruction and the pain. There is much less danger attending the profuse purging which afterwards succeeds, than if it is produced by aloes; plenty of thick gruel must, however, be administered, to which a few drachms of gentian and ginger may be added.

INFLAMMATION OF THE BOWELS (*Enteritis*).

It is important to distinguish this disease from that last described, as there is some essential difference required in the treatment. It consists of inflammation, principally, of the muscular coat of the bowels, and it causes the most acute and severe pain. The horse lies down, looks round at his flanks, groans, sweats, rolls and plunges about, and gets up again, and thus continues with but slight, if any, intervals of intermission. There are, in fact, no paroxysms, as in colic; there is no relief from pain, though the agony may not be at all times alike. The extremities soon get cold; there is an absolute loathing of food; the pulse is exceedingly quick; at first somewhat full and hard, but it soon becomes small and wiry; and except at the onset of the disease, the blood is of a dark colour. The causes of enteritis are cold applied to the abdomen, either externally or internally, long-continued and rapid exertion, and indigestible or improper food, or indigestion from other causes.

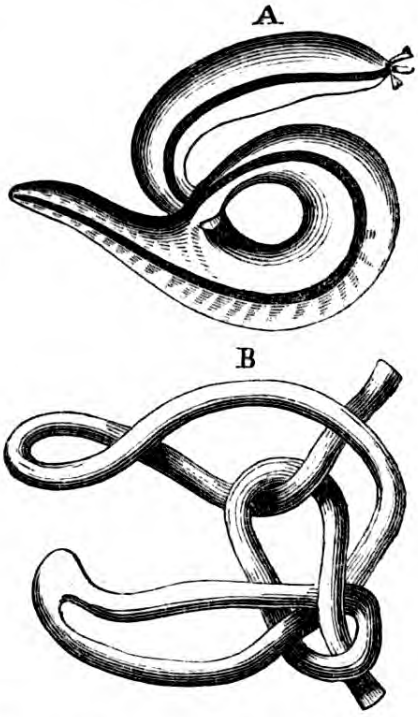
Treatment.—There is no disease that requires more prompt and energetic attention than this. In the first instance a large opening should be made in the jugular, and if the blood does not flow

rapidly, a similar opening on the other side of the neck. With the finger on the pulse, we should abstract as much blood as the animal can bear, continuing the operation till the pulse is scarcely perceptible, by which time from six to eight quarts will probably have been abstracted. The following draught should next be administered—powdered opium, a drachm and a half; tartarized antimony, one drachm; spirit of nitrous ether, one ounce, which, having been mixed together, a pint and a half of linseed oil may be added. Injections of warm water should be frequently thrown up, the extremities bandaged with flannel, the warmth having been previously restored by means of hand-rubbing and a liniment of oil and turpentine. The abdomen should be fomented with hot water for a long time together, by means of long woollen cloths held by two men, one on each side of the horse; the cloths should not be very wet, but being wrung by the men, they should be applied to the abdomen for several minutes at a time. The bleeding, if required, should be repeated in the course of four or six hours, and the best sedative will be a ball containing a drachm each of opium and calomel, which may be given every six hours. The horse should be encouraged to drink warm water and tepid gruel, and thick oatmeal or linseed gruel may be given as a drench from time to time. If constipation continue, the oil, in half doses, must be repeated. When the horse gets better, no corn and very little hay should be given for several days, but plenty of bran mashes. He will require much care and attention, and should not be put to his work too soon.

STRANGULATION OF THE BOWELS.

Strangulation of the bowels sometimes produces symptoms very similar to those we have described under the head of enteritis. It is, in fact, inflammation of the bowels, but confined to a more limited space. There are various kinds or causes of strangulation —sometimes the guts become entangled and twisted into a knot, at others the mesentery is ruptured, and the part separated forms a noose, through which the bowels pass when empty, and afterwards becoming distended with food or wind, strangulation is the consequence. Sometimes one portion of the intestines becomes insinuated into another, causing *inter-vagination.* These morbid changes may either be the consequence of the violent motion of the bowels in spasmodic colic, or they may arise from accidental or natural causes, which produce all the symptoms that we notice from the beginning. When spasmodic colic becomes fatal, it is most frequently from strangulation of the intestines supervening. The early symptoms of strangulation resemble those of colic, but without any remission of pain: it thus differs from enteritis in the

rapid pulse, and other marks of inflammation, not being present at first, but gradually and fatally developed afterwards. It must be



15.—A, Strangulation of the rectum.
B, Strangulation of the small intestines.

evident, though it is impossible to pronounce decidedly that strangulation has taken place, that, when it is so, all treatment will be fruitless.

HERNIA, OR RUPTURE.

Hernia consists in the escape of a portion of the intestines from the abdomen. When this takes place through the abdominal ring, it is called *scrotal* hernia in the horse, and *inguinal* in the gelding. Sometimes it is *congenital*, appearing at birth, and this may also be the case with abdominal hernia; but it is more frequently produced afterwards by external injury, such as a hook from a cow, which ruptures the abdominal muscles, but not the more elastic skin. Scrotal hernia sometimes becomes strangulated, when the utmost agony is produced, and, if relief is not speedily obtained, death is sure to follow. No time, therefore, must be lost, but the horse being thrown, attempts should be made to reduce the hernia by manipulation with the hands (the *taxis*), a powerful opiate, with blood-letting, having been previously employed. If this fails, the scrotum must be opened, the stricture carefully en-

larged, the intestine returned, and the testicles removed. In congenital scrotal hernia, the intestine should be returned into the abdomen, and the colt castrated by the caustic clams without cutting into the vaginal sac. Abdominal hernia may often be cured by pressing in the intestines, and tying a strong ligature closely round the skin, which, sloughing off, leaves a cicatrix, which prevents the re-escape of the bowels. In more extensive cases, a cure has been accomplished by cutting through the skin, reducing the rupture, and preventing its return by strong metallic sutures connecting together the lacerated muscles.

CALCULI IN THE INTESTINES.

Large stones in the intestines sometimes produce stoppage, inflammation, and death. Millers' horses are most subject to this disease, and the appearance of the calculi shows that for the most part it consists of the powder from the millstone intermingled with the food: this is taken with the bran, which usually forms a larger portion of the diet of such animals. Horses so affected are frequently subject to colic, but usually get relieved after a while, either with treatment, or by the stone becoming dislodged by the struggles of the animal. The *symptoms* resemble those of colic; but there is obstinate constipation, and if the stone is in the large intestines, as it generally is, unless it is in the stomach, the horse will sometimes sit on his haunches like a dog. He should be copiously bled, and opium, with large doses of oil, administered; the former to relieve the pain, and the latter to promote the evacuation of the calculi, which, if not too large, may sometimes be accomplished.

RUPTURE OF THE INTESTINES.

Rupture of the intestines now and then occurs: the symptoms resemble enteritis of the worst kind, but with greater loss of strength and pulse, and it becomes fatal often in the course of twelve hours; the horse will also sometimes sit on his haunches.

DIARRHŒA AND DYSENTERY.

Inflammation of the mucous coat of the bowels is not so common as it used to be, when the enormous doses of aloes, and other purgatives of which we read in old books, were commonly administered. This leads us to the most frequent cause of the disease, which is, an overdose of purgative medicine. The horse, either from its vast extent or other causes, is very liable to inflammation of the mucous coat of the intestines. It is, indeed, one of the peculiarities

of the animal, and renders purging a much more serious affair than in man, and occasions a small dose of aloes to be so dangerous in affections of the lungs. There are, however, several stages or varieties of disease in this coat. We may have simple *diarrhœa*, which is purging without inflammation; or *dysentery*, vulgarly called molten grease, in which large flakes and masses of fatty-looking mucus are discharged with the fæces, which may either be hard or relaxed. This disease appears to be subacute inflammation of the mucous membrane. Diarrhœa should be treated with opium, 1 dr., powdered chalk 2 oz., catechu 2 drs., and ginger 1 dr., with wheat-flour gruel, keeping the body warm and comfortable. Dysentery requires the oily laxative, together with the calomel and opium ball previously advised, with plenty of linseed tea or other diluents.

SUPER-PURGATION.

Super-purgation from actual inflammation is extremely dangerous: it is attended with coldness of the extremities, weakness, and pain; the horse lying down, looking round at his flanks, and feeling greatly distressed; the pulse is small and thready, and the membrane of the eyelids and nostrils of a deep red or orange colour. It is necessary to avoid bleeding, at any rate until the pulse becomes much more distinct and stronger. The following draught should be administered as early as possible:—Powdered opium, 1 dr.; prepared chalk, 4 oz.; acacia gum, 1 oz.; carefully dissolved in warm water, and given with plenty of oatmeal gruel, which, alternated with linseed tea, should be often repeated. The legs should be bandaged, and the abdomen fomented with hot water. The medicine, or one half of it, may be repeated, if necessary, in a few hours; and when the purging appears to be stopped, half a pint of linseed oil should be given to prevent constipation, which, as the sequel, is attended with danger. Unless the symptoms can be relieved early, the disease becomes fatal sometimes in the course of twelve hours; and the inside of the intestines discovers traces of extensive disease, being often completely black. This disease is more frequent than enteritis, and, like it, may be produced by over-exertion and exposure to cold. Some horses are more disposed to it than others, and particularly those with light carcases.

PERITONITIS.

Peritonitis, or inflammation of the peritoneal coat of the bowels, is extremely rare in the horse. When it does occur, it usually proceeds from castration, the inflammation spreading from the

scrotum through the abdominal rings, which in the horse continue open to the abdomen; and then it is frequently fatal. It also sometimes accompanies pleurisy, the membrane attacked being the same in both these diseases.

The *treatment* must be regulated by the symptoms, and should be nearly similar to that advised for enteritis.

ASCITES.

Dropsy of the abdomen is still more rare in the horse: it is the effect of subacute inflammation of the peritoneum, and should be relieved by tapping.

WORMS.

There are various worms which are found in the intestines of the horse. *Bots* are the larvæ of the gad-fly, of which there are two species, which deposit their eggs on the skin. These eggs are swallowed by the horse, and are hatched in the stomach, where they remain fixed by their hooks for the greater part of the year, and are then excreted with the food, and take the form of the



16.—Gad Fly.



17.—Œstrus Equi.



18.—Red Bot.

parent fly. They are seldom injurious. The *Tercs*, or round worms, as well as the thread-worm, *Ascaris*, are very common in horses, particularly in those that are poorly fed, and in bad condition. The latter occasion the most irritation, and are principally found in the cæcum. If the horse appears in good health and condition, it is well to let the worms alone; but if otherwise, we may have recourse to some means for their expulsion. A drachm of tartarized antimony, or six grains of arsenic, combined with vegetable tonics, and given daily for a week, and followed with a pint and half of linseed oil, will often succeed in removing them; or three ounces of spirits of turpentine, with the above dose of oil, and followed with tonics, have also been exhibited with success.

DISEASES OF THE LIVER.

Diseases of the liver are much less frequent in the horse than in man, owing probably to the more regular manner in which the

former is both fed and worked. If, however, a horse is very highly fed, and very little exercised, the system becomes loaded with carbon, which cannot get relieved through the usual outlet—the lungs, as the horse does not respire sufficiently, nor consequently absorb sufficient oxygen to combine with the carbon that is ready to be excreted. Much of the superfluous carbon is converted into fat; but what cannot be so converted is thrown on the liver, and disease of the organ is the consequence. In warm weather there is much less oxygen required for keeping up the animal heat, and there is consequently less oxygen absorbed, and less carbon expired: thus it is that animals are more disposed to get fat in the summer than in the winter, and more liable, for the same reason, to diseases of the liver.

JAUNDICE.

Jaundice, or the yellows, is an extremely rare disease in the horse. There being no gall-bladder, there is less danger of obstruction from gall-stones, or other causes, and therefore the bile is rarely absorbed into the system, colouring the membranes of the eyelids and nostrils with a yellow tinge, which is the principal symptom in the human subject. When the membranes are so tinged, it is generally the consequence of

Hepatitis or Inflammation of the Liver.—The *symptoms* of this disease are less marked than in inflammation of the lungs, but they depend very much upon the acuteness of the attack. In the acute variety, we have a quick pulse, ranging probably between 50 and 70, and firm and regular. The respiration is also increased, but without the distressed appearance of pneumonia, and the horse prefers a standing posture, but not obstinately, as in that disease; and as the inflammation advances, he will lie down and get up frequently. The mouth feels hot, and there is no appetite. These symptoms do not all make their appearance suddenly, but the disease has probably been creeping on for days before the horse has been thought to be amiss. The yellowness of the eyelids and mouth, in addition to the other symptoms, testifies the nature of the malady, which is otherwise obscure. It is a very dangerous complaint, and is not unfrequently fatal; and it often occurs in connection with other diseases, and more particularly with the *Influenza*, the danger of which it greatly increases. The sides, and particularly the right, are tender on being pressed, and the fæces are hard and coated with mucus, and sometimes fœtid and purging. When the symptoms are unrelieved, they all become more urgent; the pulse quicker, weaker, and vacillating; and the animal dies in the course of ten or twelve days.

