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Blaine's Outlines of the veterinary art; or, A treatise on the anatomy, physiology, and curative treatment of the diseases of the horse, and subordinately, of those of neat cattle and sheep

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BLAINE'S OUTLINES

OF

THE VETERINARY ART;

OR,

A TREATISE

ON THE

ANATOMY, PHYSIOLOGY, AND CURATIVE TREATMENT

OF THE

DISEASES OF THE HORSE,

AND, SUBORDINATELY, OF THOSE OF

NEAT CATTLE AND SHEEP.

ILLUSTRATED BY SURGICAL AND ANATOMICAL PLATES.

SIXTH EDITION,

REVISED THROUGHOUT, AND CONSIDERABLY IMPROVED,
BY THE INTRODUCTION OF MANY IMPORTANT SUBJECTS BOTH IN THE FOREIGN AND BRITISH PRACTICE OF THE ART,

BY

EDWARD MAYHEW, M.R.C.V.S.

AUTHOR OF "THE HORSE'S MOUTH," &c. &c.

LONDON:

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EDINBURGH: MACLACHLAN AND STEWART.

1854.

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ADVERTISEMENT.

THE Proprietors of Blaine's Veterinary Art, being desirous to keep the Book even with the knowledge of the day, have entrusted it to a gentleman of professional standing for revision; how much has been done to it the changed aspect of the Work fully testifies. Sheets of antiquated opinions have been removed, while several new articles have been added; the pages have been printed in a larger and a more elegant type; new copper-plates have taken the place of the old ones; and several wood-cuts have been distributed through the text, to illustrate the anatomical division of the treatise. The whole, they now trust, assumes so improved a character as to render it deserving of the patronage which the time, labour, and expense, devoted to the new edition, entitles them to expect.

Paternoster Row,
May, 1854.

PREFACE.

The Editor of the new edition of Blaine's Veterinary Art has small occasion to remind the public of his labours; the altered appearance of the Book will alone testify how much has been done to it.

He, however, may with pride point to the copper-plates, brilliantly executed by H. Adlard, Esq.; while no one acquainted with the nicety and firmness of pencil requisite for anatomical delineations, but will at once recognize the artistic handling of W. Bagg, Esq., in the original drawings.

Now that his labours are finished, and the Book upon the eve of publication, the Editor feels there is some reason for pride; though, at the same time, some cause for regret at the omissions and defects which, on a close inspection, he is conscious may be detected in it.

For any objection that may be taken to the punctuation of the anatomy he is, of course, alone responsible; semi-colons being in this portion of the work introduced more frequently than is calculated to please the general reader. Of this he is fully aware. But having presided over an anatomical school he studied to suit the convenience of those to whom this section especially appeals, so that they might repeatedly look from the book to the subject before them, and still have some slight license for such frequent interruptions.

7, *London Street, Norfolk Square,*
May, 1854.

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INTRODUCTION.

If the animals domesticated by man be essentially necessary to his comfort and convenience, no apology need be offered for attempting to reduce into a system the art of preserving them in health and removing their diseases; which practice must be founded on an intimate acquaintance with the structure, functions, and economy of such creatures: these acquirements, therefore, form the groundwork of what is called the *Veterinary Art*.

The deplorable state of this art in Great Britain has, until lately, been animadverted upon by every one who has written on the subject; the principal cause of which appears to have been the total abandonment of every rule by persons of proverbial ignorance. The value of animals, particularly of the horse, is a theme that has exercised the attention of thousands; nevertheless the preservation of their health has long been consigned to the groom, as the treatment of their diseases has devolved on the maker of their shoes. The study was regarded as beneath the station of educated men, and the practice as derogatory to the character of a gentleman.

But, at length, mankind becoming wiser are disposed to receive this study among the liberal arts, and to regard the profession of it as no longer incompatible with the pretensions of the scholar. The establishment of a Veterinary

College has tended much to this change; and the benefits derived from the excellent practitioners who have emanated from that institution, have further added to the dignity and importance of the new art. There are, however, persons desirous to obtain information on the subject who cannot apply to this source; and there also are others, who, having enjoyed those advantages, still wish for a condensed treatise, to revive in their memories the fleeting remembrances of former instruction. Among the first are such farriers as are sensible of their own defects, and anxious to repair them, but who cannot leave their homes: for these persons former publications have hardly been directing-posts.

Too many of the class called *farriers*, however, even yet are not willing to trouble themselves with learning, nor to acknowledge that they need it; hence they obstinately maintain, that nothing is necessary but what is already known; that theirs is purely a mechanical art, learned by imitation, and that it descends in perpetuity from father to son. We even, to our regret, find one of their body boldly combating against improvement in the following terms:— "Whatever may be written by those newfangled farriers of the advantages resulting from a minute knowledge of anatomy, nothing in their practice has proved its utility." Fortunately, however, for the horse, the well-informed now think very differently; they are fully aware that to the study of anatomy and physiology we are indebted for our improved methods of treating diseases. By dissections many important errors have been detected. We now are aware that the gangrenous state of the lungs, which the older farriers attributed to chronic disease, is the simple effect of active congestion. The different diseases of the bowels, notwithstanding their anomalous symptoms, are likewise illustrated. We have been enabled to make the

important distinction between spasmodic and flatulent colic. It is also from the same sources, that we have been taught many bowel complaints are the effect of strangulation, introsusception, and hernial displacements. From these, likewise, we now recognize the disease called *molten grease* to be no *mechanical melting of the animal fat*, but a dysenteric attack on the mucous surface of the intestines.

To what but anatomy and physiology do we owe our present acquaintance with the diseases of the feet? And if the services we require of the animal are such as to prevent our conquering all of them, we yet have greatly mitigated the sufferings of the animal. We now avoid torturing the shoulder, as the seat of almost every lameness which occurs. We are also enabled to relieve the horse from the agony consequent upon navicular disease by neurotomy. To an acquaintance with the anatomy of the eye it is that we no longer attribute *ophthalmia* to an enlargement of the *haw*. This knowledge has prevented us from cruelly depriving the horse of a necessary organ, as a remedy for an imaginary disease. Have anatomy and physiology, therefore, taught us nothing?

The subject-matter of the VETERINARY OUTLINES have been divided into *Four Natural Parts*. The *first* of these comprises what may be termed the collateral branches of the art, as the history of the horse, &c. &c.

The *second* division of the work is occupied by an anatomical description of the several parts of the body.

The *third* division of the work is allotted to the practice of the veterinary art, or to the curative treatment of each disease.

The *fourth* division is dedicated to the Veterinary Materia Medica, or the chemical and pharmaceutical nature of drugs.

To the whole is added a copious Index, by which means subjects otherwise disjointed may be drawn together into one point of view; and by aid of which the reader will be readily enabled to find any subject he wishes under the term that is familiar to him.

CONTENTS.

SECTION I.

HISTORY OF VETERINARY MEDICINE.

PAGE

Was first sown in Greece; next nurtured in Rome—Languished during the dark ages—Revived in the sixteenth century—Aided by the translation of the writings of Vegetius—The succeeding age still further cultivated it—The eighteenth century marked by veterinary writings of acknowledged merit, and by the establishment of the first public school of the art—The subsequent march of veterinary science may be legibly traced in the works of the many eminent authors who have since written on it. 1—4

SECTION II.

HISTORY OF VETERINARY MEDICINE IN GREAT BRITAIN.

Our first improvements were coupled with the arts of the menage borrowed from France and Germany—The early writings on the subject were mostly translations from the French—The English school was stimulated by the works of Sollysel, towards the middle of the last century; Great Britain also began to furnish native writers and eminent practitioners—History of the Veterinary College—A short sketch of the more prominent English writers on the subject . . . . . 4—6

SECTION III.

THE HISTORY OF THE VETERINARY COLLEGE.

St. Bel makes two attempts to found a Veterinary School—He is appointed professor—Review of his deserts—Messrs. Coleman and Moorcroft appointed to succeed him—Medical Committee established—Review of Coleman's character—Succeeding professors up to the present time—Her Majesty grants a Charter to the Veterinary Profession . . . 6—11

SECTION IV.

THE NATURAL HISTORY OF THE HORSE.

Whether Job had horses, discussed—Change of breed induced by alterations in National customs—Comparison made between horse and dog—The external conformation of the horse—The teeth as indications of the age—Also to be depended upon in other animals—Exterior conformation continued—The Colours and Markings of Horses . . . . 11—50

SECTION V.

THE CONDITION OF HORSES.

The Conventional Term of Condition, its real meaning—Morbid Condition—System of getting a Horse into Condition—Injury of purgatives as promoters of condition . . . . . 51—55

SECTION VI.

STABLING OF HORSES.

PAGE

The Stable itself—Summering of Hunters—Summering at grass—Food of Horses—Grooming—Exercise . . . . . 55—59

SECTION VII.

THE ANATOMY OF THE HORSE.—THE BONES.

Description of Plate I.—The Composition of Bones—Bones of the Skull—Of the Face—The Posterior Jaw—Anatomy of the Teeth—Bones of the Trunk—The Vertebræ—Pelvic Bones—The Coccygeal Bones—Bones of the Thorax: Costæ or Ribs, Sternum—Bones of the Anterior Extremities—Scapula or Shoulder-blade Bone—Humerus or Real Arm—Radius and Ulna—Carpus or Knee—Metacarpus or Cannon—Small Metacarpals or Splint Bones, Suffraginis or Pastern, Lesser Pastern and Foot Bones—Bones of the Posterior Extremities—The Femur or true Thigh Bone—Patella or Stifle—Tibia or Leg Bone, and the Fibula—Tarsus or Hock Bones—Mechanical Structure of this latter assemblage—Metacarpal, Coronary, and Coffin Bones—The Mechanism of the Skeleton considered . 59—90

SECTION VIII.

OF THE APPENDAGES TO BONE.

Cartilages Articular—Non-articular, Attached and Unattached—Periosteum, Medulla or Marrow, Connecting and Capsular Ligaments; Synovia . . . . . 90—92

SECTION IX.

OF MUSCLES.

Description of Plate II.—Muscles, their Structure and Functions—Voluntary and Involuntary—Tendons, Aponeuroses, Fascias—Muscles of the Head and Neck—Of the Trunk and Abdomen—Muscles of the Anterior Extremity—Of the Posterior Extremity—Description of Plate III. . . . . 92—118

SECTION X.

OF BURSÆ MUCOSÆ.

Organs of Anti-attrition, as Mucous Capsules and Mucous Sheaths to the Extensor and Flexor Tendons 118, 119

SECTION XI.

OF ARTERIES AND VESSELS.

Description of Plate IV.—The Vessels of the Body—Arteries, their Structure and Function—Uses of Absorbents—The Pulse, and its various indications—Mean Pulsations per minute—Differences under varied circumstances—Where most conveniently felt in the Horse—Variations a guide to our judgment in Disease—Distribution of the Arteries—Anterior Aorta—Furnishes the Fore Extremity—Carotids—Supply the Head—The Posterior Aorta—Distribution to the Trunk and Hind Extremity—Pulmonary Arteries.

Veins, Structure and Functions—The Anterior Cava—The Posterior Cava—The Vena Portæ . . . . . 119—149

SECTION XII.

OF THE NERVES.

PAGE

Description of Plate V.—The Brain—The Cerebral Nerves—The Spinal Nerves—Distribution of the Spinal Nerves—Nerves of the Fore Extremities—Of the Hinder Extremities—Physiology of the Nervous System . . . . . 149—166

SECTION XIII.

OF GLANDULAR STRUCTURES.

The Structure, Functions, and Distribution of the Glands—Their Division into Folliculose, Glomerate and Conglomerate Masses . . 166—168

SECTION XIV.

OF THE VARIOUS VISCERA.

Teaches the Knowledge of the Viscera of the Body and its Coverings—The Common Integuments—The Hair—The Cuticle and Cutis—Sense of Touch—Adipose Membrane and Fat—Subcutaneous Muscles—Panniculus Carnosus.

Of the HEAD Structurally—Description of Plate VI.—The Outer Ear—The Inner Ear—Sense of Hearing—The Eye, Anatomy of—Physiology of Vision—The Nose—Physiology of Smelling—The Cavity of the Mouth—Its Muscles, Lips, Gums, Bars, Palate, Palatine Arch, and Tongue—Physiology of Tasting—The Cavities of the Pharynx and Larynx—Functions of Mastication and Deglutition—Glands of the Head: the Parotid, Submaxillary and Sublingual, as Salivary Glands—The Neck, anatomically considered—Trachea and Œsophagus—Description of Plate VII.

Anatomy of the CHEST: Its Pleuræ, costal, pulmonic, and mediastinal—The Diaphragm—The Heart: its Auricular and Ventricular Cavities, and Valvular Apparatus; Physiology of its Agency in the Circulation of the Blood—The Lungs; Physiology of Respiration—Nature and Properties of the Blood; Aëration of it in the Blood; becomes the source of Animal Heat—Description of Plate VIII.

Anatomy of the ABDOMEN: Abdominal Regions—The Stomach; Physiology of Digestion—The Intestines—The Economy of the Intestines—in continuing the Digestive Process—The Liver—The Pancreas and Spleen, the Renal Capsules and Kidneys—Anatomy of the Pelvis—The Bladder—Physiology of the Urinary Secretion—The Male Organs of Generation—The Female Organs—Description of Plate IX. . 168—250

SECTION XV.

REPRODUCTIVE SYSTEM.

Physiology of the Work of Generation—Œstrum or Heat—Generative Act—Conception and Pregnancy, Gestatory Period of the Mare, Parturition or Foaling—Lactation or Suckling—The Fœtal Colt and his Organization; the Fœtal Circulation; Descent of his Testicles and Evolution of his Form to the Adult Period—Anatomy and Physiology of the Foot—Structure and Economy—External Parts—Internal Parts—Description of Plate X. . . . . 250—266

THE DISEASES OF THE HORSE, &c. &c.

PAGE

Of Disease generally . . . . . 269—271

CHAPTER I.

OF PURE FEVER.

Simple Fever in Horses—Diffused or General Inflammation in Horses—Epidemic Catarrhal Fever in the Horse—Symptomatic Fever—Purpura Hæmorrhagica—Fevers of Horned Cattle—Dropping after Calving—Garget or Inflammation of the Udder in Cows—Hoose, Cough or Cold in Cattle—Influenza or Epidemic Catarrh in Cattle—The Vesicular Disease in Cattle, or the Epidemic of 1841-42 . . . . . 271—299

CHAPTER II.

MADNESS, OR PHRENITIS, OR INFLAMMATION OF THE BRAIN IN HORSES.

Madness, Phrenitis, or Inflammation of the Brain—Mad, Sleepy, and Stomach Staggers—Pneumonia or Inflammation of the Lungs—Pleurisy—Pleuro-Pneumonia—Inflamed Lungs in Neat Cattle—In Sheep—Inflammation of the Heart—Inflammation of the Muscular Coat of the Intestines—Inflammation of their Mucous Surface, or Dysentery—Peritonitis, or Inflammation of the Outer Coat of the Intestines—Inflamed Bowels in Neat Cattle—Inflammation of the Liver—In Neat Cattle—Inflammation of the Kidneys—Hœmaturia in Cattle—Inflammation of the Bladder—Spasm of the Neck of the Bladder—Inflammation of the Womb 299—341

CHAPTER III.

INFLAMMATION OF MUCOUS MEMBRANES.

Simple Catarrh, or Common Cold—Sore Throat—Bronchitis—Roaring—Chronic Cough—Thick Wind—Broken Wind—Glanders—Farcy—Dysentery—In Cattle . . . . . 341—374

CHAPTER IV.

DISEASES OF THE BRAIN AND NERVES.

General Considerations of the Nervous System—Phrenitis—Apoplexy—Megrims—Paralysis, or Palsy—Spasm—Tetanus, or Locked Jaw—Stringhalt . . . . . 374—385

CHAPTER V.

DISEASES OF THE ALIMENTARY CANAL.

Spasmodic Colic—Colic in Horned Cattle—Chronic Indigestion—Acute Indigestion, or Stomach Staggers—Hove, or Blown in Cattle—Lampas—Worms—Parasitic Animals in Cattle—Costiveness—Diarrhœa—Ditto in Cattle—Scouring in Calves—Cribbiting—Morbid Displacements of the Intestines—Hernia—Reduction of Strangulated Hernia—Hernia Congenital—Involutions, Strictures, and Invaginations of the Intestines 385—407

CHAPTER VI.

DISEASES OF THE GLANDS.

PAGE

Jaundice—Yellows—In Cattle and Sheep—True Red Water in Cattle—Hæmaturia, or Bloody Urine—Profuse Staling . . . 407—412

CHAPTER VII.

DISEASED COLLECTIONS OF FLUID WITHIN CIRCUMSCRIBED CAVITIES.

Hydrocephalus Internus, or Dropsy of the Head—Hydrothorax, or Dropsy of the Chest—Operation of Paracentesis Thoracis—Hydrops Pericardii, or Dropsy of the Pericardium—Ascites, or Dropsy of the Belly 412—417

CHAPTER VIII.

DISEASED COLLECTIONS OF FLUID WITHIN THE CELLULAR MEMBRANE.

Anasarca—Water Farcy—Œdema of the Extremities, or Swelled Legs—Ecchymosis, or Extravasation of Blood—Emphysema, or Extravasation of Gas . . . . . 417—422

CHAPTER IX.

CALCULUS, OR STONY CONCRETIONS.

Calculus Concretions—Intestinal Calculi, or Stones in the Intestines—Urinary, or Stone in the Kidneys—Vesicular, or Stone in the Bladder 422—425

CHAPTER X.

ANIMAL, VEGETABLE, AND MINERAL POISONS.

Rabies or Madness—The Bites of Venomous Reptiles—Vegetable Poisons—Mineral Poisons.

Principles and Doctrine of Local Inflammation—Characters of Local Inflammation—Adhesive Process—Suppurative Process—Gangrene 425—436

CHAPTER XI.

WOUNDS.

Surgical Treatment of Wounds generally—Particular Wounds—Of the Head—Of the Neck—Of the Chest—Rupture of the Diaphragm—Wounds of the Abdomen—Wounds of Articular and Bursal Cavities, or Wounds of the Joints generally—Wound into the Knee Joint particularly—Knees Broken without penetrating the Joint—Wounds of the Arteries—Of the Veins—Inflammation of the Veins . . 436—454

CHAPTER XII.

OF ABSCESS.

Acute Abscess—Strangles—Warbles . . . . . 455—459

CHAPTER XIII.

OF CHRONIC ABSCESS AND ULCERATION.

PAGE

Ulcerative Process—Individual Ulcerations: Poll Evil—Fistulous Withers —Salivary Fistulæ—Of the Parotid Gland . . . . . 459—466

CHAPTER XIV.

SPRAINS, OR STRAINS.

Membranous and Ligamentary Injuries called Strains or Sprains, considered generally—Shoulder Strain—Strain of the Flexor Tendons, or their ligamentous Connexions—Overreach—Rupture of the Suspensory Ligaments —Rupture of the Back Sinew—Strain of the Fetlock Joint—Sprain of the Ligaments of the Femur—Of the Patellæ or Stifle—Bruises—Rheumatism Acute and Chronic—In Cattle—Sitfast—Indurated Elbow-Point . . . . . 466—478

CHAPTER XV.

OF ENCYSTED SWELLINGS.

Varix, or Blood Spavin—Windgalls—Distended Bursæ, called Bog Spavin—Thorough-Pin—Capped Hock . . . . . 478—481

CHAPTER XVI.

FRACTURES AND DISLOCATIONS.

Considerations of these Injuries generally—Particular Fractures: of the Skull—Of the Face—Of the Jaw-Bone—Of the Ribs—Of the Pelvis—Of the Vertebræ—Fractured Bones of the Extremities—Of the Scapula —Of the Humerus—Of the Radius—Of the Femur—Of the Tibia—Of the Olecranon—Of the Cannon before and behind—Of the Pastern Bones—Of the Navicular Bone—Of the Patella—Dislocations—Patella or Stifle Bone . . . . . 481—488

CHAPTER XVII.

DISEASES OF THE BONES.

Caries of Bones, commences by Inflammation—Exostosis—Particular Exostoses: Splint—Spavin—Curb—Ringbone—Exostosis of the Coffin Bone —Anchylosis . . . . . 488—497

CHAPTER XVIII.

DISEASES OF THE EYE.

Simple or Common Ophthalmia, or Inflammation of the Eye—Specific or Periodical Ophthalmia—Cataract—Amaurosis, or Gutta Serena—Excrescences, &c. on the Eyes . . . . . 497—507

CHAPTER XIX.

DISEASES OF THE SKIN.

Grease—Small-pox among Sheep—Swelled Legs—Mallenders and Sallenders—Warts—Mange—Hidebound . . . . . 507—522

CHAPTER XX.

DISEASES OF THE FEET

PAGE

Founder or Inflammation of the Feet—Acute Founder—Chronic Founder—Shoeing of Horses—The Pumiced Foot—Naviculartbritis—Corns—Thrush—Sandcrack—Foot pricked by a nail—Tread or Overreach—Quittor—Canker—False Quarter . . . . . 522—560

OF SURGICAL OPERATIONS.

The necessary Restraints employed on such occasions—The Trevis—Casting—Slinging—Veterinary Obstetrics, or the necessary assistance rendered in difficult Foaling—Embryotomy—Castration—By Cauterization—The French method—By Ligature, &c.—Lithotomy—Tracheotomy—Esophagotomy—Neurotomy—Periosteotomy—Division of the Flexor Tendons—Amputations: Of the Penis—Docking—Firing—Blistering—Rowelling—Setons—Blood-letting—By the Arteries—By the Veins, or Phlebotomy—The Physicking of Horses—The Use and Abuse of Purgatives—Diuretics . . . . . 561—607

THE VETERINARY MATERIA MEDICA . . . 609—660

DIRECTIONS TO THE BINDER.

Plate	I.	*to face page*	60
	II.		Frontispiece
	III.	„	117
	IV.	„	119
	V.	„	149
	VI.	„	175
	VII.	„	209
	VIII.	„	224
	IX.	„	250
	X.	„	265

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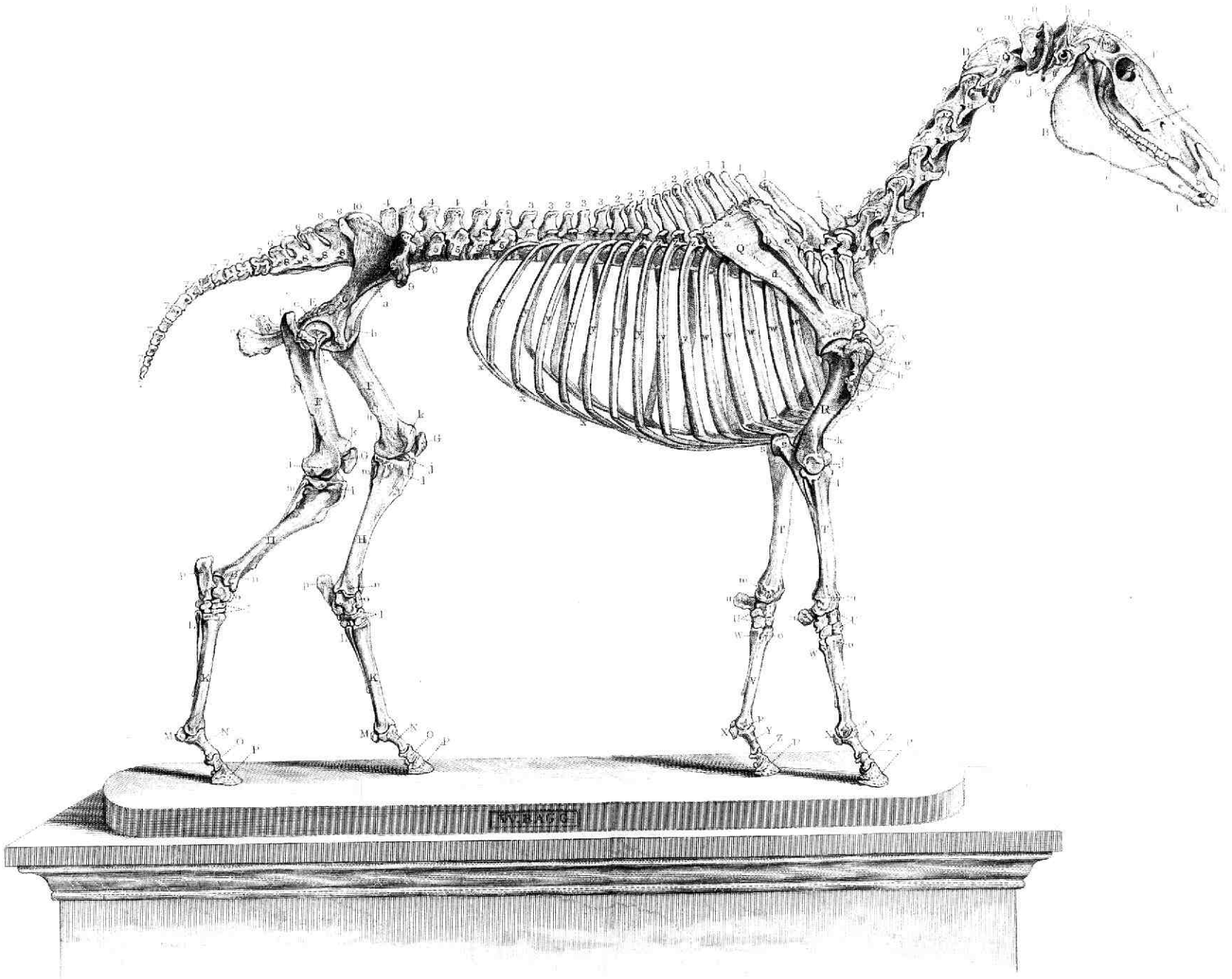
OF

THE VETERINARY ART.

SECTION I.

HISTORY OF VETERINARY MEDICINE.

MAN, who is ever ready to change surrounding objects to his advantage, would not, probably, be long without subjecting to his use such animals as his reason led him to suppose would prove most useful, or his experience had noted were the most tractable. This is said, supposing the horse ever existed in a state of perfect freedom—of which fact there is no decided testimony. The herds of so-called wild horses existing in Asia and America are tame animals that have either broken loose, or are private property turned out to breed and graze where pasturage is plentiful and stabling expensive. It would appear probable that the ass was first perfectly broken to the use of man; nor was it until, as we learn from Genesis, chap. xlvii., that, with the herds of asses, horses also were sent to Pharaoh, which Sir Isaac Newton computes to have been 1034 years before Christ, about which time the renowned Erictheusa appears to have been employed in taming and breaking the horse to the use of man. But animals, when forced to obey the desires of an exacting master, could not long continue in perfect health; hence their owners were soon led to search for such remedies as their small stock of information pointed out: thus veterinary medicine must, in some degree, have been coeval with the possession of the animals in question. The early practice of it was, however, without doubt, mingled with the general manage-

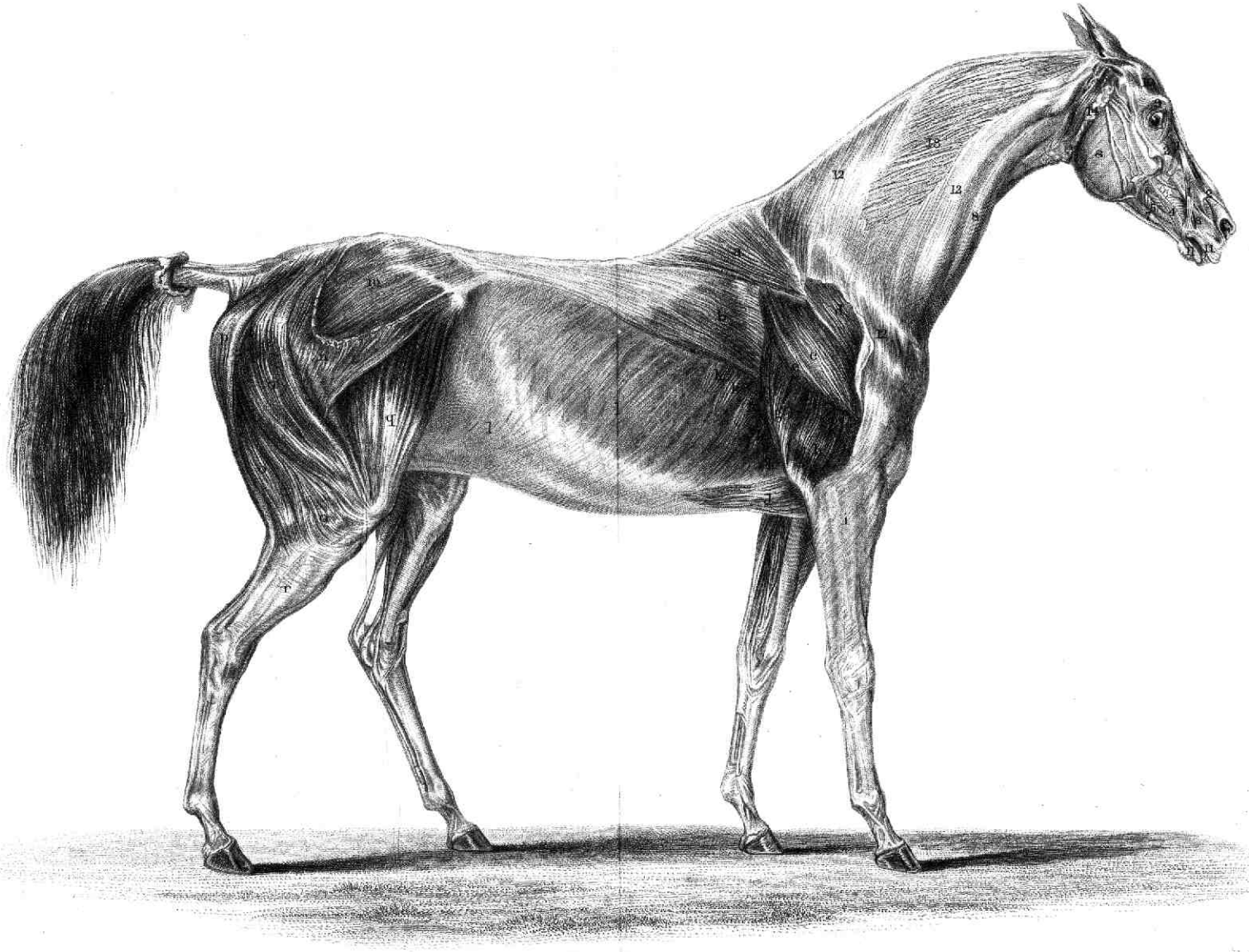


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ment, and what little was then known probably existed among those professing the art of human physic. When the early Egyptians had trained the horse to the purposes of war, his health may be supposed to have become an object of solicitude. From the Egyptians the Grecians received the knowledge of the management of the horse; and with them we know it flourished. Chiron, surnamed the Centaur, pursued both human and brute medicine. Homer, who flourished 900 years before Christ, celebrates the training of the horse in the Greek courses; and Xenophon, the renowned warrior, poet, and philosopher, wrote a treatise on equitation, which contains ample evidence how much the study of this valuable animal was in repute among the most distinguished characters of his day. Hippocrates, also, the most celebrated physician of early times, wrote a treatise on the curative treatment of horses; nor did he disdain, in common with the eminent human practitioners of those times, to practise indiscriminately on the horse and his rider.

When Rome had snatched from Greece her honours and her arts, the horse also was taken with the rest; and a host of Latin authors on subjects connected with the animal sprung up, the names of whom would swell our pages. As a rustic writer, Columella deserves our mention; the rest we pass over till the age of Vegetius, who flourished about 300 years after the birth of Christ, and whose writings concentrated within themselves all that had been collected by former veterinary authors of the empire. A long night of darkness succeeded the irruptions of the barbarous nations. During this time, however, iron shoes, before but partially tried, became more generally used; and by an association only to be excused by the state of the times, the treatment of the diseases of the horse became the province of the shoeing-smith; while the medical assistance required for other beasts was gained from goatherds, shepherds, &c.

The ancient and honourable name of *Veterinarius* (whence *veterinarian*) sanctioned by the classics of the Augustan age, became lost in the more humble appellative of *farrier*, derived solely from the metal on which he worked; and for a long period (happily now on the decline) the igno-



W. Bagg, ad nat. del

H. Adlard sc.

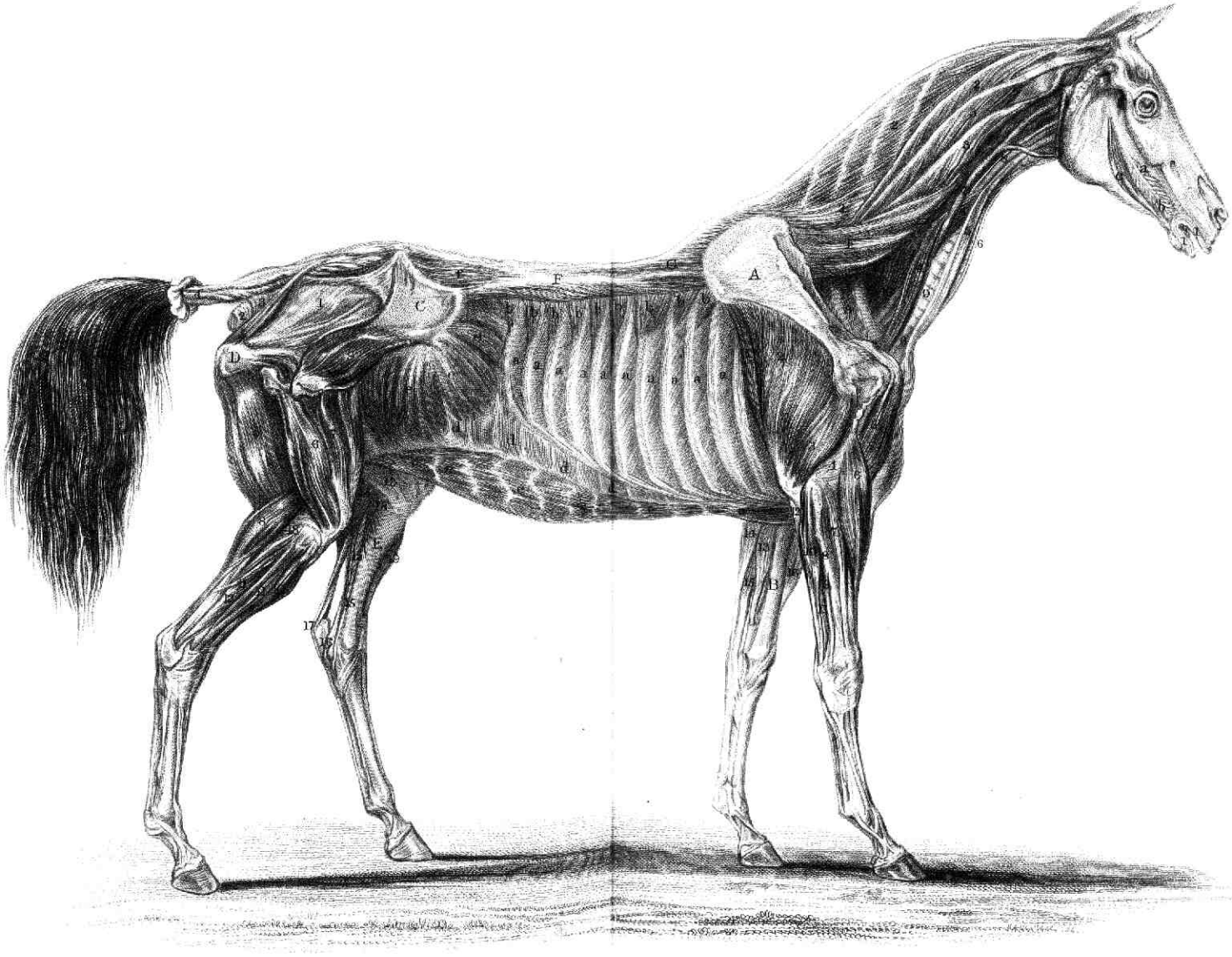
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rance of the shoer and the meanness of his title remained indissoluble.

The sixteenth century, famed for the revival of learning and the encouragement of art, fostered also the subject of our present discourse: among its patrons may be noted Francis the First, who ordered the Constantine collection to be translated from the original Greek into Latin; from which it was soon afterwards rendered into Italian, German, and French, and thence became dispersed over Europe. About the same time, the works of Vegetius were translated into the popular European languages; and from this period we may date the gradual improvement of the art.

During the seventeenth century, the veterinary art continued to advance, and numerous publications on the subject were contributed by various hands; among which we may notice Cæsar Fiarchi's Italian treatise on horsemanship, in which is introduced the most rational mode of shoeing then practised. Neither should we omit to mention the *Infermita, & suoi remedii, del Signor Carlo Ruini*, published in Venice, 1618; from which Snape, Gibson, as well as most of the early French authors, have copied their anatomical plates. In 1654, the *Grand Maréschal François*, a meritorious work, said to be composed by many hands, appeared. In the latter end of this century, the art received a very great addition from the elaborate work of Sollysel, whose attention was drawn to the subject from his situation of riding master; and as the practices of this school were at this time in great repute, it followed that the treatment of the diseases of horses became very much confined to the professors of this art. It will not, therefore, excite our wonder that almost all the treatises on veterinary medicine of this time are found united with systematic equitation; and although, as regards Sollysel, the cause was not injured, yet generally it may be considered, that to this union of arts, practised by persons not medically educated, may be attributed the small progress made by veterinary medicine.

The eighteenth century produced numerous writers on the subject, and was destined to witness important improvements in the art. In 1761, France set the notable example of establishing, under royal patronage, a public



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veterinary seminary at Lyons, having the celebrated Bourgelat for its professor: his medical and anatomical works were numerous, and are well known. In 1766, a second public school was opened at Alfort, near Charenton, in the neighbourhood of Paris, and others subsequently at Strasburgh and Montpellier: establishments of the same kind have likewise since been organized in almost every European country, as Vienna, Berlin, Copenhagen, Dresden, Leipsic, Prague, Munich, London, Hanover, Naples, &c. &c. In Russia, also, a veterinary school was founded, over which Mr. Blaine was invited to preside.

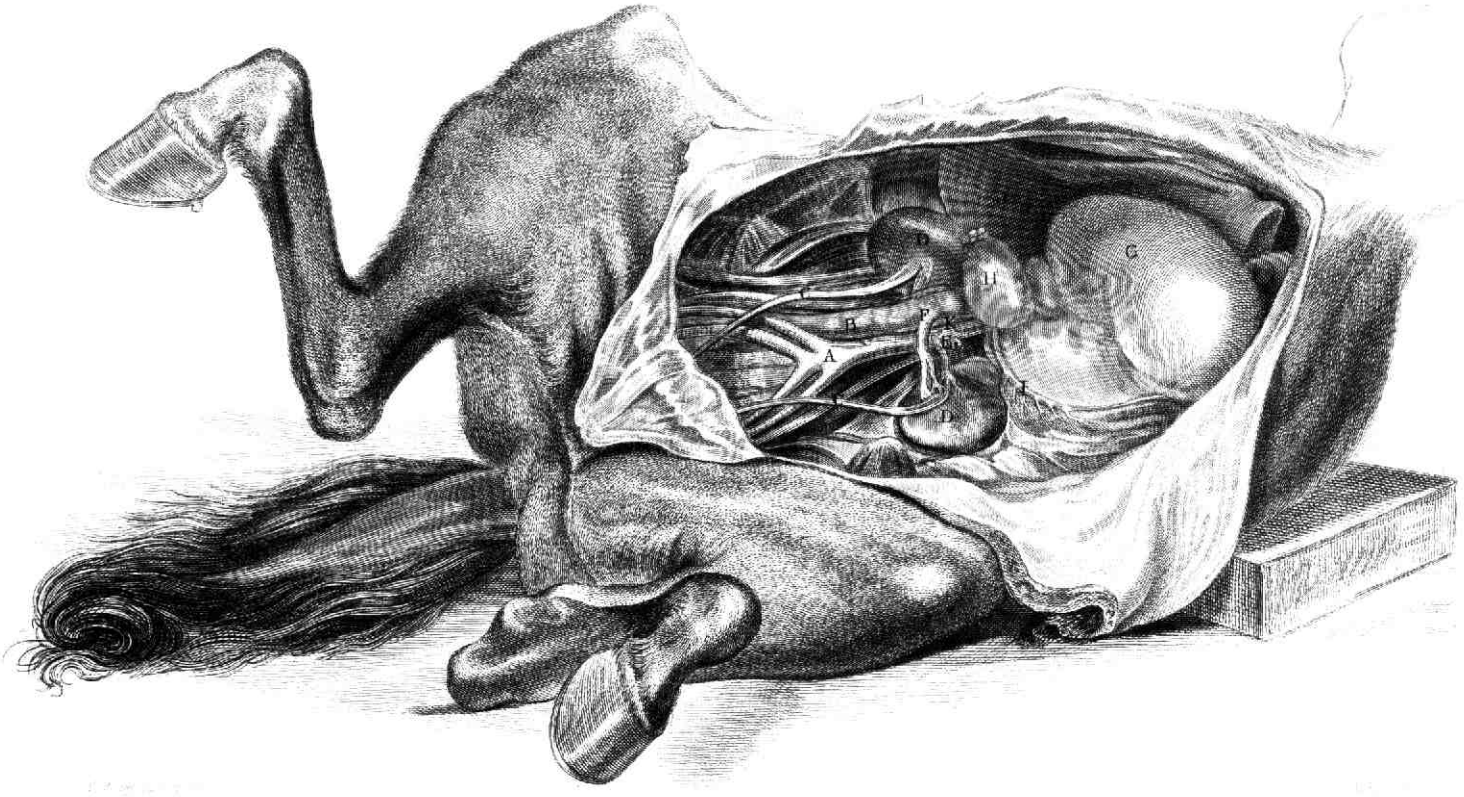
As a contemporary with Bourgelat lived the elder La Fosse, a name that will ever be respected in the annals of veterinary medicine. La Fosse made numerous improvements and discoveries, which he usually communicated in the form of memoirs to the Royal Academy of Sciences in Paris. In 1754, he had collected these into one volume, which was quickly translated into other languages, and diffused over Europe.

The French revolution for some time disturbed the course of veterinary improvement; but the calm which succeeded employed the talents of many eminent veterinarians; and the names of Chabert, Flandrin, Gilbert, Vicq-D'Azyr, and Huzard, stand conspicuous on this list. From that time to the present, the writings on the veterinary art have become numerous in every country, but more particularly in France, and it follows that, in the course of our labours, many of the most popular will be quoted.

SECTION II.

A CONCISE HISTORY OF VETERINARY MEDICINE IN GREAT BRITAIN.

THE healing art, as applied to a curative treatment of the diseases of our domesticated animals, was, in England, even longer buried in gross ignorance than either in France or Germany; and when, at length, emulation had excited us, our early attempts were more the effects of an imitation of our French and German neighbours, than native improvements of our own. It, however, worked a favourable


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change among us; for although the medical treatment of horses particularly had not yet emerged from the hands of those immediately about the animals, still, as the teachers of equitation were much more enlightened than either blacksmiths or grooms, the medical practitioner necessarily became educated on better principles. The riding school gave place, towards the close of the seventeenth century, to horse-racing and hunting, which again threw the care of the health of the horse back to the currier of his hide and the shoer of his heels; and this æra witnessed only feeble and occasional efforts to rescue the valuable art of curing his diseases from ignorance and barbarity.

Blundeville, who lived in the reign of Elizabeth, appears to have been one of our earliest veterinary writers. His work, which was chiefly a compilation from ancient authors, was fettered with his attachment to the riding school. Subsequent to him appeared Mascal, Martin, Clifford, and Burdon. About this time also lived the celebrated Gervase Markham, whose *Treatise on Farriery*, though empirical and absurd, went through numerous editions, and became the guide of the practitioner of that time. The reign of James I. produced little original writing, but several translations from the Italian, German, and French. In the time of Charles II. appeared *The Anatomical Treatise on the Horse*, by Snape, farrier to his Majesty. The plates are copies from Ruini and Saunier. His descriptions are likewise taken from these authors; and where he deviated from them, he made the human body his guide and went wrong. In the reign of George I. Sollysel's celebrated work was translated by Sir William Hope from the French, which tended to combat many of the errors at that time prevalent. About the middle of the last century, the art experienced still further improvement by the labours of Gibson, who was originally surgeon to a regiment of cavalry; from which situation it is probable he was first led to turn his attention to the diseases of the horse, and by which he was, at length, enabled to present the best treatise on farriery that had appeared in the English language.

As a contemporary with Gibson lived the celebrated and eccentric physician Dr. Bracken, a man of considerable erudition, a sportsman, and a wit of a peculiar cast; his

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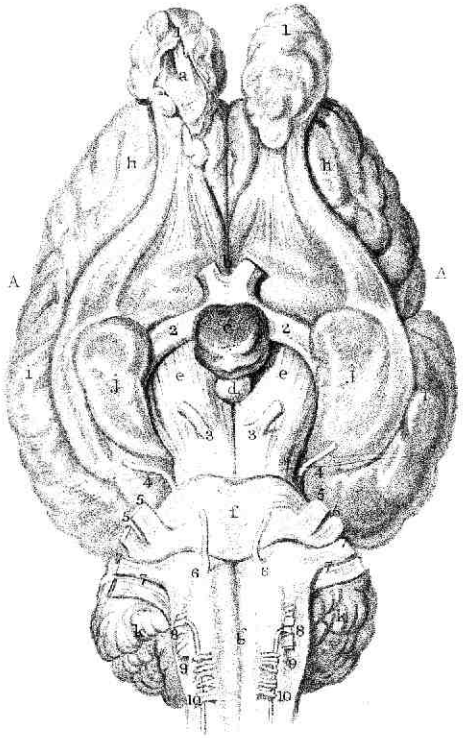
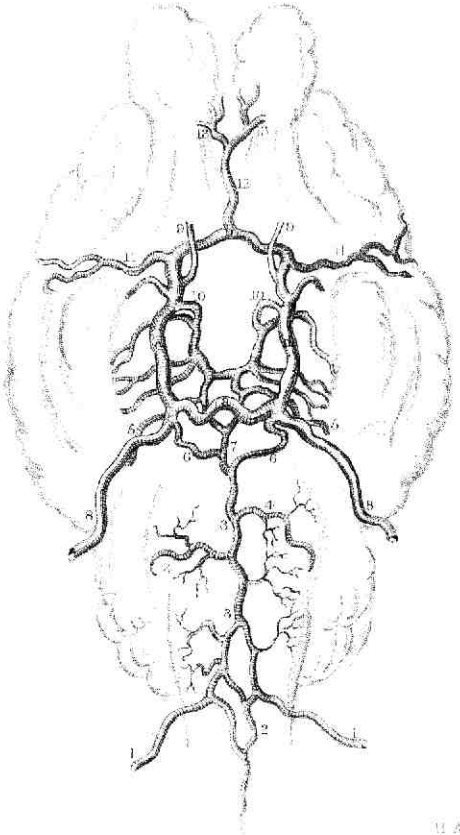


Fig. 2.



works have been as much admired and read for the peculiar style in which they are written, as for the real information they contain.

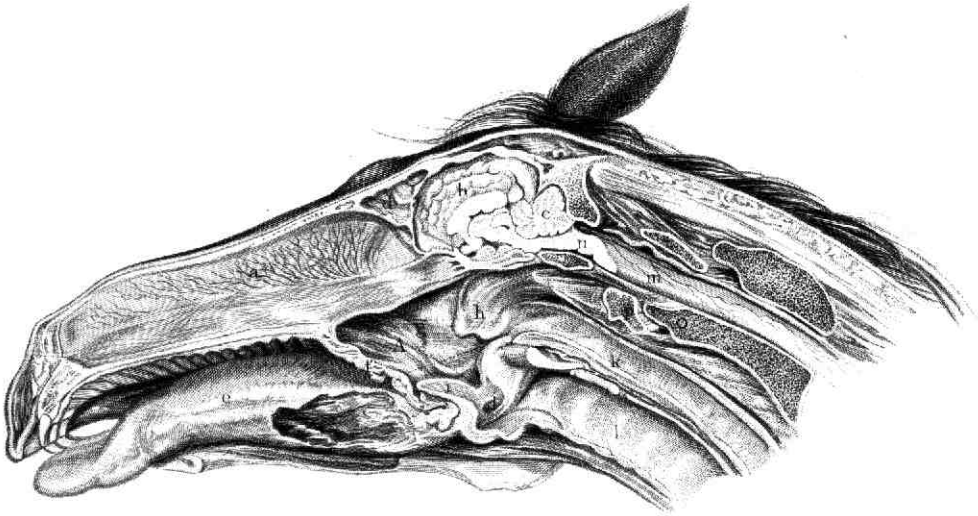
Bartlet, who was a successor to the two former, was likewise a surgeon: he formed himself on the model of Gibson and Bracken, and he gave the sum of their treatment in a much more compendious and practical form. He likewise benefited the art by translating La Fosse's improvements and discoveries: but Bartlet is to be noticed principally as a copyist and compilator, for he brought forward little of his own, except a cruel and absurd alteration in the mode of nicking.

To him succeeded Osmer, who was also initiated a human surgeon, but afterwards practised as a veterinarian in *Oxford Street*. His *Treatise on the Lamenesses of Horses*, with an improved mode of shoeing, is most deservedly esteemed, and his practice was adopted with some slight alterations, by the late Mr. Morecroft. He first commented upon La Fosse's method, and pointed out the excellence of his mode of treating the feet; at the same time showing that the short shoe was inadequate to the support and protection of the foot in the present improved and hard state of our roads. The practical part of this treatise on lamenesses is likewise excellent, and will hand his name down as one of the early contributors to the success of the art. The next luminary in the veterinary horizon was Clarke, of Edinburgh, the king's farrier for Scotland, whose excellent *Treatise on Shoeing and the Diseases of the Feet* was afterwards followed by a work on the *Prevention of the Diseases of the Horse* generally; these succeeded the publication of the engravings of the Muscles of the Horse, by Mr. Stubbs, the professional horse painter, who, to high excellence in his art, added a very considerable knowledge of the general anatomy of the animal.

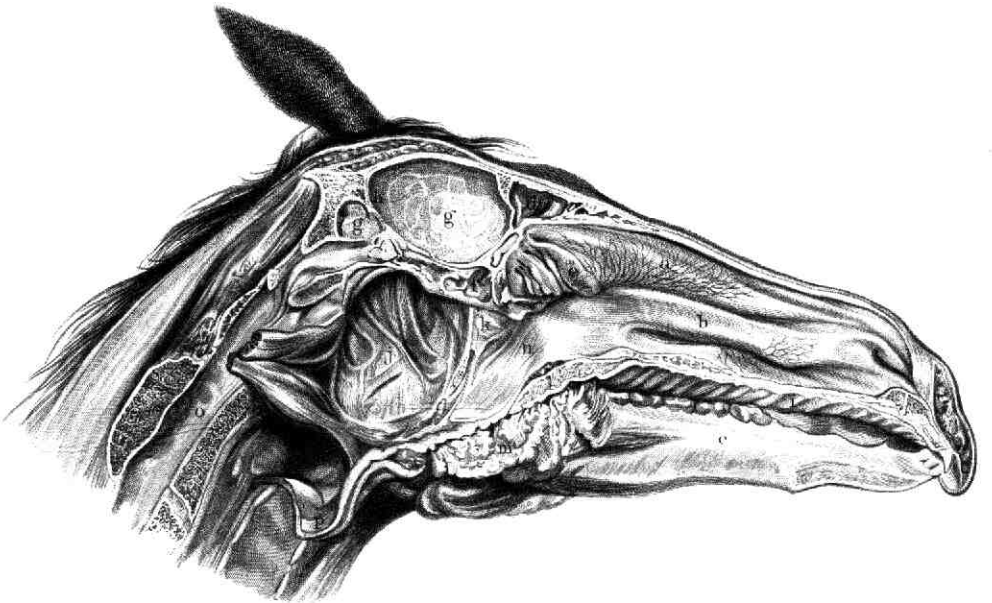
SECTION III.

THE HISTORY OF THE VETERINARY COLLEGE.

THE period of the establishment of a National School will ever remain a memorable epoch to the veterinary


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amateur, as being that from which the principal improvements in his art are to be dated. Charles Vial de St. Bel first published proposals for founding a veterinary school in the year 1788; but the plan meeting with no support, he returned to France. This gentleman was professionally educated at the Royal Veterinary College of Lyons, and, as we are told, afterwards became junior assistant at Alfort. In 1790, he made a second visit to England, which proved more successful; for, on again renewing his proposals, they were noticed by the Agricultural Society of Odiham, in Hampshire, the members of which, convinced of the utility of such a measure, proposed to form an institution, called *The Veterinary College of London*, and to appoint St. Bel to the professorship; Mr. Blaine being engaged as his assistant. It was in February 1791, that the first organized meeting of the supporters of the society took place at the Blenheim Coffee House, Bond Street, at which time many new subscribers enrolled themselves. His Grace the Duke of Northumberland condescended to become the president; and such was the general opinion of the importance of the subject to the country at large, that vice-presidents and directors offered themselves from among the most distinguished characters for rank and talent. A house was next taken for the purposes in view at St. Pancras. Pupils were received to board with the professor; and Mr. Blaine was also located there as translator and anatomical demonstrator. To him it was, however, a matter of surprise that the concern succeeded to the extent it did; so totally inadequate to such an undertaking was St. Bel. That he was enterprising and ingenious no one will deny; he was also indefatigable in promoting the interest of the establishment, which indeed involved all his future prospects; but that by his knowledge of the anatomy, physiology, and pathology of the horse he was fitted to become the veterinary professor, no one of those who most strongly supported him can believe. His writings and his practice bear out this opinion; his election to the chair could have alone arisen from a wish that such a school might be established; and it could only have occurred because no other person then in the kingdom was better able to undertake its management.


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In March 1792, it was resolved, that a temporary stabling for fifty horses, and a forge for shoeing, should be built near the house taken for the college; but the completion of which the Professor was hardly permitted to witness, for he was attacked with an illness in August, 1793, which proved fatal in about a fortnight.

On the death of St. Bel, the public attention was of course engaged in considering on whom the vacant professorship would devolve: some eyes were directed towards Mr. Blaine; many more to Mr. Clarke, of Edinburgh, who, however, refused it. Mr. Morecroft, then in practice as a veterinary surgeon, was unquestionably the most eligible person. Mr. M. was originally a student of human medicine; but he had lately studied veterinary practice in the French schools, and was considered to possess extensive information on the subject. Mr. Coleman, a medical pupil of the Borough hospitals, who had much distinguished himself by some physiological inquiries, and by some experiments on the diseases of the eyes of the horse, was brought forward likewise; although his attention had never, I believe, reached beyond that point. The fitness of Mr. Morecroft was, however, so nicely balanced by the interest of Mr. Coleman, that it was determined to unite them in the professorship; since, with the practical knowledge of the one, and the investigations of the other, every thing was to be hoped from the association. Unfortunately for the institution, Mr. Morecroft, finding that he had quitted a profitable concern for one which held out little prospect of gain, soon seceded; and Mr. Coleman, who now applied himself to fill up by his own talents the loss of his colleague, was appointed sole professor. The general establishment, also, at this time received some important alterations; in proof, a theatre for the delivery of lectures, with a dissecting-room and museum, were erected. A medical committee of assistance was also appointed, consisting of the most distinguished medical practitioners in London, by whom the pupils were to be examined, and, if found to have acquired a sufficient knowledge of the art, certificates were to be granted them. Pupils were now admitted to the practice of the institution, which, from the erection of a very extensive infirmary, and the encouragement it had received from

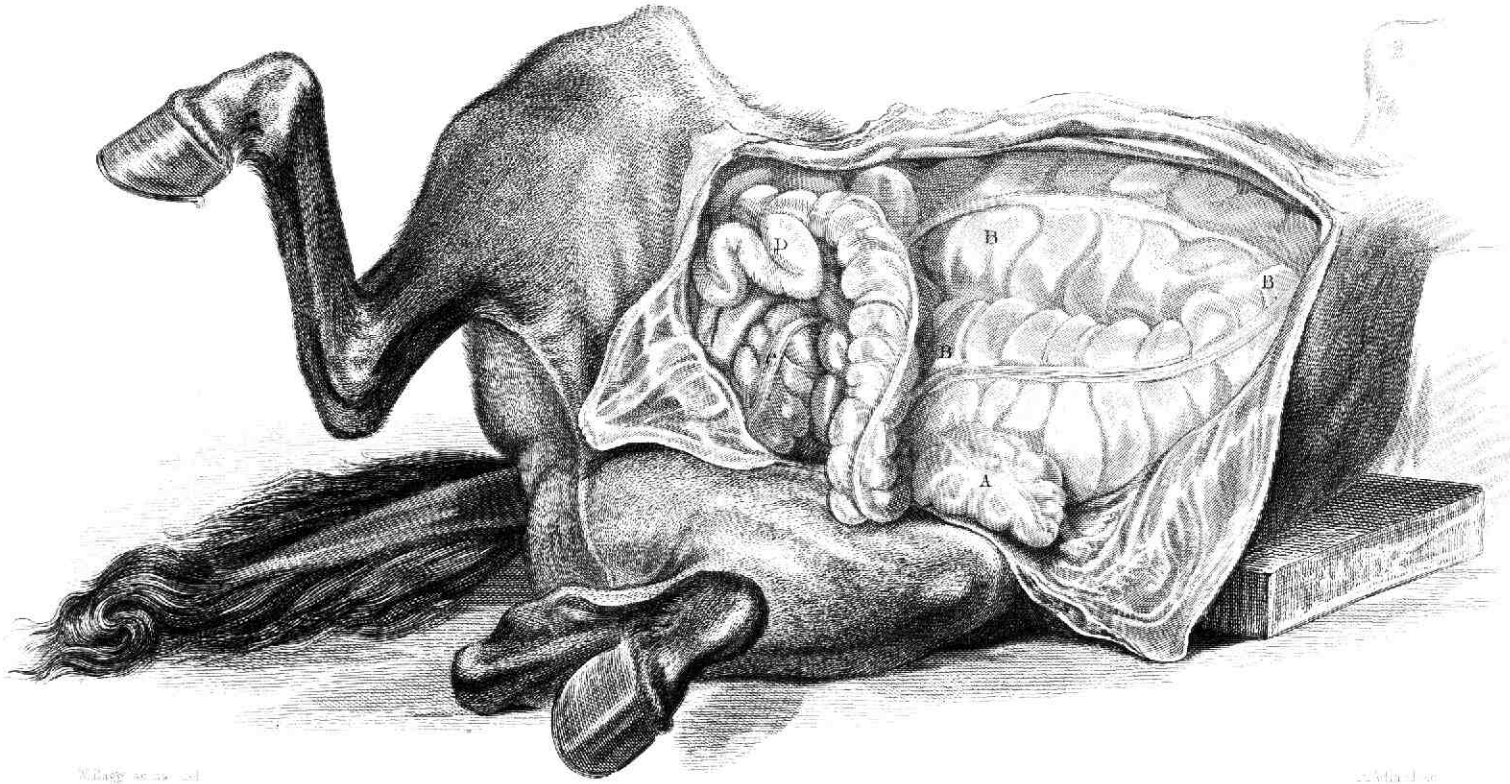


London, Longman & C° and Geo. Lowe Edinburgh

the subscribers, had become a considerable field of medical observation.

A *regular* course of lectures was delivered throughout the season; and dissections were also carried on, in which the pupils had the benefit of the instruction of the professor or his assistant. These advantages were received for twenty guineas, paid by each pupil on his entrance. It also should not be omitted in this place to note, that, by the liberality of the distinguished characters who composed the medical committee, the pupils were admitted to their lectures gratis, and this spirited example was afterwards followed by several other professors of human medicine. It would be inexcusable, also, if this description proceeded without a tribute to that active promoter of every branch of the healing art, Mr. J. Hunter. Veterinarians will ever remember with gratitude how much they were indebted to him for his zealous promotion of this establishment. The country at large, in fact, fostered it as a rising plant; in proof of which, the British parliament annually voted a sum for its support: and, as an inducement to young men of education and respectability to become students, George III. granted the rank of commissioned officers to such veterinary surgeons as might be appointed to regiments. Under such encouragement the increasing business of the college soon required additional teachers. Mr. Sewell was appointed assistant professor; and, subsequently, Mr. Morton has been added to the list of active and useful instructors.

Since the above was written Mr. Coleman has been gathered to his fathers, and in this place we may now fairly consider his title to the reputation he has enjoyed. His eloquence in the lecture-room captivated the young gentlemen who were his listeners; and the views which he expounded, they, for the most part, zealously adopted: nor was the experience of a life afterward sufficient to disenthral them from their infatuation. Coleman's fame also reached far beyond the theatre or the school at the head of which he presided. He made an ample fortune in consequence of the public estimation in which he was held. No man enjoyed so many offices, or was so servilely consulted on every occasion. Though surrounded by men of un-


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doubted, and even far greater ability, not one of them, while he lived, rose to be his rival; though, now that he is dead, the meanest amongst them ranks as his superior. The fact was, Coleman enjoyed great fluency, with much cunning, and consummate worldly ability; to these he owed the position which he held, and the emoluments he acquired. When viewed calmly as a professor and a veterinarian, he becomes small indeed. While yet Coleman lived, the establishment over the welfare of which he presided, fell from being held high in the public estimation into utter insignificance and positive stagnation; it lost a place which it may be very long before it regains. He invented nothing that did not prove an egregious failure; he wrote nothing that is now esteemed an authority; he did nothing for the art; he accomplished every thing for himself, and the nature of his ability is shown in nothing more than the firm manner in which he managed to make not only the public, but the profession believe in his imposture.

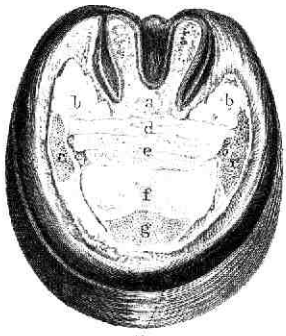
After Coleman's death, Mr. Sewell took the place of head professor; which post he, until a recent period, retained, though he had long retired from the exercise of all its active duties.

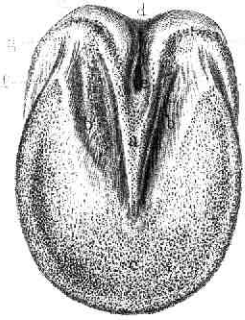
Mr. Spooner has now been appointed head professor of anatomy, physiology, pathology, shoeing, surgery, and practice; Mr. Simonds has been added to the staff, and has been instituted lecturer upon the anatomy, physiology, and pathology of the ox, sheep, and dog, together with the operations which the accidents and diseases of these animals may require; Mr. Morton retains his old post, for which he is eminently qualified, as lecturer on general chemistry and veterinary materia medica.

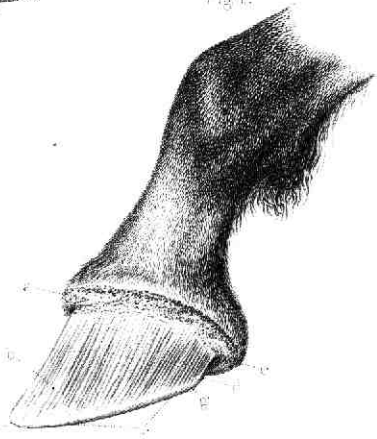
Any one looking at the Veterinary College, will perceive it has not greatly improved since Coleman's death. One professor (Mr. Simonds) has been added to the establishment, but another (Mr. Sewell) has been snatched from all participation in its active duties. Thus the medical staff remains virtually the same, though nominally enlarged, while the school has experienced the loss of Coleman's dulcet notes, which had the power to gild the wrong.

To amend such a state of things, and introduce renewed vitality into the dormant profession, her present Majesty was


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pleased to grant a charter to the veterinary body at large, who were in it recognized as forming a Royal College of Veterinary Surgeons, in contradistinction to the Royal Veterinary College or School which already existed in Camden Town. The veterinary profession were, by this charter, empowered to examine, and grant diplomas to, the future members of their own body; but this newly created authority deprived the established schools of privileges which they had hitherto enjoyed; and, therefore, on the enactment being made known, the schools became the most violent opponents to the chartered body. Mutual concessions have, however, seemingly put an end to the inimical feelings of the professors, and we now may hope for some of those advantages from the charter which were originally contemplated by the Messrs. Mayor, to whose exertions the profession chiefly owe the obtainment of the grant.

We cannot conclude this sketch of the state of the veterinary art among us, without adverting to the advantages likely to accrue to it from the establishment of a Veterinary School in Edinburgh, having at its head an able and zealous teacher in the person of Mr. Dick. We heartily wish him all the success which his apparently judicious method of pursuing his course of instruction merits.

SECTION IV.

THE NATURAL HISTORY OF THE HORSE.

THE early history of the animal is so mingled with that of man that we in vain endeavour to separate the two. Whether the horse ever existed in a perfectly wild state there is no fact to prove, though incontestable authority establishes that the animal once was in far less perfect subjugation to its master than at present.

It has been assumed that the horse was reduced to a state of domestication at a period comparatively late in the history of the world. The proof of this is rashly conjectured to be contained within the Holy Scriptures. No horse is mentioned as associated with the patriarchs, and therefore it is held that none then lived under the dominion of man. This is by no means a sequitor. The patriarchs were

wholly pastoral. With their mode of life the horse might not have been compatible. It can prove no more than that the horse is not, in the earliest records, to be found together with flocks and herds any more than the same animal is at the present day. But it is argued that Job, who is described as an earthly prince, "the richest man of all the East," did not possess a single horse. This also is by no means proved. Such ample property, in flocks and herds, would to one man be rather a pest, without equal means to defend them. Had Job one half the animals he is described as owning, he must also have had a large tract of land on which to pasture them. Flocks and land necessitated soldiers to defend them, yet not a single soldier is mentioned among Job's retainers, nor a single arm spoken of as among his property.

How is this omission to be accounted for? Were those days blessed with ignorance of armies? This cannot be believed, for the captains are spoken of, and in the same passage the horse is mentioned. But the animal is alluded to only in connexion with men trained to warfare. He was evidently not then associated with the uses of peace. Those who attentively peruse the description of the horse given in the book of Job will at once perceive that it is a fierce, half-broken creature, of which the poet speaks. The passage has been much admired, but no one could now long be possessed of such an animal without deeply repenting when he had acquired it. It was a semi-wild brute, employed only in the deadliest strife; and as Job is then described, a man surrounded by the good things of this life, and basking in the sunshine of peace, of course neither captain nor horse are introduced as constituting part of his possessions.

The Romans are described to have exported horses from England after Julius Cæsar first invaded the country. This, to people who assume the docility of the beast must be represented by the refinement of the man, may appear preposterous. But the two states are by no means co-existent. A nation may be far advanced in civilization, as the Chinese, and yet the animals in their possession be comparatively mean or worthless. That the horses in Julius Cæsar's army were not possessed either of uncommon power or docility, is proved by that general often gaining a battle

through dismounting his cavalry, and causing them to act as infantry. That the British horse was better trained, and even more highly domesticated, is shown by the description Julius Cæsar gives of his services in battle, and it doubtless was to secure these that the breed was exported to Rome.

With regard to what the English horse then was we decline to conjecture, only ample evidence exists to demonstrate that the creature which the Romans possessed was not nigh to perfection. The sculptor's art could not render it near the point of modern requirements, and the sculptors of Rome were not more than those of modern times fettered by the facts with which they were surrounded.

Numerous changes are supposed to have taken place in the English breed, but these will be best understood by crediting the animal with a power of mutation equal almost to the desire of its master. Differences might have been induced, but no great improvement in the breed of horses could have possibly taken place so long as men were cased in armour. The weight of the rider then necessitated a certain build in the horse, and the charger of chivalry was as different from the charger of a modern crack regiment as two animals possibly could be. In James the First's reign the actual change, or substantial improvement in the national breed of horses, commenced slowly to take place. Men then first began to disuse armour, and with lighter weights more attention could be paid to positive points, as they are now esteemed. This alteration however was very gradual. The introduction of a single horse, or even of a thousand horses, cannot affect the breed of an entire kingdom without time being allowed.

The change has been going forward even to the present time. The squire of a few years back did not ride in a carriage and four because of sheer pomposity, but because a less number of horses could not pull his heavy vehicle along the heavier roads at the rate which he desired to be propelled. Most people of fifty years old can recollect the old thick-legged, hairy-heeled coach-horse, which is now no where to be found; lighter vehicles and better roads having created a nobler animal. So prints of even moderate age portray a far heavier hunter than could now be

discovered present in any field. The cause is obvious. Better drainage and higher cultivation has rendered the country easier to cross, and, simultaneous with this improvement, a more agile description of hunter has been adopted. It is not therefore any one man, or number of men, who has directed or influenced the change, which has been swayed chiefly by the customs of a nation.

The racecourse, as supplying the means of improvement, has been of immense use in the national amelioration of the breed of horses. It however begins to languish, showing by this circumstance that its usefulness is nearly accomplished. Under its influence the sturdy breed of animals appears to be departing. These were so useful, so gentle, so sure, and so enduring, that we cannot lose them without regret.

Many persons will speak of the intelligence of the horse as superior to that of the dog; we see nothing in the animals to warrant even the remotest comparison between them; the horse is the servant, the dog is the companion of man. The position each holds is sundered, and all that can be said is, that each is gifted with qualities which will fit it for the situation it is destined to fill. It is well known that horses reared by hand can rarely be thoroughly broken in. The familiarity established in early life appears to be remembered in after years, and the creature which has been the pet refuses to become the patient drudge.

Gentlemen who lavish too much kindness on a horse they ride or drive generally live to repent of their weakness. Over the horse it is imperative to exercise what is termed a "firm hand." Every necessary must be supplied; every want anticipated; but fondness must be indulged in a fashion which convinces the animal that receives it there is a whip near at hand. Many stories are told of the Arab in the tent, but we must be excused if we treat all such as fables. No horse is so vicious as the Arab. In the Indian army their ferocity constitutes one of the difficulties of the march. In England we have seldom looked upon an example of a genuine gentle Arab. We wish it were otherwise. The beauty of the animal, joined to its small figure, invites you to caress it, but rarely have we been able to gratify the feeling with perfect safety. And there are stories about

the manner in which horses are managed in Arabia, which account fully for the evil disposition of the breed. Ill treatment to the horse is always remembered. Its memory is excellent, and an injury is never forgotten. A single act of barbarity may change the disposition of the creature, and knowing this circumstance, we can easily comprehend why the Arab horse is generally an enemy to peace.

The dog, on the other hand, is a creature educated by fondness. The animal of this species, a stranger to its master's eye or hand, which passes away its life chained to a kennel, soon becomes an untamed brute. But the dog kindly treated is thereby improved; he looks for, and he answers to affection. He cannot be harmed by any amount of judicious attention. He is the very opposite of the horse; the one animal is injured by the demonstration which aids the development of the other.

THE EXTERIOR CONFORMATION OF THE HORSE.

The horse's body, like that of the human form, when anatomically considered, is divided into head, neck, trunk, and extremities. The parts which enter into the formations of each have different scientific designations; and though experience has proved that there is a form best adapted to the generality of horses, yet the same unerring monitor teaches that by such rules no man can pick out the best animal from a given number of horses. So much depends on nervous excitement, or spirit and endurance, which is not to be known by any exterior conformation; the actual trial alone can decide the point.

A good form seldom covers a bad horse, yet very good animals are generally notoriously ugly creatures. Hark-away was a peculiar example of this truth; a more ungainly beast never crossed a lady's path, but a better horse never entered the racecourse. When, however, judging of exterior conformation, the breed, age, and condition of the animal has to be fairly considered. The horse of one year old, or more correctly speaking the yearling, provided he has height and bone which shall hold forth no promise to the trainer's eye, may nevertheless pass all before him on attaining his fourth year, or may turn out a regular clipper upon gaining his sixth year.

Horses are not fully furnished so as to develop to advantage every point until their youth has entirely passed, or until the animal has reached his prime, or eighth year; then the animal that has been properly nurtured will be ready to render its master a long train of willing service. But most horses die before the attainment of eight years, and all horses which have reached that point are condemned as aged, or put on one side, as having performed their most valuable services. The horse, doubtless, is more full of spirit, grace, and beauty at his fourth year; but this is no excuse for cruelly torturing the animal, by putting it to the extent of its powers at such an early period of its existence, and thus rendering it a cripple for the remainder of its life.

To give any determinate figure for the horse would argue folly. He who desires a good, useful, honest horse will do well to buy the best looking of the group out of which he makes his selection; but he who wishes for an extraordinary creature, and can afford to disregard spirit or temper, may safely buy the ugliest brute he can clap his eyes upon. The above directions, however, supposes the person thus directed to be fully acquainted with that which constitutes beauty and deformity in the horse.

The head is important. For the light horse some approach to the blood-head is desirable. The forehead high, the eyes wide apart, the nostrils and the mouth large, the muzzle small, and the cheek, or hinder part of the jawbone, deep, and wide apart. But for long slow work, and heavy draught, the very reverse of all this is even to be sought for. The forehead low, the eyes close, the nostrils and mouth small, the muzzle large, and the cheek shallow. Of course these last are only to be judged by comparing them with the more beautiful head of the blood-horse, and neither are to be taken in an absolute sense.

The setting on, or putting on, of the head is next to be considered; and the difference between the good and bad in this particular will best be understood by attentively studying the way in which the heads of the gentleman's riding-horse, or, better still, of the thorough-bred racer, and of the ordinary cart-horse, are joined to the neck of the animal. The head of the heavy creature is fixed upon the neck as though it were *jobbed* upon a stick; the neck has

little or no bend, certainly less play, and the head is protruded as though the unfortunate horse were afflicted with a stiff neck. On the other hand, the head of the blood-horse is full of play; it requires small force in his rider to draw the chin towards the chest. The motion is elastic; it has all the ease and grace of a lady's hand; and the neck, which joins the head, has all the freedom and beauty of line to be detected in the most captivating woman's wrist.

The *ears* are not to be overlooked. One ear forward, and the other carried backward, is a good sign of endurance, when the horse is on a journey, for it shows the animal is attentive to every thing passing around him. Both ears laid backward, in the stable or elsewhere, upon the approach of a stranger, is generally a sign of vice. This statement, however, is not to be applied universally, as the action may be the result of nervousness or timidity. Where it is displayed, however, the stranger had better speak to the groom before he ventures to approach. Any unnatural degree of activity in the ears denotes blindness. If the ears are altogether stationary the animal may be suspected of deafness. After all, an easy motion, neither restless nor sluggish, is to be wished for, and the ears should be rather small than large; and above all things they should not fall down on one side, or be in any degree lopped.

The *eyes* should be very particularly attended to in an exterior examination of a horse: the globe should be full and prominent, with a thin surface of eyelid. When it is small, or sunken within an orbit and surrounded by much membranous substance, or a swollen lid, such an eye is found more prone to inflammation than the former one. It is prudent, however, to guard against too great a convexity of the globe, which now and then does actually exist, and probably renders the horse shortsighted. The eyes should always be examined in the shade: no better situation can be chosen than that the head of the horse be pointed *outwards*, but that his eyes remain half a foot *within* a stable door. The light now falling directly on the eye, will enable every defect to be readily seen. Viewed in front, the depths of the eye should be first looked into: the position of the looker should be then changed, and it should be viewed sideways, still from within the stable, which will much assist to ascertain

the critical clearness of the parts immediately on and within the surface, and its freedom from central white specks.