The *treatment* must be less active than that advised for pneu-

monia, and particularly with regard to bleeding. From three to five quarts will usually be sufficient at first, and two or three on repeating the operation. The following draught should be given:—Carbonate of potash, 2 drs., aloes, 2 drs., dissolved in hot water, and then well shaken up with 12 ozs. of linseed oil, and 1 dr. of calomel; to be repeated twice a day, without the aloes, until the bowels are moderately relaxed, and to be assisted by raking and injections. If there are symptoms of pain, 1 oz. of tincture of opium may be added to the above.

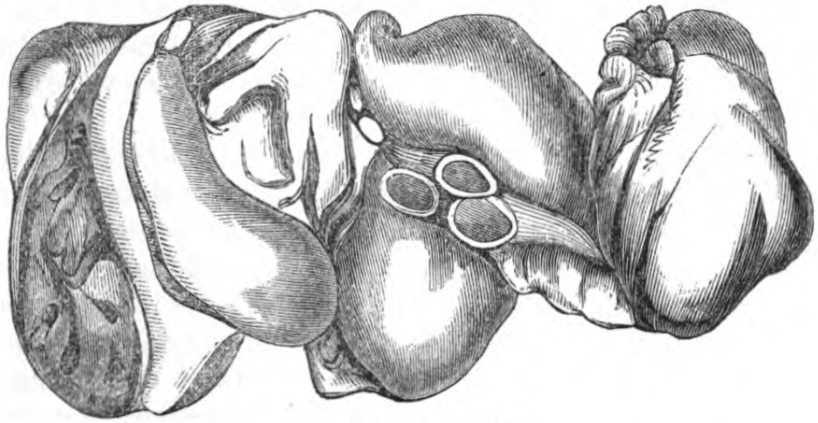
The sides should be well blistered opposite the region of the liver; and when the bowels are relaxed, the following should be administered every twelve hours:—Opium, $\frac{1}{2}$ dr.; calomel, 1 dr.; resin, 3 drs.; carbonate of potash, 2 drs.; to be made into a ball with soft soap. Vegetable tonics may afterwards be given in combination with the above, or alone, as the symptoms may intimate.

Chronic Hepatitis.—Chronic inflammation of the liver is attended with symptoms more obscure than those last mentioned, but of the same character, and a dull heavy appearance: the animal should be treated on the same principles, but bleeding must be very moderate, or altogether omitted.

Enlargement of the Liver is an obscure disease, and creeps on without attracting attention. The symptoms are, enlargement and hardness of the abdomen, bowels either constipated or relaxed, pulse remarkably rapid, and loud and thumping, as in disease of the heart.

The *treatment* should consist of laxatives, calomel and opium, and counter-irritation, and afterwards vegetable tonics; to these the iodide of iron, in doses of a scruple, may be added.

Hepatirrhœa.—Closely connected with this disease is hepatirrhœa,



19.—Diseased Liver.

or rupture of the coats of the liver, and hæmorrhage from it. Old

Fig. 19. The concave surface of the liver, shewing structural alteration of the organ, and the effusion of blood underneath its peritoneal tunic.

horses are chiefly affected, and the rupture is preceded by structural disorganization, similar to that last described. The *symptoms* vary according to the amount of the rupture and the loss of blood, and whether it be merely effused under the peritoneal coat of the liver, or whether the coat is also broken, and the blood escaped into the abdomen. In the latter case, the loss is considerably greater, and the horse paws, shifts his posture, sighs, curls the upper lip, tosses his head, and exhibits great debility, and partial or total blindness: the pulse is exceedingly quick and feeble, and the membranes blanched. Death occurs in the course of a few hours; and on examining the horse, a considerable quantity of dark blood is found in the abdomen, and various rents in the liver, from which it escaped. This viscus is greatly enlarged, weighing sometimes upwards of sixty pounds; the increased size consisting for the most part of effused and coagulated blood. The structure of the liver is readily broken down, and it is of a fawn or brown colour. If the hæmorrhage is but moderate, or simply under the peritoneal coat, the symptoms are much less urgent, though of the same character, and the horse may rally and apparently recover, only however to sink under the disease at some future time, though perhaps not till after several attacks. The partial or total blindness is a frequent, and sometimes one of the earliest symptoms: the retina becomes gradually insensible to light, and paralysis and amaurosis take place. This may occur first in one eye, and then in the other; and in this case, the first attacked either may or may not be restored to sight. As the animal gets better from an attack, the urine becomes of a dark brown or black colour, from the presence of carbonaceous principles, which are thus carried out of the system.

Treatment in this disease can be of little avail: bleeding, however, should be avoided, and preparations of turpentine, copaiba balsam, and alum, may be given; one ounce of the two former, and a drachm of the latter.

Decayed Structure of the Liver.—Another disease of the liver, and of a very insidious and destructive character, and by no means of uncommon occurrence, may, in the absence of a more appropriate name, be called *decayed structure*. It often precedes or accompanies other diseases, and greatly increases their danger, sometimes causing blood-letting, or a dose of physic which would otherwise have been harmless, to produce a fatal effect; and then the liver is found to be of a yellow-brown colour, and sometimes so disorganized as to be easily separated from its covering, and, in fact, a pulpy mass. The *symptoms* are very uncertain and obscure, for the horse may look sleek and fat, although the liver may be dreadfully disorganized. The eyelids and mouth, however, will usually have a yellow appearance; the appetite will be impaired,

and faintness and dulness be present. The fæces are usually soft, showing that indigestion exists; and the pulse is as slow, or slower, than usual.

Treatment.—Bleeding should be avoided in this disease, and much caution otherwise exercised. Calomel and opium, and aloes, of each one drachm, should be given once a day in a ball, combined with three drachms of resin. This treatment should be continued for four or five days, and may be followed by mild tonics, regular exercise, and wholesome but not too rich food.

The *unhealthy* secretions of the liver are sometimes the cause of excessive purging, when the pulse is rapid in the extreme, and the debility very great. Such cases should be treated as advised for *super-purgation.*

INFLAMMATION OF THE KIDNEYS *(Nephritis).*

Nephritis is not a frequent disease in the horse. The *symptoms* are, considerable pain and distress, very quick pulse, an increased respiration, hot mouth, and other tokens of fever: the horse flinches on the least pressure applied to the loins, and the urine is of a very dark and almost black colour. It may be produced from a strain across the loins, exposure to cold and wet, and too strong or too long-continued diuretics.

Treatment.—Copious blood-letting, repeated if necessary, oily purgatives, stimulating the loins with the iodide of mercury ointment, and applying afterwards a sheep-skin just taken from the sheep's back, the woolly side outwards. The skin should be replaced by another when it begins to smell offensively. Diuretics should be avoided, but sedatives will be very beneficial. A scruple of hellebore twice a day in a ball, till nausea is produced, has been employed in this disease with much advantage, but requires to be carefully watched. A drachm each of calomel and opium is also very suitable. Injections of warm water should be frequently thrown up, and the diet should consist of mashes and green food.

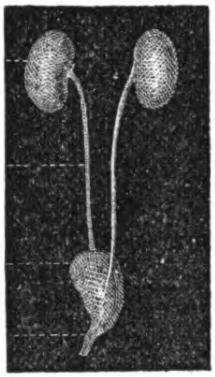
Injuries of the Loins.—Injuries of the muscles of the loins, from strains or other causes, and giving rise to many of the symptoms above described, although there may not be any actual inflammation of the kidneys themselves, should, however, be treated in the same manner.

INFLAMMATION OF THE BLADDER *(Cystitis).*

Cystitis is a still rarer disease than that of the kidneys. The symptoms are, great pain and fever, with their concomitants, and a continued desire to stale. No sooner is urine conveyed to the bladder than it irritates the inflamed mucous coat of this organ,

and prompts its immediate and forcible discharge. This disease is more dangerous than that last described.

Treatment.—Extensive bleeding, repeated if demanded. Oily laxatives, sedatives, but no diuretics. Sheepskin applied to the loins and to the abdomen if possible, or frequent hot fomentations to the latter. Sometimes the neck of the bladder is principally inflamed, in which case the urine is obstinately retained, and in some instances the bladder has been ruptured. This is more likely to occur in the horse than in the mare; whilst the latter is more liable to inflammation of the bladder itself. The treatment should be pretty nearly alike in both instances; but in the mare we are able to inject mucilaginous liquids into the bladder, whilst in the horse it is scarcely practicable. Linseed tea, made thin, with a few grains of opium dissolved in warm water, should be gently injected into the bladder, two or three times a day; and injections should be thrown up the rectum, which will act in some degree as a fomentation.



20.—Urinary Organs.

Spasm of the Neck of the Bladder.—Spasm of the neck of the bladder is by no means uncommon, particularly in the horse. It has already been stated that this affection frequently attends spasmodic colic, but then it appears to arise from sympathy, and is removed when the bowels are relieved. The most usual cause is travelling a long distance without being allowed to stale. The urine accumulates in the bladder, and the sphincter muscle, which closes its neck, having been so long in violent action, is thrown into a state of spasm and cannot be relaxed. The nature of the disease is shown by the frequent but ineffectual attempts at passing the urine, and the absence of those feverish and other symptoms which denote the accession of inflammation.

Treatment.—In the mare, relief can at once be obtained by passing the catheter into the bladder; but from the difficulty attending this operation in the horse, other means should be previously tried. In the first instance, the horse may be bled, then an ounce and a half of tincture of opium and spirit of nitrous ether should be given with a pint of warm water. The bladder should be examined per rectum, and the fæces removed at the same time, and gentle pressure used on the bladder, so as to encourage and assist the effort of staling. Clysters of warm water should be thrown up, and if these means fail, we must then have recourse to the elastic catheter, made with twisted wire and caoutchouc. The penis being drawn out at its full length, and grasped with the left

Fig. 20. *a*, kidneys; *b*, *b*, ureters; *c*, bladder; *d*, urinary canal.

hand, the catheter, which has been oiled, should be gently forced up the urethra until it passes the angle at the perineum and enters the bladder. The whalebone stilette should then be withdrawn, and the urine will pass through the tube.

DIABETES.

Diabetes, or excessive staling, is generally owing to the disturbance of the digestive organs, and foul provender. It is attended with thirst and fever, and is best treated by moderate purging, mineral and vegetable tonics, and iodine.

URINARY CALCULI.

Urinary calculus in the horse is more frequently found in the kidneys than in the bladder, and may exist there for years without its being known or suspected. In man, it is generally found in the bladder, which is owing to his erect position favouring the descent of the stone by its gravity. When it occurs in the bladder of the horse, it occasions much uneasiness, and frequent efforts to stale, the act being painful; and sometimes a few drops of blood are passed with the urine. The stone may occasionally be felt by passing the hand up the rectum, but still better if the animal is thrown, and turned on his back.

Treatment.—**Lithotomy.**—Almost the only method of relief is by the operation of *lithotomy*, which consists in passing a grooved staff up the penis (the horse being cast and turned on his back), until it can be felt at the perineum, where it is cut down upon, and the opening being enlarged by the *bistouri caché*, the forceps is passed into the bladder, and the calculus grasped and removed. Tepid water should be injected into the bladder, so as thoroughly to wash out its contents, and the wound sewn up, and the horse released. This operation requires much anatomical knowledge and surgical skill; and though the necessity for it seldom occurs, it has been performed successfully in various instances by the Professors of the Veterinary College and others. The urine will be discharged for some little time through the wound, which will heal gradually, the horse requiring care for several weeks. Calculi have been removed from the mare without this operation, but through the natural opening, by means of the forceps, one hand being kept in the vagina, so as to guide the stone.

CASTRATION.

The usual method of performing this operation is to open the scrotum with the knife, put on the clams, and divide the spermatic

cord with a hot iron. Another plan is, to divide the cord with the knife, tying the vessels, or stopping the bleeding by *torsion*. On the Continent it is customary to place the cord between two elder-sticks, tied together, and enclosing a caustic paste, and remove the testicles in a few days. This may be done without cutting into the vaginal sac, but enclosing it with the cord.

DISEASES OF THE BRAIN.

DISEASES of the brain are far less frequent than those either of the chest or the abdomen, and are comparatively much rarer than in the human subject.

PHRENITIS.

Phrenitis, or inflammation of the brain, vulgarly called *mad staggers*, is occasionally met with, and is ushered in with symptoms of heaviness, dulness, and unwillingness to move, diminished appetite, and redness of the membrane of the eyelids, &c. These appearances frequently escape observation, which, however, is quickly awakened by those of madness or delirium, which suddenly supervene. The horse plunges about the stall or box with the greatest violence, and will bite his attendants or other horses, rendering it somewhat dangerous to be with him. After exhausting himself by struggling, he will lie or fall down, the violence, however, returning with his strength. The disease consists of inflammation of the brain, and though somewhat resembling rabies and stomach staggers, may yet be distinguished from them. There is no method in the madness, as in rabies, and, with more violence, there is less actual disposition for mischief. In stomach staggers, there is generally an inclination to force the head forwards against the rack or other object, and there is a longer duration of the previous stage of dulness than in phrenitis. The cause of this disease may be considered to be too high feeding, and want of sufficient exercise, producing a too great fulness of the vessels, or plethora.