The *cornea*, or transparent part of the eye, ought to be perfectly clear throughout its whole extent of surface. Sometimes it will appear so on a slight inspection, but, when more attentively examined, opaque milky lines may be seen crossing its surface. In other cases nearly the whole may be clear, except the extreme limits, which will be found surrounded by a well-defined opaque line: when such an appearance exists, it bespeaks the remains of former inflammation, and a great danger of recurrence. It might, however, be proper to remark, that an accidental blow, as the stroke of a whip, may leave an opaque speck or line without any liability of recurring inflammation; but then the effect, in such cases, will seldom be found at the circumference. Not only must this exterior glassy covering of the eye be examined, but the attention should be likewise directed to the deeper parts within the pupil, the appearance of which, in a moderate light, should be perfectly transparent. In a strong light it should exhibit a lively bluishness; but if, in a moderate light, it appears turbid or milky, there has been inflammation, which will probably again recur; but if a speck or line of white more conspicuous and deep-seated than the rest should appear, in such case a cataract has already begun to form. In other instances, again, though the internal eye should not appear opaque or milky, yet it may exhibit a glassy greenishness, which is a proof of the existence of a most destructive affection, called, by the farriers, glass eye: but, properly, *gutta serena*. The existence of this may be proved by observing whether the iris, or the curtain forming the pupil, contracts and dilates; that is, when the hand is placed over a sound eye for a little time, the iris will dilate so as to increase the size of the pupil to admit more rays; but, on the removal of the hand, will again contract and lessen the pupil, to exclude them. This does well enough for an off-hand or primary trial; but before the animal is purchased, or a decisive opinion delivered, the horse should be placed in a darkened stable for some time, and then the eyes be examined by means of a candle; when it will be easily observed whether the iris has dilated, and after a

minute or two the pupil may be observed to contract; that is, supposing the eye to be free from disease. A blind horse, moreover, usually carries his ears as though alarmed, in quick changes of direction, and hangs back on his bridle or halter, lifting his legs up very high; in fact, he presents every indication that a person blindfold would do. When the iris, or moving curtain that immediately surrounds the pupil or opening into the eye, is of a lighter colour than brown, such horses are said to be *wall-eyed;* but, however it may detract from beauty, it no farther affects the eye. In some horses, the transparent cornea is small in its circumference, in which case the animal shows much of the *white* of the eye. It is of consequence to distinguish such instances from others, in which, though the opaque or *white* coat may be of its natural dimensions, yet from the greater contraction and dilatation of the eyelid, more of it is seen. In the former case, it is evident that the *white* of the eye shows itself in a greater degree, merely from a small superfices of transparent cornea. This is the natural form of the organ, and can have nothing to do with the temper: but, in the latter instance, a large appearance of *white* may be viewed as an indication of a vicious disposition; for extraordinary motions of either the eyes or ears, and particularly where they act in unison, are indications of the passions of the animal. If a horse be suspicious, he generally looks out for opportunities to revenge former injuries, or to repel new imaginary attacks; and the retroverted direction of the eye, in which, of course, much of the *white* is seen, is merely intended to guide the blow he meditates.

The *face* comprehends the part between and below the eyes: a spot of white or star in the forehead is deemed a beauty, but much white is a blemish. If white extends down the face, it is termed a *blaze;* and, when continued into the muzzle, it is called *blaze and snip.* If, with a star, white begins below the place of the *star*, and is then carried downwards, it is called *a race.* Thus, when a stolen horse is described, these distinctions become useful; and, in regimental accounts of the marks of horses, they are particularly attended to. Such an advertised horse is said to have *star, race,* and *snip* white, while another has a *blaze* only.

All the lower part of the head, including the nostrils and lips, is called the *muzzle*. The darker the colour of this part, the more is the horse esteemed. Very dark brown horses are, however, an exception to this, for, in them, the muzzle is generally of a tan colour, which is also prized. The general contour of the face in our best horses is either that of a plane, or very slightly curved inward, but not equal to that of the native barb: our worst breeds arch outwards. The facial straight line is found on many, perhaps on most, of our esteemed racers, and of our well-bred hunters.

The *lips* themselves should be thin and compact, or firm; when hanging loose and pendulous, they bespeak age, sluggishness, debility, or bad health; and it is of more consequence than is usually supposed, that the mouth should be of sufficient extent. If too small, it is unfavourable to beauty; but what is worse, it is inconvenient for the well placing the bridle. A wide open nostril is not only requisite to form beauty in the lower part of the head, but it is certainly conducive to free respiration or good wind.

The *channel*, among horsemen, is the hollow that is formed between the two branches of the posterior jaw; internally it lodges the tongue, pharynx hyodeal bone, and part of the larynx; more exteriorly are placed glands, vessels, and fat. It can hardly be too wide, as upon its width depends much of the beauty of the head; within it are lodged organs of vital importance to respiration, and with width of channel the head is nearly certain to be well set on the neck: but, on the contrary, if it be too narrow, it becomes a still greater defect, both in the riding and the carriage horse; for in this case it will prove painful for the horse to bend his head inwards, or to rein in to the bridle, either in riding or driving.

The *neck* should form from the head to the withers an elegant curve, while its under surface ought to be but gracefully incurvated near to the channel, and should join the chest, by an easy flow of line, rather above the point of the shoulders. In point of length, it is of consequence that the neck be duly proportioned: a long neck is generally a sign of weakness throughout the frame. When, on the contrary, the neck is too short, the head is frequently ill-

placed. No neck can be too loaded with flesh, as flesh is muscle of which no horse can have too much, provided other parts have it in a like degree. It is evident that short necks cannot be reined up without danger of suffocation; and it is seldom that a short-necked horse is speedy, though we have seen some excellent trotting-horses with obvious short necks. In stallions thickness of neck is to be expected as a *distinctive sexual* mark. Short-necks, when very obvious, have one disadvantage. The horse of this conformation cannot lower his head sufficiently to get a full meal when turned out to grass. Now and then the neck is arched downwards, which is called ewe-necked. When the deformity is considerable, it prevents the head from being carried in its true angle; instead of which, the nose, from being projected, upwards and forwards, has occasioned such horses to be called star-gazers; to remedy which, it is usual to draw down the head by a martingale. It may not be amiss to mention, that, in the purchase of a horse, it is prudent to observe whether the upper part of the neck bears any marks of a tight collar having been worn: when such an appearance does exist, it commonly arises either from a strap worn to prevent the action of cribbiting, or such a horse is apt to unloose himself from the halter, which is almost an equal defect. A large prominent wind-pipe is considered desirable; and a point which will seldom be found to disappoint, though little noticed among horsemen, is a free pendulous cord or fleshy band proceeding from the upper part of the throat to the part of the channel which joins the neck.

The *mane* crowns the neck throughout its whole extent: in front of the head it is called the foretop. Its intention evidently is to act as a whisp to drive away the flies from the forehead, which part is much exposed and has no muscle wherewith to shake off insects. In stallions, the mane is generally thick and long; a white one, exhibited some years ago, was several feet long, and was carried in a bag. It is usual, when it is wished to thin the mane and tail, to wrap a tuft of the hair around the fingers, and pull it out by the roots; but this mode prevents its laying well, and disposes some horses to resist. In my own stable I have found that the

frequent use of a three-pronged angular iron was the best means of keeping the hair thin, and assisting it to lay well.

CONFORMATION OF THE BODY AND LIMBS.

In proceeding to a description of the external conformation of the trunk and members of the horse, are we to regard him as the type of an important genus? or are we to examine his frame with a view to his adaptation for some one of the numerous purposes to which mankind apply him? It is in this latter way that the purchaser of a horse would most likely proceed; but it is by general principles that the author can best accomplish his purpose, being well aware that it is by an extended view of the whole that the individual purposes can be best exemplified. Whatever may be the services required of the horse, strength and safety are indispensables: the degrees of these qualities may relatively vary, according to the work he is employed in, but each of them is, in every instance, requisite. *Power* is the result of muscular contractions acting on organs adapted for motion. The *safety*, generally, is connected with the degree of perfection in the form and direction of the limbs, united with a just proportion of their lengths.

The *withers* are formed from the long spinous processes of the first dorsal vertebræ; and as, conjointly with the muscles originating from them, they act as levers in elevating the fore parts generally, it is evident that any increase of their height is an addition to their power. It is thus that horses with *high* withers usually elevate their legs considerably in action, which is unquestionably favourable to the safety of their progression: this form is also considered as an agent in the quickness of motion; for, as we usually raise every part we wish to throw forward, so the elevation of the fore quarters allows the hinder to act with greater advantage. It is, however, evident, that to a just appreciation of the form of the withers we should consider the immediate services of the horse. In the hackney, the lightness of his carriage, the safety of his footing, and the readiness with which his saddle remains in its proper situation, render their height invaluable. To the hunter, in addition to the above, we may add the advantages which result from

these lengthened levers in the action of leaping. The racer, on the contrary, is found to perform his wonderful exertions without any remarkable height in his withers: in Eclipse they were very low, and they are so in the majority of our racing fillies and mares. Reasoning on general principles, which seldom lead us into error, we should not consider great height in these parts as essentials to the speed of the racer. The gallop of full speed is but a succession of bounds, and all animals remarkable for their rapidity in this motion are found low before and high behind; that is, they are furnished with long muscular hinder extremities exhibiting angular proportions acting on fore extremities, which are comparatively inert as to the propelling power. To the draught horse, low withers are peculiarly advantageous, and he can better apply his powers by approximating his fore quarters to the ground; for as all drawing is but throwing the weight of the body beyond its centre, or into the collar, so, the greater the weight the animal carries before, and the nearer he approximates this centre, the more advantageously he acts.

The *shoulder* extends obliquely forward, from a little below the withers to what are called among horsemen the point of the shoulders; but which point is formed by the articulation of the shoulder-blade with the true arm-bone. The shoulder is apt to be confounded with the withers, which often leads to much error in justly appreciating the power and operation of the fore quarters. The withers may be high, at the same time that the shoulders may be narrow, straight, and altogether badly formed. The shoulder, to be perfect, should be muscular, but by no means heavy with extraneous cellular matter, for it is by the muscles of the shoulder that the action of the fore limbs is principally effected: it is, therefore, of much consequence that the muscular markings and prominences should be strong. Immense muscular power is also necessary for the suspension and connexion of these parts; the shoulder in the horse not being connected with the trunk by any ligamentous union, but wholly by a muscular fibre. Large fleshy masses unite the broad expansive shoulder-blade by its upper and inner surface to the ribs and withers, while other powerful muscles below suspend it, as it were, from the

chest; by which admirable contrivance perfect elasticity is preserved. The uneasy seat we experience when riding on or near the croup of the horse, where the hinder limbs are connected with the body by a ligamentous and bony articulation, will illustrate the difference between the elasticity of the one connexion and the other. When the body is propelled forward, its tendency to the centre of gravity is counteracted by the fore extremities, which being the true props or supports of the trunk then receive the mass: had the shoulders, therefore, been articulated like the thighs, the machine at every motion would have experienced a powerful and hurtful shock, if not an absolute dislocation; but, formed as they are, the strong muscles of these parts receive and sustain what the hind quarters have thrown upon them. This connexion, it may likewise be observed, is not rendered strong by the power of these muscular masses alone, but also by the geometrical situation of the scapulæ or shoulder-blades themselves, which being approximated above, form a kind of partial arch, receiving the trunk within the entrance of its arms: consequently the greater the force applied, either by gravitation or impulsion, the nearer will these segmental portions be approximated, and the more will their capability of supporting the weight thrown on them be increased.

The motion the shoulder enjoys is confined by the nature of its articulation to the perpendicular backwards, or to a kind of swinging action, to as great an elevation as the muscles will admit of forwards; and these extensions being commonly uniform, it will be at once evident that the more oblique, long, or deep the shoulder is, the greater number of degrees it will be able to run through. It is therefore easy to comprehend why obliquity, breadth, and length of shoulders are favourable to the safety of action by elevating the limb, to the elasticity of action by increasing the spring, and to the celerity of action by enlarging the angle.

Mares have very commonly low foreheads, both as regards the height of their withers and the extent and obliquity of their shoulders: to counteract this, and to regulate the angles, an increased obliquity is very commonly observed in the whole limb downwards; or, as it is familiarly expressed, they stand with their legs well under them, which is a merit

rather than a defect, if not carried to the extreme. This, however, is ordained for wise purposes; for by such a position of their fore extremities the pelvis is raised higher, and the foal thereby becomes more conveniently placed, and less likely to be ejected. Few rules can be laid down for observance in the exterior conformation of the horse that are of so general application, as that a short and upright shoulder, particularly if united to an inclined direction of the whole limb backward, is a sure mark of an unsafe pacer, and commonly, though not so universally, of a slow one also. Thus, by a slanting position of the shoulder-blade in one direction, and of the true arm-bone in the other, both elasticity and speed are gained; while the perpendicularity of the parts below, as of the arm, generally so called, or upper part of the fore leg, and of the canon, give columnar support.

The part between the points of the arms or shoulders is called the *breast*, *chest*, or counter; and our judgment of its form must be regulated by the variety in the animal. In the saddle-horse, it should be only moderately wide: when very confined, the lungs have not sufficient room for expansion, or otherwise they must press backwards and interfere with the stomach; and we do actually find that narrow-chested horses have seldom a good digestion, and consequently are seldom durable. On the contrary, when the breast is too wide, particularly when it projects and hangs over, the fore legs are apt to incline backwards: such a horse must be weighty, and consequently unsafe as a roadster in his mode of going. This form, however, is peculiarly favourable to the draught horse, particularly for those employed to move heavy loads.

The *elbow* of the horse, like that of man, is formed of the olecranon, but in the animal is applied to the chest; consequently the true arm of the horse, speaking comparatively with the human anatomy, is contained in the space between this and the shoulder points. The elbow should by no means incline inwards, or it will confine the action, force the toe outwards, and sometimes occasion cutting. If it incline outward, which is less common, it is unsightly, and gives the toes an inward determination, and a rolling gait in the trot. It should, therefore, stand on a level

parallel; as its inclination backward is usually regulated by the degree to which the shoulder-blade inclines forward.

The *fore-arm*, usually called the arm of the horse, cannot be too large, wide, and muscular; a small fore-arm is an indication of weakness. All animals intended for rapid progression have this part long likewise:—the knee of the greyhound is but three or four inches from the ground;—but though its length is favourable to speed, it is not found to add to the ease of the rider; and thus horses for cantering, or for the paces of the riding-school generally, are preferred with short fore-arms.

The *knee* of the horse corresponds with the human wrist. Like the joints generally, it cannot well be too large, for by means of its extent the muscular and ligamentous connexion is increased, and the stability of the limbs in proportion augmented: by this form also the tendinous insertions have their power increased. The knee should be carefully examined, to see whether the skin has been broken by falls; and great caution is necessary in this, for the hair sometimes grows so well over the scar as to leave it hardly discernible. Horse dealers likewise hide the blemish by blackening the part. It does not, however, follow that a mark or scar always indicates a stumbler; and persons are too apt to forget, that the safest horse may by an unavoidable accident fall; and the circumstance will not influence his future manner of going, unless the cicatrix should be of such extent as to interfere with the motion of the joint: if, therefore, the arm and fore-arm be strong, the fore-hand high, and the horse show good action, he should not be rejected wholly for an accidental blemish, which is no unsoundness.

The *canon* or *shank* follows the knee, and the perfection of its form throughout is important. As here are no fleshy masses, but almost purely tendinous matter, and as the bone itself is sufficiently solid, so it is not the circumference, but the breadth of the part, that is requisite to form a good shank. An attention to the osteology will show, that there is an especial contrivance behind the knee to give an advantageous insertion to some of the flexor tendons. When this bony projection behind the knees, called the trapezium,

stands well out, the advantages are greatly increased; for not only do the muscles act mechanically to greater advantage, but the flexor tendons likewise have their powers much augmented; which explains why a horse *tied in* under the knee, as it is called, soon becomes strained, the legs get bowed or arched, and totter on the slightest exertion. Dealers frequently assert that such a horse was foaled so; and it may be true that the colt was born badly formed, but that circumstance does not render the consequences likely to ensue the less awkward. It may be considered as a rule admitting of few exceptions, that hardly one horse in fifty reaches eight years old with straight legs and sound pasterns. The tendons themselves, which are the *back sinews* of horsemen, should moreover be continued downwards, so as to give a surface of great width to the leg, but which should be thin posteriorly: the mass of sinew itself should, however, be considerable, and as hard to the feel as iron. In blood-horses this form is particularly observed; on the contrary, in the cart-horse the back sinews are seldom proportionally so large, and more seldom are they so well placed. These important tendons should stand wholly distinct and clear from the knee to the fetlock: when any thickening is observed in their course, some injury has been received. If the swelling appear nearer to the bone than the tendon, particularly if it be on the inner side, it betokens a *splint*. When a splint is situated forward, and evidently distinct from the tendons, it frequently occasions no future inconvenience; but when it appears to extend itself inwards and backwards among the ligaments and tendons, it irritates these parts, occasions inflammation, and ends in an enlarged callous swelling. When the flexor tendons and their sheaths are swelled, and rounded, as it were, into one mass with the bone, leaving no distinctive marks between the one and the other, still greater mischief, probably, has at some time happened. Either some of the ligaments have become ruptured, or such a relaxation has taken place from strain and subsequent inflammation as will always keep the limb weak. To detect lesser enlargements of the tendons and ligaments, the eye alone should not be trusted, particularly in hairy-legged horses; but the hand should be deliberately passed down the shank before and behind. The inner and

under surface of the knee should also be examined in purchasing a horse; when, if either an enlargement or a scar appear, it arises from what is called the *speedy cut*, or blow given to the part by the foot of the opposite side when it is elevated high in fast trotting horses. A sore scabby eruption within the bend of the knee sometimes exists, particularly in cart or other low bred fleshy-legged horses. These eruptive appearances are called *mallenders*, and render the horse objectionable, inasmuch as they prove frequently obstinate against healing.

The next part below the canon or shank is the *pastern*. Among horsemen, the articulation between the pastern and shank is called the fetlock joint: but, properly speaking, the fetlock is only the posterior part of the joint of the pastern, from which grows the *foot lock* of hair. When the pastern is very short and upright, the limb is deprived of much of its elasticity, and such horses prove uneasy movers: they are also unsafe, for the pastern being so nearly in an upright position, requires but a small resistance, or slight shock, to bring it forwards beyond the perpendicular, in which case the weight of the machine, uniting with the impetus, brings the animal down. Nor are these the only attendant evils: this formation tends also to an early deterioration of the parts; for the ends of the bones being opposed to each other in a more vertical direction, receive such a jar or shock at each progressive movement, as gradually deranges the part, producing an *overshot* joint, absorption of the cartilages, and thickening of the ligaments. When, on the contrary, the pasterns are too long, they are frequently too oblique likewise, and must then be also proportionally weak; though, from the increased elasticity occasioned by this formation, such horses are commonly pleasant and easy in their paces; and, by the extension given, they must also be more speedy, particularly in the gallop. The soft swelling at the side of the canon, called *windgalls*, need not here occupy any farther notice than to remark, that although they bespeak undue exertion, yet that, in themselves, unless they are so large as to prove injurious by their pressure, they are not very important. *Cutting* of the pastern joints, when dependent on a faulty formation of the fore limbs, as when they naturally approxi-

mate too much inwards, or otherwise when the toes are directed too much outwards, are either of them a serious evil. *Cutting* is, however, frequently brought on by debility and emaciation; hence lean, jaded, and tired horses, will do it at times, which under other circumstances will go free and not "*interfere.*" For the same reasons, many horses *cut* before they become strong and furnished that never do it afterwards.

The *feet* are next to be considered, and much more fuss was formerly made about the foot than is thought necessary at present. A foot, either too large or too small, is defective. The mule-footed blood-horse is in this respect as faulty as the heavy animal reared on the fens of Lincolnshire. The horn of the large-footed horse is weak, and by battering upon hard roads, or harder stones, generally becomes, before he has been long at work, what is called pumiced. Small feet may be natural, but the horn is apt to become too hard and unyielding. They are more liable to be found too small than too large; though in horses bred in low marshy situations, as Lincolnshire and Cambridgeshire, the hoofs are often of a larger size than ordinary; and however convenient this may prove to the animal while moving on the quaggy surface of these marshy districts, they are very unfit for speedy and light movements in more dry situations. Such horses go heavily, and stumble; and as the horn of which these enormous feet are formed is always weak, so, by use on hard roads, the anterior or front part falls in, and the sole, or under surface, projects outward, reducing it, at last, from a concave to a convex figure: such feet are then called *pumiced*. A foot should be of a proper obliquity; display a sufficient expansion at the heels, and have a due quantity, not a superabundance, of horn, with a healthy frog. When the foot shows a deficiency of horn, the heels, quarters, and soles must, of necessity, be weak, and tenderness in going prove the consequence.

The *heels* should be particularly attended to; they must be of a fair width, and the frog firm, yet pliable. *Thrushes* are always strong objections to a horse, inasmuch as the animal having them is not safe to ride, and the thrushes themselves necessitate medical treatment. But when the complaint accompanies a foot already smaller than it was

originally, when the heels are, in the smith's language, *wired* and *drawn in*, and the whole circumference of the hoof is perhaps encircled with rings, reject such a horse, let him go as he will, for he cannot long remain sound. When a horse's foot is held up, the sole should present a concave surface; if it be less concave than natural, that sole is weak, and will not bear much pressure; and it is more than probable it will continue lessening in concavity until it becomes a plane, when every subsequent shoeing will endanger the laming of the animal. *White feet* are by some people thought to be objectionable on this account; they being considered particularly liable to become flat in the sole. *Corns* are another evil to which horses' feet are very liable; and, unless the shoes are removed during the examination of a horse, it is not easy to detect them: though, when the foot is well picked out, if a corn has been of long standing, some marks of former cuttings out will probably appear under the heel of the shoe. Another very serious complaint is a brittleness of hoof, which may be generally detected by the marks of the fragile parts detaching themselves from every old nail-hole. This kind of foot, particularly in hot weather, breaks away, till there is no room for the nails to fasten, when the horse, of course, becomes useless. In an examination of the foot, the eye should also be directed to the wearing of the shoe: if it be unequally worn, particularly if the toe be worn down, such a horse is probably a stumbler, and does not set his foot evenly on the ground, either from defective feet or some more serious reason to be named hereafter.

On a review of the conformation of the fore extremities, it may be remarked, that, although the hinder limbs appear to be more particularly concerned in the quickness of the progression, yet that upon a proper form and a true direction of the various component parts of the fore limbs must depend the elasticity, ease, and safety of the movements. Viewed anteriorly, the legs should stand rather widest at the upper part, inclining a little inwards as they approach the ground. Viewed laterally, they should be seen to stand in a direct line downwards, neither forwards nor backwards; and the toe should naturally place itself under the point of the arm or shoulder. If the foot stands beyond this, but

which is very seldom the case, the action will be confined; such a horse, however, generally treads flat, even, and safe. When the foot stands behind the vertical line, the defect is more considerable; for it makes the forehand heavy, and inclines the animal to fall; and as, in general, the consequence of such formation is a want of extent and obliquity in the shoulders, so it tends to detract from the speed.

The *carcass* or trunk comprises the ribs, belly, loins, flank, and haunch. The *ribs* form the chest of the horse, which should be wide upwards, and as much deepened below as possible, affording what is popularly termed great depth in the girth. The capacity of the chest is dependent on its form more than its mere external measurement; for two horses shall be measured, and shall yield the same apparent dimensions, yet one shall have much larger lungs than the other. It is, therefore, not depth alone in the chest that is required, but sufficient breadth also. This form increases the surface of attachment for the muscles, and very materially assists respiration. Posteriorly, the ribs should form the body as much as possible into a circular figure, that being of all others the most extended, and the best surface for absorption; thus *barrelled* horses, as they are called, are justly preferred; for a circle contains much more than an ellipsis of the same circumference. But when the chest is too straight and flat, the *belly* is also small; hence neither can the blood absorb its vital principle from the air, nor the lacteals sufficiently extract the chyliferous juices from the food which passes into the intestines. Horses, therefore, with these defects, are neither long-winded nor lasting in their exertions. As less nutriment is taken up by the lacteals, so less is eaten; thus also these horses seldom are good feeders; and as weakness is the result of deficient nutriment, hence they are what is termed *washy*, that is, easily purged, whereby an additional cause of exhaustion exists, from the too early passing off of the food. Nevertheless, it must be remarked, that these sort of horses sometimes prove better workers than one would expect, and are commonly spirited and lively. A knowledge of the advantages gained by size in the belly is what constituted Mr. Bakewell's grand secret in the breeding of cattle: he always bred from such as would be most likely to produce

this form, well knowing no other would fatten so advantageously.

The *back* commences from the withers. It should not be too long, as such a form is unfavourable to strength: long-backed horses are, however, pleasant to the rider, because the action and re-action are more considerable in a long than a short back, and consequently the spring greater in the one than the other. But what such horses gain in ease they lose in strength; both the ligaments and tissues being longer, must act to greater disadvantage. When the back is too short, such horses, by having their extremities too much approximated, usually overreach. The back may be curved inwards or outwards; when inwards, it is termed *hollow*, or *saddle-backed*, and presents a formation not favourable to strength; but as the counterpoise is kept up by other curves, so the crest is generally good: such horses ride pleasantly, and commonly carry considerable carcass, sometimes, indeed, too much. When the curve is outwards, the horse is said to be *roach-backed*, which form tends to prevent liberty in action, renders him uneasy in his paces, and, from the approximation of his extremities, he will also often overreach; and, as a necessary consequence of this form of the spine, the neck and head are sometimes carried low. A short-backed horse is in considerable request with many persons; but when the back is too short, there is seldom great speed, for the hind legs cannot be brought sufficiently under the body to propel the mass forwards.

The *loins* occupy the attention of all good judges in their consideration of a horse, and for any purpose they can hardly be too broad. The back extends to the posterior rib, and where the back ends, the loins begin. Sometimes, this junction of the back and loins presents an indentation, as though the union was incomplete. This may be considered, in some degree, as a defect, inasmuch as it deprives the part of powerful attachments, and such horses are said to be *badly loined*. The strength of the loins depends on the length of the transverse processes of the lumbar vertebræ, which should be long, that there may be an extensive surface for the attachment of the muscles of the back: the muscles themselves should also be powerful on each side,

giving width to the loins, and seeming by their enlargement, as it were, to swallow the back-bone. When the protuberances of the haunch-bone are very prominent, the horse is called *ragged hipped*, which is only injurious to the appearance, except in cases where it seems to arise from a paucity of muscle to fill up the intervening spaces. From the loins to the setting on of the tail, the line should be long and very slightly rounded; by which means, also, the distance between the *hip* and the point of the buttock will be considerable. This formation is peculiar to the improved or blood breed, and in every point of view appears the most perfect; for it affords a very increased surface for the insertion of the most active and powerful muscles in the horse. And though the large rounded buttocks of the cart-horse would at first sight bespeak superior strength; yet, when he comes to be viewed attentively, it will be found that the rounding of the sacral line or croup, the low setting on of the tail, and the small space between the hip and buttock, produce a decreased extent of surface, compared with the broad croup, wide haunches, and deep-spread thighs of the blood-horse.

The *flank* is the space between the ribs and the haunches, which part, when too extensive, indicates, except in mares, great weakness in the loins, and too great length in the back. A hollow flank is the consequence of shortness in the transverse processes of the lumbar vertebræ, which occasions a want of room for the attachment of the large muscles of the loins. When the flank rises and falls in respiration quicker than ordinary, particularly if the horse be at rest, it betokens either present fever or defective lungs. Should it arise from present fever other symptoms will also be apparent, as heat, dulness, and disinclination to feed: but when the horse appears otherwise in health, and yet heaves at the flanks more than natural, particularly if the weather be moderate, and the stable not hot, it is probable that such a horse is *thick winded*. If the inspiration of the air appear to be performed readily, but the expiration with difficulty,—and the flank, in expelling it seems to be much exerted, or as it were at two efforts, such a horse is *broken winded*. His cough, which should then be tried, will be found hollow, hard, and, as it is

termed, hacking. If no quickness in respiration appear, but on trotting or galloping a sonorous noise be heard, it is called *roaring;* and though it constitutes no present disease, yet it is the remains of a former affection; for it even now interferes with speedy action, and, in law, renders a horse unsound or returnable.

The *tail*, in the improved breeds of horses, is set on high, which is the natural consequence of length in the hinder quarters. It should, however, neither seem to be swallowed up by the buttocks, nor yet to start out ungracefully from the end of the back-bone, but should form a graceful curve with the croup.

As the fore extremities may be considered as especially designed to receive and sustain the weight of the body, so the hinder extremities may be regarded as the essential propelling organs: since these last, having less to support, are flexed into considerable angles,—which angles are operated on by masses of muscles of immense power. It is also a curious but wise provision in the mechanism of the limbs, that their angles should be reversed; for, while the scapula, or shoulderblade, inclines backward, the ilium, or haunch-bone, is directed forward. (See *Plate* I. *skel.*) The inclinations of the humerus or arm, and of the femur or thigh are equally reversed; and, in a slighter degree, the same is observable in the corresponding bones immediately below; by which arrangement the trunk is suspended equally, instead of falling backward or forward, as might have happened, had all the angles been in one direction. That the hinder extremities are principally concerned in progression, is again evident from the attention that nature pays to the strength in all cases where great speed is required; for let the animal be ever so lightly framed in other respects, yet great power will be always displayed in its hinder parts. Thus, in blood-horses, which are derived in part from the eastern breed, not only are the loins wide and the croup long, but, viewed from behind, these horses will be found wider in the thighs than even in the hips: and of all the distinctive marks between the high and the low-bred horse, this is the most striking and characteristic. A good judge, under every disadvantage, immediately discovers a portion of breeding by this appearance of power in the muscles of

the thigh alone. The greyhound offers us also a corroborative instance of a similar form and intention.

The real *thigh* of the horse, like the true arm, is so concealed by muscles, as not generally to be known by that name; but a view of the skeleton will readily point out its true position. It will be found, as has been noticed, reversed in its angle of inclination to that of the real arm, to which it corresponds, but descending downward lower, also with a greater inclination, by which elasticity is gained, and the acuteness of the angle resulting therefrom rendered greatly favourable to the power of action. This bone being able to pass beyond the perpendicular backward, also assists these intentions, particularly when the croup, hips, and thighs, are well furnished with muscle.

The *whirl-bone*, among jockeys, is the articulation of the thigh-bone with the pelvis, or bone of the haunch: it is a very strong joint, and but rarely dislocated.

The *stifle* corresponds to the knee of the human being; consequently the part below it (with reference to human anatomy) ought to be called the leg, but is usually known by the name of the *thigh*. For the reasons before mentioned, the true leg of the horse should be strong and muscular; it should likewise make a considerable angle with the thigh, forming a direct line under the hip or haunch. Its length, as is seen in all animals destined for much speed, should be considerable, and its supply of muscle great: whenever that portion of limb between the stifle and hock is thin, seemingly long, and but indifferently furnished with muscles, that limb cannot be strong.

The *hock*, as it is called by horsemen, forms the joint between the true leg and the canon, and may be considered as one of the most complex and important joints of the body: its figure should be broad and wide; for, in proportion as the point of the hock extends itself beyond the other bones, thereby increasing the depth of the joint, so the tendons inserted into it act with a longer lever, and thus with a great increase of power.

This joint is subject to several diseases, which are prejudicial in different degrees, and therefore require different degrees of attention. When, on examining a horse, a soft

puffy swelling is discovered within the bend, it is termed a *bog spavin;* which is the consequence of too large a secretion of joint oil, thereby distending the sac of the joint. A mucous capsule above and behind the hock also, at times, becomes enlarged, and is then called *thoroughpin.* At the back, likewise, of the joint the ligaments are liable to extension or other violence, when the part, instead of exhibiting a straight line from the point of the hock downwards, presents in this case a curved surface, accompanied with heat and tenderness, which is called a *curb.* The inner part of the joint at its bend or ply is subject also to a similar scabby eruption to that of the fore legs, called *sellenders.* To detect the existence of *bone spavin,* the hocks should be attentively viewed from behind, when any enlargement in the place of spavin, may be easily detected. From this enumeration, it will be evident that a strict examination of the whole joint is very necessary in the purchase of a horse. In the consideration of the parts below the hock, what has been said of the fore extremities applies equally to the hinder.

OF THE TEETH, AS CHARACTERIZING THE AGE.

As it is necessary to obtain some marks whereby we can ascertain the *age* of the horse, the ingenuity of man has employed itself in noticing those changes in the organs which are most readily observed, and the least liable to variation. The teeth, as a part of the bony structure, have been happily seized on for this purpose. We shall here consider the teeth as indices of age only; reserving a more general sketch of their anatomy and physiology, as masticatory organs, for a future opportunity. It is well known that the usual indications of the age of the horse are commonly derived from certain *marks* in the incisor teeth, and principally from those of the lower or posterior jaw. These *marks* consist in a *funnel-like cavity* in each of these teeth; each is also covered over with two coats, one, the outer one, of a brown tough substance called *crusta petrosa,* and an inner one, which is very brittle and hard, called enamel. As these coatings of the tooth reach its nipping edge, they pass over the plane surface, and then

dip down to line the *funnel-like cavity* in its centre. This central hollow thus formed, and thus lined, becomes very dark within by incrustation; and, therefore, as long as this oval cavity remains, so long a striking *mark* continues: but when, by constant attrition, the cavity has been worn away, such horse is said to have '*lost his mark.*'

The duration of the mark, however, is in a great measure determined by the thinness or thickness of the lining membranes or outer coats: as in proportion as these are of less substance, of course the cavity is deeper and endures the longer. The wear of the teeth is also in some measure influenced by the food; and in cases where the enamel and crusta petrosa are very thick, every mark or hole may be lost by the sixth year, but then the rim of enamel, enclosing a brown plug of the darker membrane, shows where the mark should have been. The crusta petrosa and enamel which, when the tooth is cut, are developed upon its table or biting surface, soon by attrition become worn away, and then the bone or ivory (which forms the great substance of the tooth) is laid bare between two layers of the membranes, one covering the exterior, and the other lining the small cavity in the centre of the table. The bone or ivory being softer than the enamel, wears away faster, and thus leaves two ridges on the table, biting or nipping surface, one of which surrounds the central cavity, and the other embraces the outer surface; but both serve to raise prominences for the double purpose of cropping the food and holding it between the teeth when necessary; and by which also the teeth become a more terrible weapon of offence.

The horse, as is well known, has two sets of nipping and grinding teeth, a *temporary* and a *permanent* set. On the outset we shall treat only of what are called the nippers among horsemen, and incisors by naturalists. At birth, or sometimes about a week or ten days after birth, the foal has two *front nippers* above and below, which seem to fill up almost the whole of the mouth. The little jaw enlarges, however, so rapidly, that about the third or fourth week the *middle nippers* also find room to appear, and, with this complement of *temporary* or *milk teeth*, this sportive and interesting animal frolics about, until towards his ninth

month, when he becomes furnished with two *corner* nippers above and below. In very forward colts, the dentition partakes also of the early evolution, and thus these corner nippers, known among breeders as the *shell teeth*, will sometimes appear as early as the eighth month; but in cold situations, with a spare supply of generous milk, they are occasionally kept back until two or even three months later. The animal has now its full '*colt's mouth*' of nippers; and the completion of the process occurs most opportunely at a time when its wants, from increased growth, become greater, and its maternal supplies less; the milk of the mare beginning about this time to decrease.

This *early* or *temporary set* of nippers, as might be expected, differ from the permanent or horse teeth by being altogether smaller and whiter, and also by having a well-marked neck to each, which ends in a more pointed and slender fang; and they also have several very fine grooves or furrows on their outer surfaces. They are slightly rounded in front, and hollowed towards the mouth: the cutting surface of each of these also rises into a sharp edge in front, which fits it for tearing up the grass. But these early teeth being less durably framed than those which are to follow, soon show the marks of even the early attrition they meet with. Before twelve months the teeth, therefore, show considerable wear, and all closely meet on their biting or nipping surfaces.

The *molares*, or *grinders*, although they do not yield such definite characters of the age, may be usefully employed as auxiliaries. The foal is usually born with a certain number of grinders already protruded above and below. Two always appear together, and we believe the third is not so frequently synchronous with the two former. At a period varying between eleven and fourteen months a fourth grinder is added, which is the first permanent, and constitutes the fourth of the future row of permanent grinders. It may, therefore, be considered, that a full yearling colt or filly will have six nippers well up; and when twelve months old it will usually have four grinders on each side, above and below. Before the completion of the second year, the second permanent grinder is added, and

forms the fifth of the row. Between the second and third years, the first two milk grinders fall out, and are replaced by the first two of the row of the permanent grinders; and between the third and fourth year, the third temporary grinder is shed and the sixth permanent grinder cut, so the colt has a full set of permanent molars when four years old.

To pursue our dental characteristics of the age, we must now take up the permanent or horse nippers, and which are those most important to the purposes of the breeder, the seller, and the buyer. We must first observe, that, although constitutional peculiarities will occasionally interfere with uniform dentition, and although the evolution of the teeth may be hastened or retarded by an early or a late foaling, yet, by common consent among us, May is presumed to be the birth-month of every horse; and, notwithstanding these circumstances, this understanding answers all the usual purposes of commerce. Far otherwise is it with the veterinarian, who must look much closer, as on his judgment very weighty decisions will often depend.

The appearance of the permanent set of nippers may, in brevity, be thus stated:—The *front*, at from two years to two years and a half. The *middle*, from three to three years and a half. The *corners*, from four to four years and a half; while the tushes may appear at any period after the second or before the fifth year. The colt, after the attainment of five years, assumes the name of horse; the filly is also transformed into a mare at the like period: both are now adults, and are, without hesitation, applied to the purposes intended for them.

The horse's *tusks*, *tushes*, or *canine teeth*, are four, one on either side of either jaw. When the tush is at its full growth, it assumes a slightly incurved cone-like form, having internally furrows, which arising from the base, extend upwards and meet, leaving a triangular eminence between. The tush is not unfrequently examined as a criterion of the age; and some persons place much dependence on the presence or absence of its point, and the degree of its curvature, as well as the distinctness of its furrows: although these appearances are liable to

variation, yet the veterinarian would do well to accustom himself to an examination of the tushes, as it occasionally happens that he can only take a very hasty glance at the mouth of some animals; but there are few that will not allow the finger to be passed between the lips. In the evening also, or in very dark stables, the tush will often afford a useful, though not a positive indication as to the sex of the animal, mares generally having no tushes.

Making the nippers our principal guides, we proceed to remark that, during the period between the fifth and sixth years, the cavity in the front nippers wears away; and thus a horse is said to have lost his mark at *six*. The close observer will, however, yet be able to discover a central discoloured depression, and a prominent ridge of enamel around it, with an intervening part occupied by what has been already called the bone of the tooth.

At *seven*, similar appearances have taken place in the middle nippers, which have now lost their mark also.

At *eight*, the mark, or rather the cavity, is obliterated from the corner teeth likewise, and in jockey language the horse is now *aged*.

The marks, however, are very uncertain guides, being subject to numerous variations, hardly ever alike and never to be absolutely trusted. The mouth, indeed, ceases to be a certain guide after the fifth year, though the age may be told with tolerable accuracy up to the sixth year, when all the teeth are fully up or close together.

It must, however, never be lost sight of, that the descriptions which have been given of dentition throughout are best understood,—indeed, can only be justly apprehended, by considering that it is not by simple wearing away of the upper surface, and consequent decrease of the column of the tooth, that the *indicatory* changes in their appearances take place, particularly in the protracted periods of life, but by a disposition in the teeth to shoot upwards to meet the continual deterioration going on; *by which a gradual exposure of their under surfaces is made far below the original depth of the central cavity producing the mark*. It must, also, not be forgotten, that as, on a view of the figure of a tooth throughout its whole extent, the fang will be found to vary much from the free

portion, so it is readily explained why the figures of senile teeth are so unlike those of more early periods. The fangs, as age advances, are actually protruded into the mouth, and the tables, or biting or nipping surfaces of these, for the most part, are nearly or quite square, while the teeth themselves, at this advanced period, are projected forward or presented almost horizontally from the gums.

It will also strike the reflecting mind, that attention to the later character will become even more important than our yielding to old but erroneous impressions of *age*, as it stands in the horseman's vocabulary ; as this gives place to conviction, analogy, and experience, that which the jockey calls age, as connected with the natural powers and duration of the animal, is removed by at least twelve years ; for premature age in the generality of horses is brought on by too hard and too early work.

Impressed with a conviction resulting from experience, that what is called *age* in the mouth is often combined with *youth* in the limbs, the practical judge, instead of refusing such an offer when it occurs, hails it as a boon ; for the reputed age has produced only the best effects, by condensing the solid parts of the frame, and rendering them capable of continued exertion. Such age is usually accompanied by a steadiness of temper and disposition that teaches the horse to employ his powers judiciously, because the animal is certain to have been gently used in his youth.

The truly *senile horse* will be seen with eyes sunken, sometimes dim, and eye-pits hollow ; the lips will be thin and pendulous, the under or posterior often extremely so. The anus, not wedged up by interstitial matter as heretofore, and not sufficiently retracted by its muscles, projects much. The grey horse becomes white, and the darker colours become intermixed with grey, particularly about the head. The bony processes in every part of the body stare out, and give a rigidity of appearance which well accords with the actual state of the body. So much greater is the absorption of parts now than their increase, that even the diseased deposits of more youthful times, as windgalls and bony exostoses, are lessened, or their outward indications disappear altogether. The mouth also will present

some appearances which deserve attention. The upper corner nipper is frequently sawed, as it were, into two parts by the action of the lower, which in turn loses its outer edge also in the wear. The whole of them become yellow, are covered with tartar, and stand wide apart from condensation and approximation to their roots.

The cautious veterinarian, when called on to give a professional opinion, must however not form his judgment principally on the appearances afforded by the teeth. Under this view, it is imperatively necessary for him to take into his account all such circumstances as are likely to mislead the judgment: the principal of these are, the irregularities of dentition, and the arts of breeders, dealers, &c. Although, as already observed, the age of all horses is dated from the 1st of May, yet we know that they are occasionally dropped in December even, and we have seen others which were said to be foaled in July. These differences must, of course, influence the dentition much, and an early foal will thus have what is called a *forward mouth.* When such a one is either reared by an expert breeder, or falls into the hands of a professed jockey, he takes care to make this circumstance turn to account, by converting these few months of difference into a year. Neither is the time of birth the only means of early or protracted dentition. Warm sheltered situations, with a liberal supply of generous milk, and a pasturage so luxuriant as to allow early browsing in the foal, will hasten the evolution of the teeth, as the absence of these will retard it. In some instances, constitutional anomalies present themselves: the middle and corner nippers have been delayed two, three, and even four months beyond the usual time; in which, and similar cases, the judgment can only be directed by an inspection of the grinders, which seldom participate in the irregularity.

The front nippers usually fall at two years old; and the veterinarian, in examining a colt in July, which had been foaled December or January two years and three or four months ago, and finding that the subject of his examination had already two permanent nippers in front tolerably well up, without examining further, would state the age as rising four, instead of just two and a half; which would be the real age according to all fair rules of reckoning. It is evident,

however, that a closer examination would detect this judgment was not quite in accordance with established signs; for if the colt were really four years old, the age the breeder intended to make him appear, the middle nippers should have undergone considerable attrition; the corner temporary teeth would also show the effects of wear; neither of which appearances would, in the present instance, occur. Further examination into the mouth, in such case, may likewise show, that although the colt or filly has already five grinders, yet that the first of them are of the milk set, and the posterior one only belongs to the permanent or horse set. The difference however is not very easily told between the temporary and permanent grinders, though the size, supposing the animal submits to such an examination as will permit of a careful comparison, is some guide.

A fraud, comparatively very common, is that of passing off a four-year old for one of five years, particularly where the colt is a promising and somewhat early one. This however is only a fraud inasmuch as the seller passes off a colt for that which it is not. When however the teeth say five, other developments generally declare the same, and a year of youth and actual service is a positive gain to the purchaser. The idea that dealers can hasten the growth of the permanent teeth by punching out or drawing the temporary ones is now wholly disbelieved in. A man may retard, but he cannot hasten growth by cruelty; the more any animal suffers the less it grows.

We now have to speak of positive deceptions practised on the teeth of the horse: thus, when a dealer becomes possessed of a horse whose teeth bear more actual marks of age than either his limbs or spirit, it is an object worthy his attention to give such teeth a more youthful appearance. The principal part of this art consists in the operation called *bishoping* (supposed to be derived from a man of that name, one of its earliest or most expert practitioners), which consists in the making an artificial cavity in the upper surface of the nippers, by means of a sharp hard tool, and rendering the cavity permanently black with a heated pointed instrument: but the strokes of the graver detect the imposition, and the two inner grooves of the

tushes cannot be restored by similar means; nor can the aged position and appearance of the tables of the teeth be affected by this artifice.

The judgment formed from the teeth, though generally to be depended on when these frauds have not been practised, is yet liable to some error from other causes than these. Some horses living wholly on grain, and very early worked, will occasionally be found to have gained on others which have fed principally on succulent matter. In those which champ much on the bit, this variation may be very considerable, and make a full year's difference between them and others. It remains again to remark, that a too strict adherence to the teeth-marks very frequently leads those who are only moderate judges into very great error in another way; which is, that of frequently causing them to reject the most useful and valuable horses without these marks, as being supposed past their work. Nothing is more fallacious than this: the commonly received indices of the age grant an assurance that the animal has not passed a third of its natural life; nor one half of the time in which he is perfectly useful, and fully capable of answering all the purposes for which he was intended. It is only in a country like our own, where these generous creatures are so early put to labour, and so unremittingly forced to pursue it, that this mark is so much attended to. A subordinate attention only should be paid to the appearance of the teeth, if a horse appear what is termed fresh and sound; that is, if all his organs be capable of their several functions, the limbs being firm, and exhibiting no appearance of too early, too great, or too long continued exertion. The early ruin of English horses is not only to be attributed to the excellence of the roads and the calls of business, which urge our horses onward, but it is equally to be laid to the account of their being worked before the maturity of the system is perfected, or the motar organs completely evolved. The premature exertion forces nature into artificial means of strengthening the debilitated organs; hence the cavities between the tendons and their sheaths are destroyed: parts take on a bony structure, whose original formation was cartilaginous, as the lateral cartilages of the

feet, and the articular processes of the vertebræ; a greater quantity of ossific matter is deposited on the surface of some bones than is natural, forming splints, spavins, ring-bones, &c.: and to counteract the unnatural waste, other secretions are likewise preternaturally augmented, producing windgalls. But where horses are suffered to attain their full growth, and the complete evolution of their stamina, if they are afterwards put to full exercise, not altogether inordinate, they become competent to the exertions expected of them, and reach old age sound and vigorous. Many good judges will not purchase a horse for hunting earlier than eight years old, and regard him only in his prime at ten or twelve. It is too little considered, that the period of a horse's life, with moderate care and good usage, is protracted to twenty-five, thirty-five, and forty-five years; and an instance lately occurred of a horse dying at fifty. The accounts of their being vigorous and strong at thirty, and thirty-five, are very numerous; and nearly as frequent as activity in men of eighty and ninety. A gentleman at Dulwich, near London, has three monuments of three horses, who severally died in his possession at the ages of thirty-five, thirty-seven, and thirty-nine. The oldest, it is to be remarked, was in a carriage the very day he died, strong and vigorous; but was carried off in a few hours by spasmodic colic, to which he was subject. At Chesham, in Buckinghamshire, there was a horse of thirty-six years old, who exhibited no symptoms of debility, nor any external signs of age. It was remarkable, with regard to this four-footed Nestor, that when an unusual hard day's work was required, he was always chosen, as never failing in what was expected from him. A horse named Wonder, belonging to the riding-school at Woolwich, may be quoted as living to forty years.

Mr. Culley, in his *Observations on Live Stock*, mentions a horse he knew which lived to the age of forty-seven years, having during the greater part of that time a ball in his neck, received in the battle of Preston, and which was extracted at his death: for, judging him at four years at the time he received the wound (and it is probable he was more), he must, at his death, have been forty-seven. But

even these venerables were mere babies to the barge-horse of the Mersey and Irwell Navigation, who was well known to have been in his sixty-second year when he died.

It is true, that these are not very common instances; yet it is not the natural economy of the animal which makes them so rare, but their early application to full exertion, and the unremitting continuance of it, whereby their race has begun frequently before they are three years old; before five, their utmost speed is exerted after the hounds in winter, and as hackneys against time in the summer; at seven, blind, foundered, and spavined, they gallantly shine in the mail or stage; at eight, they falter in the fish cart; and, before ten, worn out with disease and inanition, their reputed old age gains them an honourable exit at the slaughter-house.

Hence it must be at once evident how small a proportion of a horse's *natural* life is eight years; and yet this past, the majority of persons begin to consider him as aged, and unfit for service. The more we see and observe of horses, the more we shall be astonished at the want of attention and consideration this evinces. A long acquaintance with these animals has induced us to draw the following comparisons between their ages and that of man; that is, at these several periods of comparison, the constitution of horses and man may be considered as in an equal degree of perfection and capability for exertion. Thus, the first five years of a horse may be considered as equivalent to the first twenty years of a man; or thus, that a horse of five years may be comparatively considered as old as a man of twenty; a horse of ten years, as a man of forty; a horse of fifteen, as a man of fifty; a horse of twenty, as a man of sixty; of twenty-five, as a man of seventy; of thirty, as a man of eighty; and of thirty-five, as a man of ninety. So far from this comparison being too much in favour of the horse, we are disposed to think it too little. Horses of thirty-five years of age are as common as men of ninety, provided it be taken into the account that there are twenty human subjects for every horse; and, unquestionably, a horse of forty-five is less rare than a man of a hundred and ten.

OF THE AGE OF HORNED CATTLE.

In the *ox*, the age is most frequently judged of by the horns, as offering a more convenient point of observation than the teeth. But as the horns are the subject of much trickery, and as some breeds are now hornless, it is not important that we should be justly informed of the indications of age by them. The dentition of horned cattle has been more neglected than that of the horse; and the scientific breeders, who have learned to mould the form of these animals at their will, have failed to inform themselves on so simple a matter as the successional changes in the bovine teeth. On the contrary, they have copied each other's errors from Buffon downward; until, in the present day, some of our highest authorities are not within twelve months of the correct periods of the displacement of the one set and the appearance of the other.

A *calf*, either at birth, or very soon after, is found to have two middle incisors in the lower or posterior jaw; neat cattle having, as is well known, none above. In a fortnight, two others appear alongside of the first. The third week usually produces two more; and by the fourth or fifth week from birth, there is an addition of two others, making the complement of milk incisors (eight) complete.

These teeth will present a surface convex externally, and somewhat concave within; the portion above the gum will be covered with enamel, and which will slant upward from the internal to the external surface of the tooth, forming an edge of considerable sharpness. The only indication of advancing age will be the wearing down of these sharp edges, and the appearance of the bony substance of the tooth beneath. Even at a month the centre teeth are a little worn. At two months the enamel will have been slightly worn off the edge of the four centre teeth. At three months, from the six centre; and at four months, the corner teeth will likewise be considerably worn. From this period these teeth decrease in size in the order of their appearance, until two years old, when the two middle ones are pushed out by those of the permanent set; and thus a two-year old steer or heifer will have two large middle

incisors pushing up, and six dwindled ones remaining. At three years old there are four of the old and four of the new set; but the older will seem to be almost hidden by the others. When the beast is four years old, there will be found six permanent broad incisors, and two shrunken ones of the milk set, which latter sometimes do not displace themselves so readily, but, on the contrary, form a species of wolves-teeth, and annoy the animal much, unless they are extracted. It is at five years old that the animal may be said to be full-mouthed; for at this period, whether it be steer or heifer, the eight incisors will be all up, though they will not appear equally grown until six years old.

The *horns* of cattle also yield indications of age thus:— At three years the horns are smooth, and by the fourth year, two small circles extending round the bases appear. The growth of the horn impels this circle forward, and another horny cylinder, similarly terminated, appears annually as long as the animal lives. The horny accretion converts these circular extremities into annular joints or horny rings; and thus, by allowing three years for the point of the horn, and an additional year for each ring, the age is obtained. To frustrate this judgment, it is not uncommon to shave or rasp the horns: but the mouth, by the foregoing rules, will yield a just indication.

In *sheep*, also, the age is judged of by the teeth. The second dentition commences between the first and second year, but by the second year, the middle permanent incisors of the under or posterior jaw (for they also have none above) are up. At three years they have four of these *broad teeth*, as they are called; at four, six of them are fully evolved; and at five years, the two others are up, which makes them *full-mouthed*. The sheep's teeth, as the animal advances in years, becoming divested of their enamel, blacken, shrink in volume, and, where circumstances occasion these animals to be allowed to become very old, they loosen, and prove almost useless. The teeth of goats follow similar laws, and their age is indicated by the same appearances.

The *horns* of sheep and of goats are not changed, but

appear the first year; and as they also gain a horny ring every year, so, by adding one year for the end and one for each ring, the age is indicated in the horned breeds.

THE COLOURS AND MARKINGS OF HORSES.

The colour of horses, being derived from their hairy covering, is necessarily very varied. Numerous conjectures have been entertained as to what was the *original* colour of this animal: but the inquiry has not been attended with success; for the horse is seen to perform all his functions under any tint; though fancy, and perhaps experience, has appropriated particular constitutional properties and mental qualities to some hues more than others. The various colours of horses would seem to be truly original and inherent; for such of them as have, from a state of domestication, been suffered again to run wild, have retained the colour they carried with them, although their form has altered, and submitted to the agencies of climate. Neither have the horses of different countries, according to the accounts of travellers, exhibited any individual characteristic hue. The horses of the East are not darker than those of the North; on the contrary, we have white Arabians, and we procure the darkest breeds from the north of Europe; while in Russia bright bay is as common a colour as any other. Geographical distribution is not, however, wholly without its influence on the hair; for our heavy breeds, drawn from the northern parts of Europe, are very frequently black; but a full blood black horse is seldom met with. Age has likewise a powerful effect on the tinting of the hair; that of the colt alters many shades; in some cases it becomes much lighter, and in others altogether much darker, as the adult period arrives. But the alteration in them which takes place between the time of full growth and that of old age, is invariably from a darker to a lighter hue.

The colours of the parents, among horses, appear to be nearly divided in the offspring; to which adherence in the propagation of the external covering, we are indebted for the endless variety of shades found among them. It was probably to add to the personal beauty of this animal, that in many the mane and tail are either much lighter or much

darker than the short hair of the body; which variation tends greatly, in the painter's language, to relieve and throw up the body-hue. If nature, in these varied markings, had personal beauty really in view, as from analogy we may suppose, it would then be natural to conclude that the original horses all had it; as a contrasted tint of mane and tail is common to some colours more than to others; but these varieties will not afford any conjecture to be thence drawn as to the hue prevailing among the primogenitors of the genus. Besides these contrastings of colours, we may add those markings frequently met with, such as the dark dorsal stripe of some breeds, as well as the bandings or stripings common on the legs and arms of others, of the duns particularly. The humeral cross stripe is principally found on the ass; faint traces of it, however, are now and then seen on some horses, but which, like some other anomalies, may be rather considered as minute links of assimilation to other more remote members of the genus. A still more usual marking is found on the joints, which are in many horses several shades darker than the rest of the body, and in some others altogether black. The dappling in the grey, the bay, the brown, &c., may be regarded as intended, like the spots of the tiger and panther, to add to the beauty of the animal, and cannot be considered as arbitrary deviations from nature, gained by domestication or crossings in breed.

On this subject it may be observed, that there is a sensible difference between the markings imprinted by nature, and those which are added by artificial agencies in operation since the subjugation of this animal. The former please every eye, and they never offend: whereas such as appear to be the consequence of cross alliances, or other effects of domestication, however custom may have forced on us the adoption, yet most of them are found to prove unpleasant to the eye. Piebald horses are displeasing to most; and few can ever become reconciled to the tiger-spotted. Extensive markings of white on black horses offend all.

SECTION V.

CONDITION OF HORSES.

CONDITION is a term generally understood, but hardly ever applied in its strict signification. In the mouths of the trainer, the gentleman, the stableman, the dealer, and the carter, it is used with strict propriety when appealing to the animal each in his own sphere has to deal with. But taken beyond this sphere, each will pronounce the horse the other prizes out of condition. Yet the word so often used, and in the mouth of everybody, must have some meaning. Condition implies the highest possible state of positive health compatible with the purposes to which man seeks to put a horse. It is a state of health so fine, that it borders on disease, and animals kept in condition for any length of time (unless admirably tended) are apt to be attacked by disorders.

The trainer, to attain condition, endeavours to promote the absorption of every particle of loose tissue or of fat; to have the muscles and tendons in their highest working order; and the nervous system in a state of energy which too often disappoints the hopes of him who induces it. This is, on the race-course, called perfect condition.

The gentleman likes to behold his hunter much in the state of the racer, only, as the animal has to endure every vicissitude of weather, and is expected to carry its rider for a day rather than for a few minutes, he can permit, perhaps, a slight quantity of flesh which would be deemed superfluous in the racer. This, in the gentleman's opinion, is excellent condition.

The stableman likes the horses under his care to carry a fair quantity of flesh, to be gay, but not too sprightly, to have glossy coats, and altogether to appear after a fashion that may captivate his mistress' eye; and this when brought about is, to his mind, admirable condition.

The dealer loves to behold his stock so fat, as to be unfit for long or even actual work, but fat enough to render the body round, so as to conceal every defect. Fed up to the point of excitement, but, like drunkards, unable to maintain it long. Very fresh for the few minutes they are

taken out of the stable to be shown, but with lungs that would hardly permit them to frolic for a longer period. With their coats blooming, their manes and tails nicely combed, and with their hoofs freshly oiled. This, in his judgment, is absolute condition.

The carter wishes his horse to carry as much fat and flesh as possible, thereby to increase his weight, and enable the animal to pull heavy loads. To obtain the means of doing this he employs various nostrums, and not unfrequently cribs from his master's granary. When he beholds his teams fat to repletion, he, with pride, pronounces them to be in beautiful condition.

Thus condition in horses, though applied in different senses, yet, when properly considered, means always the same thing. The horse is intended, by the word, to be in an unnatural or forced state, up to the requirements of an arbitrary master's will; but, when carried to extremes, not in such a condition as is altogether fairly compatible with the creature's enjoyment of existence, or directly equal to a state of health which promises prolonged life.

With so artificial a state, no matter to which sort of condition the horse be subjected, any sudden change is likely to interfere. There is no practice more foolish than that of suddenly turning a horse into a field, in order that he may support life upon grass. It is true herbage may be the natural food of the animal, but the horse of our stables is not in a state of nature. In his free state the animal does no work, neither, it may be said, does he when turned out to grass. This, at first, may appear very true, but the hardest of all work is any exercise we are unused to. The editor of this edition has seen a countryman sweat over a letter for half a day, and at the end of the time the man has only spoiled several sheets of paper. So also he has witnessed a lawyer perspire, when positively doing nothing in a garden. Then the horse turned into a field has to do that which it is not used to perform. In the stable its food is brought to it, in the field it has to walk for its living; thus there is a total change of habit by the day, and at night, instead of a warm stable, with a good bed and plenty of clothing, he has to lie down perhaps on the damp grass, with the heavens above him, and nothing to cover his

shivering body. Then there are the flies to be taken into the account; yet, not to mention these pests, there is the diet; the horse in the stable eats only hay and oats; a comparatively small portion of which suffice for his sustenance; when turned to grass he is taken away from such stimulating diet, and compelled to march many a mile before he can collect enough of watery herbage to satisfy the cravings of nature.

Let no man who has an animal that is worth stable provender turn such a horse out to grass. It is an old and unfounded notion that grass is the natural food of the horse. We know nothing of the wild animal, and therefore cannot say what it did or did not eat; it is certain many horses can exist upon the growth of the field, but then very many cannot; and how is the master to decide which will and that which is unable.

The loss of a horse is a serious sacrifice, not to mention the disappointment when the mind was fixed on its improvement. Any change is inimical to condition; an increase or change of food; mowburnt or musty hay; kiln-dried or new oats; any alteration in the water the horse is accustomed to drink; scarcity of, or too much water; excess of warmth in the stable, and too much clothing: excessive exertion or want of exercise; cramming upon or after a journey; too hard a burst or too long a check; in short, any thing whatever which endangers the high state of excitability to which the animal has been brought will throw the animal out of condition, as it is termed. To keep up perfect condition is a most difficult task: it requires all the master's and the groom's utmost attention; and when maintained for any period, as a general rule, it certainly tends to shorten life.

MORBID CONDITION.

This simply means that the horse is suffering from some immediate disease, or that he is the victim of the lingering effects of a disorder, the active symptoms of which have subsided. In such a case no rule of treatment can with propriety be laid down, but the animal must be subjected to those measures that apply to his peculiar state; ample directions for which will be given hereafter.

GETTING A HORSE INTO CONDITION.

Turning a horse out to grass is like taking an alderman from his customary diet to place him on pauper food. All the evil we should expect in the one case we see in the other: the belly enlarged; the body swells; the skin becomes hard, coarse, or stares. All these signs announce the lowering of the system, but, if any further proof be required, the weakness of the animal is shown when it is either ridden or driven. It very soon becomes covered with a lather, as it is termed, in contradistinction to a natural sweat.

The straw-yard is not much better. If the horse be not debilitated by innutritious food, in these places he usually suffers from semi-starvation. The entire system is bad, and requires to be changed.

But, when a horse is taken up from grass he ought to be put into as cool a stable as possible; no clothing at first is required; a pail of water, kept constantly full, should be placed in his manger; his food should consist of oats mingled with bran; two bran-mashes daily for the first week; then one for the next week; no hay should be allowed at first, but carrots, cut small and mixed with bran, ought to be placed in the manger. On the following week a portion of moistened hay may be allowed, and some of the carrots withdrawn; more oats may be given, and a bran-mash withheld; some covering at night should also be allowed, minding, however, that it is thin at first, and gradually increased. All the while the grooming should be double the usual quantity: the horse may, with advantage, be dressed night and morning; at first gently, then with the utmost strength, using the curry-comb as freely as the animal can endure it. Plenty of exercise at the same time is essential, starting with a walk, and as the horse improves, augmenting it into a trot, and even a gallop; but nothing like a sweat under a pile of clothing should be admitted. The horse that cannot, by the gentler means, be got into condition is not worthy of the trouble which the process necessitates. Not a particle of physic of any kind, unless the animal be really diseased, should be given, under the notion of getting up the belly, and reducing the flesh. It is not flesh it is desired to

remove, but a dropsical habit it is wished to amend. The bowels do not contain too much nourishment; but dropsical effusion, originating in weakness, has taken place. It is not generally known, but it is perfectly true, that a horse can be purged into the very state which the utmost want of condition can represent. Perhaps, however, rather than have all the trouble of getting an animal into condition, after it has been turned to grass, it is the better and the cheaper plan, though probably one which the groom who loves idleness and excitement may not altogether approve, to keep the horse at home, and never to allow him to sink so low as to require so much labour to get him into condition again.

SECTION VI.

STABLING OF HORSES.

THE STABLE ITSELF.

STABLING of every description is an evil. It is impossible a stable should be so built that it will allow the animal one half the freedom he enjoys when loose out of doors. Most stables are built so as to aggravate their inseparable cruelty. The flooring slants from the manger to a gutter, which runs at the horse's heels. Now, if horses be in a field, and at rest, they will always be seen standing upon a piece of ground that declines in precisely the opposite direction. The fact is, our modern stables throw the stress upon the back sinews or flexor tendons, and thus prepare many an animal for the injury he afterwards unexpectedly experiences. Nor is this all: the stall is perfectly at variance with the habits of the horse; he is evidently gregarious, or lives among crowds of his fellow-creatures; the stall dooms him to solitude, and the groom sits behind to see he does not put his nose over the divisions, only to look at a comrade. In many stables the stall is so small that the horse cannot turn round; he can lie down perfectly at ease in very few; yet, there he stands, looking at a bare wall, with the stress upon his back sinews, for a period varying from twenty to twenty-three hours during the day. The horse, in any condition beyond the dominion of man, is necessitated to

walk, in order to crop the herbage on which he exists; when under human protection, he changes a life of ceaseless activity for one of all but continuous stagnation. Is it to be wondered then that the sinews often fail? Or is it a cause of complaint against nature, that the feet and legs so often oblige man to allow his wretched servant to remain idle? The foot is the most valuable part of the horse; but, to preserve the foot, continued motion is imperative. This is denied; a condition the very contrary is enforced; and then man, in his presumption, blames nature because the foot of the horse is so often the seat of disease.

Loose boxes are better than stalls. But in these the injury is only lessened, not removed. The horse has a loving heart bestowed upon him. He must love something. Lambs, dogs, cats, goats, fowls, &c., every creature he is permitted to see, by turns have become the object of his affections. Mr. Blaine records, that horses have defeated the utmost efforts of man to get them into condition when a companion has been taken away from the next stall, or when the animal has been stabled alone. Bales, after the fashion of military stables, are to be preferred to wooden partitions, unless they be made much lower than at present. The stall should be made a few feet wider than is the custom to build it. The floor should slant from behind towards the middle, where the gutter may be placed, and then be gently raised and afterwards incline towards the manger. A notion is abroad, that the present flooring carries off the urine of the mare, but were stables paved in the manner we advocate, they would equally carry off the urine of geldings. The point in dispute is surely, then, in our favour.

Most stables, moreover, are kept much too warm. Not that any are heated by means of a stove or fire, but the animals doomed to reside within them are made to breathe the same air over and over again, until it becomes hot, and smells so strongly of ammonia, as to sting the eyes and take away the breath of the stranger who unexpectedly enters them. This is not warmth; but foulness, filth, and abomination, which should immediately be abjured. Let a stable be freely ventilated; it cannot have too much air at any period of the year; its inhabitants and the shelter of the

walls will always make sufficient difference, especially when the mode of ventilation is considered. The air must never blow directly upon the horses, but the ventilation should be above their heads, for foul air always has a tendency to ascend. If this plan were followed, the stable would range from 40° to 50° in winter, and from 60° to 70° in the summer; but the most violent draughts are better than foulness. If the proprietor therefore, on entering his stable, detects any stench, he had better order the horses out to exercise, and while they are absent have every door and window thrown wide open. After this has been done once or twice, the groom will take care the stable is always sweet, let the master enter when he may.

Every stable should be thoroughly drained, not into a neighbouring cesspool, but to such a distance as will preclude any effluvia escaping into the building. Likewise all dung and litter ought to be carried far away from the place twice a day. This of course imposes extra work on those who are not very fond of employment, but our business here is to point out that which ought to be done, and not to please idlers.

The manger and hay-rack are best low, as the last especially, being in this position, enables the horse to reach his food without raising his head and thereby injuring the vessels by maintaining an unnatural position, and likewise prevents any hay-seed from falling into the animal's eyes. For the last reason the place ought to be thoroughly ceiled, lest any dust or litter fall down from the loft above, the hay in which is likewise kept free from contamination arising from ammoniacal fumes, which always have a tendency to ascend.

The loose boxes ought to have their sides smooth, no nail or projection of any kind should be permitted, as the animal is apt to tear itself against such substances. When designed as substitutes for stalls, it is sufficient to have the partition close half way up, and the remainder formed of open rails, whereby the horses are enabled to see one another, and much of the dulness of their lives is removed. Every box ought to be drained by means of a centre grating.

It is a question much disputed whether the litter should be removed or not during the day-time. In the great majority it is entirely taken from the fore, and but a small portion left under the hind feet; and this method seems to

be so good as to admit of no improvement as a general rule, though of course individual cases will require varieties in treatment.

While in this place it may be as well to mention summering hunters. Mr. Blaine thus speaks of the effects of turning out: "But a more critical examination of the subject, and the collation of facts, will perhaps set the matter in rather a different point of view. It has long been observed that a horse that has been stabled for many years, and then turned out to grass, seldom thrives; on the contrary, he usually loses flesh and condition, although the pasture in which he is placed may be of the most luxuriant kind. It has been noticed also, by intelligent trainers, that race-horses, after being turned out, never again fully recover that speed they had previously exhibited. It is likewise equally remarked on, that in hunters which have been completely summered abroad, it has been found very difficult, and often impossible, to restore them to their full condition until much of the hunting season has passed by."

There are gentlemen, however, who imagine they are acting with great generosity towards the animal which has carried them well through the hunting season, when they determine their dumb servant, after the fatigues of the field, shall enjoy a long rest in a loose box during the summer. Can there be any greater folly than this? Let any man try it upon himself. A rest of six months or more is an impossibility. It is positive stagnation, and the poor horse which is forced to undergo it must feel rejoiced when the hunting season even once more commences.

A better plan is to stable the horse; to endeavour to maintain as far as possible the condition at which he has arrived; to hack him gently, taking him for a slow ride daily, and choosing shady lanes with grass on either side for the exercise; never to remove the shoes under the idea of freeing the feet, but to keep on that which the animal has become accustomed to. Mr. Blaine bears evidence to the advantage of some such plan in the following words; and he is a writer whose veracity has never been questioned.

"It is said that the Earl of Plymouth first tried the plan of summering his hunters altogether within the stable, with little variation in their treatment; by which it is asserted

their condition was fully preserved, and that, by this means, his horses entered on their hunting season in full '*wind, speed, and bottom.*' Others, to avoid this extreme, have soiled their hunters in the stable, or have given carrots; and some have gone a step further, and have pursued the in-door summering, not in stables, but in loose boxes. Still, in all these cases, regular *exercise* is required, or the feet must suffer, or the horses are apt to become pursive, thick-winded, roarers, or broken-winded; but be it remembered that, if such exercise is too severe, then the wear on the limbs continues the deterioration which the hunting season had brought on."

SECTION VII.

THE ANATOMY OF THE HORSE.—THE BONES.

Bones are the hardest, and in a state of health the most insensible, substances in the entire body; they sustain the soft parts, and form the base of the frame. They are composed of earth, gelatine, nerves, vessels, and membrane. The membrane appears first formed, into which a gelatinous fluid, that afterwards becomes cartilage, is deposited; it next becomes vascular, and gradually the arteries pour out within the centre of each bone the *earthy matter*, until the whole is completely consolidated. This consolidation does not take place in all the bones until the full growth of the animal; neither are the stages of osseous evolution alike in each bone; those becoming soonest ossified whose use could be least dispensed with. The bones of the horse are much harder than those of man, and consequently stronger. The deposit of earthy matter, and the consequent consolidation of their substance, appears to be hastened by any thing that permanently quickens the circulation, thus occasioning a more speedy separation of the earthy parts from the blood: it is thus that the inhabitants of warm climates come to perfection sooner than those of the northern regions. But by preternaturally hastening the earthy deposit in the bones we check their growth; thus, horses early and severely worked, never arrive at their full size.

The earthy matter of bones is continually changing by

means of the absorbents, which remove it, and the arteries which replace it. Its quantity also depends on the wants of the animal and the stimulus applied: in the full-bred horse, therefore, the bones will be found more solid than in the bulky lower-bred varieties. Most cylindrical bones are hollow, and are lined by a membrane, called the *medullary*, or membrane of the *marrow*: the bones have also an *external periosteum*, or outer covering. The medullary cavities have the effect of diminishing the weight of bones without weakening them, and at the same time are of service in supplying cavities where nature can store away her superabundant fat for a time of need. Bones, though furnished with blood-vessels and nerves, have in health little sensibility, but during disease they inflame, and then become acutely sensitive. The varieties in the form of bones have occasioned their division into cylindrical, flat, short or long, and irregular. They are furnished with cavities and eminences: the cavities, in all excepting long bones, are small, and lined with a medullary membrane, which secretes only in these places a reddish fluid; they have, also, pits, furrows, notches, holes, sinuses, &c.; the eminences are long and short, to which tendons are attached through which the muscles move the bones as by means of levers. Bones articulate with each other by joints; either like to a cup and ball; held loosely together by ligaments as a hinge; bound together more tightly by cartilage and ligament; intermingled, or fixed closely together by notches.

DESCRIPTION OF PLATE I.—THE SKELETON.

THE HEAD.

A, The skull, face, and upper jaw, in one piece; *B*, the lower jaw; *a*, the incisor teeth; *b*, the tushes; *c*, the molares, or grinders; *d*, the peak formed by the extremities of the nasal bones; *e*, the zygomatic spine, to the bottom of which the masseter esternus takes its origin; *f*, the orbit; *g*, the cavity above the orbital arch; *h*, the pole; *i*, the zygomatic arch; *j*, *j*, the styloid processes for the attachment of the muscles; *k*, the joint formed by the upper and lower jaws; *l*, the meatus auditorius, or opening to the internal ear.

THE NECK.

C, *C*, marks the extent of the cervical vertebræ; *D*, the dentata; *m*, the atlas; *n*, the wing of the atlas; *o*, the large superior spine of the dentata; *p*, the body of the dentata; *q*, the inferior spine of the dentata; *s*, *s*, *s*, *s*, *s*, the superior spines of the five remaining cervical vertebræ; *r*, *r*, *r*, *r*, *r*, the oblique processes of the five last cervical vertebræ; *u*, *u*, *u*, *u*, *u*, the transverse processes of the same bones; *t*, *t*, *t*, *t*, *t*, the inferior spines of the five last cervical vertebræ.

THE THORAX.

v, *v*, the cariniform process of the sternum; *w*, *w*, *w*, *w*, *w*, *w*, *w*, the costæ or true ribs; *y*, *y*, *y*, *y*, *y*, *y*, *y*, *y*, *y*, *y*, the ribs as distinguished from the costæ; *x*, *x*, *x*, *x*, *x*, *x*, *x*, *x*, *x*, the cartilages by means of which the ribs are attached to the sternum; *z*, *z*, *z*, *z*, *z*, *z*, *z*, the heads of the ribs; 1, 1, 1, 1, 1, the superior spines of the first five dorsal vertebræ, the fifth being generally the longest spine in the body; 2, 2, 2, 2, 2, 2, 2, 2, the superior spines from the sixth to the thirteenth, towards which they slope downwards; the thirteenth is generally the most upright spine in the dorsal region; 3, 3, 3, 3, 3, the last five of the superior of the back spines, which have an inclination forwards.

THE LOINS, OR LUMBAR REGION.

4, 4, 4, 4, 4, 4, the superior spines of the lumbar region, thicker than the dorsal spines, and having a decided inclination forwards; 5, 5, 5, 5, the projecting transverse processes of the loins.

THE SACRUM.

6, 6, 6, 6, 6, the superior spines of the sacrum leaning decidedly backward, thus leaving a large space between the points of the last lumbar and the first sacral spine, at which place occurs the great hinge of the back; 8, 8, 8, 8, the bodies of the sacral vertebræ.

THE TAIL.

7, 7, 7, 7, 7, 7, 7, 7, 7, the cocygeal bones.

THE PELVIS.