Treatment.—The treatment should consist of immediate and profuse bleeding, either from the neck or the temporal arteries, or any large vein that may be more readily opened. The bleeding should continue until the delirium ceases, the pulse falters, or the animal exhibits signs of fainting. More blood can be abstracted in this disease with impunity and advantage than any other, two and three gallons having sometimes been abstracted. Next in importance to bleeding is purging: a strong dose of physic should be given, either in a ball or in a draught: the latter is the quickest

in its action, but the former is the more certain, and its operation should be assisted by frequent injections. If the animal gets better, the diet should be restricted for some time.

MEGRIMS.

Megrims or *vertigo* is more frequent than phrenitis; it comes on suddenly, and appears to arise from sudden determination of blood to the head, produced by the pressure of a tight collar, or severe exertion, assisted by the predisposition of the animal, which in some instances is so great as to render the horse of very little value. The animal will suddenly stop, shake his head violently, reel from one side to the other, and sometimes recover, and at others will fall and struggle for some time with great violence.

The *treatment* consists in immediate bleeding, and giving afterwards a dose of physic.

RABIES.

Rabies, or *canine madness*, is invariably produced by the bite of a rabid animal, the poison being communicated by the saliva.

The *symptoms* very much resemble those of phrenitis, but with somewhat less violence: there is a greater disposition for mischief. There is not the reckless abandonment of phrenitis; the intellect of the animal is not impaired, but his destructive and combative propensities are more violently excited. One of the most striking symptoms of its approach is a spasmodic movement of the upper lip, and particularly at the angles. Convulsions of different parts of the body succeed, and the horse often fancies he sees some imaginary object, at which he will rear. To this succeeds the propensity for mischief, and the state of extreme violence, in which he will often level or destroy all surrounding objects. This generally terminates in paralysis, under which he sinks in the course of three to six days.

Treatment.—All treatment after the symptoms have once been developed is fruitless; but if the bitten spot can be discovered, we may succeed in preventing the disease. The writer has operated successfully on various horses that had been bitten by a rabid dog, by carefully applying the nitrate of silver to every part that exhibited the slightest appearance of the bite: if the bitten part can be afterwards conveniently excised, it will render the operation still more secure. The disease is generally developed from six weeks to three months after the bite, and sometimes much longer.

PARALYSIS.

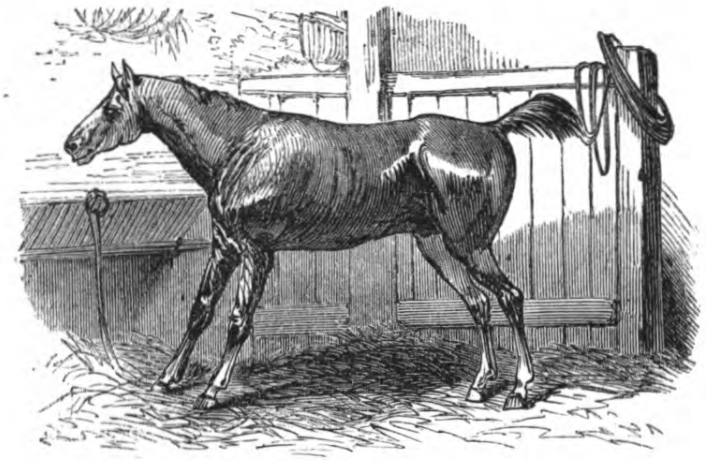
Palsy, or *paralysis*, is of two kinds,—*hemiplegia*, which is paralysis of one side of the body, and *paraplegia*, which is palsy of the

hind extremities. The former is very rarely met with in the horse, the latter is much more frequent, and generally arises from sudden injury of the spinal marrow at the region of the loins, such as a severe fall in hunting, or keeping back a loaded waggon; and it may also be produced by a tumour pressing on the nerves which supply the hind extremities. The former may or may not be accompanied by fracture of the vertebræ, and the latter is generally gradual in its approach.

The *treatment* should consist of venesections, laxative and febrifuge medicines, and the application of sheep-skins and stimulants to the loins. It, however, frequently happens that although the horse gets better, he is permanently weak in the loins,—"chinked in the back," as it is termed, and of no use, except for the lightest work. A disease very similar to this is common in India, and is there called *kumree.*

TETANUS.

Tetanus, commonly called locked-jaw, though this is but one of its symptoms, is not uncommon in the horse. It consists of violent spasm of the muscles of the body; if confined to the head and neck, it is called *trismus,* which is more manageable than when the greater part of the body is convulsed. When it is produced by a local injury, such as a broken knee, a prick from a nail, or docking, or nicking, it is called *symptomatic,* or *traumatic*; and when from other causes, such as exposure to wet and cold, or internal disease, it is denominated *idiopathic.* Spasm of the muscles of the jaw



21.—Horse with tetanus.

and neck, so that the former becomes nearly or quite closed, is one of the earlier symptoms, from which it gradually extends till the back and loins become rigid and fixed. The peculiar appear-

ance of a tetanic horse cannot be mistaken—the spine is immoveable, the head poked out, neck stiff, nostrils distended, ears and tail erect, and eyes often distorted; the muscles, thus cramped, feel hard as a board, and the whole aspect of the animal is one of the greatest distress. The nervous system, it is evident, is in a state of the highest excitement; and, on the least noise being made, the animal is greatly alarmed, and the respiration much increased and disturbed. The pulse is usually full, and not much quickened. On examining fatal cases, the viscera are often found greatly inflamed and diseased; and the brain and its envelopments, as well as the spinal marrow, frequently exhibit traces of inflammatory action.

Treatment.—Various methods of treatment have been recommended and adopted for this severe and fatal disease, and all with occasional success, but more frequent failure.

Idiopathic is more curable than *traumatic* tetanus, and has most frequently yielded to copious blood-lettings and purgatives, with opium and camphor, exhibited by the mouth, if possible, in doses of a drachm each, and also in the form of injections: croton-oil, forty drops, or aloes, eight drachms of which will not be too strong a dose, as there is much torpor of the bowels. Blistering applications to the abdomen have also proved of much service, and if the disease has arisen from an injury, the cauterization, or removal of the part, or the destruction of its sensibility by dividing its sensitive nerve, has assisted in the cure.

SPECIFIC DISEASES.

RHEUMATISM.

It used to be denied that the horse was subject to rheumatism, but there now can be no question as to the fact, both as regards the acute and chronic kind. The former is commonly termed a *chill*, and arises indeed from exposure to cold, and its reaction. The *symptoms* vary with the muscles that are attacked; if those of the chest, there is very rapid respiration in addition to the other symptoms. In all cases there is great pain, unwillingness to move, considerable fever, the pulse very quick, strong, full, and hard; and the blood, when taken, as we might anticipate from the pulse, is covered with a thick buffy coat, which, together with the character of the pulse, is characteristic of the disease. Notwithstanding the great pain and fever, the appetite is but little impaired. The disease is essentially an inflammation of the fibrous tissues, and it may and does fly about from one part to another, but still attacking the same tissue: thus it may affect the fibres of the muscles, the sinews and the ligaments, the bones and their envelopments, and thus it may accompany pleurisy, or precede or succeed it.

Treatment.—Copious blood-letting and repeated, oily purgatives, diffusible stimulants, diuretics, stimulating liniments rubbed on the affected parts, together with the application of sheep-skins, particularly if the loins are affected. The shoes should be removed from the fore feet, as there is considerable danger of the inflammation flying to the laminæ or *fibrous* tissues of the feet: poultices to the feet will be also calculated to prevent this result. The diet should be light and cooling.

CHRONIC RHEUMATISM.

Chronic rheumatism sometimes occurs as the sequel of the former disease, or independent of it. In the former instance there are frequently bony swellings thrown out about the joints, and the lameness shifts from one limb to another. In the latter instance there is generally lameness flying about from part to part in the

most irregular manner, often attacking muscles and sinews, and leaving no external appearance. It is sometimes the result of pleurisy, and the lameness may be either temporary or permanent.

The *treatment* is seldom satisfactory, and must be principally confined to external stimulants, as there are few, if any, constitutional symptoms to combat.

GLANDERS AND FARCY.

Glanders and farcy are two of the most fatal diseases to which the horse is liable; hundreds of animals have been carried off by them, but in consequence of the better stable management and improved ventilation now adopted, these diseases are far less frequent than they formerly were.

Glanders.—Glanders is so called from the hard swelling of the submaxillary glands, which is almost invariably found, and is attended with a discharge from the nostrils, somewhat of the nature of pus, which sticks to them, being of a viscid character. This discharge may be either copious or slight, according to the extent of the disease, or the stage it may be in. The disease has been distinguished as acute glanders, and chronic. In the former, the discharge is very copious from both nostrils, the glandular swelling is large, and there are frequently ulcers visible on the Schneiderian membrane which lines the nostrils. The pulse is generally slightly increased, and in the advanced stages a snuffling noise is heard when the animal breathes, arising from the obstruction caused by the matter. There is also an unthrifty appearance, hide-bound, and deficient condition. In chronic glanders the health is not impaired, or but slightly so; the discharge is generally from one nostril, the left, and the glandular swelling corresponds. No ulcers are visible, and in this state the horse may remain for months, or even years; but at length acute glanders and death succeed. Glanders is undoubtedly a contagious disease. If another horse, or an ass, is inoculated with the nasal discharge, it rarely fails to produce a kindred disease, which, by infecting the whole system, proves fatal in a short time. The inoculated part swells, and the absorbents in the neighbourhood also enlarge, and small abscesses form in their course, thus constituting farcy; but the poison soon reaches the head, and glanders appears. The appearance after death varies with the stage of the disease, for the horse is generally destroyed ere the malady becomes fatal. The membrane lining the nostrils is generally found covered with deep ulcers, which sometimes almost penetrate the thick cartilage called the *septum nasi*, which divides one nostril from the other. This ulceration likewise affects the different sinuses of the head, which are often nearly filled with offensive pus; the turbinated bones are

in a carious state, and sometimes the ulceration extends down the windpipe to the lungs, which are occasionally found full of small abscesses and tubercles. In mild chronic cases, the diseased appearances are apparently slight, and confined to a small extent of surface. The causes of glanders are, breathing a confined and unwholesome atmosphere, excessive exertion, bad provender, and contact with a glandered or farcied horse.

Treatment.—With regard to the remedy, it must be confessed that, although there are instances of a cure being accomplished, they are so extremely rare that it is only a very valuable animal indeed that will justify the expense of treatment. The sulphate of copper, in large doses, of 4 drs. to an ounce, in a draught, with linseed meal; cantharides 6 to 10 grs., with vegetable tonics, have been found, amongst the host of medicines that have been tried, the most successful in combating this disease: but it too frequently happens, that after a cure has to all appearance been accomplished, the disease again returns with all its former virulence.

Farcy.—Farcy is analogous to glanders, though a different part is affected. It may be produced by glanderous matter, and it may be the cause of glanders. Its usual commencement is generally lameness of one of the legs, usually the hind one, which, on examination, appears to arise from a trifling sore: a swelling takes place which cannot readily be reduced; other sores, or rather small abscesses, arise; the absorbent vessels of the limb feel hard and corded, particularly those of the groin. The nature of the disease is now self-evident. It spreads into the system; the fore legs become affected in the same manner as the hind ones; the mischief travels up the neck, attacking the head, and producing glanders and death, if the animal is not previously destroyed.

Treatment.—Although the poison appears to be the same, yet farcy is much more manageable than glanders, although, like it, appearances are very deceptive, and the disease often returns. The abscesses or farcy buds, as they are termed, should be opened as soon as they feel soft, and either the hot iron, or some strong caustic, applied to the ulcer. Iodine should be applied externally in the form of an ointment or liniment, well rubbed into the swollen parts, and particularly in the course of the absorbents. The iodide of mercury ointment will be rather too stimulating, but it may be mixed with the simple iodine ointment, viz., iodine powdered 1 dr., lard 1 oz.; mixed in equal proportions. Internally, the following tonic ball should be given twice a-day:—

Sulphate of iron	2 drs.
Hydriodate of potash	10 grs.
Ginger	1 dr.
Gentian	2 drs.

To be made into a ball with treacle.

The bowels must be regulated by an occasional laxative, and a diuretic ball may be substituted for the above every alternate day. This treatment will in many cases succeed in effecting a cure. The diet should consist of green food or carrots, and about two feeds of corn a day, and, when the horse is convalescent, a month's feed in a good salt-marsh will be beneficial.

INFLUENZA.