E, the ossa innominata, consisting of three bones upon each side; *a*, the ilium; *b*, the pubis; *c*, the ischium: the three bones unite at the cavity which receives the head of the thigh bone; 9, 9, the inferior spines of the ilium; 10, the superior spine, which partly covers the first sacral spine; *c*, *c*, the ischiatic spines.

THE THIGH AND STIFLE JOINT.

F, *F*, the femurs; *d*, the round head of the bone; *e*, the short neck of the femur; *f*, the great trochanter; *g*, the small external trochanter; *h*, the small internal trochanter; *i*, *i*, the sulcus whence the gastrocnemii muscles originate; *J*, *J*, the posterior condyles of the femur; *k*, *k*, the anterior trochlea over which the patella glides; *G*, *G*, the patellas: the interarticular cartilages of the stifle joint, as well as the cartilages tipping the dorsal lumbar sacral spines, and the superior margin of the blade bone or scapula, are necessarily omitted in this delineation, which is admirably drawn from a macerated skeleton.

THE TIBIA AND FIBULA, OR LEG BONES, AND THE HOCK JOINT.

H, *H*, the tibias; *l*, *l*, the heads of the bones; *m*, *m*, the fibulas; *n*, *n*, the inferior head of the tibia; *I*, *I*, the hock joint; *o*, *o*, the astragalus; *p*, *p*, the calcis forming the point of the hock.

THE POSTERIOR SHANK BONES.

K, *K*, the canons, metatarsals, or shank bones; *L*, *L*, the splint bones.

THE BONES OF THE PASTERNS, AND FEET, OF THE POSTERIOR LIMBS.

M, *M*, the sessamoids; *N*, *N*, the large pastern bone; *O*, *O*, the smaller pastern bone; *p*, *p*, the pedal bones.

BONES OF THE ANTERIOR EXTREMITY.

Q, the scapula or blade bone; *a*, the superior margin whence the cartilage has been removed; *b*, the spine of the scapula; *c*, the anterior fossa of the scapula; *d*, the posterior fossa; *e*, the shallow cup which receives the head of the humerus: the cartilage, which is situated around the

margin of this cup, and which serves to deepen it, has been destroyed by maceration; *f*, the tuberosity terminating the spine of the scapula, whence the flexor brachii originates.

R, the humerus or arm bone; *g*, the head of the bone; *h*, the smooth cartilaginous and synovial pulley over which the tendon of the flexor brachii plays; *i*, the external trochanter of the humerus; *j*, the inferior head of the humerus; *k*, the pit into which the ulna is received; *S*, *S*, the ulna, the top of which is termed the olecranon.

T, *T*, the radius; *l*, the head of the bone; *m*, the inferior head of the bone.

U, *U*, the carpus or knee joint, consisting of two rows of bones; *n*, the trapezium, which give security to the great flexors, and attachment to several of the lesser flexors of the fore leg.

V, *V*, the canon or shank bone; *o*, *o*, the head of the bone receiving the lower row of the bones of the knee; *W*, *W*, the splint bones; *p*, the inferior head of the canon bone.

X, *X*, the sessamoid bones; *Y*, *Y*, the large pastern bone; *Z*, *Z*, the small pastern bones; *P*, the pedal or coffin bone.

BONES OF THE HEAD.

The head consists of two portions: one is simple, and is merely the lower jaw (*skel. B*), which, in a prepared skeleton of the head, is loose, and freely separates from the other part. The top portion is more complex, and consists of many pieces. At the back part of the skull (*skel. h*) is the pole; towards the sides are the cavities for the eyes (*skel. f*); more forward are the openings, with long passages, for the nostrils (*skel. d*); and below is the roof of the mouth, with half of the teeth (*skel. a*, *b*, *c*).

THE SKULL.

Several bones enter into the formation of this last-mentioned part, each of which have distinct anatomical names, but, as all of them speedily become one mass, it will be better if we consider this portion of the framework as a whole. The bones, however, are not united at the time of birth; whence it is assumed that nature formed the skull of several bits, to assist the expulsion of the foal from the

womb. As these separate portions are originally soft, and upon even slight pressure can be made to overlap. Within the skull is contained the brain, and to hold this important organ safely, seems to be its principal use. The hair and skin covers the outside of the head; next a layer, deep and broad, of muscle laps over the sides of the skull, the bones of which there are double, each consisting of two layers; an outer layer, which is soft and spongy, like common bone, and an inner layer, which is hard and smooth, like ivory or glass. There is an imperfect cavity between these two layers, termed diploe, and then, internally, come three membranes and some fluid before the brain is reached; so the reader will perceive how thoroughly this organ (the brain) is protected within the skull.

Behind the skull will be observed a large opening (*Plate* VI. *n*), which is for the passage of the medulla oblongata, or substance which unites the spinal marrow and the brain. On every side of the skull will be perceived openings, some very small and others of considerable size; the larger are to admit of the passage of veins, which carry blood from the brain; the smaller ones are for the entrance of arteries, which carry blood to the brain, and to give egress to the nerves, which bestow sense or motion on the whole head, and also upon some other parts of the body.

Yet, as the division of the skull gives attachment to various muscles, it may be as well to mention the more prominent of their peculiarities, for the sake of a better understanding hereafter.

The cranium is said to be composed of twelve bones, four pairs, which make eight bones, and four single bones, which complete the twelve. The pairs are the squamous and the petrous temporal, the parietal, and the frontal. The single bones are the os triquatrum, the ethmoid, the sphenoid, and the occipital.

The OCCIPITAL BONE (single) is situated partly at the bottom, and directly at the back of the skull. It has two surfaces, an external and an internal. The *external* we will consider first. Right at the back of the head is the large hole of the skull, called the foramen magnum (*Plate* VI. *n*). Projecting from the bottom of the foramen magnum, so as to form part of the base of the cranium, is the basilar

process of the bone; and upon each side of this is a ragged hole, called the foramen lacerum basis cranii. Upon either side of the foramen magnum are a couple of projecting smooth bodies, termed the condyles, which fit into and articulate with the atlas. A little before, but on either side of these condyles, are two small holes, known as the condyloid foramina, out of which come the lingual nerves. Near to these are two downward projecting knife-shaped pieces of bone, spoken of as the styloid processes (*Skel. j, j*). Above the foramen magnum is a high and sharp continuation of bone, which forms the pole (*Skel. h*), and from which a sharp line, spoken of as the ridge of the occiput, descends upon either side.

The *internal* surface presents the upper part of the basilar process, upon which reposes the medulla oblongata and the pons varoli.

The PETROUS TEMPORAL (a pair) are the hardest bones in the whole body, owing to their closer texture. Upon the *exterior* is a canal, seeming to lead to the interior of the skull. This is the meatus auditorius or opening to the internal ear (*Skel. l*), and along the bottom of this canal is stretched, during life, a fine membrane. At the anterior portion of its interior surface is another styloid process for the attachment of muscles; and behind this is a bulbous projection for the mastoid cells of the internal ear; upon the internal side of this mastoid process, is a small flat surface, to which the large horn of the os hyoides is attached.

The SPHENOID BONE (single) is not very unlike a bird. We have two wings, a body, and two legs, looking forward, but not a head. It has two surfaces, an external and an internal. *External surface.* The body is convex, and receives several muscles. To the legs, also, muscles are attached. The wings are flat and smooth; upon them are two foramina, the sphenoidal and the pathetic. With regard to the *internal surface.* Upon the body rests the cruca cereri and pituitary gland, together with the cavernus sinuses; its wings form imperfect foramina for the superior maxillary nerve, the optic nerve, and the third pair of nerves, together with the orbital, the internal maxillary, and the supra orbital arteries.

The ETHMOID BONE (single) consists of a body, two

wings, neck, and appendages. The body, which is somewhat concealed, being hollow because of the ethmoid sinuses (*Plate* VII. *f*), which are cavities within it; upon the wings are parts of the optic, and the lateral nasal foramina. Towards the nose are two fine flat pieces of bone, pierced by numerous holes; these are the cribriform plates, that give passage to the Olfactory nerves. In front of these grow, within the nasal cavities, a spongy formation, termed the ethmoid cells (*Plate* VII. *e*). The *internal surface* is smooth, and between the two cribriform plates is a slight projection of bone, termed the crista galli, which gives attachment to the falx cerebri.

Os TRIQUATRUM (single) is an angular-shaped bone; smooth upon its outer surface. It joins the occipital bone, and lies before it; being in the middle or upon the top of the skull; its inner surface is indented for various sinuses, and from it proceeds a projecting piece of bone, called the tentorium (*Plate* VII. *h*), which divides the cerebrum from the cerebellum.

PARIETAL BONES (a pair) are situated upon the sides of the skull. *Externally* they are smooth and convex, being covered by the temporal muscles to which they give origin; *internally* they are concave, and indented by the convolutions and the arteries of the brain.

SQUAMOUS TEMPORAL (a pair) are in front of the petrous temporal. *External surface.* Projecting pieces of bone upon the outer sides are called the zygomatic processes. The orbital arches rest upon part of these processes; upon the inferior borders are the glenoid cavities for articulating with the lower jaw, near to which are the mastoid processes. The *internal surface* is smaller than the outer, being trenched upon by the parietal bones.

FRONTAL BONES (a pair). *External surface.* These bones form the arches of the orbit; the arch is pierced by the supra orbital foramen, and the under part of the arch is hollow for the lacrymal gland; the frontal also forms half of the lateral nasal foramen; it enters into the composition of the top of the nose. The *internal surface* is divided into two parts; one belongs to the nose, the other to the cranium. The external and internal plates of the bone separate, and thus form the frontal sinuses (*Plate* VI. *and*

VII. *d*), which are strengthened by several minute pillars running from one plate to the other.

THE ORBITS

Are in the horse merely bony rings, one on each side; not osseous cups, as in man. The reader, however, at a glance will perceive the place in which the eye should be situated, and he will also discover numerous holes which serve the purposes we have already alluded to; save one placed near the lower edge of the orbit, which allows of the secure location of an important vessel called the lacrymal duct. The bones of the face and of the skull unite to form the orbit, which has no distinct bone allotted to it.

The orbit is composed of eight bones, yet the two orbits are formed by only fourteen bones; because the ethmoid and sphenoid, which are both single bones, enter into the formation of each orbit.

The bones which enter into the composition of the orbits are the sphenoid, squamous temporals, ethmoid, and frontals; the lacrymal, malar, palatine, and superior maxillaries; thus four come from the face, and a like number from the cranium. The cup of the orbit is chiefly made up by the ethmoid, sphenoid, palatine and squamous temporals. The rim of the orbit consists of the frontals, the lacrymals, the malars, and the superior maxillaries.

THE FACE.

The face is principally formed by the protrusion of the nose, which in this animal is carried so far as to form by far the largest portion of the head. It has two large openings (the nostrils), divided by a cartilaginous wall (*Plate* VI. *a*), the septum; within the nasal passages are two bones rolled round, and composed of very fine osseous network; upon these lie the vascular and highly sensitive membrane of the nose, within which resides the sense of smell (*Plate* VII. *a*, *b*). The nose, however, does not extend from the skull to the most forward point of the head; behind the passages of the nostrils are situated several comparatively large, vacant spaces, termed the frontal facial (*Plates* VI. *and* VII. *d*), and maxillary sinuses. The use of these spaces is not very well understood. Two things,

however, are certain; that they aid the voice and add to the characteristic beauty of the countenance. Of the latter fact every body can judge, and with regard to the first it may be proper to state that the foal in whom these spaces are absent squeaks when he attempts to neigh.

The face consists of nine pairs of, and two single bones; the pairs being the inter-maxillary 1, superior maxillary 2, nasal 3, lacrymal 4, malar 5, palatine 6, pterygoid 7, inferior turbinated 8, superior turbinated 9 pairs, or 18 bones; the single bones being the vomer 1, and the inferior maxillary 2, making 20 bones in all.

1. These bones will demand but brief notice. The INTER-MAXILLARY contains the superior incisor teeth, and is pierced by a hole, through which runs the terminations of the palatine artery; this hole is called the foramen incisivum.

2. The SUPERIOR MAXILLARY BONE is the largest bone of the face; it forms the largest portion of the palate, has a division of its plates posteriorly, by which division the maxillary sinuses are formed, holds the molar teeth of the upper jaw, and is externally marked with a prominence called the zygomatic spine (*Plate* I. *e*), from which the external masseter muscle has its origin.

3. The NASAL BONES compose the most forward and uppermost portion of the nostrils; they both come to a sharp peak in front (*Skel. d*), and behind their plates divide, forming sinuses which are continuous with those of the frontal bone.

4. The MALARS form a portion of the rim of the orbits, and give rise to the levator labii superioris muscles.

5. The LACRYMALS also enter into the rim of the orbits, and have a small spine upon their facial surface for the tendon of the orbicularis muscle to originate from. Upon its orbital surface there is a slight depression near to the outer side, for the origin of the inferior oblique muscle, and a hole for the commencement of the lacrymal duct.

6. The PALATINES form the most posterior border or terminating arch of the palate, and their wings enter into the composition of the orbit.

7, 8. The SUPERIOR and INFERIOR TURBINATED (*Plate* VII. *a and b*), are situated within the nasal cavity, in the situations which their names imply.

9. The PTERYGOID are two thin plates of bone, placed behind the palate bone, and at the base of the cranium.

1. The LOWER JAW (*Skel. B*), or inferior maxillary, is sufficiently described in other parts of this work.

2. The VOMER lies upon a groove upon the upper surface of the palatine portion of the superior maxillaries, and is itself deeply grooved for the reception of the cartilaginous nasal septum (*Plate* VI. *a*), the entire bone being within the nose.

THE LOWER JAW.

The mouth is formed by the two jaws conjointly (*Plate* VII. *c*), and in each is fixed an equal number of teeth, viz. six grinders on either side, or twelve in each jaw (*Skel. c*); two tushes in each jaw, or four in both (*Skel. b*); six nippers or incisors in each jaw, or twelve in the two (*Skel. a*), making altogether forty teeth. The lower jaw constitutes the base of the mouth, and on the outer side of it are placed several glands which pour forth a large quantity of saliva during the time the animal is eating. The use of this fluid thus emptied upon the food which is being masticated between the teeth is to render it moist, so that it may ultimately become a soft mass, and be in a state fit to be swallowed. Within the large branches of the lower jaw are contained the tongue, the fauces, the pharynx, the hyoidal bone or bone of the tongue, part of the larynx, and some glands, the use of all and each of which, for none are useless, we shall have to point out in their proper places hereafter.

The upper jaw, beside containing half of the teeth, forms the top of the mouth, on which are formed certain indentations running from side to side, the projecting parts being termed the bars (*Plate* VII. *i*). From the middle of the upper jaw hangs down the soft palate (*Plate* VI. *f, and Plate* VII. *l*), which constitutes the back of the mouth. The soft palate rests upon the posterior part of the tongue (*Plate* VI. *e*). Being attached to the upper jaw slightly forward, as well as in a crescentic form, it slopes backward to its resting place; thus situated it forms a barrier to any substance passing into the mouth which is ejected by the stomach; but allows any thing to pass with perfect ease which may be propelled from the mouth towards the stomach. The sides of the mouth consist of flesh which, on its inner surface,

is lined with a very rough skin, having its points facing backward; thus serving to aid the palate in retaining whatever substance may have entered the mouth to be masticated.

The front of the mouth is formed partly by the teeth and partly by the lips, the upper of which is the prehensile organ in the horse, as by means of this he is able, when feeding off the ground, to gather the grass together in sufficient quantities for a bite; to turn over the hay in his rack; and even nicely to select certain portions as well as to reject others. The lips also are the principal seat of feeling in the animal, a fact apparently well known to man, as he selects this part on which to apply that torturing instrument—the twitch.

On the side of the upper part of the head, behind the place where it is connected by a joint with the lower jaw, is a small projecting canal, which is the opening to the internal ear (*Skel. l*); but as this organ, as well as its outward appendage, belongs to another part of our subject, we must at present do no more than allude to them.

THE TEETH.

The substances which enter into the formation of tooth are bone, enamel, and crusta petrosa. These three are perfect when the tooth enters the mouth, and lay one under the other. The crusta petrosa is the outer covering, of a dark colour and tolerable thickness. It was formerly mistaken for tartar, covering and dirtying the teeth; but that it is not tartar is shown by its always covering young teeth, and being absent from the front of old horses when the attrition consequent upon gathering the food has worn it off; therefore whiteness in teeth is no sign of youth in the horse. The crusta petrosa is a dark, tough, and highly organized substance, covering the whole of the fang, and following the enamel wherever it bends or dips into the windings upon the table of the tooth.

The enamel lies next under the crusta petrosa, and consists of a thin layer of very brittle unorganized and crystalline substance; it principally coats the crown of the tooth, being very thin up the fang, which it only partially envelops.

The main bulk of the tooth consists of bone, which is

tough, and of a yellowish colour, not so dark as the crusta petrosa, but much darker than the enamel, which last is perfectly white. It has an opening at the point, or bottom of the fang, which leads to a cavity that contains the vessels and nerves that nurture the substance of the tooth, as well as endow it with feeling.

Now, when we properly consider the services to which the horse's teeth are put, viz. to nipping off and grinding up the food, the use of these three substances is perceived. The enamel, which is brittle as glass, yet being firmly enclosed between two tough substances, is preserved from chipping or breaking; but being protected acts with the efficiency of steel. It is usually the least worn of the three materials that enter into the composition of the tooth, projecting comparatively far beyond them.

A tooth is divided into fang, neck, and crown. The fang is placed in the jaws, and fixed firm into certain cavities in the bones of each jaw; whence it is propelled upward into the mouth as age advances, the lower part of the cavity closing up as the fang enters the mouth. The fangs then form the teeth of very old horses; upon this the enamel being in parts deficient, and where it exists very thin, we can easily see a reason why the teeth of old horses, composed almost entirely of crusta petrosa and bone, should appear yellow or discoloured.

The neck is that part of the tooth which narrows as it meets the gum, the point of narrowing being termed "*the neck.*" There is no neck to be discovered in the permanent, but it is well marked in the temporary teeth.

The crown is that part of a tooth which can be seen by a spectator upon opening the mouth. Thus, as age progresses, and part of the fangs are pushed into the mouth, every portion of a fang so projecting from the gum becomes the crown of a tooth.

The teeth of the horse have been thought to be endowed with growth to meet the wear of years; so undoubtedly they are, but not to the extent that has been imagined. The chief loss of substance is supplied by the cavity in which the fang is situated becoming more shallow, and thus pushing down, or lifting up, the tooth into the mouth.

The double teeth of the horse perform the office of

grinding, and are placed on either side of the jaws, rather to the back of the mouth. The same substances enter into their composition as form the nippers. Thus the bone, being yielding, gives way under the grinding process, and by its action becomes indented. The crusta petrosa, being soft, also is carried off, save where it clings to the side, as a protector. The enamel being very hard, and between both, projects above either, and thus keeps the surface sharp, or admirably adapted to perform its office.

Six molars are placed close together, on either side of each jaw; then there is a vacant space, then a tush on either side of each jaw; then another space, and then six incisors; thus the teeth of the horse do not, like the teeth of man, form a continuous line, but occur as it were in patches, and in this manner the teeth of the great majority of the brute creation are placed in their heads.

The use of the tushes Mr. Percivall, in our opinion, rightly conjectures to be as weapons of offence. Mr. Percivall's judgment is, however, much contested by some writers, who appeal to the worn state of the tushes in age as proof conclusive of the unsoundness of that author's decision. But the wear is consequent on the bit introduced into the horse's mouth, which the animal could hardly be supposed to possess, in any state of nature they may please to imagine. Did these gentleman objectors ever observe the tushes in a stallion kept for service? If so, they must at once relinquish their ideas of these teeth not being long enough to be used as weapons of offence. The horses kept for this purpose scarcely ever have a bit put into their mouths, and the tushes become of exceeding length. The animal, as it at present comes into our possession, may not use the tushes as weapons of offence, but then it has been so domesticated, that we need not wonder if very many of its habits are entirely forgotten or abandoned.

It now becomes our duty to speak of the manner in which the temporary teeth are removed, and the permanent projected into the mouth. This takes place by absorption. The harder substance, in the living body, seems to yield and be governed by the softer: thus the bones of the skull are regulated, as to their size and dimensions, by the magnitude of the brain; the extent of the ribs is subservient to the

size of the lungs; and the very tooth itself, in spite of its hardness, gives way before the pressure of the newly formed organ, which as yet is incapable of doing any work, never having seen the light. As the new tooth shoots up the fang of the incisor is absorbed, and when it is entirely removed of course the crown falls out of the mouth, leaving a vacant space, which the new organ is destined to fill. It is otherwise with the molars. When the fang of the molar is absorbed, the temporary tooth does not fall out, but the absorption is continued to the crown, a great portion of which also is removed, leaving the grinding surface as a protection to the new tooth. When this grinding surface is, by the process of absorption, reduced to great thinness, and the permanent molar is well up, or into the mouth, the covering of the old tooth falls off, and there is a new member fully formed and ready to supply its loss.

The reason of this is very apparent. A horse with four nippers can gather enough food to support life; but serious ills would occur if a molar were absent, even for a single day. The continued presence of the more important teeth is thus provided for.

The horse has been said to cut his teeth with ease, but Mr. Percivall, in his lately finished work, entitled "Hippopathology," records cases where the animal has been seriously affected during the process of dentition. Nothing is easier than to conclude those who are dumb undergo no pain; but any man, with proper feeling, has only to look into the horse's mouth, at the time of shedding the teeth, and to behold the swollen, inflamed, and bleeding condition of the gums, to be convinced that Mr. Percivall's is the truer statement.

THE BONY TRUNK.

The osseous structure of the trunk comprises the neck, the back, the haunch, the ribs, and the breast bones.

The neck consists of seven, the back of eighteen, the loins of six, the top of the pelvis, or sacrum, of five, and the tail, generally, of from thirteen to eighteen vertebræ, or distinct bones; the whole forming what is termed the spine. The spinal bones are divided into different

parts, on account of the varieties they possess; but they have some characteristics in common, each being composed of a spongy *body*, and parts protruded therefrom, called *processes*. These processes often unite to form a hollow, through which the spinal marrow is transmitted: they also furnish surfaces of articulation with each other, as well as by their bodies anteriorly and posteriorly; by their means the surfaces of attachment are increased, and the strength of the spinal chain is thereby rendered very great. Though but little motion is allowed between any two of these bones; yet the flexibility of the whole spine is considerable; by which wise contrivance the spinal marrow, nerves, and blood-vessels, are not liable to compression.

The neck bones, or cervical vertebræ (see *Skel. C, C*) are the largest of the spinal chain. Their spinous, or upward projecting processes (*Skel. s, s, s, s, s*) are indistinct; but on each side of the body a considerable prominence branches out into two transverse processes (*Skel. u, u, u, u, u*): at the common base of these is seen a foramen for the passage of the vertebral arteries and veins. Each vertebra likewise is indented posteriorly, into which hollow, the most forward part of the body, the next vertebra fits; and from the sides of each bone, before and behind, a piece is wanting, which deficiency is termed the notch; and when the bones are together these notches in one, meet those of another bone, and thus is formed a circular hole, or foramen, through which the spinal nerves emerge. The bones are united together by articular cartilages, dense capsular ligaments, and all the appendages of a joint. Above the arch, where the spinal marrow is protected, are several oblique articulating processes (*Skel. r, r, r, r, r*). It will be evident, from the strong means employed for the articulation of the bones of the neck, not only by the round head and corresponding cavity, but more particularly by their oblique processes, that no dislocation can easily take place between any of these vertebræ; for when such an accident does occur the animal inevitably dies from the compression of the spinal marrow, which accident is usually called *breaking the neck*.

The back, or *dorsal vertebræ*, are eighteen (*Skel.* 1 *to the last* 3). These bones do not essentially differ from each other except in the length of their spinous processes, which

in the first twelve is considerable, for the purpose of giving a long lever to the shoulder muscles. It is these processes that give height to the withers; and as they are covered with muscles that act powerfully, so their length is of great consequence to progression. Their four oblique processes are small, as well as their transverse. They articulate with each other by their anterior and posterior surfaces, and by their oblique processes: each also articulates with two ribs, one upon either side. As they advance they increase in size, and are pierced by the spinal canal equally enlarged. Between each is interposed a substance of the mixed nature of cartilage and ligament, which is most compressible at its sides, permitting the motion of the spine, and forming, by the solidity of its centre, a fulcrum, or pivot, for the bones to move on. This interposed substance loses its elasticity in the old horse, and becomes nearly converted into bone; to which we may attribute that stiffness in old horses when attempting to rise after lying down; and the want of that *springy* gait which is felt when upon the back of the young horse.

The bones of the loins, or *lumbar vertebræ* (*Skel.* 4, 4, 4, 4, 4, 4), have somewhat larger bodies than the bones of the back, and broader spinous processes. Their transverse processes bear no comparison to those of any other vertebræ; being extended out to supply the place of the ribs, and to afford attachment to the muscles of the back: the last unites with the sacrum (*Skel.* 5, 5, 5, 5, 5).

With the loins, the true vertebræ end; and here it may be as well to speak of the peculiarities appertaining to them. The head and first bone of the neck have very free motion, principally upwards and downwards, as when the horse tosses his head. The joint formed by the next bone of the neck with the first has likewise a very easy movement, but it is chiefly towards either side, or rotatory, as when the animal shakes his head or looks round about it. The remaining neck bones move very freely altogether, though but slightly upon one another; they come into play whenever the horse turns his head to one side or to the other, as likewise when he raises the head upward, or bends it downward.

The bones of the back have the least motion of all; their

function being to confer strength (for which purpose they are very short, and very closely locked together), and to permit of the motion of the ribs.

The bones of the loins have more motion, particularly the last, which is rather loosely articulated with the first bone of the sacrum. This gives to the horse a facility of rearing up; an act which he could never perform, were the last lumbar vertebræ as firmly fixed as most of the other bones of the spinal column.

The spinal column serves to hold and to safely lodge the spinal marrow, there being holes in the sides of the bones which admit of the passage of the spinal nerves. The bones already referred to are termed true vertebræ, because they have all the processes and uses belonging to the most perfect of these bones. The rest, to be mentioned hereafter, are termed false, because one or more of the processes are wanted, and their functions are limited.

The top of the pelvis, or the sacrum (*Skel.* 6, 6, 6, 6, 6), is in the very young foal composed of five pieces of bone; but long before the animal becomes an adult the bones are united, and the whole then consists of one piece. In this latter view we choose here to regard it as one bone; for there are other bones in the body, the pieces of which are not united till after the sacrum, and yet by anatomists these last are considered to form one bone. The sacrum, then, which constitutes a continuation of the spine, is composed of irregular vertebræ, because the spinal marrow does not descend so far as this bone, but only nerves travel along its internal canal; because it is gifted with less motion than true vertebræ, and because also it is deficient in some of the processes and articulations.

We said it had less motion. It has no lateral motion, though it is able to be elevated at its front part considerably; and for this reason forms a true synovial joint with the haunch bone.

The haunch bone, or rump bone, or basin, or pelvis, named ossa innominata (*Skel. E*), is said to be formed of six bones, for the like cause as the sacrum is said to consist of five. We here, however, choose to regard it as one. It is one solid piece, of almost a circular form; but open before and behind, and at the top, into which last place the

sacrum fits. Before articulating with the forward part of the sacrum its most anterior portion constitutes the projecting hip of the horse (*Skel.* 9, 9). A little lower, and more backward than the joint of the spine (*Skel.* 10), lies the cup for the reception of the head of the femur, or the round bone, as it is termed by jockeys (*Skel. d*); and its hindermost part projects backwards, forming the points of the rump (*Skel. c, c*). The interior of this bone contains important organs; within it are held the rectum; the urethra of the male, and the vagina of the female; a portion of the bladders of each, with the womb of the mare. All of these are vital organs; for on the proper performance of the functions of each life itself depends.

It is as well, having stated our own views, to describe those entertained by most anatomists. The ilium is the most forward, broadest, and highest portion of the innominata (*Skel. a*). It has two spines; a superior, which lies close to the sacral spine, and an inferior, somewhat more forward than the last (*Skel.* 9, 9). The ilium, and all the other bones composing the haunch, are supposed to meet about the cup of the round bone (*Skel. d*). The pubis (*Skel. b*) forms the floor of the pelvis, and the ischium is the most posterior portion (*Skel. c, c*). Its two projecting prominences being designated the spines of the ischium.

To complete the spine there remain the tail bones to be enumerated (*Skel.* 7, 7, 7, &c.). These at first bear some resemblance to vertebræ, but ultimately dwindle to very thin and short round pieces of bone, like to little pieces of hollow stick. They, however, possess one peculiarity; the two bones in apposition do not fit one into the other by means of a shallow cup and ball joint, but each meets the next by a rounded kind of projection, and nothing can be imagined better calculated to facilitate perfect freedom and play of action than two balls meeting together. Hence, we can easily comprehend how the tail is enabled to be switched about in every direction without fear of dislocation.

The neck always consists of seven bones. In animals with the longest and the shortest necks this holds good; the number of bones forming the neck of any animal is never more than seven. Creatures of the sloth species used

to be thought to have eight neck bones, but that which was once considered the eighth bone of the neck is now regarded as the first bone of the back, only varied in formation, to enable the animal, which passes its life hanging pendulous from trees, to freely turn its head so as to see what takes place below it, or upon the earth. The number of bones which form the other compartments of the spine are not fixed; indeed bones, as a general rule, are subject to constant variations, as the instances of born-deformities sufficiently testify.

The chest is composed of part of the spine, of the back, of the ribs, and the breast bone.

The breast bone is composed of several pieces of bone embedded in the cartilage; the latter material, however, preponderating. To it the lowermost parts of most of the ribs are attached, and in form it is something like the keel of a ship, being rounded in front, or turned upwards, and having a ridge projecting along its centre the entire length (*Skel. v, v*). Its posterior portion is flattened and expanded like to the tail of a fish. This expanded portion serves to receive several of the abdominal muscles, and is well shown in (*Plate* VIII. *l*).

The ribs are narrow and semicircular pieces of bone, attached above to the spine of the back, and below to the breast bone. They are, however, not composed of bone throughout; but the lower portion is formed of cartilage. The eight first ribs are termed costæ or "true ribs" (*Skel. w*), because each has a distinct insertion into the breast bone; the remainder are called false ribs (*Skel. y*), because they only are connected with the breast bone through one another. The central rib is the longest, but the last is gifted with the freest motion. The posterior edge on the inner surface of each has a groove within which the vessels and nerves are protected. The bottoms of the ribs are attached to the breast bone by means of ligament, excepting the first rib, which on account of its possessing more motion than any other of the true ribs has a synovial articulation. All the ribs form synovial joints with the spine of the back (*Skel. z, z, z, z*), and each is gifted with motion which takes place forward and outward; the true ribs being more imme-

diately moved forward, and the false ribs more directly urged outward; but both moving in both directions during respiration.

THE ANTERIOR EXTREMITIES.

These extremities bear but little resemblance to the human arm, particularly in those quadrupeds, as the horse, who have a limb ending in a single hoof, toe, or phalange: in those with several toes, the resemblance is much nearer, till in the fore extremities of the ape they differ little but in the thumb, which forms a bad antagonist to the fingers. It appears a very wise provision of nature, to have given a colt very long limbs at birth, that the form of parts might not be afterwards much altered; but, at the same time the hinder ones are by much the longest; because, were the fore equal to the hind, the young animal would have been too much elevated from the ground, and rendered incapable of grazing, or even of sucking conveniently.

The *shoulder-blade* or *scapula* (*Skel. Q*) is a broad and rather triangular bone, applied to the outside of the ribs, so that its apex reaches downward between the first and second ribs, and a portion of its base as far back as the seventh. It is, therefore, situated obliquely, with its broadest extremity above, and its narrowest extremity below. Its internal surface is slightly hollowed and smooth; its external is divided into two unequal portions by a projecting ridge or spine (*Skel. b*). Its anterior edge, as it continues down, contracts inwards, and ends in a blunt rounded extremity (*Skel. f*). Its superior surface is furnished with a considerable cartilage, covered with strong ligamentous fibres; by means of which the surface of muscular attachment is much increased: yet with little addition to either weight or bulk, and without the liability to fracture which would have been incurred had the cartilage been bone. The posterior edge of the scapula inclines inwards, and ends in its neck, the bulging part immediately below the neck presenting a shallow cup to receive the head of the arm bone (*Skel. g*). The projecting ridge or spine divides the outer surface into two unequal portions, of which the hindermost is the largest (*Skel. d and c*).

The *arm bone* or *humerus* (*Skel. R*) is strong, short, and

very unlike the same bone in man. It extends from what is called the point of the shoulder to the elbow, forming an angle with the scapula. At the anterior part of the upper extremity it stretches out into a round head; having about it a circular indentation for the insertion of the capsular ligament of the joint, which it forms with the apex of the shoulder bone. The most forward part of the extremity is usually termed the point of the shoulder, and over this part there plays a very strong tendon which aids in the motion of the lower limb. This tendon, almost of a cartilaginous hardness, is flattened out, effectually preventing any dislocation of this joint. The body of the humerus presents an external tuberosity, for the insertion of muscles: proceeding downwards, it terminates in two rounded bodies that are termed condyles (*Skel. j*), which are received into articular cavities in the superior extremity of the radius (*Skel. l*), and allow of the limb being bent and straightened. In the front of this extremity is a cavity to receive the protuberances of the radius, in the greatest flexions of the fore arm; and behind there is a very deep depression for the reception of the bone of the elbow (*Skel. k*), when it is again extended.

The *fore arm* is composed of two bones, the most forward of which is called the radius (*Skel. T, T*), and the most backward the *ulna* (*Skel. S, S*). These are separate in the young subject, but become so intimately united in the old horse, as to be by some, and without any great impropriety, described as one bone. In common parlance, the site of these bones is known by the terms *arm* and the *elbow*. The *radius* is the long cylindrical bone giving the chief support to the body, and having two nearly equal extremities (*Skel. l, m*). The superior end is flat, and receives into its articular depressions the condyles of the humerus: it presents anteriorly tuberosities for the attachment of muscles, and posteriorly a surface for the ulna. Its body is slightly bent anteriorly (*Skel. T*), and its inferior extremity (see *Skel. m*) is furnished with eminences, covered with cartilage, which articulate with the first bones of the knee or carpus (*Skel. U*).

The *knee* or *carpus* (*Skel. V*) must be the same with the wrist in man. In most of the articulated skeletons there

are *seven* principal carpal bones; in the recent subject, when the horse is carefully dissected, there is always found an osselet of the shape and size of a pea, situated behind the trapezoid, with which it is articulated. With this, the knee consists of eight bones: the upper articulates with the inferior extremity of the radius; and the lower with the superior of the cannon and the two small splent bones. Six of the eight bones are to be seen from the front; ranged in two rows; of which the top one is the thicker; each row being composed of three bones. The three upon three, however, do not join both in the same place; but have articulations similar to bricks in a wall; that is, the two uppermost are joined upon the middle of a solid bone beneath. Each of these rows have free articular surfaces, both above and below; as though they composed but one bone, being smooth and plentifully lubricated by synovia. Their motion, also, is greater in one direction; the rows being capable of such separation as allows the heel to touch the fore arm. Turning to the hind part of the knee, we can see two additional bones. The very small pea-like one, situated against the lower row; and a large rounded square bone (*Skel. n*), articulating with both rows; and projecting out a considerable distance from the other bones of the knee. The reason of this projection is to afford leverage for the hold of tendons through which muscles exert their power; and likewise to afford a shield or protection to the back sinews or flexor tendons, which pass between this bone and the others of the knee.

The reason for forming the knee of so many distinct bones is very apparent. Concussion is lessened by a division of parts; a fact well known to man, who hangs out sand and cotton-bags to break the force of cannon balls, or take off the concussion of the blow. This result is materially aided by the synovia, or fluid between the different rows; and hence we find the effects of concussion below rather than above the knee. The bones, moreover, though bound closely together by means of ligaments, and each individually fixed, nevertheless, as a whole, admit of considerable lateral motion. Thus a powerful wrench, to which the foot in progression is exposed, may take place without dislocation.

The *shank*, or metacarpal region, consists of one large and two small bones, which last are known by the name of splents. The *cannon* is a plain cylindrical bone (*Skel. V* and *K*), having its two extremities rather enlarged, the superior of which articulates with the second row of the knee (*Skel. U*): posteriorly its head is indented into two surfaces, receiving the two splents, one upon either side. Its inferior surface is formed into two condyles (*Skel. p*); divided by an eminence, with which it articulates with the great pastern (*Skel. Y*) and the sessamoid bones (*Skel. X*), in a manner that preserves the utmost freedom of flexion and extension; yet denies any lateral motion which would have detracted from the necessary strength of the joint. The splents are placed one on each side of the posterior part of the cannon; each having a superior articulating surface uniting it with the carpal bones, and likewise a synovial articulation with the upper extremity of the cannon. As they proceed downwards they taper; and are less closely bound by a fibro-cartilaginous union (that is, by a union composed partly of cartilage, partly of ligament); terminating at about two-thirds the length of the cannon bone, by an unattached button-like extremity.

The purpose of this mixed union of fibro-cartilage, is to allow of motion; though, at the same time, to limit it. It, however, gives such play as renders the rider conscious of elasticity in the animal's motions upon which he is mounted. Any extra weight, is very apt to put this connecting substance to the stretch; when it inflames; becomes vascular; hot, and painful; and is ultimately converted into bone, which gives the name to the part; the bony formation being called a splent, and the small bones being likewise so termed. The inner splent bone is more liable to the disease than the outer; and for two supposed reasons,—firstly, as is said with much plausibility, because it is more under the centre of gravity; and, secondly, because it receives the entire weight of one of the lower row of the bones of the knee; and hence is more likely to be driven downwards, or put upon the stretch.