The epizootic malady which has received the above designation resembles in many respects the disease of the same name in the human subject. It has not prevailed in this country to any extent since 1840, when its attack was very general, though it is customary with some persons to designate every case of epidemic Catarrh as the Influenza. This, however, is erroneous; for there are many instances in which catarrh is entirely absent, and therefore we must seek for other invariable characteristics in order to ascertain in what the disease really consists. We always find considerable fever, hot mouth, and quick pulse; the extremities are warm, and, after a few days, swell from serous effusion, which also affects the eyelids to such a degree that temporary blindness is often produced. The pulse is usually soft and weak, and considerable debility is a striking characteristic of the disease. These, therefore, may be regarded as the uniform symptoms of influenza, and in many cases they are the only ones that are present, and when such is the fact, the disease, if properly treated, passes through its usual stages, and the animal soon becomes convalescent. In the greatest number of cases, however, there is some local inflammation in connection with the general derangement, which may be either trivial or highly dangerous. The nature and seat of this local affection is very much determined by the season of the year: in the summer, affections of the liver and abdominal organs are most frequent, whilst at other periods the respiratory apparatus is most frequently attacked. In fatal cases of the latter description, the ravages of pneumonia and pleurisy are exhibited in the chest, and in the former the liver is found greatly disorganized. Affections of the air-passages are, however, more frequent than derangements of the abdominal organs; and influenza, attended with catarrh and sore throat, constitute the bulk of our cases. In all, however, we may consider the mucous membranes in a state of irritation, so that they are very quickly and severely acted on, either by sympathy or medicinal agents. It is an undecided point whether or not the influenza is infectious, but we incline to the opinion that it is so; although it must be confessed that its appearance, disappearance, and reappearance, are often extremely strange and irregular. One of the earliest symptoms is the failure

of the appetite, which is attended or immediately succeeded by a dull listless appearance, and the symptoms of fever before noticed; and soon afterwards the soreness of the throat is developed, if the disease takes this form.

Treatment.—If the pulse possesses tolerable strength, we may abstract a moderate portion of blood. The amount, regulated, of course, by the symptoms, in a few instances may be copious, but generally we must be cautious not to abstract too much; from two quarts to four will be usually enough. Though it is desirable to relax the bowels, we must be equally cautious as to this part of our treatment. A pint of linseed oil, or ten drops of croton oil, or half of each combined, may be given with the following diffusible stimulant and febrifuge:—

Spirit of nitrous ether	2 ozs.
Tartarized antimony	1 dr.
Nitrate of potash	4 drs.
Warm water	½ pint.

Mix.

This may be given twice a day without the aperient, omitting the nitre after the second day for a day or two, and adding half a drachm of ginger, and one drachm of gentian. It will be rarely prudent to bleed a second time; but if the eyelids are much tumefied, local bleeding from the angular veins, a few inches below the eyes, will be found extremely serviceable; and in many cases, where from the debility of the animal, or the lowness of the pulse, general depletion will not be judicious, the local bleeding from the angular veins may be adopted with much advantage. If the legs become engorged, they should be bandaged with flannel, and a few punctures with the lancet will afford much relief. The local treatment must be according to the symptoms. If the throat is affected, it should be stimulated externally with a blistering liniment. In severe cases, setons will be useful in the region of the throat, and also in the brisket, if the chest appears affected. Blisters on the sides are also in some cases demanded; and if the liver appears to be diseased, we must adopt in some degree the treatment advised under that head. In cases attended with dangerous inflammation of the vital organs, our treatment must be proportionately energetic; but we must still bear in mind that one great peculiarity of the influenza is debility, and as such our treatment must be more moderate with regard to depletion than we should otherwise be disposed to adopt. The diet should consist of bran mashes, green food or carrots, with a moderate portion of corn. A loose box will be useful, and very moderate walking exercise.

DISEASES OF THE SKIN.

Structure of the Skin.—The skin of the horse, like that of man and other animals, is composed of three distinct coats, the outer of which, termed the *cuticle*, is thin, transparent, and void of vessels and nerves, thus serving as a protection to the vascular parts beneath it. The *cutis*, or true skin, is much thicker, vascular, and extremely sensible, receiving the termination of the sensitive nerves. The hair grows from the cutis, or rather from bulbs planted in it, and pierces the cuticle to appear on its surface. The *rete mucosum*, or mucous net-work, is situate between the cutis and the cuticle, and secretes a pigment, which gives the colour to the skin, being in some of a dark hue, and in very light-coloured horses absent. When the cuticle is injured or destroyed it is quickly restored, without any perceptible difference; but if the cutis is destroyed, and with it the bulbs of the hair, the latter are not restored, as new skin never possesses hair: this is the reason why horses often become so much blemished from injuries of the knees. The growth of the skin, unlike that of flesh, is extremely tedious, owing to the fact that it grows only from the old skin, where it first appears as a white line, which gradually widens until the cicatrization is complete.

Surfeit.—The diseases of the skin of the horse are by no means numerous. *Surfeit*, as it is commonly termed, is an inflammatory eruption, arising from plethora or some sudden determination or reaction of the blood on the skin, on which pimples appear: they are sometimes attended with itching.

Mange.—Mange is the most contagious disease with which the horse is affected. It is analogous to the itch in the human subject, and, like it, is owing to the presence of very minute insects called *acari*, which are of both sexes, and pierce the skin and multiply in great numbers. The first appearance of mange is accompanied by itching: the horse exhibits pleasure on being rubbed, and on examination we find numerous small pimples on the skin, particularly on the withers and rump; on removing them, a bare spot of a white colour is perceived, from which an ichorous fluid is discharged, which destroys the hair in the neighbourhood. This and the violent itching inducing a horse to rub himself against any object that he can find, causes the hair to come off. Thus it is that horses which have had the disease for some time are nearly bare of hair, and present a loathsome appearance, particularly when the skin becomes wrinkled and thickened, as it does in chronic cases.

Treatment.—The disease can only be eradicated by topical applications; and of the various medicaments that have been employed there is none better than the following:—

Sulphur	4 ozs.
White Hellebore	½ oz.
Oil of Tar	3 ozs.
Train, linseed, or olive oil	12 ozs.

To be carefully rubbed down together and mixed.

This liniment should be well rubbed into every affected part, or better still, over the whole body, either with the hand, a brush, or a piece of flannel, once a day for several days, after which the skin should be well washed with soap and water. This treatment may be repeated until the disease is entirely eradicated, and the horse no longer rubs himself against other objects; and the following powder should be given daily in the food, or a mash, and continued for seven or eight days:—

Sulphur	4 drs.
Black antimony	2 „

Mix, adding occasionally half an ounce of nitre, or giving it in the water.

The mangers, racks, clothes, &c., should be well washed with soap and water, and afterwards with a solution of chloride of lime.

Warts.—Warts are scirrhous excrescences, which appear on different parts of the body, and are best removed by the hot iron or the knife.

Wens.—Wens are oval or round bodies, found floating loosely under the skin, and they may generally be removed by making an incision through it.

Encysted Tumours.—An encysted tumour is a collection of serous fluid contained in a membranous sac; one part is generally loose, and the other attached to the integuments. They are sometimes found at the poll or the withers, and are then generally the result of pressure, and often terminate in fistulous withers or poll evil. These tumours should be carefully dissected out; and in the same manner should those hard, almost cartilaginous, substances which sometimes appear on the shoulders from continued galls.

Melanosis.—Melanosis is a description of tumour, though rare in this country, yet extremely common in India, where it usually affects the tails of white horses. On cutting into the tumours they are found to contain a black fluid. Sometimes they exist within the abdomen, and attached to the spine, where the writer has known them produce gradual paralysis of the hind extremities, by pressing on their nerves and vessels. No cure is known, but iodine may be tried internally and externally.

DISEASES OF THE CELLULAR MEMBRANE AND ABSORBENTS.

The parts immediately beneath the skin principally consist of cellular membrane, which, being elastic, tends to give, with the assistance of the adipose membrane, that softness and resiliency of touch which the horse in good condition exhibits. This membrane is abundantly furnished with a set of vessels called Absorbents, which, with the membrane, are the seat of various diseases.

Anasarca.—The first of these diseases is anasarca or dropsy, which, in the horse, is of two kinds, one proceeding from debility, and the other from a plethoric or inflammatory state of the system. Horses with round gummy legs, having a superabundance of cellular membrane, are most disposed to this disease, which consists of watery swellings generally of the hinder legs. The nature of this enlargement may be readily ascertained by pressing the fingers on it, when the prints of the fingers remain for some little time, showing that it is of a dropsical or watery nature. This disease may be either severe or mild, gradual in its commencement or sudden. Other parts of the body may be affected as well as the legs.

Treatment.—The treatment, unless there is great debility, should commence with blood-letting, with a diuretic ball, such as the following:—

Nitrate of potash	3 drs.
Powdered resin	4 „
Oil of juniper	1 scr.
Ginger, powdered	½ dr.

Soft soap to form a ball;

and, on the following day, a dose of physic. Puncturing the limb, and fomenting afterwards with warm water, will relieve the enlargement, with the assistance of hand-rubbing, bandaging, and walking exercise. In some cases it may be necessary to insert rowels or setons in the thigh. If debility supervenes, tonics may be given with diuretics; and if the weakness at first should be so great as to forbid bleeding, the following draught may be administered:—

Nitrate of potash	1 oz.
Ginger, powdered	2 drs.
Gentian, „	4 „
Sulphate of copper	2 „

To be dissolved in a pint and half of warm water, ale, or gruel, then adding 2 ounces of spirits of nitrous ether. To be repeated, if required,

on the second day. This disease is commonly termed *humour*, and there is another somewhat resembling it, and requiring the same treatment, which, in Scotland, is termed *weed*, and commences with a very painful swelling of the absorbent vessels on the inside of the thigh and near the groin, which extends downwards, producing considerable swelling.

Chapped Heels sometimes accompanies Anasarca, or it may occur without it. It is most frequent in the autumn and in wet weather, and horses with white legs are most disposed to it. A thin acrid discharge appears from the wound, and the irritation causes the horse to catch up the affected leg suddenly and with great force, which greatly retards the healing of the crack.

Treatment.—The treatment should resemble that advised for anasarca, to which we may add poultices to the heels for several nights, made with linseed meal and a solution of alum and sulphate of zinc: the cracks may afterwards be dressed with tincture of myrrh or some mild astringent powder.

Grease, which consists of an offensive discharge from the heels and legs, often proceeds from the diseases before spoken of being neglected. It should be treated in the same manner as that just recommended, but the local astringents must be longer continued.

The following will be an excellent powder to apply to the part:—

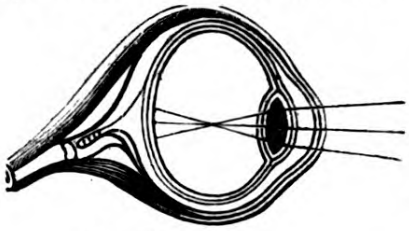
Prepared chalk	4 ozs.
Sulphate of zinc	1 oz.
Charcoal	1 „
Armenian bole	2 ozs.

And to be finely powdered and mixed.

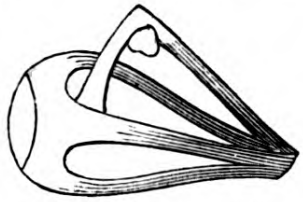
LOCAL DISEASES.

DISEASES OF THE EYE.

Structure of the Eye.—Before we proceed to describe the diseases of the eye, it will be desirable to refer to the structure of this



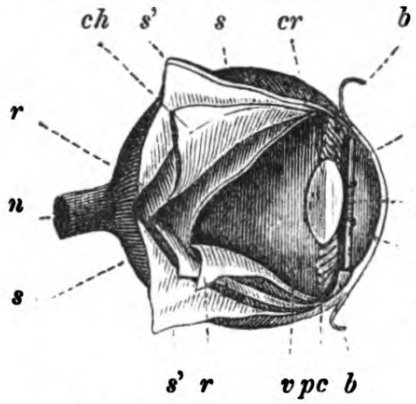
22.—The eye.



23.—The muscles of the eye.

delicate and important organ. It consists of various transparent and opaque coats or membranes, forming chambers which contain watery fluids, and a surface for the expansion of the optic nerve.

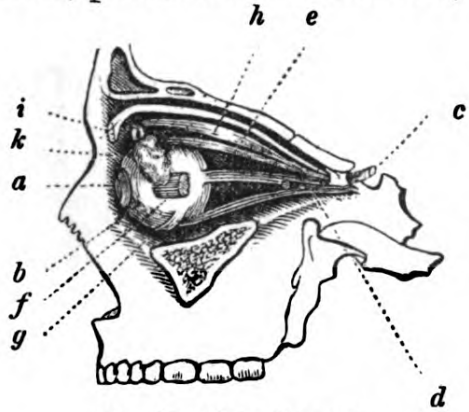
Parts of the Eye.—If we plunge a needle through the eye, from the front to the back part, it first penetrates the *conjunctiva*, a thin delicate membrane, which lines every part of the eye and its lids that we can see externally; it next passes through the *cornea*, a strong, transparent, double coat, on penetrating which the needle enters the *aqueous humour*, which consists of two chambers, one in front and one behind the curtain called the *iris*, one edge or border of which is fixed to the eye, whilst the other, the internal, floats loosely in the aqueous humour. This curtain, which in the horse is of a brown colour, has the power of contraction, so as to admit or shut out the rays of light through the oval



24.—Structure of the eye.

Fig. 24. *b*, *b*, conjunctiva; *c*, transparent cornea; *c a*, anterior chamber, containing the aqueous humour; *i*, iris; *p*, pupil; *c r*, crystalline humour; *v*, vitreous humour; *r*, retina, behind which is the pigmentum nigrum, or more correctly the tapetum lucidum; *s*, *s*, sclerotic coat; *s'*, *s'*, sclerotic, continued back; *c h*, cheroid coat, turned back; *n*, optic nerve; *p c*, ciliary process.

opening in its centre called the *pupil*, at the upper and lower borders of which we observe some brown or black bodies peculiar to the horse. The needle next enters the *crystalline humour* or *lens*, which is a convex, transparent body, semifluid in its structure. The transparent cornea, rendered convex by the aqueous humour, serves to admit and refract the rays of light, which is still further accomplished by the crystalline lens, the principal glass of the eye. Its posterior part lies in a cavity adapted to it in the *vitreous* or *glassy humour*, which forms three-fourths of the bulk of the eye, and preserves its globular shape. It is composed of watery fluid deposited in cells, and is denser than the aqueous humour, but less so than the crystalline lens. Around the membrane which covers its posterior and lateral surface, is spread the *retina* or expansion of the optic nerve, which is of a pulpy nature, a grey colour, and semi-transparent, and on which the picture of external objects is painted in an inverted position, the impression of which is conveyed by the optic nerve to the brain. Behind it there is a dark substance called the *pigmentum nigrum*, which acts like the quicksilver of a looking-glass, preventing the penetration of rays of light, and causing the retina to reflect them. Immediately at the back of the eye, this pigment in the horse is of a bluish colour. This *tapetum lucidum*, as it is termed, enables the horse, by reflecting and economizing the light, to see better during the night than would otherwise be the case. The needle next enters the *sclerotic* coat, which is very strong and dense, and surrounds every part of the eye not externally visible. The *optic* nerves cross each other, and then emerge from the cranium at the bottom of the orbit, pierce the sclerotic coat, and are expanded as before stated.



25.—Muscles of the eye.

The eye is embedded in fat, which serves as a cushion to prevent injury, and is moved readily on every side by means of muscles, of which there are four straight ones, one above and below, and each side, and two oblique ones, the upper of which acts like a pulley. In addition to these, which correspond to those of man, there is a very powerful strong muscle, called the retractor, immediately at the

Fig. 25. This is an engraving showing the muscles of the human eye, here introduced for the better illustration of the mechanism of the motive power of that important organ :—*a*, cornea ; *b*, sclerotic coat ; *c*, optic nerve ; *d*, right inferior muscle ; *e*, right superior muscle ; *f*, portion of the right external muscle ; *g*, extremity of the lesser oblique muscle ; *h*, greater oblique muscle ; *i*, elevatory muscle of the upper eyelid ; *k*, lachrymal gland.

back of the eye, which draws the eye further within the orbit. These muscles are all attached to the bony orbit and the sclerotic coat, and are furnished with nerves for the communication of motive power, as well as vessels for their nourishment. There is another peculiarity in the horse's eye which requires to be noticed, and that is, the elastic cartilaginous substance called *membrana nictitans* or *haw*, the use of which is to act as an additional eyelid in wiping off extraneous particles from the surface of the eye. When the eye is drawn into the orbit by the retractor muscle, the haw is advanced over the eye from its elasticity, assisted by the pressure of the fat in which the eye is embedded. The anterior portion of the eye is lubricated by the tears which are secreted by the lachrymal gland which is attached to the upper part of the orbit, the superfluous tears being conveyed through a duct to the nostrils. The eyelids are put in motion by distinct muscles.

DISEASES OF THE EYE.

The diseases of the eye are far less numerous than in the human subject, but are yet so serious that there are probably more blind horses than men in proportion to their relative numbers. *Ophthalmia* is of two kinds, simple and specific; the former, if properly and early attended to, ends in recovery; the latter generally terminates in blindness after a succession of attacks.

Simple Ophthalmia.—Simple ophthalmia proceeds from external injury, such as blows, scratches, or hay seed, or other objects getting into the eye. The inflammation is generally considerable, with swelling and closing of the lids, superabundance of tears, and considerable cloudiness of the cornea and aqueous humour; the superficial inflammation is greater, and there is more opacity of the cornea than in

Specific Ophthalmia, which appears to arise from constitutional causes, engendered by stimulating food, hot stables, the escape of ammonia from the urine, and the hereditary predisposition of the animal, derived from its sire or dam. The *symptoms* very much resemble those of simple ophthalmia, but there is less external inflammation and opacity of the cornea, and more derangement in the interior, in the iris, the crystalline lens, and the vitreous humour. In very bad cases all these parts may be simultaneously affected, and blindness may soon follow; but the inflammation is generally more limited, attacking most frequently the crystalline lens and its capsule. When this is the case, the irritation is less than when the iris is principally affected. There is a great impatience of light, and on exposure to it the pupil is soon closed. After some time the inflammation subsides, even if nothing is done,

to be again renewed at another time; and in proportion to the duration, extent, and intensity of the attack is the disorganization that remains. From the periodical character of the disease, it has been absurdly supposed by the ignorant to have some connection with the changes of the moon, and thence it has been termed moon blindness; but though sometimes the attacks may return in about a month, the intervals are generally much longer. It is very important to ascertain, on purchasing a horse, if he has had any attack of ophthalmia; this cannot, however, always be done, for sometimes, with timely treatment, there has been no visible alteration of the structure left. But if we observe any dimness in the aqueous humour, cloudiness in the interior, specks or opacity of the crystalline lens, or unusual smallness of the pupil compared with the other eye, we may justly conclude that the horse has had one or more attacks of specific ophthalmia, which are likely to recur; whereas if there are only streaks across the cornea, or partial opacity of it, and the interior of the eye is bright and healthy, we may conclude that these appearances are to be attributed to simple ophthalmia, which is not likely to return.

Treatment.—The treatment of both diseases should be for the most part the same. If the attack is severe, we should commence by bleeding from the jugular vein on the same side as the affected eye, and follow this on the same or the following day by local bleeding from the angular veins, and lancing the eyelids. A dose of physic should be given, the eye frequently fomented with warm water, and the following lotion afterwards applied:—

Tincture of opium	2 drs.
Extract of belladonna	1 dr.
Water, pure or distilled	1 pint

Mix.

Cataract.—Cataract is the usual sequel of ophthalmia, but sometimes it arises without any previous inflammation; and, when small and only semi-opaque, appearing rather to affect the capsule than the body of the lens, it often disappears.

Amaurosis.—Amaurosis, or Gutta Serena, is paralysis of the optic nerve, and is attended with partial, or more frequently total, blindness; the eye retaining its brightness, but the iris no longer acting from the stimulus of light.

Treatment.—The cure is uncertain and doubtful, but may be attempted by bleeding, purging, and the exhibition of calomel and opium, a drachm of each daily. This disease may arise from blows, injuries of the brain, constitutional derangement, or from causes unknown.

DISEASES OF THE MOUTH.

Lampas is a term commonly given to a swelling of the bars at the upper part of the mouth. It is most common with young

horses, and is frequently connected with the process of dentition. Unless it interferes with mastication, it is as well to let it alone; if otherwise, it may be lanced, or removed with a hot iron. It is often accompanied by a swelling of the gums and membrane between the molar and incisor teeth, and which, from getting between the teeth, is more frequently the cause of defective mastication than the lampas.

Treatment.—It should be removed by taking it up with a forceps or crook, and cutting off a portion with a pair of scissors or a knife. Sometimes the teeth are found irregular, so as to injure the gums; when this is the case the irregular edges should be removed with a tooth-rasp, made expressly for the purpose. The gums are frequently injured by the bit: when this is the case, the following wash will be found the most suitable:—

Alum	2 drs.
Tincture of myrrh	1 oz.
Honey	1 „
Water	2 ozs.

Mix.

Sometimes the bone is greatly injured, and an ulcer is the consequence, the nature of which is ascertained by the very offensive smell that is present. In this case two drachms of hydrochloric acid, mixed with one ounce of tincture of myrrh, should be applied to the ulcer alone on a little tow. This will probably hurry the process of exfoliation if the injury is sufficient to produce it, and a portion of the bone will be separated from the other part, and may be removed with a forceps; after which, with the application of the lotion, the jaw will soon get well. Other injuries of the mouth and tongue should be treated in a similar manner, viz., by the application of the lotion previously advised.

Injuries of the Tongue.—Sometimes the tongue is cut asunder by the halter being placed upon it, the horse's head being tied up, and the animal in this state hanging back. This injury may also be produced by other means originating in the carelessness or brutality of the attendant.

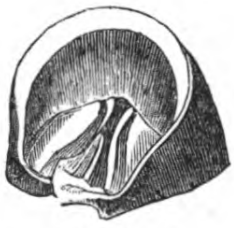
Treatment.—If the tongue is not more than half severed, the divided portions may be united by sutures; but if it is nearly or quite cut asunder, the bleeding vessels should be tied, and the part dressed with the above lotion; and though the horse must be kept on gruel and mashes for some time, it is astonishing how well the mutilated tongue will become adapted to perform its functions, so that corn and hay will be consumed as well as before; but it will not be advisable to turn the horse to grass, as he will not be able to gather the grass either so fast or so well as before.

Obstructions in the Œsophagus sometimes arise either from a hard ball getting across, or a piece of carrot or turnip, or other food, being hastily swallowed without being properly masticated.

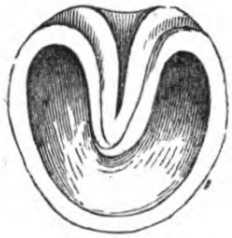
Treatment.—If the obstruction lie in the throat, it may often be removed by the hand; but if it cannot be reached, an instrument called a probang, consisting of a long piece of whalebone, with a handle at one end and a ball of wood at the other, should be carefully passed down the œsophagus, so as to force into the stomach the obstructing body. Or if the obstruction is near the throat, it may be withdrawn by means of a suitable probang. If the object cannot be removed by these methods, we must then have recourse to the operation of *œsophagotomy*. The horse's head being elevated, a careful incision must be made through the skin and the coats of the œsophagus, sufficiently large to permit the removal of the obstructing body. The wounds both in the œsophagus and the skin should afterwards be united by separate stitches, and kept clean. No food should be allowed for many hours afterwards; and it should then be given in a soft state.

STRUCTURE OF THE FOOT OF THE HORSE.

The foot of the horse is an admirable piece of mechanism; but so complicated and minute is its construction, that our space will only permit us to mention its various parts, which may be seen in the plates of the horse which accompany the present work; and we must refer the reader who desires more extended information to Spooner's Treatise on the Foot and Leg of the Horse, and other works on the subject. When the foot is on the ground, all that we see externally is the *wall* or *crust*, which is the strongest part, and bears the weight of the animal. It is attached to the coffin-bone within by means of certain horny leaves or *laminæ*, 500 in number, on its inner surface, which dove-tail with corresponding fleshy plates on the coffin-bone. The lower part of the foot is concave, and is, for the most part, formed by the *sole:* it is incapable of supporting much weight, or pressure, with impunity; thus the shoe is nailed to the crust above, and occasions lameness if it presses on the sole. The *bars* appear to be inflections of the crust, and meet the frog, which is formed of softer and more elastic horn than the other parts, and acts like a wedge in preventing slipping. The bars and crust are secreted by the laminæ, and the vascular material at the coronet

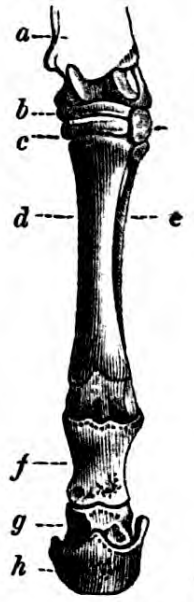


26.—Crust.



27.—Sole.

called the *coronary substance;* the sole and frog are secreted by the sensible sole and frog immediately above them, the former being firmly attached to the lower part of the coffin-bone, the latter to the elastic cushion which forms and fills up the back part of the hoof. The coffin-bone, or *os pedis*, corresponds in shape to the hoof which surrounds it, but does not extend so far back, particularly in the middle part: it has cartilages attached to its wings, which extend above the hoof, and sometimes become ossified. At its posterior and central part we find the *navicular* or shuttle-bone, the upper part of which forms, with the coffin-bone in front, and the small pastern above, the coffin-joint, whilst its posterior and lower surface forms the navicular-joint capsule, over which the flexor tendon glides like a pulley, just previous to its insertion into the lower part of the coffin-bone. It is this joint capsule which is the seat of the navicular disease, the frequent cause of lameness. The small pastern, or *os coronæ*, is a short, thick, strong bone; above which is the *os suffraginis*, or large pastern, a longer bone articulating with the metacarpal bone above, and forming the fetlock joint. This important joint is protected on the back by two small bones, the *sesamoids*, which bear a portion of the weight, and are suspended above by the elastic suspensory ligament, thus forming a beautiful spring. The *suspensory* ligament, which becomes double half way down the shank, is attached to the metacarpal bone above, and passes down between this bone and the flexor tendons. The most posterior of these tendons, called the *perforatus*, forms a sheath for the other, the *perforans*, just above the fetlock; which sheath continues half way down the pasterns, where the perforatus is inserted into the small pastern, and the perforatus continues on at the back of the navicular bone to be inserted into the lower part of the coffin-bone, as before observed. The above brief notice will be better understood by reference to the plates, and our space forbids any further description of these beautiful and complicated organs.