The large *pastern bone* (*Skel. Y*) is the first of an oblique pile, which terminates the extremities of the horse. The great pastern bone is cylindrical, and inclined obliquely for-

ward (see *Skel.*). Upon its length and obliquity the ease and elasticity of the motion of the animal greatly depend: nevertheless, when these properties are very considerable, it must require a corresponding effort in the tendinous and ligamentous parts to preserve it in its situation; hence very long-jointed horses are weaker, and more liable to become strained than others. Its superior surface receives the greater part of the inferior surface of the cannon: posteriorly it articulates with the sessamoids; and inferiorly with the small pastern. The body of the bone is much smaller than its extremities.

The *sessamoids* (*Skel. X*) are two small wedge-shaped bones, situated at the point of the fetlock, exactly behind the inferior head of the cannon; and also articulating with the back of the upper part of the great pastern bone; to both of which they unite very closely, fitting into depressions suited to their prominences. With the cannon the connexion is very close; by means of a ligament, through which, and by the nature of their situation, they support a portion of the stress and weight of the body imposed upon these bones. They are placed side by side; with their thinner portion pointed upwards, and their thicker and more obtuse part downward; by which latter they are firmly attached to the pastern bone by strong fibres, as well as by the suspensory ligament. Between and behind them a hollow is left, through which the flexor tendons slide with freedom and partial security.

The use of these bones is more important than, from their size, a casual observer might be disposed to think. Their strongest attachment is to the great pastern bone; their weakest to the suspensory ligament. But then they are very closely united to the cannon bone, and the ligament before named; pressure from behind, from the flexor tendons, also serves to force them into, and to keep them in their right places. They can move downward, because their connexions admit of motion in that direction; but only to a certain distance; because the connexion to the suspensory ligament prevents it; and because the flexor tendons pressing on them behind hinder them from descending very low. The force which displaces them, or causes them to descend, is the cannon bone; when in progression it is thrown backward. In horses, with very oblique pasterns,

part of the cannon bone always rests upon the sessamoids; and we can readily understand how such a formation must contribute to weakness; as well as to the grace of the animal's paces, and the ease of the rider. Horses, with very erect pasterns, hardly ever have the sessamoids depressed by the cannon bone; hence we can account for their want of elasticity, as well as danger to themselves, when put beyond a walk.

The *lesser pastern*, or *coronet bone* (*Skel. Z*), receives the great pastern; its largest extremity being placed below. The eminence on the top of this bone is received into the depression at the bottom of the large pastern. Upon its sides are two projections; which are intended to receive the ends of the perforatus tendon. Its lower articulating surface is very large; showing it has a vast extent of motion. It rests upon the coffin and navicular bones; and as the last is another moveable bone, yielding to weight; and as the coronet bones in horses with long pasterns have necessarily greater motion than those with short; we can further understand the reason for those qualities which such a conformation would bestow.

The *coffin bone* (*Skel. P*) is a very peculiar one. In shape it corresponds with the hoof; which, with its appendages, it almost fills: in structure it is very porous; having its bony fibres perpendicularly placed so as to give it a rough linear appearance. When viewed in front, an eminence is seen at the upper part; to which the tendon of the extensor pedis is attached: its lateral parts are not so high, but project farther back; and form two lateral processes, which are always distinct, and are called its wings. Upon the inner surface of these wings is a groove for an artery, which forms a semicircle within the substance of the bone, and sends off branches to the internal and external parts. Above the wings are concavities which receive the two side cartilages of the foot. Around the outer surface of the coffin bone are placed the sensible laminæ; which are very firmly attached to the roughened exterior. The inferior surface of the coffin bone is concave, for the reception of the sensible sole; and though this part is far from smooth, yet it is by no means so rough as the other parts of the same bone. The porous nature of the coffin bone answers

three intentions: First, it gives lightness as well as solidity to the foot. Secondly, it affords protection to the nerves and vessels which ramify within its interior; and which could not travel on the outer surface without suffering serious pressure from the great weight of the horse. Thirdly, it gives ample hold to the various structures covering its exterior; and thus bestows strength and durability to the entire machine.

The *nut*, the *shuttle*, the *quiltor*, or the *navicular bone*, is situated behind the coffin bone, between the two wings. Its upper surface is continuous with the articulatory surface of the coffin bone. Its lower surface rests on the perforans flexor tendon; which tendon also rests upon the insensible frog; which again has the sensible frog and the tough and flexible horn of the external frog on its lower side. Its motion is downward; and in this direction it would appear to be amply protected. By its upper surface it helps to sustain the vast weight of the animal; yet between it and the coronet bone there is only synovia to break the force. Nor does it require any thing more; however much to the contrary it may appear to the inexperienced reader; for to the force from above it is yielding. The upper surface of the bone is never injured; but the lower surface driven further downward whenever the coronet bone travels backward,—the inferior surface though, as it would seem, amply protected by the synovial capsule; by the perforans tendon; by the sensible frog; by the insensible frog; and by the tough horny frog,—is the situation of one of the most terrible and fatal scourges that horse-flesh is heir to, viz. navicular disease; because, in this direction, the bone is propelled against and bruised by any inequality of the ground.

THE POSTERIOR EXTREMITIES.

These differ much from the anterior; not only in the strength of the parts generally, but in the length and direction of the bones entering their formation.

The *femur*, or *thigh bone* (*Skel. F*), is the largest, thickest, and strongest in the body. It is, however, short in the horse, as compared with that of most other animals: its surface exhibits eminences, and indentations for the attach-

ment of the most powerful muscles. From its upper extremity extends the *neck* (*Skel. e*), supporting the rounded *head* (*Skel. d*), by which it is articulated with the pelvis. Within the head is a cavity, giving origin to a *flat* ligament, which retains the head of the bone in its situation: below the head is inserted the capsular ligament. Upon the middle of the inner side of the bone is a small eminence, called the *internal trochanter* (*Skel. h*). Immediately in front, and slightly behind the head of the bone, is a large eminence, known as the great trochanter (*Skel. f*); below it is a small projection, named the small external trochanter (*Skel. g*). The use of each and of all these projections is to give greater surface for attachment, and thus aid the action of muscles. The lower end of the bone has two large round surfaces or condyles (*Skel. j*). The *stifle bone* (*Skel. G*) glides over the front of two prominences, called trochlea (*Skel. k*). Behind the bone, above the condyles previously mentioned, there is an indentation that affords origin to the gastrocnemei muscles (*Skel. i*) which form the calf of man.

The *stifle bone*, or *patella* (*Skel. G*), belongs to the class of sessamoid bones, and is the largest in the body. This order of bones are of a loose cellular structure; having a quantity of ligamentous fibre running through their interiors, or mixed up with their bony material. They are of much utility; as they serve to aid motion; and in the horse are, save the patella, always found favouring the flexion of the limbs. The stifle bone is of an irregular shape; its outer surface is roughened, for the insertion of numerous ligaments and tendons; its inner surface articulates, or glides over the front of the lower part of the femur; its upper border is connected with a powerful tendon, given off by a muscle called the rectus; and from its lower surface, which is narrow or pointed, arises a muscle which serves to extend the limb,—the flexor metacarpi magnus. So, on every side that can bear attachment of a tendon, the patella, which is not of more than the size of a man's palm, is connected with muscles, or the organs of motion. Indeed the hind leg cannot be moved in any direction without the stifle changing its position.

The *tibia* (*Skel. H*) is a large bone, situated within that

part which is properly the leg. It is of a long and triangular shape; connected on the outer side with a mere representative of a bone, which in the horse is not altogether absent, called the fibula (*Skel. m*). Of course the tibia has two ends. The top, or upper surface (*Skel. l*), has two slightly hollow places, divided by a ridge; upon which hollows the two semilunar cartilages of the stifle joint repose. Its bottom, or lower surface (*Skel. n*), presents three eminences; between which the two projecting parts of one of the bones of the hock exactly fit. The parts thus fitting present rather more than one-third of a circle; and of course admit of extensive motion. The projecting portions on the lower surface, upon the inner and outer parts, present two prominences; which are perfectly natural, though by the ignorant often mistaken for bone spavin. The most forward part, just above the lower surface of this bone, lies immediately under the skin; hence it is very liable to be fractured. *In situ* it will be found placed obliquely backward, as the femur is obliquely forward; forming with that bone an obtuse angle. The superior extremity presents an anterior flat protuberant surface, for receiving the patella.

The *fibula* (*Skel. m*) appears more designed to keep up that beautiful connexion which we observe throughout animated nature, than for any great use in the machine. It is attached by a synovial surface to the superior part of the tibia; being placed with its base upwards and its point directed below; reaching a third of the length of the tibia, to which its lower point is attached.

The *tarsus*, or *hock* (*Skel. I*), is a most complex and important joint; and though it consists of several bones, these are so intimately united as to appear a solid mass. The *astragalus*, or knuckle bone, presents a very irregular figure (*Skel. o*). Its upper and anterior surface is pulley-like; having two remarkable partially circular risings, separated by an intermediate depression; which risings articulate with the lower end of the tibia. Posteriorly it has several surfaces of attachment with the calcis (*Skel. p*); receiving the eminences of that bone into considerable depressions: and in other places it is closely connected to other bones articulating with the great cuneiform, the cuboid, and others.

The *os calcis* is placed nearly behind the joint; into the point of which bone the tendon of the gastrocnemius internus muscle is inserted: the longer therefore this process is, the longer is the lever this muscle has to act upon; and a very slight increase or diminution in the length of this bone must enlarge or lessen the power by which the motion of the joint is effected. It is by tendons that the lower part of the limb is moved; having been bent by the muscles misnamed extensors, by such means the angle between the cannon and the tibia is enabled again to open. The calcis is placed so as to rise from the joint, rather externally; and this formation leaves a space on the inner side for the flexor tendons of the foot to pass protected from pressure; the calcis anteriorly articulates with the depressions of the astragalus.

The remaining bones are more wedge-like; and principally serve to increase the surface of attachment. The *large cuneiform*, or great wedge-like bone, is placed under the astragalus, and articulates with it: posteriorly its internal, as well as part of its inferior surface, articulates with the cuboid: it has likewise, posteriorly and inferiorly, a small surface of attachment with the little cuneiform. Immediately behind this, on the outer side, appears the *cuboid*, resting inferiorly on the external small splent, or metatarsal bone (*Skel. L*), and part of the cannon (*Skel. K*): it has likewise a surface of attachment with the great cuneiform. The lesser, or inner cuneiform, is situated more posteriorly on the inner side; its principal portions articulate with the great cuneiform superiorly; and with the cannon as well as the internal small splent, or metatarsal bone, inferiorly. The *cuneiform medium* is seen in front of the hock, articulating by its superior cartilaginous surface with the great cuneiform, and inferiorly with the head of the cannon, or great metatarsal.

The bones of the hock are not so nicely placed for description as those of the knee; the entire joint appears more irregularly bound together. A student would conclude it possessed but little motion. Such, however, is not the fact; in truth, it is endowed with more movement than the more symmetrical knee. The motion between the astragalus and tibia is alone equal if not superior to that of the

whole knee. Then between the inferior bones, of which there are two imperfect rows, there is a kind of rotatory grinding movement, that allows the animal to move the limb to a certain degree outward; for if horses swung their hoofs in very quick action, nearly as close as they are placed, they would then be sadly in danger of cutting; and from the superior power of the hind muscles, of cutting very severely; especially as the speed prevented any great care being taken in directing the foot. The lower part of the hock, for the same reason as was alluded to when discussing the knee, receives the principal shock when the foot reaches the ground; in consequence of this it is often the seat of incurable lameness; and even more often is united by bony junction to the great cannon bone.

THE POSTERIOR METATARSALS, CORONARY, AND COFFIN BONES.

These bones have so much general resemblance to those of the fore extremities, that I shall only point out the particular variations which occur in them. The *large metatarsal*, or cannon bone (*Skel. K*), is longer, and altogether larger than that of the anterior extremity; it is articulated above with the lower part of the hock, and below with the great pastern and sessamoids (*Skel. M* and *N*). The *external small metatarsal* (*Skel. L*) is considerably larger than the internal; articulating superiorly with the cuboid, and laterally with the cannon. The *great pastern* bone is longer; and its situation is less oblique, which constitute its principal differences. The *sessamoids* of this limb are two; and do not differ from those already described. The *coronary bone* (*Skel. O*), resting more on the coffin, and less on the navicular bones here than in the anterior limb, shows that the leg has a more extended movement than the fore limb; the hind, especially in the gallop, being brought far under, as well as propelled a great distance behind the animal. In the coffin bone (*Skel. P*) the articulation is deeper; the reason of which appears to be, that, as a horse has frequently to support his whole weight on his hinder extremities, so it was necessary that these bones should be opposed to each other in a more direct line, whereby they acquire

strength; the loss of elasticity thus occasioned is, however, amply made up by the formation of the hock.

SECTION VIII.

OF THE APPENDAGES TO BONE.

THE appendages to bone consist of *cartilages*, *periosteum*, *medulla*, *ligaments*, and *synovia*.

Cartilages may be divided into four kinds: *articular*, *inter-articular*, *non-articular*, and *temporary*. Considered generally, cartilage (familiarly called *gristle*) is a smooth, minutely fibrous, white, elastic substance; less hard than bone; and when in health having no vascularity.

Articular cartilages furnish the extremity of every bone in which there is much motion; being in form of a layer, which is thickest at the point of extreme pressure. By these means the bones slide easily on one another; and the elasticity of the interposed cartilage prevents the effects of that concussion which must otherwise take place between two such inelastic bodies as bones, being driven forcibly together.

The *non-articular cartilages* may be divided into the attached and unattached. *Attached* cartilages are such as are placed on the ends of bones not articulated; as the point of the hip; sides of the foot; edges of the orbits, &c. They are likewise interposed between bones immoveably joined together. The cartilages of the ribs are of this kind; and afford flexibility to parts that would otherwise have but little. The division of the nostrils is an attached cartilage; serving the purpose of bone. The *unattached cartilages* serve to sustain parts without adhering to any bone; those of the ears and larynx are familiar instances. A variety exists, which may be named fibro-cartilaginous, from its partaking of the properties of both cartilage and ligament; such are those between the splent bones, &c. The *temporary cartilages* are those of which the ends of bones are formed in young animals; they become very vascular; that they may be the more easily converted into bone as the other organs become fully ossified. There are but six

inter-articular cartilages in the horse's body; two between the articulations of the lower jaw; and two within each of the stifle joints. They are peculiar only for their situation; and in no way differ from other substances of the same description. The powers of life in cartilages, though small, yet are fully evinced by their liability to take on inflammation; and to ossify, which disposition appears more common and universal in those of the horse species than of any other known animal; there being very few cartilaginous parts in him that have not been found partially converted into bone; either by age, or the stimulus of great exertion, &c.; from which we readily perceive why stiffness and want of elasticity are the consequences of these states; from the elasticity of the cartilages decreasing. The ulceration of cartilage, from its slight vascularity, is necessarily very slow; as we witness in its attack on the navicular bone; and in the lower bones of the hock; but from the stimulating effects of the atmosphere this ulceration proceeds much quicker at the ends of bones, where an opening into the joint has been made. It is not ascertained that true cartilage is ever reproduced; but a cartilago-ligamentous substance is substituted sometimes by healthy granulations.

The *periosteum* is a general investing fibrous membrane to bones; receiving different names as it covers different parts; that investing the skull being called *pericranium*, &c. The uses of the periosteum appear to be to act as the medium whereby vessels are assisted in the ingress and egress to part of the bone; and also to afford attachment to tendons. Periosteum, in a healthy state, has no sensation; but, like some other parts, when diseased it becomes very sensitive.

The *medulla* or *marrow* is a soft fatty matter, deposited in the interior of bones; particularly of the long ones, by means of little membranous sacs, which do not communicate, or the marrow would gravitate; and which, as keeping the unctuous matter distinct from the bones, convinces us that the use of this oil is not that of preventing brittleness in them. The medullary vessels secrete the marrow within these cells; which secretion, being in itself wholly inorganic, confutes the foolish notion of the exquisite sensibility of the marrow.

Ligaments are dense, white, fibrous substances, of great tenacity; either cord-like as tendons, or expanded into more flat layers. Under still greater tenuity, ligament becomes a common membrane in every part of the body, under the name of fascia; but it is more particularly appropriate to bones; hence it is generally described with them. Ligaments have usually but little inelasticity; when however they are of a yellow colour they are highly elastic; as witness the ligament of the neck; the ligamentous substance covering the abdominal muscles, &c. Some of them partake of the nature of cartilage, and are hence called cartilaginous ligaments; being hard and little vascular.

The *synovia* is a fluid popularly, but erroneously, termed *joint-oil;* for it is not unlike the white of an egg, and is secreted by the fine membrane lining the interior of joints. Its lubricating use is very great; for without it, the attrition between the articulated ends of bones would painfully interfere with motion: but by this slippery medium they readily slide over each other, without pain or difficulty. This fluid may be secreted in undue quantities; and then forms dropsy of the joint; which is not, however, frequent in the horse, excepting in the hock-joint, when it is called bog spavin. Bursal dropsy, under the name of wind-gall, is sufficiently common.

SECTION IX.

DESCRIPTION OF PLATE II.

THE MUSCLES OF THE HORSE; SHOWN BY DEPRIVING THE ANIMAL OF HIS SKIN, AND THE GREATER PART OF THE PANNICULUS CARNOSUS.

1, Levator anglioris; 2, levator labii superioris; 3, retractor labii superioris; 4, zygomaticus; 5, caninus; 6, buccinator; 7, retractor labii inferioris; 8, 8, the tracheal portion of the panniculus carnosus, which, reflected over the masseter externus muscle, ultimately extends to the mouth, and there forms the retractor anglioris; the portions turned back in the engraving denote whence the thin muscle has

been dissected; 9, the orbicularis occuli; 10, the temporalis; 11, 11, the orbicularis oris; 12, 12, 12, the levator humeri, showing the manner it is associated with and acts upon *i*, the fascia covering the fore leg; 13, the splenius, covered by fascia; 14, the parotid gland and the abductor conchæ; *a*, the trapezius; *b*, the latissimus dorsi; *c*, the postea spinatus; *d*, the antea spinatus; *e*, the teres externus; *f*, the scapula ulnarius; *g*, the caput magnum of the triceps extensor brachii; *h*, the caput medium of the triceps extensor brachii; *j*, the pectoralis magnus; *k*, *k*, *k*, *k*, *k*, the serratus magnus; *l*, *l*, the obliquius externus abdominis and its yellow elastic fascia; *m*, the gluteus maximus; *n*, the gluteus externus, deprived of its fascia, which braces the gluteus maximus; *o*, *o*, *o*, the three heads of the triceps abductor tibialis; *p*, the biceps retractor tibialis; *q*, the tensor vagina; *r*, the fascia of the hind leg; showing how it is acted upon by the muscles of the haunch.

OF THE MUSCLES.

Muscle is that part in an animal we term flesh, in distinction from skin, cartilage, bone, membrane or fat, &c.; and the phenomena it exhibits are so universal, that it probably exists in every living creature; though we are not able to detect it in some animals. Muscles appear composed generally of reddish bundles of fibres laid alongside of each other; divisible into lesser fibres of the same figure. When a mass of these bundles is connected together into a determinate form, it is then called a muscle: and as the motions of an animal are very various; and the circumstances under which they are brought about equally so; the peculiar shape these motive masses take on is very different. Muscular fibre not only exists in determinate masses, but it appears to be spread over almost the whole of the body; and it has been very judiciously remarked that our ideas of it are probably much too limited.

We have said muscles are red; so the external and part of the internal, forming the vast majority of the body, decidedly are of this colour; but there exists within the abdomen another kind of muscle, which is not only without colour, but wholly removed from the influence of the will. These muscles are found forming the middle coat of the sto-

mach, intestines, bladder, uterus, &c. They are purely of a white hue; and are put in motion entirely by mechanical means, that is by the amount or condition of their contents. Of this last description of muscle we shall have to speak more at length when discussing the various organs to which it appertains.

That which is, however, generally understood by a muscle, is a distinct body, having a determinate action. The vascularity of muscles is extreme; and their power is connected with the blood which circulates within them; for when deprived of a part of it, they become weak; and if it be wholly lost, they will die, or lose all their force. On the contrary, by exertion, which is but another term for increased vascularity, since motion forces more blood into them, they enlarge in size, in strength, and colour. Thus a limb which has lost its feeling, and is freed from the control of the will, may by continued artificial motion be made to retain its original hue and bulk. From the extreme vascularity of muscles, their powers are very great; they are also plentifully supplied with nerves and absorbents. They sympathize greatly with other parts; and other parts with them; thus if a muscle be greatly injured, the head, stomach, heart, bowels, &c. are disordered; and if another important structure be hurt the muscles assume a disordered condition: few persons, during severe illness, being disposed to move with alacrity. Nevertheless muscles possess their peculiar faculty; which is to contract or shorten, and thereby pull closer any loose part into which they or their tendons may be inserted. During contraction, they become thicker and harder; and alter their shapes, but do not increase in bulk. This power is dependent on the will in muscles, which are termed *voluntary;* and in the *involuntary* on appropriate stimulus, as light to the iris. This obedience to the action of stimuli has been called their *irritability;* and exists for some time after death. If, however, the nerves going to voluntary muscles are pressed upon or tied, they lose their power of motion, or become incapable of obeying the commands of the will: hence it would appear, that nervous influence is the proper stimulus, for the performance of their inherent functions, to voluntary muscles. Neither can the will force the muscles to contract beyond the capacity of their physical

powers; and hence, after exertion, they become fatigued, and at last powerless.

Voluntary muscles are to be found composing the chief substance of the arms, legs, back, mouth, &c. They have points which are called their origin, or from which they are anatomically said to take their rise; also other points with which their substance, or the tendons springing from them, are connected; which are called their points of insertion. The point of origin is generally some bone of somewhat a fixed character; and that of insertion also a bone, but one that can be moved with more or less ease. It is by moving this last that their power or utility is displayed; sometimes, however, both insertion and origin are equally moveable; and then they cannot draw one towards the other, but force the two closer together, by contracting or lessening the space between them. Voluntary muscles have usually antagonists; whereby the perpetual tendency to contraction is counterbalanced. The muscular masses are commonly invested by a cellular or membranous covering; which in some instances is very dense, called *fascia;* whereby they are bound down and assisted in their action.

There is another kind of muscles denominated *mixed;* that is, such as the muscles of respiration; over which we can exercise a certain, but not an absolute control. Thus we can hold our breath for a limited time; but by no effort of which he is capable can man prevent his breathing altogether.

Tendons.—These hang from or form continuations of muscles; they are almost all of them fixed into the periosteum of bones, which they help to pull; thus serving to lengthen the muscle, and allowing its action to be asserted at a distant point, without necessitating an increase in either the bulk or weight; which would have been imperative, had the muscle been in substance extended to the point that a comparative small tendon can reach with ease. They are of a firm glossy nature; and of an almost metallic lustre; perfectly insensible when in health; but causing the most intense pain when inflamed. They possess great strength. During life, however, the tendons snap before the muscles; after death the muscles always yield the first.

They have but little vascularity, and hence are not readily absorbed; consequently the necessity of releasing pus when beneath fascia, which is nothing but expanded tendon with another name. A certain degree of pulling is necessary for their well being; but any tension beyond this creates pain, and tendons, when distended or sprained, are accompanied with exquisite torture; therefore we are assured tendons are possessed of vitality; as their granulating and ultimately joining when divided further convinces us. They are of various forms; and the substance of which they are composed is called cellular tissue, which is largely distributed throughout the body.

LEVATOR HUMERI (*Plate* II. 12). *Arises* from the mastoid process of the petrous temporal bone; from the wing of the atlas; from the posterior of the dentator; from the transverse processes of the third, fourth, and fifth cervical vertebræ; and the lower portion of the ligamentum nuchæ. *Is inserted* into the humerus; to gain which it passes between the flexor brachii and humeralis muscles, being also connected with the brachial fascia. *Action:* we have named the origins and insertion, but this muscle has no fixed point. When the head is fixed it will draw the anterior extremity forward; when the legs are fixed one muscle contracting will pull the head to that side, or both muscles acting will curve the neck downward.

LATISSIMUS DORSI (*Plate* II. *b*). *Origin:* by fine tendons from the fascia lumborum, and the ligamentum supra spinalis; and as far forward as the third dorsal spine. *Insertion:* into the inner side of the humerus, by tendon, which joins that of the teres internus muscle. *Action:* to retract the humerus, and aid in bracing the muscles of the back.

TRAPEZIUS (*Plate* II. *a*). *Arises* partly by tendon, partly by fibre, from the summit of the second, extending as far back as the fourteenth dorsal spine. *Insertion:* by tendon into the spine of the scapula. *Action:* this muscle is very useful in drawing the scapula upwards and backwards; and, therefore, must be a powerful assistant in progression.

RHOMBOIDEUS is one muscle, though generally described as two, a longus and a brevis. *Arises* from the ligamentum

supra spinalis, as far forward as the third cervical vertebræ; and as far backward as the fifth dorsal; and is *inserted* into the inner surface of the cartilage of the scapula. *Action.* It aids the serratus magnus, as well as keeps the cartilage of the scapula close to the trunk.

SERRATUS MAGNUS (*Plate* II. *k*). *Origin.* From the transverse processes of the third, fourth, fifth, sixth, and seventh cervical vertebræ; from the entire length of the first, second, third, and fourth ribs; and into diminishing surfaces of the fifth, sixth, seventh, and eighth ribs. *Insertion.* Into the cartilage and venter of the scapula. It is that portion only of this muscle which goes to the eighth, seventh, sixth, and fifth ribs and digitates with the external oblique. *Action.* To move the scapula in progression; and also to enlarge the chest, by drawing the true ribs forward and outward when standing still.

OF THE ANTERIOR EXTREMITY.

SUBSCAPULO-HYOIDEUS (*Plate* III. *h*). *Originates:* anteriorly, by fibre from the spur process of the os hyoides. *Inserted:* posteriorly by fine tendon to the inner side of the shoulder. *Action:* to draw the os hyoides downwards; and to a slight extent to aid in pulling the shoulder forward. The muscle passes between and over important parts, dividing the jugular vein from the carotid artery; and covering the par vagum, sympathetic, recurrent, and phrenic nerves, besides lymphatics and conglomerate glands.

SCAPULO-ULNARIUS (*Plate* III. 1. *Plate* II. *f*. *Fig* 1 . 5). *Originates:* by tendon from the olecranon; and is *inserted* into the posterior angle of the scapula. There is another muscle inferiorly situated, which usually is cut off with the scapulo-ulnarius; though it is distinct. *Action.* To flex the scapula upon the humerus.

TERES EXTERNUS (*Plate* II. *e*). *Arises:* from the spine of the scapula; and is *inserted* into the small trochanter, upon the humerus. There is likewise an additional muscle, usually separated with the teres externus. *Action.* This muscle acts with the teres internus serving to flex the scapula upon the humerus.

TERES INTERNUS (*Fig* 1 . 3). *Originates:* from the posterior angle of the scapula; to be *inserted* into the body of

the humerus, upon the inner side. *Action.* It is described with the foregoing muscle.

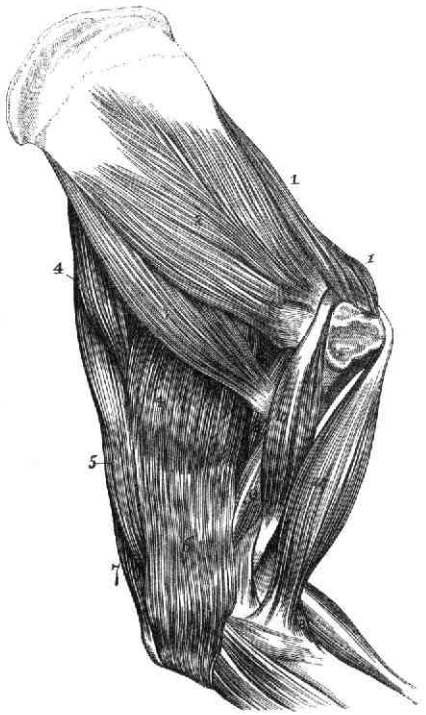
ANTEA SPINATUS (*Plate* II. *d*. *Fig* 1 . 1). *Origin.* From the anterior fossa of the scapula; a small portion of the cartilage of the scapula; and the neck of the coracoid process of the bone. To be *inserted* into the head of the humerus; the capsular ligament; and the bursal membrane of the flexor brachii. *Action.* To draw the scapula forward upon the humerus; and also to extend the humerus, when it is flexed upon the scapula.

POSTEA SPINATUS (*Plate* II. *c*). *Originates:* from the cartilages and the posterior fossa of the scapula; and is *inserted* into the capsular ligament; and outer tubercle of the humerus, by tendon—underneath which there is a bursa; —it gains the ridge extending from the trochanter of the humerus. *Action.* To oppose the foregoing muscle.

FIG 1.

INSIDE OF THE SCAPULA.

1, 1, The antea spinatus.
2, Subscapularis.
3, Teres internus.
4, Caput magnum of triceps extensor pedis.
5, Scapulo-ulnarius.
6, A distinct muscle, without a name.
7, A portion of the caput medium.
8, 8, Humeralis.
9, Caput parvum.
10, Coraco humeralis.
11, Flexor brachii.



SUB-SCAPULARIS (*Fig* 1 . 2). *Origin.* From the venter of the scapula to the neck of the bone; and to the cora-

coid process of the scapula. *Insertion.* Into the capsular ligament; and into the inner tubercle of the humerus. *Action.* To prevent the abducting power of the antea muscles. Acting singly it would slightly adduct the humerus.

These last three muscles are copiously intersected by fascia, which endows them with endurance; as well as enables them to act in the place of ligaments to the shoulder-joint.

TRICEPS EXTENSOR BRACHII (has three heads) :—CAPUT MAGNUM (*Plate* II. *g*. *Plate* III. 2. *Fig* 1 . 4). *Arises:* from the posterior margin of the scapula; from a ridge extending along the neck of the bone, upon the outer side; and from the capsular ligament of the shoulder-joint. *Insertion.* Into the posterior of the olecranon.

CAPUT MEDIUM (*Plate* II. *h*. *Plate* III. 3. *Fig* 1 . 7).

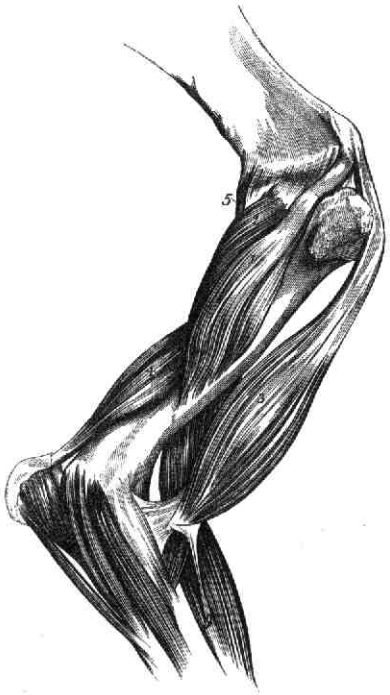


FIG 2.

DEEP-SEATED MUSCLES INSIDE OF THE HUMERUS.

1, The coraco humeralis.
2, Humeralis.
3, Flexor brachii.
4, Caput parvum of the triceps extensor brachii.
5, Minimus.

Origin. From a ridge upon the outer side of the humerus. *Insertion.* Into the outer part of the olecranon.

CAPUT PARVUM (*Fig* 2 . 4). *Arises:* from the body of the humerus. *Inserted:* into the inner side of the olecranon

by tendon common to the three heads. *Action of the three heads.* These muscles are much used in draught, in pushing the body against the collar; or in forcing the fore leg under the body. Between the point of the olecranon and the tendon common to the three heads there is a bursa mucosa.

HUMERALIS (*Fig* 1 . 8; *fig* 2 . 2; *fig* 3 . 2). *Origin.* From the inner and upper side to the radius; whence it takes a spiral course, to be *inserted* into the posterior part of the head of the humerus. *Action.* To pull down the humerus; to raise the radius; and to co-operate with the flexor brachii.

ANCONEUS (*Fig* 3 . 3). *Origin.* From the inner side of the ulna. *Insertion.* To the sulcus behind the inferior head of the humerus; and to the capsular ligament. *Action.* To co-operate with the triceps extensor brachii; and to guard the capsular ligament.

CORACO HUMERALIS (*Fig* 1 . 10; *fig* 2 . 1). *Origin.* By two heads from the body of the humerus; and by the tendon common to the *teres internus* and *latissimi dorsi.* *Insertion.* Into a small bulb, upon the inner side of the coracoid process of the scapula. *Action.* To pull the scapula erect; or to extend the humerus.

SCAPULO HUMERALIS MAJOR (*Fig* 3 . 1). *Origin.* From the upper part of the body of the humerus. *Inserted.* Into the neck and posterior margin of the scapula. *Action.* To flex the humerus or scapula.

SCAPULO HUMERALIS MINOR. *Origin.* From the neck of the scapula, by tendon. *Inserted.* Into the head of the humerus upon the outer side; and to the capsular ligament. *Action.* To aid the major; and to guard the capsular ligament.

MINIMUS (*Fig* 2 . 5). The smallest muscle in the body of the horse. *Origin.* From the posterior of the neck of the scapula. *Insertion.* Through the substance of the humeralis, into the posterior of the humerus, near the neck of the bone. *Action.* To protect the posterior of the capsular ligament.

FLEXOR BRACHII (*Plate* III. 5. *Fig* 1 . 11; *fig* 2 . 3). *Origin.* From the coracoid process of the scapula, by strong tendon. *Insertion.* By flattened tendon, to the inner side of the upper head of the radius, underneath the lateral ligament.

This muscle forms a cartilaginous joint with the trochlea of the humerus; and has a synovial membrane to facilitate its movements. Near to the insertion of the flexor brachii

it sends off an auxiliary tendon to the extensor metacarpi magnus. *Action.* To draw the scapula forward; and through its auxiliary tendon to raise the fore arm.

The muscles of the arm, which remain to be dissected, are characterized by having fleshy bellies, terminating in long tendons; most of them having distinct fascial sheaths; all the more important originating from the lower head of the humerus. They are divided into extensors and flexors: four extensors and seven flexors. An eighth flexor, answering to the pronator teres, has been described by Dr. Knox of Edinburgh; but, never having been able to find that muscle, I conclude it is sometimes encountered, yet is not invariably present.



FIG 3.

DEEPEST-SEATED MUSCLES AT THE BACK OF THE HUMERUS.

1, The scapulo-humeralis major.

2, Humeralis.

3, Anconeus.

EXTENSOR METACARPI MAGNUS (*Plate* III. 6. 16). *Origin.* From the ridge extending from the outer condyle of the humerus, by tendon, which is likewise common to the extensor pedis. *Insertion.* To the anterior of the upper head of the cannon bone, by strong tendon.

This muscle receives a tendon from the flexor brachii; which ultimately joins the Extensor Pedis; and runs to its insertion. Near to the extremity of the radius, the tendon of this muscle is crossed by that of the Extensor metacarpi obliquius.

EXTENSOR PEDIS (*Plate* III. 7). *Originates:* from the outer side of the humerus. *Insertion.* Into the os suffraginis; the os corona; and the coronal process of the os pedis. *Action.* To co-operate with the extensor metacarpi magnus; to extend the leg and foot; and to counteract the influence of the flexor pedis perforans and perforatus.

EXTENSOR SUFFRAGINIS (*Plate* III. 9). *Arises:* from the head of the radius; and from the junction of that bone with the ulna. *Inserted:* into the head of os suffraginis by long tendon. *Action.* To co-operate with the pedis in the extension of the leg; and also to incline the pastern joint outwards.

EXTENSOR METACARPI OBLIQUUS (*Plate* III. 8). *Origin.* From the middle of the posterior margin of the radius. *Insertion.* To the posterior of the knee, by tendon, which can be traced to the pisiform bone. *Action.* To brace downward the other extensors; and to aid in extending the metacarpal bone.

FLEXOR METACARPI INTERNUS (*Plate* III. 13). *Origin.* From the condyle of the humerus. *Insertion.* To the back of the head of the inner splent bone.

FLEXOR METACARPI MEDIUS (*Plate* III. 14). *Origin.* From the inner condyle of the humerus; and by a slip of fibre from the side of the ulna. *Insertion.* Into the trapezium.

FLEXOR METACARPI EXTERNUS (*Plate* III. 10). *Origin.* From the external condyle of the humerus by tendon. *Insertion.* To the trapezium, by half its tendon; and by the other half to the outer splent bone.

Action of the flexor metacarpi: the three contract in unison, and serve to flex the radius; helping to bend the knee.

FLEXOR PEDIS PERFORANS ET PERFORATUS (*Plate* III. 11. 15) *arise:* by tendon, from behind the inner condyle of the humerus. The fleshy belly, however, soon divides into two halves; from each of which proceeds a separate tendon. These tendons, for distinction, are called the perforans and the perforatus.

Insertion of the perforatus tendon: which below the knee is the posterior of the two. Into the sides of the os corona, by a division of its substance.

Insertion of the perforans tendon. Into the inferior and posterior of the os pedis. These tendons, in their progress, receive two bands or accessory ligaments; which prevent them, when put on the stretch, distressing the muscular fibre. The *superior* originates from the posterior and inferior of the radius; and goes to both the tendons. The *inferior* comes from the bottom row of the knee bones, and the head of the large metacarpal bones; and goes almost entirely to the perforans.

There may also be seen above the knee ligamentous bands, uniting the perforans to the perforatus.