28.—Hind Leg of the Horse.

ON SHOEING.

The art of shoeing is extremely ancient, and though not adopted in all countries, it is particularly called for on our hard roads,

Fig. 28. *a*, tibia; *b*, tarsal bones, first row; *c*, tarsal bones, second row; *d*, metatarsal or common bone; *e*, external metatarsal bone; *f*, upper pastern; *g*, lower pastern; *h*, navicular bone.

where the use of the horse would be extremely limited without it. It is a necessary evil, inasmuch as it consists in nailing an inflexible rim of iron to the elastic, though insensible hoof. The subject is one of too great extent to prosecute at any length in our limited space; we must therefore refer to more elaborate treatises, and content ourselves with mentioning certain principles by which it ought to be regulated. It would, however, be folly to attempt to establish any invariable rules, either for the preparation of the foot, or the manufacture or putting on of the shoe, further than this, that in no case ought the shoe to rest on the sole of the foot, but on the lower edge of the crust alone. The thickness, strength, elasticity, and dryness of the horn, vary considerably in different horses; but, taking for example a foot that possesses an average amount of these qualities, we may observe, that as the shoe prevents the sole and frog from being worn down to the same amount as they grow, as would be at least the case if the foot was unshod, a certain portion requires to be pared with the drawing-knife at each time of shoeing; but in general this paring should be limited to the ragged parts of the frog and the dry portions of the sole.



29.—Shoeing horses.

Some of the crust also requires to be lowered, particularly towards the toe and heels; but if the foot is weak and thin, the latter should be held sacred, and the other parts of the foot merely cleaned or scraped out: the sole lying between the crust and the bars at the heels should, however, be pared out, particularly if there be any disposition to corns. The shoes must be heavy or

light in proportion to the size, work, and wear of the horse. It should be made to last, if possible, three weeks; but if not worn out in a month, it ought to be removed, in order that the foot may be properly pared out. The shoe on the fore-foot should generally be of equal thickness throughout, seated on the inner part of the foot surface, and flat on the ground surface, about an inch in width, and one-third of an inch in thickness for saddle horses, and fastened on with eight nails, the back one on the inside being as far removed from the heel as the security of the shoe permits. The hind shoes must be thicker and narrower than the front ones, and rounded off on the inside so as to prevent cutting. The *leather sole* is an excellent addition to the shoe for horses that travel on the road, and in the summer season particularly. It diminishes concussion, protects the horn from too much wear, and preserves the sole soft and elastic by means of the stopping of tar, grease, &c., which is secured by tow between the foot and the leather. There are a variety of shoes adapted to particular feet, and particular circumstances, which cannot well be explained without figures, and can be better understood by visiting the forge of a veterinary surgeon, where may be seen shoes adapted for hunters, others for saddle horses, wider and stouter ones for carriage horses, and heavier shoes still for waggon horses, often turned up at the heels to form calkins for the hinder feet with advantage, but which never ought to be done with the fore shoes. There also may be seen shoes for *cutting*, some thick on the inside, others thicker on the outside, and all *feather-edged*, as it is termed, on the inside. Shoes likewise for corns, with the inner heel made thin, so as not to rest on the ground, and *bar shoes* also, for the same purposes. It need not be observed, that the proper shoeing of light horses requires considerable care and skill; and it is a false economy that, to save expense, would be satisfied with inferior workmanship. Two men are usually employed about a horse at the same time—one who fits the shoe, and another who nails it on; the latter perhaps requires to exercise the most care, and the former the greatest skill. Both operations can be much better performed in the forge than the stable, and the feet should invariably be stopped with cow-dung or linseed meal the previous night. This stopping should be used indeed every night in dry weather to the fore feet, and several times a week otherwise. Dry brittle feet will also be greatly benefited by being occasionally anointed with one part of oil of tar mixed with two or three portions of linseed oil.

ON LAMENESS.

Lameness is the natural language of pain, immediately arising from the unequal action of the limb; the horse bearing as lightly

as he possibly can on the injured leg. It may exist in every variety, from the severe manifestation of acute pain to the slightest exhibition of partial tenderness. In very acute lameness, most people can point out the suffering limb; but in those of a less severe character, the utmost tact is often required. Persons unaccustomed to horses will more frequently pronounce the wrong limb than the right, in cases of slight lameness. They perceive that a horse drops the moment one foot comes to the ground, and they immediately conclude that that must be the lame one, fancying that he flinches from the pain received when it meets the ground, whereas the fact is, he treads as lightly as he can on the lame foot, and drops with his whole weight on the sound one. In shoulder lameness we can generally ascertain the seat of mischief by the slow and laboured extension of the limb, which is more evident in going down a declivity, and likewise in the walk more than any other place, the horse having in slow motion more time to move the limb with the care that he wishes. In severe lameness from splints, there is often an unwillingness to bend the knee exhibited; this, however, is also shown in cases of slight strains of the sinews just under the knee. With these exceptions, the seat of disease, whether of the foot, the pasterns, or the fetlock, cannot be ascertained by the nature of the horse's action.

Mode of detecting the seat of Lameness.—In examining a lame horse, it is desirable in the first place to see him undisturbed in the stable, and observe whether he *points* a foot, and in what particular manner he so favours it. He should then be trotted gently in hand on the hard road or pavement, giving him his head at the time. Having thus ascertained the leg he is lame in, we should proceed to discover the actual seat of the mischief. For this purpose, the finger and thumb should be carefully passed down the leg from the knee to the foot, to ascertain if there is any undue heat, or enlargement, or tenderness from pressure; we should also feel carefully the front and sides of the pasterns, as well as round the coronet. If a splint be the cause of lameness, the horse will evince considerable pain when it is pressed, and so likewise will he in lesions of the sinews. Supposing that we have found no sufficient cause of lameness above, we must now direct our attention to the foot. In nearly every case, unless the mischief should be very clearly exhibited elsewhere, it will be advisable to remove the shoe; the foot should then be pared out to ascertain if there be any wound or bruise in it. The nail-holes and the heels of the sole should be carefully examined and pressed with the pincers, or gently struck with a hammer to discover any symptoms of tenderness. If the horse is very lame from a corn, he will almost always favour the foot, by elevating the heel without extending the foot

very far, which will give a knuckling appearance to the limb. Should none of these symptoms be exhibited, we must consider the disease to be deeper seated, and then it is all-important to ascertain if the animal points his foot, for if such be the case, in all probability the cause of lameness exists in the navicular joint.

Lameness connected with Shoeing.—Horses sometimes exhibit a slight lameness immediately after being shod, though quite sound before. Such cases may arise from the shoe being nailed on too tight, and is often relieved by removing the shoe, and re-applying it more gently. This lameness most frequently occurs in horses with very thin horn, and is ascertained by the manner in which it comes on, and the absence of any other visible causes. The shoe may have an improper bearing, pressing severely on weak parts, or on the sole or heels. *Pricks* most frequently arise from careless or bungling workmanship, the smith not taking proper care, or being deficient in proper skill, or rendered fool-hardy by partial drunkenness. Occasionally, however, it will happen with the utmost care, either from unsteadiness of the horse, a particularly thin horn, or perhaps the deceptive appearance of the foot. After a few days, lameness manifests itself, either slight or very severe, and on removing the shoe, and pressing round the foot at the situation of the nails, considerable pain is evinced at the seat of the mischief; and on cutting down on the nail-hole, matter frequently issues. Sometimes, however, there is no matter formed, but a thin acrid fluid, which denotes that much inflammation still exists in the part, and then the lameness is commonly more severe. In either case it will be desirable to remove the surrounding horn, and immerse the foot in a warm poultice, which should be continued until much of the tenderness is removed, and the parts present a healthy appearance, when the application of a stimulating tar ointment will effect a cure, care being taken that the shoe does not bear too near the injured part.

Sometimes, on removing the shoe, there is no matter found, and indeed no wound, although considerable tenderness. In these cases the nails have been driven too near the quick, although they have not actually penetrated it. The lameness does not come on immediately after the application of the shoe, not indeed until the repeated force of the animal's weight has forced the edge of the coffin-bone so close to the nails as to bruise the sensible parts between these two hard bodies. The best treatment consists in the removal of the shoe and the application of poultices.

Corns.—Corns, in most cases, are produced either directly or indirectly by shoeing; directly, when the heel of the shoe actually presses on the heel of the horny sole, and indirectly, when it bears too hard on the crust, or prevents the performance of the functions

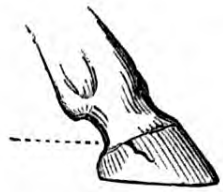
of the foot. A corn in the horse is a bruise of the sensible sole in the angle between the bar and the crust; extravasated blood is thrown out, and this being repeated, at length the vessels of the part, instead of secreting sound horn, deposit a soft spongy material, tinged with blood. Sometimes matter is formed, and at other times we find a black discharge. Corns, though found in all kinds, are most common with flat weak feet having low heels; and they are rarely found in the hind feet or the outside heel. If relief is not afforded, by making an exit below, the matter soon extends upwards, and breaks out between hair and hoof, and proves very troublesome.

Treatment.—The method of *treatment* for a slight corn consists in cutting away the horn almost to the quick, and applying some caustic, such as the muriate of antimony, to the part. In more severe cases, a poultice should first be applied for several days. A shoe should be put on with the bearing taken away from the affected heel, and the nails removed from the neighbourhood. With flat feet, a bar shoe will best enable the pressure to be removed; with others, a shoe with the ground surface of the affected heel seated off, so that the heel of the shoe does not press on the ground, will best answer the intended purpose. If matter breaks out at a coronet, a large depending opening should be made, the foot well poulticed, and a strong solution of sulphate of zinc injected with a syringe. In some cases the horn should be removed from the coronet to the heel. The treatment here recommended will apply to most other injuries of the feet, such as bruises, wounds from nails, &c.; but if the latter case is severe, blood should be taken from the affected limb.

Quittor.—Quittor is a disease somewhat resembling a festered corn, but it is more deeply seated, having for its locality the lateral cartilages of the foot, in and around which sinuses are formed; and it usually arises from a tread either from the other foot or from another horse.

Treatment.—In consequence of the cartilage being injured, the cure is often very tedious, and does not take place till a portion of the cartilage exfoliates. It is expedient to get a good free external opening, and after the foot has been well poulticed, to inject a strong solution of sulphate of zinc. This treatment will often effect a cure, but sometimes it is necessary to insert one or more setons, bringing them out between the bars and the frog. In others a slough may be produced by forcing some oxymuriate of mercury into the sinuses, which will cause a portion of the cartilage to exfoliate; after which the part will heal with ordinary applications. Severe treads should be treated by poulticing and afterwards applying the solution of sulphate of zinc.

Sandcrack.—Sandcrack is a fracture or split in the hoof, which, when it penetrates to the quick, occasions lameness. Its usual seat is the inside quarter of the fore and the front part of the hind foot.



30.—Sandcrack.

Treatment.—Poultices should be applied for a few days, and as soon as there is sufficient sound horn above the crack, a transverse line should be made with a firing-iron or drawing-knife above the crack, and a strap applied round the hoof, and in time the foot will grow down sound, and the crack disappear.

Thrush.—Thrush is a common and offensive discharge from the cleft of the frog principally, but sometimes affecting other portions of the frog, which appear, as it were, to be eaten away by the acrid discharge. Though thrush seldom occasions lameness, it renders the frog tender; and when the horse treads on a stone, there is great danger of falling; and if neglected, thrush is apt to degenerate into canker.

Treatment.—The ragged parts of the frog should be pared off; and a pledget of tow dipped in the following ointment, and renewed every second day, will usually effect a cure.

Barbadoes tar	4 ozs.
Sulphuric acid	½ oz.

Mix.

Canker.—Canker may be produced either by thrush or grease, and sometimes by neglected injuries of the foot. Though it usually commences with the frog, it spreads to the bars, sole, and crust; and when very extensive, it is often incurable. Instead of sound horn, a fungous substance is secreted, together with an offensive discharge, and it is extremely difficult to get the horn to form again, particularly where one part joins another, as between bar and frog.