The *perforans and perforatus tendons*. The perforans originates from the smallest muscular belly. After the two have received the superior accessory ligament, they pass through the synovial space at the back of the knee; the perforans here being grooved for the reception of the perforatus. Above the knee the perforans also receives the tendons of the accessory flexors; and thus, increased in bulk, comes forth below the knee the most anterior of the two; the perforatus being semicircular for the protection of the perforans. About the upper third of the large metacarpal bone the perforans receives the inferior ligament. In this position the tendons journey to the fetlock joint; where the perforatus expands, and embraces the perforans all round. The sheath thus formed is synovial within and without. Without for gliding upon the sessamoid bones; and within for the free passage of the perforans. This sheath is continued a short distance, when the perforatus divides, going to either side of the os corona. The perforans, after it emerges from the sheath, proceeds above the elastic frog to below the navicular bone, to be inserted into the sole of the os pedis. There is a synovial capsule between the lower surface of the navicular bone and the upper surface of the tendon; the joint so formed being the seat of navicular disease.

FLEXOR ULNARIUS ACCESSORIUS (*Plate* III. 12). *Origin.* From the inner side and lower border of the ulna. *Inserted.* Close to the trapezium, into the perforans, by long tendon.

FLEXOR RADIALIS ACCESSORIUS. *Origin.* From the middle of the hind surface of the radius. *Inserted.* Into the perforans by long thin tendon, on a level with the os trapezium.

Action of the perforans and perforatus with the two accessory muscles. They flex the cannon; bend the pastern; and curve backwards the foot, which they assist in raising from the ground.

NECK AND BREAST.

PECTORALIS TRANSVERSUS. *Origin.* From the fascia upon the inside of the arm. *Insertion.* Over the cariniform process of the sternum; where it joins its fellow, and has a certain degree of motion. *Action.* To adduct and to retract the limb.

PECTORALIS ANTICUS. *Origin.* From the anterior half of the cariniform process of the sternum; and from the body of the sternum; and cartilages of the first four ribs. *Insertion.* Into both sides of the scapulo-humeral joint; and into the tendon covering the antea spinatus. *Action.* To draw the shoulder back; or, the leg being fixed, to pull the body forward.

PECTORALIS MAGNUS (*Plate* II. *J*). *Origin.* From the yellow aponeurosis of the external oblique; from the ensiform cartilage; from the cariniform process; and from the fifth, sixth, seventh, and eighth ribs. *Insertion.* Into the inner tubercle of the humerus; and by tendon, which unites with that of the coraco-humeralis, into the coracoid process of the scapula. *Action.* To co-operate with, but to act with more activity than, the pectoralis anticus.

The great use of the pectoral muscles is to aid the muscles of the haunch in the propulsion of the trunk. Their blood is supplied by the external pectoral artery, and by branches coming from the internal artery. The nerves are twigs *originating* from the intercostals. The veins empty into the axillary root.

SPLENIUS (*Fig* 4 . 1. *Plate* II. 13). *Origin.* By fine tendon, common also to the complexus major, from the anterior six dorsal spines. *Insertion.* Into the ligamentum colli; into the occipital ridge, by tendon, common also to the trachelo mastoideus; into the petrous temporal bone;

and wing of the atlas; as well as into the second, third, fourth, and fifth cervical transverse processes. *Action.* One muscle contracting would draw the head to that side; both would curve the neck, and operate in the rapid movements to raise the head.

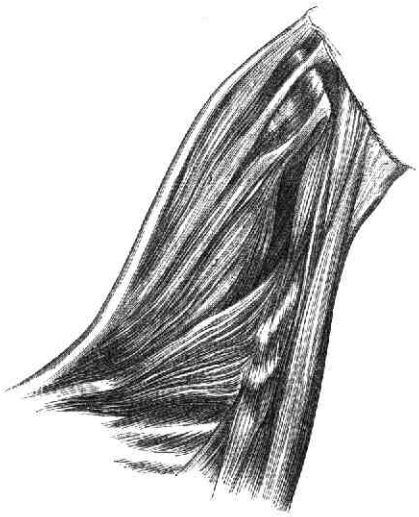


FIG 4.

THE NECK, WITH THE LEVATOR HUMERI REMOVED.

1, The splenius.

TRACHELO MASTOIDEUS (*Plate* III. 3). *Origin.* From the transverse processes of the first two dorsal vertebræ; and the oblique process of the last cervical vertebræ. *Insertion.* Into the temporal bone and wing of the atlas; by tendon, which is common also to the splenius. *Action.—Separate action.* To turn the head, or bring it to one side. *Combined action.* These muscles might be regarded as continuations of the longissimus dorsi. They will fix the neck in rearing and leaping; or assist in raising and keeping steady the head.

COMPLEXUS MAJOR (*Plate* III. 2). *Origin.* By tendon, common also to the splenius, from the anterior six dorsal spines; and by tendon, likewise shared by the longissimus dorsi, into the transverse processes of the same dorsal vertebræ. *Insertion.* Into the occiput; and into the last six cervical vertebræ. *Action.* To aid the ligamentum colli in supporting the head. Its thick short, intersected, muscular

fibre endowing it with strength and endurance for that purpose. One acting would co-operate with the splenius, and draw the head to one side.

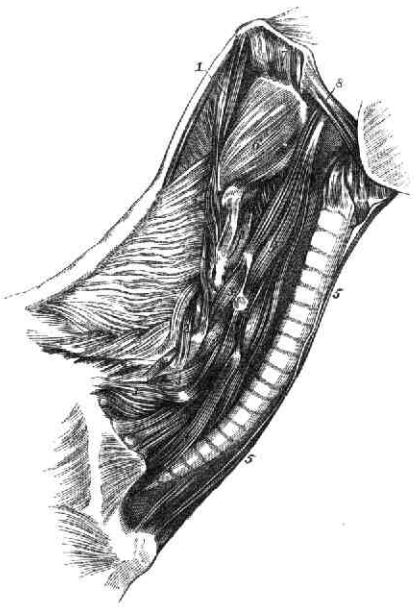
ERECTOR CAPITIS MAJOR (*Fig* 5 . 1). *Origin.* From the superior spine of the dentator. *Insertion.* Into the posterior of the occiput. *Action.* To toss the head into the air; or to move the occiput upon the atlas.

ERECTOR CAPITIS MINOR (*Fig* 5 . 1). *Origin.* From the rudimental spine of the atlas. *Insertion.* Into the occiput, immediately above the condyle; and to the capsular ligament. *Action.* To elevate the head; and to guard the capsular ligament.

FIG 5.

DEEPER-SEATED MUSCLES OF THE NECK.

1, Erectores capitis.
2, 3, Small muscles of the vertebræ.
4, Scalenus.
5, Sterno-thyro-hyoideus.
6, Rotator capitis posterior.
7, Rotator capitis anterior.
8, Stylo maxillaris.
9, Depressor capitis major.
The substance running along the back of the neck, and having waving lines proceeding from it, is the ligamentum nuchæ.



ROTATOR CAPITIS ANTERIOR (*Fig* 5 . 7). *Origin.* From the anterior margin of the wing of the atlas. *Insertion.* Into the occiput; and also into the petrous temporal bone. *Action.* To incline the head, to a limited extent, upon one side.

ROTATOR CAPITIS POSTERIOR (*Fig* 5 . 6). *Origin.* From the spine and arch of the dentata. *Insertion.* Into the upper

surface of the wing of the atlas; and to the capsular ligament of the odontoid process. *Action.* To rotate the head; and to guard the capsular ligament.

STERNO MAXILLARIS (*Plate* III. 5). *Origin.* From the cariniform process of the sternum. *Insertion.* Into the angle of the lower jaw. *Action.* To bend down the head; and to curve the neck; it also may aid in opening the mouth, though, from its position, it cannot do so with much activity.

STERNO-THYRO-HYOIDEUS (*Plate* III. 6. *Fig* 5 . 5). *Origin.* From the cariniform process of the sternum; about the middle of the trachea the muscle becomes tendinous; from this tendon it divides into two heads. *Insertion.* Into the spur process of the os hyoides by one head; and by the other head, into the thyroid cartilage of the larynx. *Action.* To regulate the downward motions of the larynx; and to pull downward the os hyoides.

SCALENUS (*Plate* III. 10. *Fig* 5 . 4). *Origin.* From the middle of the first rib. *Insertion.* Into the transverse processes of the fourth, fifth, sixth, and seventh cervical vertebræ. *Action.* To depress the neck; or to draw the first rib forward.

LONGUS COLLI. *Origin.* From the transverse processes, bodies, and inferior spines of the first six dorsal, and last six cervical vertebræ. *Insertion.* Into the inferior spines of all the cervical vertebræ, by tendinous cords. *Action.* To bend downward the neck.

DEPRESSOR CAPITIS MAJOR (*Fig* 5 . 9). *Origin.* From the transverse processes of the second, third, fourth, fifth, and sixth cervical vertebræ. *Insertion.* Into the base of the cranium, by tendon. *Action.* To depress the head, both powerfully and rapidly.

DEPRESSOR CAPITIS MINOR. *Origin.* From the inferior of the atlas. *Insertion.* Behind the former muscle, into the base of the cranium. *Action.* To aid the major.

ROTATOR CAPITIS INTERNUS. *Origin.* From the inferior surface of the wing of the atlas. *Insertion.* Into the styloid process of the occiput, upon the inner side. *Action.* To rotate the head upon the atlas; and to antagonize the rotator capitis anterior.

There are also several minute muscles around the cervical vertebræ, which serve to move one bone upon another; and

also answer the purpose of ligaments, holding the bones firmly together. These, however, are only sought by the matured student—and even by him are seldom made out. They may be considered as altogether unfitted for those into whose hands the present work is intended to pass.

THE POSTERIOR EXTREMITY.

TENSOR VAGINÆ (*Plate* II. *q*). *Origin.* From the anterior spine of the ilium. *Insertion.* Into the small external trochanter of the femur; into the fascia of the haunch; and into the patella. *Action.* To advance the leg; by drawing forwards the femur, and upwards the patella; as well as to render tense the fascia of the haunch.

GLUTEUS EXTERNUS (*Plate* II. *n*). *Origin.* From the second spine of the sacrum, and from the anterior spine of the ilium. *Insertion.* Into the small external trochanter of the femur; and into the fascia covering the gluteus maximus. *Action.* To draw the femur forward; and to brace the fascia covering the gluteus maximus.

TRICEPS ABDUCTOR FEMORIS (*Plate* II. *o*). *Originates* from the second and third sacral spines. *Insertions. Anterior head.* Into the outer side of the patella. *Middle head.* Into the aponeurosis, which connects it with the other two heads; into the tibial fascia; and into the superior of the tibia. *Posterior head.* Into the outer side of the gastrocnemius tendon; and into the fascia of the tibial region.

By releasing from the point of origin, the following additional attachments to this muscle will be discovered:—

Additional origins. From the second, third, fourth, and fifth transverse processes of the sacrum; from the transverse process of the first coccygis; from the sacro sciatic ligament; from the great trochanter; from the tuberosity of the ischium; and from the posterior of the small external trochanter of the femur. A bursa will be found between the tendon of this muscle and the great trochanter.

Action. To steady the body; and raise the anterior of the sacrum; when the feet are firmly fixed, as in leaping. The three heads do not simultaneously contract; but this powerful muscle is in motion, abducting and retracting the limb the whole time during progression. It is also energetically used in kicking.

GLUTEUS MAXIMUS (*Plate* II. *m*). *Origins.* From the sur-

face of the longissimus dorsi; from the last two lumbar vertebræ; from the dorsum of the ilium; and from the sacro sciatic ligament. *Insertion.* Into the great trochanter; and by a slip of muscle into the body of the femur, as low down as the small external trochanter. *Action.* When the legs are fixed, it aids in raising the anterior of the body; also, in progressing, it serves to abduct and to retract the femur; and is actively employed in kicking.

Biceps rotator tibialis (*Plate* II. *p. Fig* 6 . 5). *Origins. Superior head.* From the last two sacral spines; and from the first coccygis. *Inferior head.* By tendon, which is common also to the posterior head of the triceps abductor tibialis.

Insertion. Into a roughened tubercle, upon the inner surface of the tibia, by long tendon;—beneath this tendon will be discovered two bursæ.

Action. To co-operate in rearing and leaping; also to flex and rotate the tibia.

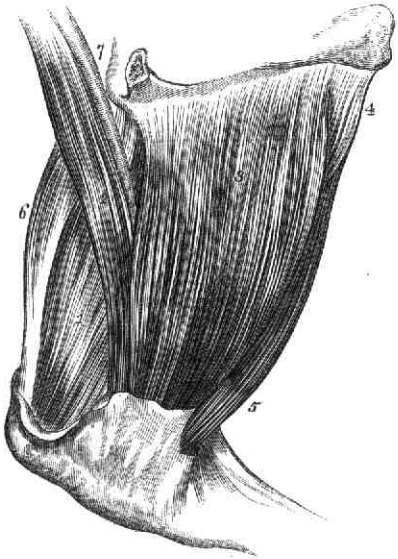


FIG 6.

THE INSIDE OF THE THIGH.

1, The vastus internus.
2, The sartorius.
3, The gracilis.
4, The caput magnum of the triceps adductor femoris.
5, The biceps rotator tibialis.
6, The rectus.
7, The femoral artery.

Sartorius (*Fig* 6 . 2). *Origin.* Partially bifid superiorly; from the psoas fascia; from the transverse process of the last lumbar vertebræ; and from the brim of the pelvis. *Insertion.* Into the inner side of the body of the

tibia; and connected with the fascia that passes over the vasti internus muscle. *Action.* To brace the vasti and rectus fascia; to extend the leg co-operating with the gracilis.

GRACILIS (*Fig* 6 . 3). *Arises.* From the symphysis pubis, a portion of its tendon arising from the head of the pectoneus muscle. *Inserted.* Into the inner and superior part of the body of the tibia. *Action.* To flex and adduct the limb.

TRICEPS ADDUCTOR FEMORIS (*Plate* III. 5). Almost three distinct muscles; which, under the name of heads, share one common name. *Large head. Origin.* Bifid superiorly; from the last sacral spine; from the first os coccygis; from the sacro sciatic ligament; and from the inferior of the tuberosity of the ischium. *Insertion.* Into the inner condyle of the femur; the patella; and the head of the tibia.

Middle head. Origin. From the tendon derived from the symphysis pubis, off which the gracilis was dissected. *Insertion.* Into the inferior, and inner side of the femur.

FIG 7.

INSIDE OF THE THIGH (*deep-seated*).

1, Iliacus.

2, Pectoneus.

3, Caput parvum of the triceps abductor femoris.

4, Ischio femoralis.

5, Obturator externus.



Small head (*Fig* 7 . 3)—*origin.* From the tendon derived from the symphysis pubis. *Insertion.* Into the inner side of the femur.

Action of the three heads. In rearing or leaping they

would raise the fore part of the trunk; in progression, they retract and rotate the femur; also they adduct the limb.

Ischio femoralis (*Fig* 7 . 4). *Origin.* From the inferior surface of the ischium. *Insertion.* Into the inner side of the body of the femur, just above the small head of the tricep adductor. *Action.* To complete the retraction of the hind extremity, when the inherent contractility of the more powerful muscles has been exhausted.

Pectoneus (*Fig* 7 . 2). *Origin.* By tendon, which meets that of the muscle from the opposite side, from the brim of the pelvis. *Insertion.* Into a ridge upon the inner side of the femur. *Action.* To raise the femur, as well as to adduct the bone.

Vasti internus, externus, and rectus (*Plate* III. 6, 7) cannot be distinctly separated into three fair muscles. *The* rectus *arises* by two tendons; the superior of which springs from the dorsum of the ilium, and has a bursa between it and the bone. The inferior comes from the venter of the ilium. The two tendons unite near the border of the bone. *Insertion.* Into the superior angle of the patella, by a mass of tendon.

Vastus externus (*Plate* III. 6). *Origin.* From the lower tubercle of the great trochanter; and from the outer surface of the femur. *Insertion.* Into the superior of the patella; and the inferior of the rectus muscle.

Vastus internus (*Fig* 6 . 1). *Origin.* From the neck of the femur; and the entire inner surface of the bone. *Insertion.* Into the upper surface of the patella; and into the inner surface of the rectus; but to a less extent than the vastus externus. *Action of the three heads.* To bend the femur; but more particularly to raise the patella, and so advance the limb.

Ilio femoralis. *Origin.* From the dorsum of the ilium, by tendon, between which and the bone there exists a small bursa. *Insertion.* By tendon, into the antero-superior of the femur. *Action.* To assist in the flexions of the femur; and to guard the capsular ligament.

Psoas parvus. *Origin.* From the necks of the last three ribs; from the last three dorsal; and from all the lumbar

vertebræ. *Insertion.* Into the tubercle on the brim of the pelvis.

Psoas magnus. *Origin.* From the angles of the last three ribs; and from the transverse processes of the lumbar vertebræ. *Insertion.* By a tendon, which is common also to the next muscle, into the internal trochanter of the femur.

Iliacus (*Fig* 7 . 1). Bifid superiorly. *Origin. By the larger head:* from the anterior spinous process, and the venter of the ilium. *By the small head:* which lies between the two psoas muscles; from the venter of the ilium. *Insertion.* By tendon, common also to the psoas magnus, from which the iliacus cannot be fairly separated; into the internal trochanter of the femur. *Action of the three heads.* To roach the lumbar vertebræ; and in galloping, conjointly with the abdominal muscles, to draw the pelvis forward; and to place the hind leg well under the body during violent motion. The three are also in use in more moderate action; but then their power is less marked. They are likewise of great service during copulation.

Gluteus internus (*Plate* III. 9). *Origin.* From the sacro sciatic ligament; and the roughened elevation above the acetabulum. *Insertion.* Into the inferior tubercle of the great trochanter; and into the capsular ligament of the hip joint. *Action.* To protect the capsular ligament; and to keep close the head of the femur.

Obturator externus (*Fig* 7 . 5). *Origin.* From the brim of the obturator foramen; from the membrane covering the opening; and a small portion also from the tendon common to the gracilis and abdominal muscles. *Insertion.* Into the sulcus behind the great trochanter; and into the ridge extending from it by tendon. *Action.* To flex the femur.

Pyriformis. *Origin.* From the first transverse process of the sacrum; and the venter of the ilium. *Insertion.* The tendon of the muscle leaves the pelvis, and winds over a synovial groove upon the border of the innominata. Having gained the exterior of the pelvis the tendon is joined by that of the obturator internus; and into this common tendon are inserted some of the fibres of the gemini. The tendon is

ultimately fixed into the sulcus, behind the great trochanter.

OBTURATOR INTERNUS. *Origin.* From the floor of the pelvis, covering the obturator foramen. *Insertion.* Winds over the bursal sacro ischiatic notch, by tendon, which joins that of the pyriformis; to be *inserted* into the sulcus, behind the great trochanter.

GEMINI. *Origins.* By tendon, from the sacro sciatic notch; and from the tendon common to the pyriformis and the obturator internus. *Insertion.* Into the sulcus, behind the great trochanter; and into the capsular ligament. *Action.* The gemini would guard the capsular ligament; the three muscles last named would rotate the head of the femur, pointing the toe of the foot outwards.

EXTENSOR PEDIS POSTERIOR (*Plate* III. 10. 13). *Origin.* From the outer side of the inferior head of the femur, by tendon; also by slips of fibre, from the head of the tibia.

Insertion. Into the coronal process of the os pedis, by long tendon.

The tendon by which this muscle originates is combined with one which passes to the flexor metatarsi magnus. The tendon by which this muscle is inserted into the os pedis begins about the inferior third of the tibia; and passes through three annular ligaments; one above the hock, which is common also to the flexor metatarsi magnus; another at the inferior of the astragalus; and a third inferior to the hock, which also binds down the extensor pedis accessorius. The accessory tendon joins that of the extensor pedis, about one third down the cannon; where they meet, some muscular fibres from the last annular ligament become inserted into them.

Action. To extend the foot; aiding also in the flexion of the hock.

EXTENSOR PEDIS ACCESSORIUS, OR PERONEUS (*Plate* III. 11). *Origin.* From the head of the fibula; from the fascial sheath of the flexor pedis; and the sheath of the extensor pedis.

Insertion. Into that of the extensor pedis, one third down the cannon. The fibres of its tendon can be traced as low down as the os suffraginis.

Action. To aid the extensor pedis.

FLEXOR METATARSI MAGNUS (*Fig* 8 . 3). *Origin.* From

the inferior of the femur, by tendon; which also passes over the entire length of the muscle, and is common also to the extensor pedis; and by fibre, from the head of the tibia. *Insertion.* By the numerous divisions of its tendon into all the bones of the hock joint; excepting the tibia; astragalus; magnum; and outer splent.

Action. To flex the hock.

FIG 8.

OUTSIDE OF THE LEG, NEARLY DEPRIVED OF MUSCLES.

1, Popliteus.

2, Flexor pedis accessorius.

3, Flexor metatarsi magnus.

4, The tendon common both to the flexor metatarsi and extensor pedis.

5, The groove in which the extensor pedis played.



PLANTARIUS (*Plate* III. 9). A small loose band of muscular fibre. *Origin.* From the head of the fibula. *Insertion.* Into the calcis, by a long tendon, concealed within the tendon of the gastrocnemius externus. *Action.* To brace, or keep in its proper place, the tendon of the gastrocnemius externus.

GASTROCNEMIUS EXTERNUS (*Plate* III. 8. 14). *Bifid anteriorly. Origin. Outer head.* From a ridge extending upwards from the outer condyle of the femur. *Inner head.* From the inner edge of the sulcus; above the outer condyle of the femur. *Insertion.* Into the point of the calcis, by tendon, common to both heads.

GASTROCNEMIUS INTERNUS. *Origin.* From the sulcus, above the outer condyle of the femur. *Insertion.* Into the os calcis; and becoming the perforatus tendon, after it has passed the point of the hock, resembles that of the fore leg; being inserted into the sides of the os corona.

Action. The external is the principal motor agent; the internal possesses scarcely more power than is necessary to adapt its tendon to the motion of the limb; but this want is supplied by the connexion between the tendons. They are the chief retractors of the lower part of the leg; and upon their power the propulsive energy of the horse mainly depends. Much of the beauty of the animal depends also upon their endurance; as the horse that has the gastrocnemii tendons cut through instantly falls to the ground. A bursa will be found between the two tendons; and another between the external tendon and the skin.

FLEXOR PEDIS PERFORANS (*Plate* III. 12). Posterior *origin.* From the hind and outer part of the head of the tibia; from underneath the fibula; also from the posterior border of the same bone; and from the strong ligament extending from it.

Insertion. Its tendon resembles the perforans of the fore leg; excepting that it extends obliquely across the back of the tibia, passing from the outer to the inner side; its tendon passing over the calcis, through the theca, at the back of the hock. Immediately below the hock it is joined by its accessory tendon; and lower down receives the ligamentous band, which originates from the lower bones of the joint, and the head of the great metatarsal bone. From this point it resembles the same tendon in the fore leg; being inserted into the os pedis, under the navicular bone.

Action. To co-operate with the gastrocnemii tendons, in retracting the metatarsal bones; but also to flex the pastern.

FLEXOR PEDIS ACCESSORIUS (*Plate* III. 15. *Fig* 8 . 2). *Origin.* From the outer and posterior part of the tibia; and from the fascial sheath of the perforans. It soon becomes tendinous; its tendon passing through the synovial sheath at the back of the hock, to gain its *insertion* into the tendon of the perforans.

Action. To assist the flexor pedis perforans.

POPLITEUS (*Plate* III. 18. *Fig* 8 . 1). *Origin.* From the

posterior of the upper head of the tibia. *Insertion.* Into the capsular ligament; and by tendon into the outer condyle of the femur.

Action. To guard the capsular ligament; and to rotate the femur.

LUMBRICI. A pair of these poorly developed muscles belong to each leg; and are the only muscles below the knee or hock. Their pale fleshy heads are not always found; but when they are present they terminate in long tendons, which run to the pad at the back of the fetlock.

MUSCLES OF THE ANUS.

SPHINCTOR ANI (*Plate* III. 2). Encircles the opening to the anus; and enters within it for the depth of four or five inches. It has neither origin nor insertion. *Action.* To close the anus; it being a very bad symptom when, during disease, this muscle relaxes.

RETRACTOR ANI INFERIOR. *Bifid posteriorly. Origin.* Os innominata, above the origin of the gluteus internus. *Insertion.* Into the rectum; both heads mingling with the fibres of the sphinctor ani, upon the lower surface. *Action.* To retract the anus; pulling it downwards, after the passage of the dung.

RETRACTOR ANI SUPERIOR. *Origin.* From the inferior of the sacrum. *Insertion.* Mingles with fibres of the sphinctor ani, upon their upper surface. *Action.* To co-operate with the inferior retractor; pulling the anus upwards.

LEVATOR ANI consists of two slips of red muscular fibres.

MUSCLES OF THE TAIL (*Plate* III. 4).

COMPRESSOR COCCYGIS. This muscle can be divided into three distinct layers. *Origin.* From the superior border of the os innominata. *Insertion.* Into the inferior of the first coccygeal bone; and into the next three bones of the tail.

Besides this, the tail is generally described as consisting of four muscles: a levator, which elevates the tail; a pair of curvators, which turns the tail to either side; and a depressor, which lowers the tail. But the firmness with which the tail can be held down by the horse is owing to the depressor, assisted by the compressor and other muscles.

The four muscles of the tail *originate* in a tendinous

sheath, as far forward as the last lumbar vertebræ; and are *inserted* into all subsequent bones, even to the last coccygis.

Other muscles, belonging to particular parts, will be found mingled with the description of such structures.

DESCRIPTION OF PLATE III.

THE SUPERFICIAL LAYER OF MUSCLES, TAKEN FROM THE BODY OF THE HORSE, SO AS TO EXPOSE THOSE MUSCLES WHICH ARE MORE DEEPLY SEATED.

THE HEAD AND NECK.

a, the buccinator; *b*, the caninus; *c*, the retractor labii inferioris.

1, 1, the orbicularis oris; 2, 2, 2, the complexus major; 3, 3, the trachelo mastoideus; 4, 4, the subscapulo hyoideus; 5, the sterno maxillaris; 6, 6, the sterno thyro hyoideus; 7, the jugular vein; 8, the carotid artery, with the eighth pair, and sympathetic nerves; 9, the trachea; 10, the scalenus.

THE FORE LIMBS.

1, the scapulo ulnarius; 2, the caput magnum of the triceps extensor brachii; 3, the caput medium of the same muscle; 4, the anconeus; 5, the flexor brachii; 6, the extensor metacarpi; 7, the extensor pedis; 8, the extensor metacarpi obliquus; 9, the extensor suffraginis; 10, the flexor metacarpi externus; 11, the perforans and perforatus; 12, the ulnarius accessorius; 13, the flexor metacarpi internus; 14, the flexor metacarpi medius; 15, the perforans and perforatus; 16, the extensor metacarpi.

THE TRUNK AND BACK.

A, the scapula; *F*, *F*, the longissimus dorsi; *G*, the spinalis dorsi; *a*, *a*, *a*, *a*, *a*, *a*, *a*, *a*, *a*, *a*, *a*, the intercostals; *b*, *b*, *b*, *b*, *b*, *b*, *b*, *b*, *b*, the superficialis costarum; *c*, *c*, *c*, *c*, *c*, the rectus abdominis; *d*, *d*, *d*, *d*, the transversalis abdominis; *e*, *e*, *e*, the obliquus internus abdominis; *f*, the hollow in the longissimus dorsi, which part of the gluteus maximus once filled.

HAUNCH AND HIND EXTREMITY.

C, the ilium; *D*, the ischium; *E*, the tibia; 1, the sacro

sciatic ligament; 2, sphinctor ani; 3, depressor coccygis; 4, the muscles of the tail; 5, 5, the triceps abductor tibialis; 6, the vastus externus; 7, the rectus; 8, the gastrocnemius muscles; 9, the plantarius; 10, the extensor pedis; 11, the peroneus; 12, the flexor pedis perforans; 13, the insertion of the gracilis; 14, the gastrocnemii muscles; 15, the flexor pedis accessorius; 16, the course of the perforans tendon, inside the os calcis of the hock joint; 17, the insertion of the gastrocnemius externus into the point of the hock; 18, 18, the popliteus muscles; 19, the extensor pedis.

SECTION X.

OF BURSÆ MUCOSÆ.

TENDONS of great length are usually furnished with sheaths, within which is secreted a glairy, slippery fluid, of a similar nature with synovia; by means of this they are enabled to slide over the bones, or other structures, with great ease. At the extremities of the tendons; also between them and at the points of bone; wherever the parts are liable to pressure or friction, these little bladders or sacs, filled with synovia, form distinct structures; they are called *mucous capsules* or *bursæ mucosæ*, being composed of dense cellular tissue, whose internal vascular surface is lined by a synovial membrane. From injury, or other causes, this membrane becomes at times inflamed; and, when resolution of such inflammation is not effected, coagulable lymph is thrown out; which not being always again absorbed, remains between the tendons and its sheath; occasioning distention and often lameness, from the obstruction it offers to the freedom of motion; therefore, we are at no loss to account for the gorged sinews in hard-worked horses; nor for the *stiffness* they occasion. The mucous capsules, at the extremities of the tendons, also are extremely liable to become distended; and bursal disease receives very different names according to its situation; as *windgalls* at the fetlock; *thoroughpin* behind the hock; and *capped hock* at the point of the joint. These diseased accumulations appear to be brought on by undue exertion of the parts: after which, any motion appears

to act as a stimulus to increase their size, and to disease the synovial secretion within.

SECTION XI.

OF THE VESSELS; OR OF ARTERIES, VEINS, AND ABSORBENTS.

DESCRIPTION OF PLATE IV.

THE ABDOMEN, DEPRIVED OF THE INTESTINES.

A, THE posterior aorta, near its termination; *B*, the posterior cava; *C*, *C*, the ureters; *D*, *D*, the kidneys; *E*, the renal artery; *F*, the renal vein; *G*, the stomach; *H*, the duodenum tied; *I*, the splenic artery; *J*, the liver; *K*, the anterior mesenteric artery.

OF THE ARTERIES GENERALLY.

The *arteries* are canals originating from the ventricles of the heart by two trunks, the aorta and the pulmonic; whose subdivisions are destined to supply the whole body with blood. Considered generally, arteries are long tubes; which by reason of their numerous bifurcations become smaller as they proceed to the extreme parts. However, the extremities of the arteries, though so much smaller than the original trunk, nevertheless, if put all together, would contain ten times as much as the parent vessels. In their course an especial regard is observed towards their safety; hence they are mostly deep seated; and invariably pass on the inner sides of the limbs, or on the side that is flexed. They appear equally guarded against accidental pressure or tension, by passing over the bending surface of a joint; and where they are situated in soft parts, liable to extension, as in the tongue, the arteries pursue a serpentine or very crooked course. Their being thus convoluted, however, answers another end than saving them from being stretched; as the arteries, before entering the brain and the testicles, are to be seen winding about in various directions; the intention of which construction is to prevent the blood from being urged too violently upon such important organs. All arteries are composed of three different coats or cover-

ings, united to form one elastic tube: the *external* coat is of condensed cellular tissue; whose *elastic* powers are so considerable, as to preserve the cylindrical form of the principal canals when empty. The middle coat consists chiefly of yellow elastic tissue; and the internal coat is serous tissue, or similar to synovial membrane. By their elastic power the arteries are capable of being distended: by this likewise they can adapt themselves to a smaller quantity of fluid than usual. It is by this elasticity, which operates longitudinally as well as circularly, that, in cases of injury, the divided ends of an artery retreat within the cellular substance around, and thus close its orifices. When this contraction is prevented by a partial division only, the hæmorrhage continues; but even the entire division of the punctured vessel is not generally effective in arteries of the first, second, or third magnitude. The elastic powers appear in dissimilar proportions in different horses, as in different men; from which arises some constitutional phenomena in the individuals of each species; giving to some a greater disposition to hæmorrhage and inflammation, which is called a sanguineous temperament. The elastic coat appears to exist in greater proportion in the horse than in the human being. To this cause it is probably owing, that acute inflammations of the vital organs, in the horse, run through their stages so much quicker, than similar affections in our own race. To this power it is to be attributed, that a horse can bear the division of a much larger artery without danger than a man.

Arteries, in their different courses, send out branches, which freely join with other branches sent out by other arteries; in consequence of this circumstance we are able to deprive the horse of large and essential vessels; the small arteries which have united with others then enlarging, and thus carrying on the circulation. Most arteries terminate by means of their capillary branches in veins; we know this, because we can empty the arteries, by drawing the blood from the venal trunks; and because injection forced into the arteries, in many instances enters the veins; but is prevented from so doing if the fluid used be of a coarse description. A more scarce termination of arteries is in cells; from which veins arise to take it up again, as in the spleen, &c. Different parts are more or less plenti-

fully supplied with arteries according to their nature: secreting organs have usually large trunks, as the kidneys, spleen, &c. Arteries are likewise themselves furnished with arterial and venal branches; for the nourishment of their tubes. They are chiefly supplied with nervous energy by the sympathetic system of nerves; which accounts for their being little endowed with feeling. It also renders easy of explanation their being possessed of eccentric powers; such as directing more blood to the face, as in blushing; and driving more blood to a part, as in local inflammation; while their action in neither case can be controlled by the will.

The evident use of the arteries is to convey the blood from the heart to the different parts of the body; thus keeping up the vital principle in these parts, by being the bearers of nutriment and heat. An intimate knowledge of their functions, and a well-grounded acquaintance with their situation, is therefore essentially necessary to the veterinary surgeon.

As the use of the arteries is to convey the blood from the heart; so the heart itself appears to be the first, but not the only agent exerted in its propulsion through the vessels. And as the force of the heart decreases with distance; so there is, at last, a column pressed on in almost a continuous stream, by the force from behind: thus when a very small artery is divided, there is a regular flow, with scarcely any jet: this, however, only takes place in their minutest branches. We thus see why there is no pulsation in the veins; they receive the blood from the arteries in one equable stream. Pulsation is a certain sensation caused by the artery; which, from various experiments, is found to arise from its being alternately in a state of distention and relaxation. It appears that, when the ventricles contract, and force the blood into the arteries, the pressure of the fluid occasions a distention of their coats: when the ventricles cease to act, and become contracted, the impetus against the sides of the vessels ceases; and now the coats of the artery contract also, and lessen its size.

Absorbents are distributed to every part of the body; it is true we cannot see them, neither are they to be traced, save by the very finest of liquid injections; but their

existence is known with certainty, because their effects are perceived. Thus the hardest part of bone is removed by a natural process, or absorbed. Inorganized cartilage is likewise taken away; to allow the arteries and veins to enter, and bone to be deposited when ossification ensues.

Absorbents are very minute, thin-coated, transparent vessels, having numerous valves, like to veins; they are spoken of as deep-seated and superficial; but as the difference of position is accompanied by no difference of structure, we shall here regard them as of one kind. Every absorbent conveys the materials it takes away from various parts into the blood; with which their contents mingle, and ultimately become blood; or they are emitted with the excretions. In starvation it is by means of the absorbents that the marrow is carried out of bones; and the fatty matter from other places in the body, and emptied into the blood; which in this manner helps to support, or keep alive, the subject starved. It is thus that it is accounted for why a fat animal is longer dying from starvation than one that is thin.

Certain absorbents, which take up the nutritive portion from the food within the intestines, are called lacteals; because the substance they abstract is at first white, like to milk; otherwise they are the same as common absorbents; all of which enter and pass through one or more of the little reddish bodies, called absorbent glands. Of what use these glands are remains to be discovered; but they doubtless promote some change in the fluid contents of the absorbent vessels; they also serve to mingle what the vessels contain; for if two or three absorbent branches enter a gland, only one is seen to leave it; which one must convey away the materials the others brought; as the glands themselves do not appropriate, or enlarge, or fatten, upon the contents of these vessels.

The functional effects of this system are abundantly active in the constitution at large; we are certain that the various organs of the body are continually changing, wholly or partially. It appears to be the office of the arteries to build up new parts, and to repair the waste of others; but the old ones must be first of all pulled down and removed

by *absorption;* which is least active at youth; equal with the arteries in middle life; and predominates in age. By this wonderful power the roots of the temporary teeth are absorbed; that their crowns may give way: by this also the gubernaculum testis, having fulfilled its office, is absorbed; and the thymus gland is likewise removed: it is thus cartilage is taken up, to make room for a bony deposit when the animal approaches maturity. By the absorbents the fluids as well as solids are continually changing; being taken up and carried back, but always in a fluid state, into the mass of blood. It is by them that the dead parts are separated from the living in sloughing and ulceration. By the superficial absorbents, even gases are received from without; the water held in suspension by the atmosphere is thus taken in; hence grazing horses require little or no water; more especially if not exposed to the heat of the sun, whereby evaporation or exhalation is promoted. The functional office of the absorbents is most important also in the preservation of life under casualties. Long fasting is thus borne; their capability of displacing the animal oil or marrow from the bones, and the fat from the body generally, is here employed to make up the want. Hybernating animals live during their torpidity by a slow absorption of the adipose matter; thus it is found in the instance of the torpid bear, that, however fat he may enter his seclusion, he returns lean and emaciated.

To our acquaintance with the power of the absorbents the practice of medicine is greatly indebted; and although we own few means of lessening absorption, we fortunately have many of increasing it. Mechanical friction is the most active and universal agent in stimulating the absorbents; as the hand-rubbing of horses sufficiently proves. Pressure also increases their action; thus we bandage the swollen legs; we girth the bodies of our horses, to promote absorption of the interstitial fluid. Exercise, by swelling the muscles, produces pressure; and thus exercise will remove swelled legs, and promote absorption generally. Blisters likewise exercise an influence over absorption. A still stronger stimulant is iodine; which is especially useful in enlargement of the glands. Purgatives and diuretics, and whatever tends to lower the pulse, promotes

internal absorption; for by offering an impediment to the circulation; removing the contents of the intestinal canal; and increasing the urinary secretion; an absence is caused in the materials for building up, which the absorbents endeavour to repair by removing other parts.