Treatment.—Slight cases may be treated like thrush, but in severe ones the fungus should first be removed by the knife or caustic, and then either the ointment recommended for canker should be applied, or a powder composed of chloride of lime, alum, and prepared chalk. In some cases nitric acid, either alone or with tar, makes the best application. Moderate pressure is extremely desirable, and if the horse can be slightly worked on a dry surface, it will expedite the cure. Moisture must by all means be avoided. If the canker proceeds from injury, and affects the crust, it will be very desirable to remove every portion of the horn that is in the slightest degree connected with disease. In this way the writer has, after some time, succeeded in curing canker so exten-

sive that one half of the crust, sole, bars, and frog has been removed and renewed.

Laminitis.—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 with these laminæ the coffin-bone. Horses with weak feet are most disposed to this disease, both in its acute and chronic form. In acute laminitis there is considerable pain and irritation, the pulse strong and quick, the respiration quickened from pain, and the feet hot; the horse is excessively lame, and almost constantly lies down. The last symptom is strongly marked, and serves to distinguish it from other acute diseases. The causes are, long-continued and rapid exertion on the hard roads in hot weather, confinement in a standing posture for a long period, and what is called *Metastasis*; that is, the sudden removal of inflammation from another part; and thus this disease often supervenes on an attack of pleurisy or rheumatism of the chest (a chill). The last cause is perhaps the most frequent, and the most likely to be attended with permanent derangement in the structure of the foot.

Treatment.—The treatment of this disease must be prompt and energetic, and the first thing which demands attention is copious blood-letting. The shoes should be taken off, the soles pared thin, and the circular artery opened by cutting through the horn between the toe and the point of the frog until the blood appears in a free and copious stream and of a red colour. The blood should be abstracted from both feet, if both feet are affected, and it may be assisted by immersing them in warm water. The bleeding should continue until the system appears to be affected by it: from six to seven quarts will not be too much to abstract. If the horse cannot be readily or freely bled from the feet, the brachial or plate vein at the arm may be selected; but the toe is preferable, being so much nearer the affected parts. After bleeding, the feet should be put in linseed-meal poultices, which should be repeated daily and continued for some time, the feet being also fomented with warm water several times a day. Unless there is very evident improvement on the second day, bleeding may be repeated, and from the arm. After a few days a blister should be rubbed on the coronet, which should be fomented the following day, so as to remove the effect of the blister, which should be thus repeated several times. Chronic laminitis may be treated in the same manner; the bleeding, however, being practised with less severity. The most favourable termination of laminitis is *resolution*, in which the inflammation soon subsides, and the parts are restored to their former state. Another result is the separation of the coffin-bone from the crust, the space being filled up with horny substance instead of laminæ, and the sinking of the sole. This is

called a pumiced foot, and the horse becomes permanently lame, and fit only for very slow work.

Pumiced feet, however, sometimes arise from weakness of the horn of the foot; and when this is the case, by careful shoeing, so as to protect, and at the same time not to press on the sole, the animal is enabled to do a good deal of work. A blister to the coronet will encourage the growth of horn; and the application of tar to the foot, and a bar shoe, and sometimes a leather sole, will be very serviceable. A *seedy toe*, which sometimes accompanies the last mentioned disease, is a separation of the outer from the inner layer of the crust, which thus appears hollow from the toe almost to the coronet, and at length no longer affords any hold for the nails.

Treatment.—The only remedy is blistering the coronet, and rest, so as to give time for a new hoof to grow down from the coronet. The disease may be attributed to too great dryness of the foot, want of tone in the secretive parts, and the destructive action of the nails of the shoe.

STRAINS.

Strain or *Sprain*, frequently the cause of lameness, is a violent extension of the fibres of a part, causing inflammation either more or less severe, with its attending pain, lameness, swelling, and heat. Strains of the muscles are much less frequent than of the tendons, and, though accompanied with greater pain and lameness, more frequently recover.

Strain of the Muscles of the Shoulder sometimes arises from a slip or other extension, and may be distinguished by noticing that the lame leg is not extended so far as the sound one; that the lameness is very evident in the walk, as well as the trot; is greatest on going down hill; and on elevating the leg and pulling it forwards, great tenderness is evinced.

Treatment.—Bleeding from the arm, fomenting the shoulders, and afterwards applying a liquid blister.

Strains of the Flexor Sinews is a frequent case, and is attended with heat, swelling of the part, and pain when pressed.

Treatment.—Bleeding from the arm, fomentations, and cold lotions to the leg; and when the inflammation is removed, blistering the leg; or if there is evident thickening, what is still better, *firing*[1].—In severe cases a patten shoe, so as to elevate the heel

[1] The operation of firing, though severe, is often necessary, and succeeds in many cases in which milder methods have failed. It should not, however, be practised when less severe remedies will succeed. The method of performing it is simple, though requiring some tact and care. The horse having been cast, the leg to be operated on must be sufficiently liberated to expose properly

of the affected leg, and put the tendons in a state of rest, will be found useful. The following lotion will be the most effectual:—

Sal ammoniac	1 oz.
Arabic acid	2 ozs.
Spirits of wine	1 oz.
Cold water	20 ozs.

Mix.

Strain of the Suspensory Ligament is nearly as common as that of the tendons; the lameness, though less severe, is often more obstinate. The part is hot, swollen, and tender on pressure.

Treatment.—The treatment should be the same as that just advised, and the firing is particularly required; and, if performed, by making punctures so as to penetrate the skin, it will be more effectual. Strains of the ligaments of the fetlock joint should be treated in a similar manner; and so likewise with regard to the pastern joint, which is often the forerunner of ringbones.

Strains of the Ligaments of the Coffin-joint are rare, the joint being so securely situated. When occurring, however, bleeding from the foot, poulticing, and blistering the coronet, will be the proper treatment.

THE NAVICULAR DISEASE.

The navicular disease is one of the most frequent lamenesses with which the horse is affected. It consists of inflammation and ulceration of the navicular joint capsule. The navicular bone is generally denuded of cartilage, with small bony excrescences, and sometimes ulcerated holes on its posterior surface, and occasionally adheres to the sinew. The symptoms of this disease are, lameness, greatest at first and diminishing with exercise; the absence of all cause of lameness elsewhere; contraction of the foot; thickening and elevation of the sole, and *pointing*; that is, the foot is put out several feet beyond the other, and bears no weight: the foot and coronet rarely feel hot, unless the lameness is sudden and very severe. Confinement in the stable, hot litter, shoeing, and particularly the hard roads, may be considered as the causes of this disease.

the affected part, on which lines about half an inch apart should be drawn by means of irons, with a moderately sharp edge, and heated to a red heat. An oblique direction is the most convenient, and the degree of heat to be applied must depend on the thickness of the skin and the nature of the case. In general it should not penetrate the cutis, but should be continued until the line it causes is of a brown colour. Its action may be increased if necessary by making punctures through the skin with a pointed iron; and in some cases the firing may be limited to these punctures with advantage, as producing a deep-seated effect with little blemish.

Treatment.—It is very frequently incurable, ulceration having commenced; but the following treatment may be tried, which has occasionally proved successful. The sole should be pared thin, the quarters well rasped, the feet bled and poulticed; and then the coronets blistered, or a seton inserted through the heel and the cleft of the frog, and kept in for a month. If this treatment should fail, and the horse is too lame to be useful, the only resource left is—

Neurotomy, or the *Nerve operation.*—The horse having been cast or thrown by means of the hobbles, the foot to be operated on should be liberated, and drawn out straight, and an incision made through the skin a few inches above the fetlock, and between the flexor sinews and the suspensory ligament. In this space the nerve will be found, on removing some of the cellular membrane, somewhat behind the artery on the inside, and posterior to the vein on the outside of the leg. A little thread should be carried under the nerve, which should be drawn up, and divided at the upper part of the incision, and an inch and a half of it excised. The horse is then to be turned, and the operation repeated on the other side of the leg. The leg should be previously rendered perfectly cool by immersing it in a bucket of cold water for half an hour at a time, so as to prevent bleeding from the small vessels, which would render the operation difficult and tedious. The object and immediate effect of the operation is to remove pain, and consequently lameness, by cutting off sensation between the diseased part and the brain. There being no muscles below the knee, the nerves only communicate feeling, and by dividing them pain is of course removed with sensation, and by removing a portion of some extent the reunion of the nerves is prevented. The operation has succeeded in very many instances, and the horses have worked for some years afterwards. It is generally performed above, but sometimes on or below, the fetlock; the effect of the latter mode is to afford some degree of feeling to the foot, as the branches that supply the coronet are given off above the seat of the operation. The wounds after the operation should be bandaged, and treated as ordinary wounds. The horse should not be turned to grass, but may be put to moderate work in the course of six weeks or two months after the operation. It is evident that the effect of the operation is to remove the lameness, but not the disease which produces it; this should be borne in mind, and the horse should be employed afterwards in moderate work alone. When this is not observed, and the horse is hunted or otherwise worked violently, or allowed to gallop at grass, the diseased sinew, which the disease had rendered thinner, and fixed to the bone, sometimes snaps asunder, the toe of the foot turns up, and the horse is rendered useless. In proper cases, it is a valuable and humane operation,

and reflects great credit on Professor Sewell, by whom it was introduced.

EXOSTOSIS.

Exostosis is a diseased enlargement of bone, from an increased action of the vessels by which it is nourished, and usually arises from inflammation produced by strain or concussion: horses are very subject to this disease, which, under the terms splint, ring-bone, spavin, &c., are frequently the cause of lameness.

Splint or Splent—is a bony deposit, situated between the large and small metacarpal bones, generally on the inside of the leg, and a few inches from the knee. Most horses are subject to it when about four or five years old, and in the majority of instances it is not attended with lameness. In some instances, however, there is severe, and in others slight, lameness, which appears to arise from the state of tension in which the periosteum, or membrane covering the bone, is placed by the increased deposition beneath it. In those cases unattended with lameness the growth of bone is so gradual that its covering has time to accommodate itself to the increased size. When lameness proceeds from splents, pressing them occasions considerable pain.

Treatment.—In very slight cases a little blistering application on the seat of the splent will be sufficient, but in severe cases the best mode of treatment consists in the operation of *periosteotomy*.

Periosteotomy.—The horse must be cast, and an incision made at the lower part of the splent, one-third of an inch in length, and a small narrow knife, blunt-pointed—made for the purpose—must then be passed up under the skin, the whole length of the splent, and the periosteum must be divided by pressing it up and down. A small opening being made above, a seton may be inserted and kept in for a fortnight. The effect of the operation is to remove the tension of the periosteum, which puts a stop to the inflammatory action and the lameness.

Spavin.—Spavin is a much more serious evil than a splent: it is perhaps in nine cases out of ten attended with lameness, which, in the majority of instances, is incurable. Its situation is the inside of the hock, on the small bones of the joint, which are frequently anchylosed, or connected together permanently by a bony substance, and the synovial membrane and cartilage are often in a state of ulceration. This state of the joint sometimes exists either in the upper or one of the lower articulations of the hock, and then the lameness is very obscure, and often incurable.

Treatment.—If there is heat perceptible in the hock, blood should be taken from the saphena vein, which passes up on the inside of the thigh, and the inflammation reduced by cooling lotions: after which the part should be repeatedly blistered with

the iodide of mercury ointment, mixed with the common blister; or the horse may be fired. Some incurable cases have been relieved by excising the nerves above, and on the inside of the hock.

Wind-galls are soft swellings existing near the fetlock joints, either formed by the distension of the capsular ligament, or the sheaths of the tendons with synovial fluid; sometimes there is a rupture of the connections of the sheath, and a consequent enlargement of the cavity. They rarely occasion lameness.

Bog-Spavin and Thorough-Pin are similar in their nature to wind-galls. The former is found at the lower and anterior part of the hock-joint, and the latter at the upper and back part of the same cavity. The best treatment of these enlargements is the application of the iodide of mercury ointment, which should be well rubbed into the part, and renewed once a-week, washing off the effects of the previous application in the interval.

Ringbones are bony formations on the pasterns, arising from strains of the ligaments or concussion. The seat of disease may be detected by the enlargement, which is generally attended with heat. The *treatment* should be the same as that recommended for spavins, and is generally attended with greater success.



24.—Ringbone.

False Ringbones are ossification of the side cartilages of the foot, and usually proceed from concussion. Heavy draught horses are most liable to this disease, which is not so usually attended with lameness as the true ringbone, to which the treatment should be similar. This disease sometimes accompanies that of the navicular joint. When the usual treatment fails, the nerve operation should be employed. Exostosis sometimes occurs round the fetlock and other joints, and should be treated as before advised.

FRACTURES.

Fractures are not so common in the horse as in the human subject, and are generally treated with less success. This arises from the great displacement of the bones from walking on them after the fracture, the difficulty in keeping the horse in a quiet state, the want of the recumbent posture, and the displacement of the bones from muscular action. Fractures of the upper parts of the limbs are therefore scarcely ever attended with success, and the most prudent plan in such cases will generally be to destroy the horse. Fractures of the bones below the knee are, however, not unfrequently cured; very much depends on the disposition of the animal, whether he is quiet, or irritable and fractious; in the latter instance, the chance of cure is but slight; and it must be

confessed that, in successful cases, much more depends on nature than on surgical skill. The parts being carefully bandaged, and kept wet and cool, will in many cases be as successful as more laboured treatment.

DISLOCATIONS.

Dislocations are, from the little lateral motion the joints possess in the horse, still rarer than fractures: they can scarcely occur without a rupture of the ligaments. Dislocation of the *patella* or *knee-pan*, which is situated at the stifle-joint, sometimes occurs, and mostly in young animals, and arises either from sudden and violent exertion, or from relaxation of the ligaments; when it takes place the animal is in much pain, cannot flex his hind leg, but drags it after him. The disease is often mistaken for cramp and other diseases.

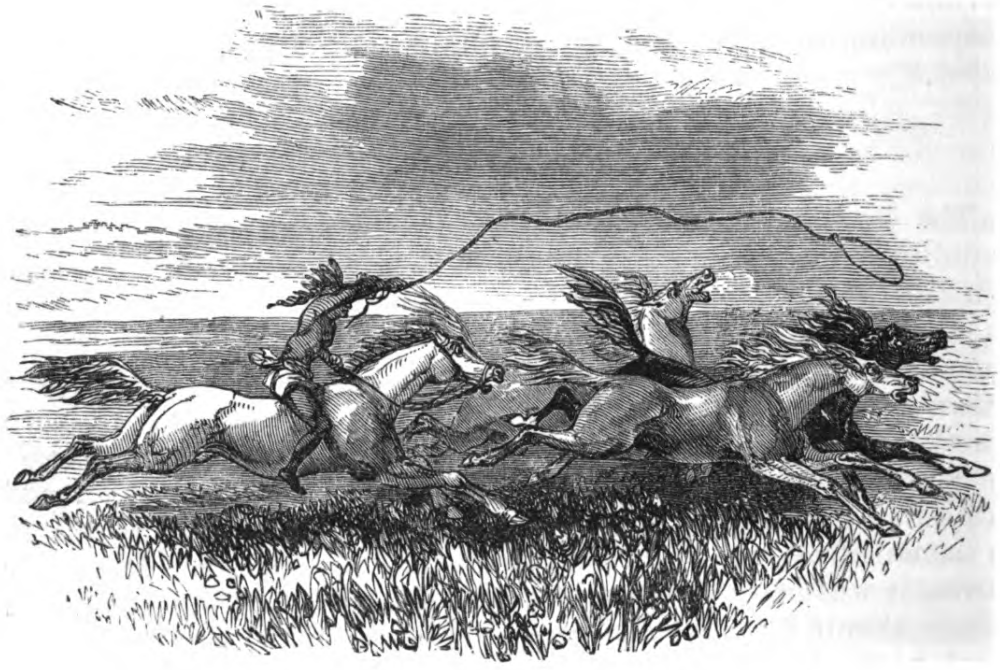
Treatment.—Sometimes, on alarming the horse, the patella will slip suddenly into its place; at others, this cannot be done without assistance. The foot should be drawn forwards with some force, and the bone pressed into its place, while the limb is thus extended; after which a blister should be applied over the part, and the animal kept perfectly still. Dislocation of the neck sometimes occurs from the horse being cast in his stall: the writer has had several cases in which he has succeeded in establishing a cure, by suspending the head, bandaging, splints, and antiphlogistic treatment.

WOUNDS.

The healing process in the horse is generally carried on with rapidity and vigour, particularly if the injury is confined to the muscles or flesh. A simple incised wound may be sewed up, but in a lacerated wound it is vain to attempt this method. Warm fomentations and cold lotions should be employed to abate the inflammation, and the wound may afterwards be dressed with tincture of myrrh or aloes, which will assist the healing process; or powdered resin may be scattered over the wound at first, and powdered chalk, alum, and Armenian bole afterwards. Bandages in some cases will be useful, in others not desirable. If matter forms, it will be essential that it should have a depending opening, which should be made and preserved by a seton. A wound of a joint, as the knee or fetlock, is entirely a different affair; the grand thing is to close the joint as quickly as possible before inflammation is set up in the cavity, which will quickly take place, unless the synovia or joint-oil is prevented from escaping, and the air from entering the joint. Poultices and fomentations on the wound are

exceedingly injurious. If the opening is small, a hot pointed iron will often close the joint, or a paste of linseed meal may be applied to the wound, and retained firmly by numerous bandages; this will generally be the most efficient method, and the inflammation may then be kept down by local bleeding and fomentations without removing the bandages, which should be retained for some time. A saturated solution of bichloride of mercury, in spirits of wine, and applied to the wound by means of a feather several times a-day, has in many instances proved successful, and the following powder is also much to be recommended:—Burnt alum, myrrh, and sulphate of iron, equal parts, to be frequently applied to the wound. When the synovia has ceased to run, the injury may be treated as a common wound.

For a more extended acquaintance with the subject of this article, we must refer to the works of our Veterinary Authors, amongst whom we may mention as the principal, the names of Coleman, Clark, Bracy Clark, Blaine, Darville, John Field, Goodwin, Morton, Percival, W. C. Spooner, Stewart, James Turner, and Youatt.



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THE END.

Wilson and Ogilvy, 57, Skinner Street, Snowhill, London.

DESCRIPTION OF THE PLATES.

PLATE I.

LATERAL VIEW OF THE SKELETON OF THE HORSE.

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.

BACK VIEW OF THE BONES OF THE FOOT AND PASTERN.

aa. 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.

PLATE II.

REPRESENTATION OF THE SKELETON OF THE HORSE, AND NOMENCLATURE OF THE BONES.

BONES OF THE HEAD.

1. Os Frontis.
2. — Parietale.
3. — Occipitis.
4. — Temporale.
5. — Lachrymale.
6. — Malare.
7. — Maxillare superius.
8. — Intermaxillare.
9. — Nasale.
10. — Maxillare inferius.

BONES OF THE TRUNK.

11. 11. Vertebræ Cervicales VII.
12. 12. ——— Dorsales XVIII.
13. 13. ——— Lumbales VI.
14. 14. ——— Sacrales V.
15. 15. ——— Coccygeales XII. to XV.
16. 16. Costæ XVIII., Veræ IX., Spuriæ IX.
17. 17. Ossa Sterni VI.

DESCRIPTION OF THE PLATES.

Bones of the Fore Extremity.

18. Scapula.
19. Humerus.
20. Radius.
21. Ulna.
22. Carpus.
    a. Os Scaphoides.
    b. — Lunare.
    c. — Cuneiforme.
    d. — Trapezium.
    e. — Trapezoides.
    f. — Magnum.
    g. — Unciforme.
    h. — Pisiforme.
23. Os Metacarpi magnum.
24. ———— internum.
25. ———— externum.
26. Os Sessamoideum internum.
27. ———— externum.
28. Os Suffraginis.
29. — Coronæ.
30. — Pedis: The Os Naviculare is placed behind the joint of the last two bones, and cannot therefore be seen.

Bones of the Hind Extremity.

31. Pelvis.
    A. Ilium.
    B. Ischium.
    C. Pubis.
32. Os Femoris.
33. Patella.
34. Tibia.
35. Fibula.
36. Tarsus.
    i. Astragalus.
    j. Os Calcis.
    k. — Cuboides.
    l. — Cuneiforme Magnum.
    m. ———— Medium.
    n. ———— Parvum.
37. Metatarsi magnum.
38. ———— internum.
39. ———— externum.
40. Os Sessamoideum internum.
41. ———— externum.
42. — Suffraginis.
43. — Coronæ.
44. — Pedis, Os Naviculare as in fore foot.

DESCRIPTION OF THE PLATES.

PLATE III.

FIRST LAYER OF MUSCLES OF THE HORSE.

THE FOOT OF THE HORSE.

1. A foot with a proper degree of obliquity.
2. A foot too upright, and its heels much too high.
3. A foot with low heels, crust too oblique, and wrinkled hoofs.
4. A narrow mule's shape foot.
5. A healthy foot in an unpared state.
   aa. The frog.
   bb. The bars.
   ccc. The sole.
   dd. The seat of corns.
6. A contracted foot.

PLATE IV.

REPRESENTATION OF THE MUSCLES OF THE HORSE.

(In this view the Panniculus Carnosus and the Levator Humeri have been removed.)

MUSCLES OF THE HEAD.

1. M. Dilatatoranaris lateralis.
2. — ———————— anterior.
3. — Orbicularis oris.
4. — Levator labii superioris alæque nasi.
5. — Masseter.
6. — Baccinator.
7. — Orbicularis palpebrarum.
8. — Temporalis.
9. — Depressor labii inferioris.

MUSCLES OF THE NECK AND TRUNK.

1. M. Trachelo-mastoideus.
2. — Splenius.
3. — Rhomboideus longus.
4. — Complexus major.
5. — Rectus capitis anticus major.
6. — Sterno-thyro-hyoideus.
7. — Sterno-maxillaris.
8. — Trapezius.
9. — Latissimus dorsi.
10. — Intercostales externi
11. — Obliquus externus abdominis.

MUSCLES OF THE FORE QUARTER AND LEG.

1. M. Antea-spinatus.
2. — Postea-spinatus.
3. — Teres minor.
4. — Triceps extensor brachii.

MUSCLES OF THE FORE QUARTER AND LEG—*continued.*

5. M. Pectoralis parvus.
6. — ———— transversus.
7. — Flexor brachii.
8. — Extensor metacarpi magnus.
9. — ———— pedis.
10. — Flexor metacarpi externus.
11. — ———————— internus.
12. — Extensor suffraginis.

MUSCLES OF THE HIND QUARTER AND LEG.

1. M. Gluteus maximus.
2. — ———— externus.
3. — Tensor vaginæ.
4. — Biceps Abductor.
5. — Semitendinosus.
6. — Rectus.
7. — Vastus internus.
8. — Sartorius.
9. — Gracilis.
10. — Gastricnemius internus.
11. — Plantaris.
12. — Flexor metatarsi.
13. — Extensor pedis.
14. — Flexor pedis.

PLATE I.

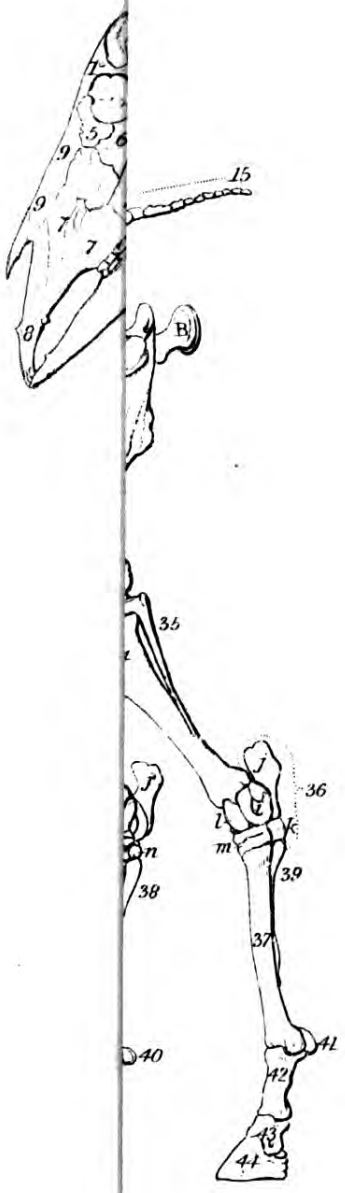




Back View of the Bones of the Foot and Pastern.

Engraved by J.W.Lowry.

PLATE II.



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PLATE III

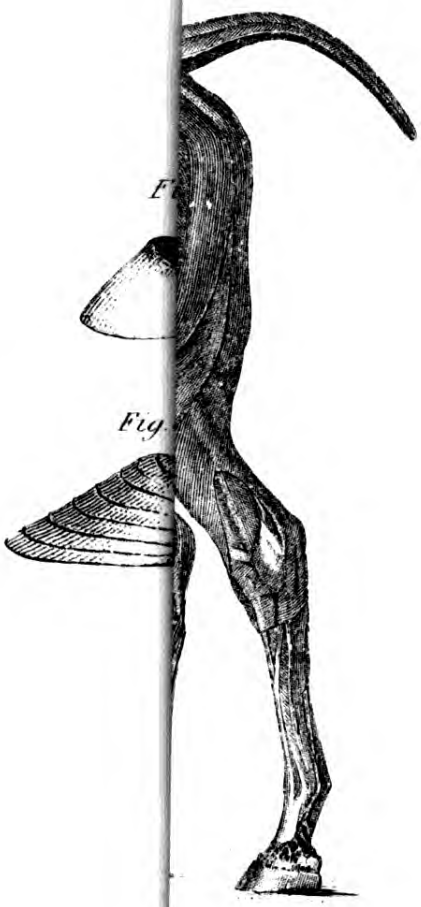


Fig. 5.



A healthy Foot in an unpared state

Fig. 6.



A contracted Foot.

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PLATE IV.



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