OF THE PULSE.

The momentary increase of capacity in the artery, whereby its diameter is enlarged, is called its *pulse;* and the more or less frequent are these dilatations, so is the pulse quicker or slower. The circulation of the blood in animals being usually in the contrary ratio to their bulk, *i. e.* it is tardy in the large, and quick in the small, has given to every kind of *standard pulse*. Thus, between the largest horse and the smallest pony, there is a difference of from six to eight beats in a minute; the greater number of course being in the more diminutive animal. In the adult horse it may be stated to range between thirty-six and forty; in the colt it will be found sixty at birth; but it gradually decreases as the animal attains the adult standard. This variation between the young and adult pulse is, however, less dependent on their relative sizes, than on weakness of the system, and the greater irritability at the early period.

There are also other causes of individual variation in the pulse of horses of the same size. The constitutional peculiarities of some animals occasion a departure from the usual standard pulse: in the irritable horse it is commonly five or six more per minute than in the mild one: and in some blood animals this is peculiarly the case. A low bred sluggish horse is commonly below the standard of his size. In stabled horses the pulsations are always more frequent than in those abroad; and it is accelerated in a degree corresponding with the heat of their dwelling; the nature of their clothing; and the stimulating properties of their food. Desire, impatience, and fear, all raise the pulse.

The *pulse* is important, as it affords us our best criterion of the state of the system. The pulse affords us a ready indication of a quickened or a tardy state of the circulation; but were our information to stop here, it would be limited indeed; and the pulse would then prove but an indifferent guide. There are various conditions of the pulse besides

its number to which we should attend: these may be characterized by the familiar terms of strong, hard, soft, wiry, oppressed, small, quick, frequent, slow, regular, and irregular; to become familiar with which requires nice discrimination and habits of close attention.

The arteries being universally diffused; and their action being uniform throughout; it follows that the pulse may be examined on any part of the body; but it can certainly be no where so conveniently, nor perhaps no where so advantageously, felt, as in the submaxillary artery (see *Fig* 9 . *c*), when that vessel crosses the lower jaw. Having detected this artery; enclose it within the fore and middle fingers, the thumb resting without; while the index and median fingers, between them, pursue the inquiry into the state of the circulation; now by one, now by the other, pressing the tube with various degrees of force against the bone.

A *strong* and *full* pulse, indicating forcible contractions in the heart; with a proportionate quantity of blood forced into, and propelled onwards, by the arteries, is present in the horse under temporary excitement; but is seldom found to accompany any morbid state into which he falls. The *full* pulse which accompanies disease in the horse has always some confined vibratory *hardness;* though, occasionally, it may be encountered without hardness in the first stages of influenza. A *hard pulse* with increased *frequency* is characterized by its feeling to the fingers like a cord vibrating under them; and not like the full undulations of an overcharged vessel. This hard pulse accompanies most extensive membranous inflammations; and is the usual attendant on the early periods of most abdominal diseases. It forms the best characteristic between incipient peritoneal inflammation and spasmodic colic or gripes; for in gripes, although after a few hours' continuance there is often a hardness in the pulse; it is always accompanied, when purely spasmodic, with a degree of fulness also, unknown in peritoneal inflammation. A *hard* and *full pulse* is common to extensive disease of parts not immediately essential to life; as of the cellular membranes; muscles; skin; &c., when they are sufficient to affect the constitution. It accompanies the early stages of bad catarrhal affections; and occasionally of pneu-

monia also; but in catarrh it usually exhibits more frequency than in pneumonia. The *wiry pulse* is a very important modification of the hard; in which last the sensation is contracted from that of a vibrating cord to that of a jarred wire; whence its name of *wiry, thready*, &c. It is commonly accompanied by increased frequency; and is often present in the protracted stages of abdominal inflammation; and in some few it accompanies them from their outset. It appears to be the common consequence of the hard and full pulse; and frequently succeeds to it in the secondary stages of inflammatory affections. The *oppressed pulse* is also a modification of the hard pulse; and is common to the active stages of inflammation of the lungs.

A *small pulse* is usually present in all cases of great debility; and is invariably attended with increased frequency. When it is very quick, small, and thread-like, it shows that the debility is extreme; and prognosticates a fatal termination of the existing disease: when this pulse varies in its regularity, and intermits, it is even more certainly a fatal prognostic.

A *quick pulse* may denote irritability of the system; but more commonly is attendant upon weakness. When produced by irritability, it seldom exceeds twenty beats more than the natural standard; and it likewise has a strength proportioned to its speed: when it is caused by weakness, it is usually from seventy to more than the most patient observer can count. It is a bad sign when it reaches the last-mentioned height; and the utmost skill and perseverance are then required to prevent a fatal termination.

A *slow pulse* may be occasioned by pressure on the brain; from the effect of accidents; or from congestion, &c. It may also be brought on through the medium of the stomach; by various substances taken in. White and black hellebore; aloes; digitalis; and whatever creates nausea, decreases the frequency of the pulse. But, unfortunately, in the horse our means of exciting this sensation are usually limited to such matters as are in themselves sources of great irritation. The pulse may be also diminished in its frequency by cold; but at the same time it is apt to be increased in strength. We must likewise bear in mind that a simple alteration in

the frequency is not all that is necessary to a beneficial end; we should render the pulse *soft* also, without which a slow pulse may retain its fatal character.

A *soft pulse* opposes little resistance to the fingers; but seems to allow a due volume of blood to flow through it without labour or interruption. This pulse is frequent at the decline of inflammatory affections; and usually shows the cessation of the disease. Suppuration, as a termination of inflammation, produces it; and when pus forms, a soft pulse is generally the consequence.

A *regular pulse* is occasionally found when disease is present; but it is usually under such circumstances of an altered character. A regular pulse, with a proportionate fulness, is one of the strongest marks of health; as an irregular one usually betokens acute disease: irregularity in it may, however, exist without acute symptoms; and may depend on organic affections or peculiarities in the system. *Irregularity* in the pulse, in most cases, is a mark of irritability; and it may characterize debility. In inflammation of the heart there is usually a peculiar irregularity in the pulse, with extreme oppression and smallness. An *irregular pulse* in fever shows great danger; it also accompanies the fatal terminations of all inflammations. The worst cases of pleuritis and pneumonia commonly present it before the close; and in certain cases a very singular irregularity is present, from a large quantity of serous fluid formed within the chest; in which, besides its intermission, the pulse appears as though undulating through a bladder of water. This pulse should be particularly noticed; as, when once it becomes familiar, along with other signs, it affords an unerring guide to the state of the patient.

THE DISTRIBUTION OF ARTERIES.

The *aorta* (*Fig* 13 . 1), the principal vessel of the arterial system, rises perpendicularly from the top of the left ventricle of the heart: having proceeded about two inches, it divides into two branches, opposite the fifth dorsal vertebra; one of which is carried forwards to furnish the head and fore extremities; the other proceeds backwards, to be distributed to the body and the hinder limbs. These divisions form the anterior (*Fig* 9 . 1) and posterior aorta (*Fig* 13 . 4);

but previous to this division, the original trunk has given off a pair of small arteries immediately at its origin, called the coronaries; which supply the heart itself with blood (*Fig* 13 . 3).

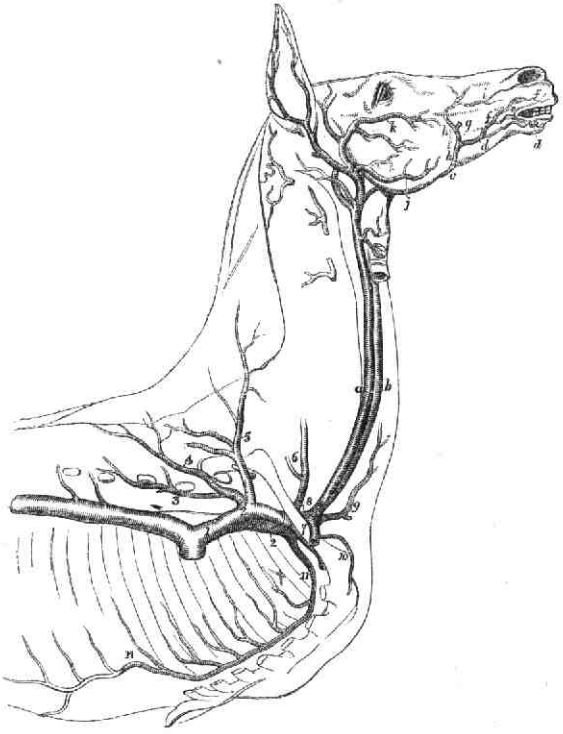


FIG 9.

THE THORAX, DIVIDED TO DISPLAY THE BRANCHING OF THE ANTERIOR AORTA.

1, The anterior aorta.
2, 2, The arteria innominata.
3, The anterior intercostal.
4, The dorsal.
5, The posterior cervical.
6, The vertebral.
7, The axillary.
8, The common carotid.
9, The inferior cervical.
10, The external pectoral.
11, The internal pectoral.

a, The left carotid.
b, The right carotid.
c, The submaxillary.
d, The inferior labial.
e, The coronary labial.
f, The superior labial.
g, The buccinator.
h, The facial.
i, The false nostril.
j, The posterior masseter.
k, The temporal.

The *anterior aorta* is continued single unto between the second and third rib; where it divides into its right and left branches, called *arteriæ innominatæ* (*Fig* 9 . 2). The *left division* supplies the dorsal to the back; and (*Fig* 9 . 4) one branch, which penetrates between the first and second ribs, under the name of posterior cervical, to afford nurture to the neck (*Fig* 9 . 5): afterwards, passing towards the first rib, it gives off the left vertebral. The *vertebrals* (*Fig* 9 . 6) are two important arteries: they are given off opposite the first ribs; and pass under the transverse process of the last cervical vertebra; and are continued upwards through the foramina at the base of the transverse processes of the remaining six of these vertebræ. As they pass, they send off small branches through the lateral notches in the vertebræ to the spinal marrow; likewise to the muscles of the neck. Approaching the head, they give a branch, which usually passes through a foramen in the wing of the atlas to communicate with the external carotid (*Fig* 11 . 4). After they have made a number of inflections, apparently to retard the circulation, they join branches, and form the *basillary* artery, that runs along the base of the medulla oblongata (*Plate* V. *Fig* 2).

After the vertebrals the innominatæ, give off the internal and external pectorals, which go to the breast (*Fig* 9 . 10, 11): when, bending its course over this rib, it takes the name of axillary (*Fig* 9 . 7). The *right division* of the anterior aorta is much larger, as well as longer, than the left. In its course, having furnished some considerable branches which mainly correspond with those given off to the left side, it becomes the common *carotid* (*Fig* 9 . 8); which directing itself forwards divides into the *right* and *left* carotids (*Fig* 9 . *a*, *b*. *Plate* VIII. *b*).

The *axillary artery* (*Fig* 10 . *a*), as furnishing the whole of the fore extremities with blood, must be deemed very important. The trunk of the vessel curves over the first rib, to reach the innermost side of the fore limb. After having pursued its course for a short distance it gives branches to the scapula, and becomes the *humeral*. The *humeral artery* descending along the internal surface of the humerus, gives a considerable branch to the flexor brachii; as well as others to the scapula (*Fig* 10 . *b*, *c*, *d*, *e*, *g*, *i*, *i*, *i*): here also it often

parts with a branch, the external thoracic, which ramifies over the ribs; behind the fore leg, in the seat of the spur vein. The humeral artery having arrived at the anterior part of the

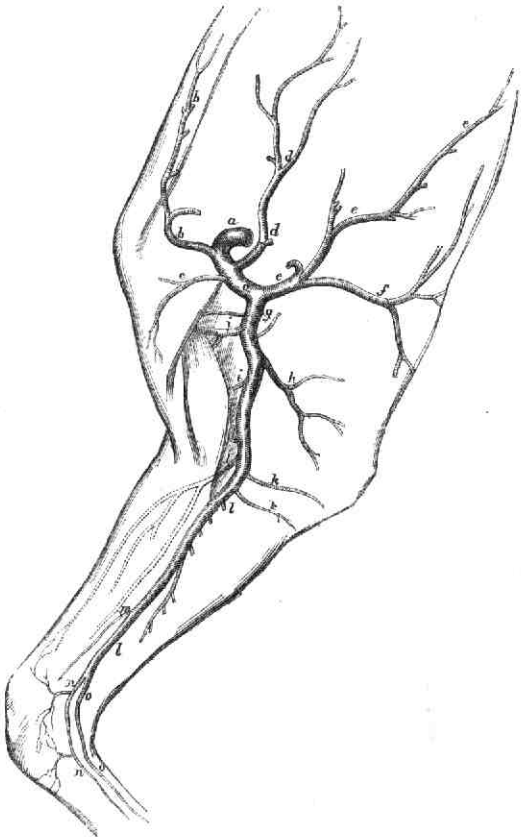


FIG 10.

THE INSIDE OF THE FORE LEG.

a, The axillary.
b, The humeral thoracic.
c, The internal thoracic.
d, The dorsalis scapulæ.
e, The subscapularis.
f, The external thoracic.
g, The humeral.
h, Branches to the triceps extensor brachii.
i, Branches to the flexor brachii.
j, The spiral.
k, The ulnars.
l, The radial.
m, The radial medullary.
n, The small metacarpal.
o, The large metacarpal.

bone, near to the inferior articulation of the humerus, makes a fresh division, giving off considerable branches; one of which

passes between the ulna and radius (*Fig* 10 . *k*). The *radial artery* (*Fig* 10 . *l*, *l*), which proceeds downwards, to nurture the flexor muscles; sends off a branch to nourish the medullar of the radius (*Fig* 10 . *m*); and another near the knee, called the small metacarpal artery (*Fig* 10 . *n*). The main trunk is then continued downwards under the muscles, behind the radius; then passes within the arch of the trapezium; and becomes the *metacarpal artery* (*Fig* 10 . *o*, *o*); which continues down under the nerve upon the inner side of the leg. At the lower part of the cannon it divides just above the fetlock into the two plantar vessels. The ulnar arteries (*Fig* 10 . *k*, *k*) go to the joint and muscles about the bone; while the spiral, sent off a little above the ulnars (*Fig* 10 . *j*), is mainly distributed to the extensors of the limb.

The two arteries, which are formed by the ultimate division of the metacarpals, are called the *plantar arteries;* and each of them passes upon the side of the pastern bone. When they reach the foot they are at the back of it; and each sends a branch to the fatty frog; while the main trunks pursue their course along the inner surface of the wings of the coffin bone; to unite with each other, and form an arterial circle within the substance of the bone of the foot. From the arterial circle thus formed are sent off various small twigs; which penetrate the porous coffin bone, and then bending downward unite and form the circumflex artery; which runs round the margin of the bony sole, to which blood from the circumflex artery is transmitted. Of course there are small branches also sent to nourish every part through which, or near to which, the arteries run; but from the fear of rendering our description too complex, we have omitted very much, which the reader, probably with justice, would consider mere dry detail.

The *carotid*, common trunk (*Fig* 9 . 8), arises from the right arteria innominata, and even this vessel sometimes divides into two portions. Each carotid is a very long vessel, whereby the strong action of the heart is counteracted; and the head of the horse is less liable to congestion than man's, in whom these vessels are so much shorter. As it approaches the head, it divides into what are termed the external (*Fig* 11 . 7) and internal carotids (*Fig* 11 . 6),

and ramus anastomoticus (*Fig* 11 . 5). As the *internal carotid* enters the skull: on account of the tortuosities which the vessel makes before the entrance is gained, its contents cannot be too much accelerated; nor by this contrivance can rarely accidental pressure deprive the brain of its functions.



FIG 11.

THE HEAD, WITH A PORTION OF THE LOWER JAW REMOVED, SO AS TO EXPOSE THE ARTERIES BENEATH.

1, The left carotid.
2, The thyroideal.
3, The laryngeal.
4, The vertebral.
5, The ramus anastomoticus.
6, The internal carotid.
7, External carotid.
8, The submaxillary divided.
9, 9, A branch sent to the cheek of the horse.
10, 10, The ranine.
11, The mental.
12, The internal masseter.
13, The ascending pharyngeal.
a, The posterior masseter divided.
b, The posterior auricular.
c, The anterior auricular.
d, The temporal.

The *external carotid artery* (*Fig* 11 . 7; *fig* 12 . 1, 1) first bends downwards behind the angle of the jaw (*Fig* 12); then, crossing the large membranous opening of the fauces, it is directed under the parotid gland towards the hindmost part of the branch of the jaw. The branchings of the *external carotid* are: the parotideal; the posterior and anterior auriculars (*Fig* 11 . *b*, *c*); which last give off a branch to the internal ear; the temporal (*Fig* 9 . *k*; *fig* 11 . *d*); the poste-

rior masseter (*Fig* 9 . *j*) ; the submaxillary (*Fig* 9 . *c* ; *fig* 11 . 8) ; beside which it sends off a large and important trunk, called the internal maxillary (*Fig* 12 . *a*) ; which, in its turn, sends off deep temporal twigs (*Fig* 12 . *b*) ; then the artery dispenses fine branches to the eye (*Fig* 12 . *f*) ; the soft palate (*Fig* 12 . *c*) ; the ear, and the articulation between the lower and upper jaw ; as well as giving rise to a large trunk called the inferior maxillary (*Fig* 12 . *d*). This last vessel enters the bone of the lower jaw, together with the nerve, and nourishes the teeth ; and emerges through the anterior maxillary foramen, to unite with the inferior labial artery (*Fig* 9 . *d*).

The terminating branches of the *internal maxillary* are :—

The supra orbital (*Fig* 12 . *e*) ; which passes through the foramen, upon the bony arch of the eye, and disperses upon the forehead.

The ocular (*Fig* 12 . *f*) are a bunch of arteries which, springing from the base of the orbit, are expended upon the appendages of the eye.

The lateral nasal (*Fig* 12 . *h*), which enter the brain ; and having joined the anterior cerebral leave the cranium with the olfactory nerves, and disperse upon the nasal membrane.

The infra orbital (*Fig* 12 . *g*), which enter the canal of that name, to nourish the bone and the upper molar teeth ; and appears again upon the side of the face ; through the external infra orbital foramen, to unite with the facial artery (*Fig* 9 . *h*).

The palato-maxillary (*Fig* 12 . *i*) ; which is the largest division of the internal maxillary, enters the palatine foramen ; appears upon the bony palate, along which it runs ; ultimately uniting with its fellow ; and passing through the foramen incisivum, at the back of the superior incisor teeth ; having emerged from which, it once more divides (*Fig* 12 . *j*), being expended upon the lips. It supplies all the parts along which, or near to which, it passes.

The *submaxillary artery* (*Fig* 9 . *c* ; *fig* 12 . 3, 3) proceeds forward ; passes over the inferior border of the lower jaw ; where it is merely covered by the skin and panniculus, as it runs along to the anterior margin of the external masseter muscle ; and close to the molar teeth becomes the facial (*Fig* 9 . *h*) ; and also sends off the inferior labial (*Fig* 9 . *d*).

Previous to this division are given off the ascending pharyngeal (*Fig* 11 . 13); which often sends off twigs to the soft palate, and to the larynx.

The submaxillary also gives off small branches to the internal masseter, and to the parotid gland.

The lingual, almost equal to the parent trunk in size, but is very short. And gives rise to

The ranine (*Fig* 11 . 10); and a branch to the cheek of the horse (*Fig* 11 . 9, 9, 9).

The ranine is much the largest of the above two; and takes a serpentine course among the muscles of the tongue.

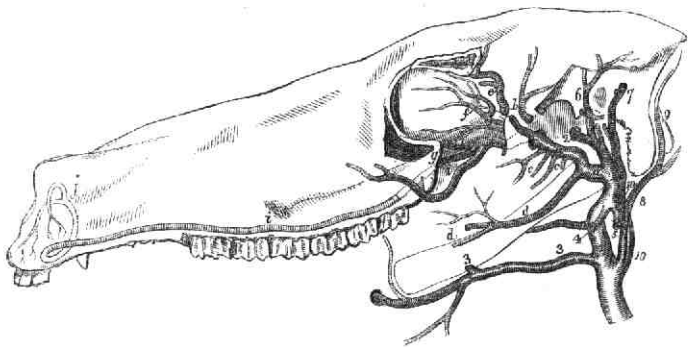


FIG 12.

THE HEAD, WITH THE LOWER JAW, THE ARCH OF THE ORBIT, AND THE ZYGOMATIC PROCESS, REMOVED TO LAY BARE THE DEEPER SEATED ARTERIES.

1, The external carotid.
2, The temporal divided.
3, The submaxillary divided.
4, The internal masseter divided.
5, The posterior masseter divided.
6, The anterior auricular divided.
7, The posterior auricular divided.
8, The ramus anastomoticus.
9, The occipital.
10, The internal carotid.
a, The internal maxillary.
b, The deep temporal.
c, Twigs to the soft palate.
d, Inferior maxillary, divided where it enters the foramen maxillary infers.
e, The supra orbitalium.
f, The ocular.
g, The infra orbital, partly concealed by the eye.
h, The lateral nasal.
i, The palato-maxillary.
j, The branches from the palato-maxillaries, after they have anastomosed, and passed through the foramen incisivum.

The mental (*Fig* 11 . 11) runs between the branches of the lower jaw; nourishing the mylo hyoideus; the internal masseter; and the gums of the lower jaw.

To the anterior of the masseter branches, one large, and two or three small ones, are also supplied from the mental.

Inferior labial runs near the lower border upon the outer

side of the inferior maxillary, close with the retractor labii inferioris muscle. It also supplies the under lip; within which it unites with its fellow of the opposite side.

It gives rise to

The buccinator arteries.

A branch, which runs to the angle of the mouth; and there divides into the superior and inferior coronary arteries, which nourish the upper and the under lips (*Fig* 9 . *e*).

The *facial artery* (*Fig* 9 . *h*) ascends in front of the masseter; having reached the termination of which, it divides and expends itself on the front of the face.

It generally sends blood to the external masseter muscle; buccal twigs; and the superior labial (*Fig* 9 . *f*, *f*); and a branch which runs to the false nostril, and to the upper lip (*Fig* 9 . *i*); all its branches freely join those of neighbouring arteries.

The *ramus anastomoticus* (*Fig* 12 . 8) proceeds upwards, underneath the parotid gland; below the styloid process it turns and gets under the wing of the atlas; where it unites with the vertebral. It gives off

The occipital (*Fig* 12 . 9), which ascends to the crest of the occiput. This last sends off a long twig, which goes through the foramen lacerum basis cranii to the dura mater, as well as nurtures other parts.

The *internal carotid* (*Fig* 12 . 10, 10; *fig*. 11. 6) crosses the extremity of the os hyoides, and by a tortuous course reaches the cranium, through the foramen lacerum basis cranii.

ARTERIES OF THE BRAIN.

The vertebrals, upon entering the cranium (*Plate* V. *Fig* 2 . 1, 1), unite with the inferior spinal artery (*Plate* V. *Fig* 2 . 2); and ultimately form one trunk, called the basilar (*Plate* V. *Fig* 3); which, when formed, gives off branches right and left to the cerebellum (*Plate* V. *Fig* 2 . 4). Having then proceeded to the front of the pons varoli the basilar is divided into three trunks, by giving off the right and left communicating arteries of the basilar (*Plate* V. *Fig* 2 . 6, 6); which join the transverse posterior (*Plate* V. *Fig* 2 . *a*), within the cranium; where for the present we must leave them. The middle communicating artery (*Plate* V. *Fig*

2 . 7) also connects the basilar with the posterior transverse (*Plate* V. *Fig* 2 . *a*); which, beside giving off several branches, transmits two large trunks, called the right and left laterals (*Plate* V. *Fig* 2 . *c*, *d*); and these, uniting with the anterior transverse artery, form the circulus arteriosis, at the very base of the brain (*Plate* V. *Fig* 2 . *a*, *b*, *c*, *d*).

The internal carotids, having entered the cranium, unite with the circulus arteriosis, at the base of the crura cerebri; which gives off, just afterwards, the ophthalmus, or central artery of the retina (*Plate* V. *Fig* 2 . 9, 9). These last, however, do not in any two subjects appear to originate exactly in the same place. The circulus arteriosis sends off two large trunks; named the middle cerebrals (*Plate* V. *Fig* 2 . 11, 11); after which, directly in front, it dispatches one trunk, called the anterior cerebral (*Plate* V. *Fig* 2 . 12); and this subsequently dividing, forms the right and left anterior cerebral (*Plate* V. *Fig* 2 . 13, 13). Thus the brain is amply supplied with blood; but whoever inspects the plate so often referred to, must be struck with the very tortuous or crooked course which one and all of these vessels take. The reason of this is obviously to check the impetuosity of the arterial current; but, notwithstanding all the care nature takes to prevent it, cases of congestion do occur.

THE POSTERIOR AORTA.

This large and important vessel (*Fig* 13 . 4. *Plate* IV. *A*) furnishes blood to all the parts of the body, save the head, neck, and fore limbs. It curves upwards and backwards, inclining in its course to the left side of the vertebræ; and supplies all but the first four or five ribs. In the thoracic passage of the aorta it gives off the bronchial (*Fig* 13 . 5); the œsophageal (*Fig* 13 . 6, 6); and the intercostals (*Fig* 13 . 7); and as it enters the abdomen between the crura of the diaphragm, it leaves the phrenic (*Fig* 13 . 8). The cœliac (*Fig* 13 . 9) is often the first true abdominal branch of the aorta, and, in most instances, is the common trunk of the splenic (*Fig* 13 . *a*); gastric (*Fig* 13 . *b*); and hepatic (*Fig* 13 . *d*) arteries. The gastric divides into two branches; one of which spreads its ramifications over the lesser curvatures of the stomach, upon the upper surface; and the other joins the splenic, and becomes the left gastric. The hepatic

artery forms a considerable branch of the cœliac: in its course to the liver it gives a branch to the duodenum; as well as one which supplies the pyloric extremity of the stomach. The splenic in its course sends blood to the pancreas; and then runs between the spleen, and the great curvature of the stomach; being in this place called the left gastric, which unites with the gastric, enclosing the stomach as in a sling.

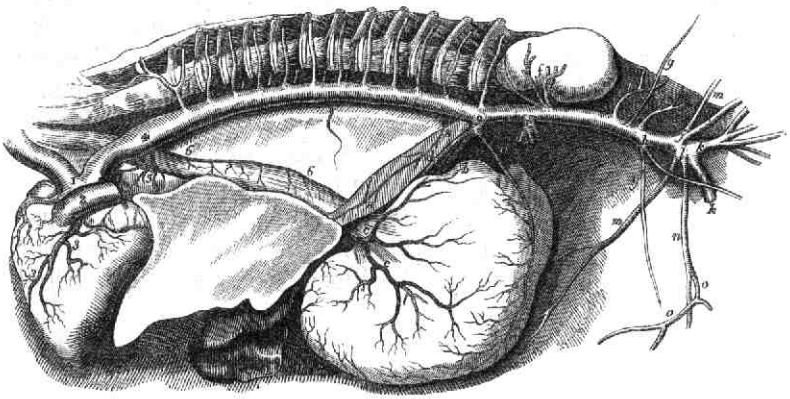


FIG 13.

THE LENGTH OF THE POSTERIOR AORTA EXPOSED.

1, The aorta.
2, The pulmonary artery.
3, The left coronary.
4, The posterior aorta.
5, The left bronchial.
6, The œsophageal.
7, The intercostals.
8, The left phrenic.
9, The cœliac.
a, The splenic.
b, The gastric.
c, Arteries derived from the gastric.
d, The hepatic.
e, The anterior mesenteric.
f, The renal.
g, *g*, The spermatics.
h, The posterior mesenteric.
i, The lumbar arteries.
j, The left external iliac.
k, The left internal iliac.
l, The right external iliac.
m, The circumflex artery of the ilium.
n, The profunda femoris.
o, The epigastric.

The *mesenterics*, *anterior* and *posterior* (*Fig* 13 . *e*, *h*), are two considerable branches given off from the aorta: the posterior being generally the last vessel emerging from the aorta; the first leaves the parent trunk, directly after the cœliac. The *anterior* is distributed to the mesentery and small intestines; giving a small branch to the pancreas. The *posterior* furnishes most of the large intestines; excepting a portion of the rectum. The mesenterics anastomose freely with each other by a particular branch; and surround the intestines, so as to form a network of vessels. The *emulgents*, or *renals*, are

given off between the two mesenterics (*Fig* 13 . *f*. *Plate* IV. *E*); and are very considerable trunks. Arising at right angles from the aorta, they at once reach their appropriate kidneys; giving off in their passage branches to supply the renal capsules. The *spermatics* (*Fig* 13 . *g*, *g*) follow next in order; parting from the main trunk, about midway between the origin of the renals and the division of the aorta. These are peculiar for being the longest arteries, in proportion to their diameters, in the body; and also for travelling a greater distance in a straight line; as well as for giving off no branches; the generality of arteries being much convoluted, and sending off numerous twigs. These vessels, in the male, pass down the abdominal rings, to join the spermatic chords; and in the female, go to the ovaries and Fallopian tubes. The *lumbar arteries* (*Fig* 13 . *i*) are usually five or six pairs; which arise from the superior part of the aorta; being distributed to the spinal canal and lumbar muscles.

The *iliac arteries*.—When the aorta has arrived to about the fifth lumbar vertebra, it first gives off the two external iliacs; and in about three quarters of an inch more, the trunk divides finally into two larger divisions.—The *internal iliacs* are so called from their pelvic situation and distribution (*Fig* 14 . *i*). The first to notice is the artery of the bulb (*Fig* 14 . *j*); sometimes given off before the iliac division, but always near it. It bends itself within the pelvis, furnishing the prostatic gland in the male; and vagina in the female; after which it proceeds to the bulb of the penis; or to the vagina. The gluteal (*Fig* 14 . *n*) is also a branch from the internal iliacs; and going through the sacro-sciatic notch, supplies the gluteal, and some of the neighbouring muscles. The lateral sacral (*Fig* 14 . *o*), likewise originating from the same trunk; sends off the peroneal (*Fig* 14 . *p*); which supplies a gluteal branch; the flexors of the thigh; and the anal muscles with part of their blood. The middle sacral (*Fig* 14 . *t*) is like the lateral, given off by the internal iliac; and both commonly travel to the end of the tail; the middle however being the smaller within the pelvis. The obturator (*Fig* 14 . *l*) often follows next; the main trunk of which traversing the pelvis, ultimately passes through the obturator foramen to the muscles of the haunch; before

it quits the pelvis it gives off the innominata (*Fig* 14 . *m*) ; which goes to the extensor muscles of the thigh ; then divides into the pubic, ischiatic, and internal pudic (*Fig* 15 . *n*, *o*, *p*) ; by which last the organs of generation in both sexes are furnished.

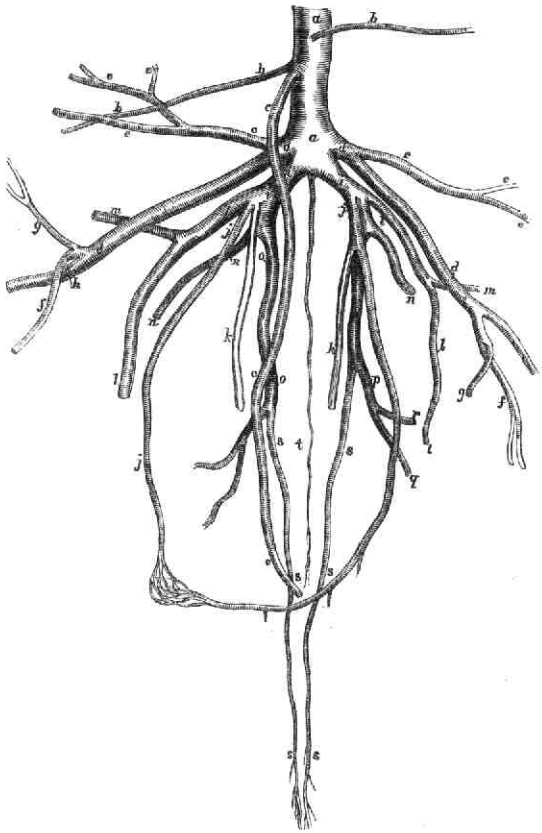


FIG 14.

THE TERMINATION OF THE AORTA IN THE TWO ILIACS, WITH THE NUMEROUS BRANCHES THAT SPRING FROM THOSE VESSELS WITHIN THE TRUNK.

a, The abdominal aorta.
b, The spermatics.
c, The posterior mesenteric.
d, The external iliac.
e, The circumflex of the ilium.
f, The profunda femoris.
g, The epigastric.
h, The femoral.
i, The internal iliac.
j, The arteries of the bulb.
k, The remains of the fœtal umbilical arteries.
l, The obturator.
m, The arteria innominata.
n, The gluteal.
o, The lateral sacral.
p, The peroneal.
q, A branch to the back of the thigh.
r, A gluteal branch.
s, Continuation of the lateral sacral.
t, The middle sacral.

The *external iliacs* (*Fig* 14 . *d*) travel more externally; but having gained the brim of the pelvis, they proceed one on each side down the iliac muscles; in which course each



FIG 15.

INSIDE OF THE HIND LEG.

a, The external iliac.
b, The profunda femoris.
c, The epigastric.
d, The femoral.
e, The inguinal.
f, Large branch to the stifle.
g, Branch to the triceps abductor femoris.
h, Branch to the posterior border of the gastrocnemii.
i, Popliteal branches.
j, Anterior tibial.
k, Posterior tibial.
l, The obdurator.
m, The arteria innominata.
n, The pubic.
o, The ischiatic.
p, The internal pudic.

gives off twigs *to the psoas* and abdominal muscles; the circumflex artery of the ilium (*Fig* 14 . *e*) being the first large branch of the external iliac. It advances across the loins, and

gives off a tube to the traversalis abdominis; and another that proceeds forwards, chiefly to supply the other abdominal muscles. The arteria profunda femoris (*Fig* 14 . *f*; *fig* 15 . *b*) also comes from the external iliac, at the termination of the main trunk; and dives amongst the thickest of the thigh; before which, however, it gives off the epigastric artery (*Fig* 14 . *g*; *fig* 15 . *c*); which runs along the border of the rectus muscle, to unite with the internal pectoral artery.

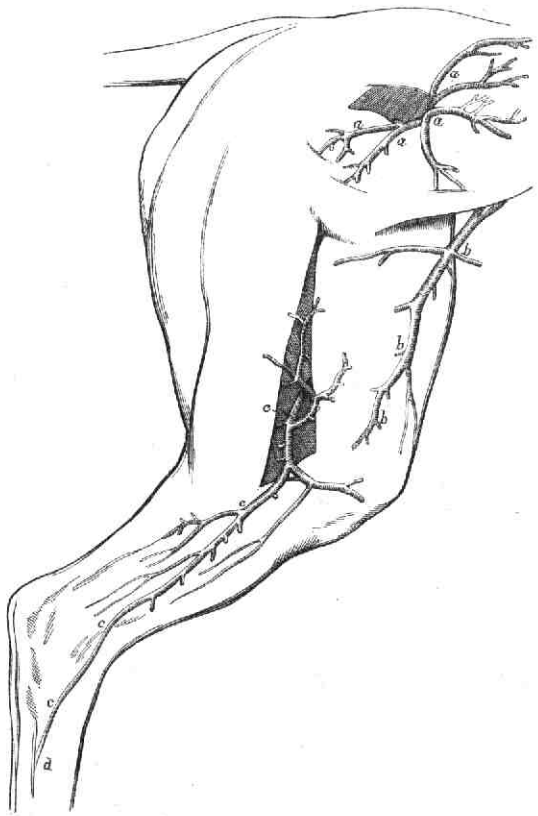


FIG 16.

THE OUTSIDE OF THE HIND LEG.

a, Gluteal branches.
b, The arteria innominata.
c, The anterior tibial.
d, The metacarpal.

The *femoral artery* (*Fig* 15 . *d*), passing out of the abdomen, descends along the internal side of the femur, to about the

middle of the bone; where proceeding obliquely, it gains the centre of the thigh; and is continued down behind that bone. Pursuing its course, the femoral artery at length reaches the sulcus at the back of the stifle; to which last it sends numerous small arteries, called the popliteals (*Fig* 15 . *i*). In its course the femoral dispatches the inguinal (*Fig* 15 . *e*); which last proceeds to get between the vastus internus and rectus; giving off branches to all the parts through which it passes. The femoral artery subsequently sends blood to all parts of the thigh; the twigs by means of which it does so having no name; and upon reaching the stifle divides into the anterior (*Fig* 15 . *j*) and posterior tibial (*Fig* 15 . *k*) arteries. The *posterior tibial* artery is continued down the posterior of the tibia. The *anterior tibial* (*Fig* 16 . *c*) forms the other division of the femoral; and runs obliquely to the external inferior part of the tibia; passing between that bone and the fibula, the artery then takes its course between the extensor muscles. It here winds round the outer side of the hock; and descending along the cannon bone changes its name to the *metatarsal artery* (*Fig* 16 . *d*); which is continued down between the large and the small metacarpal bones. It thus gains the superior part of the sessamoid bones; when it bifurcates into the two *pastern* or *plantar arteries;* following a similar distribution with those of the fore extremities.

THE PULMONARY VESSELS.

The pulmonary artery (*Fig* 13 . 2) unlike the generality of similar tubes conveys venous blood from the right side of the heart; and the pulmonary veins carry arterial blood back to the left auricle. This is their striking peculiarity or chief characteristic. The passage of the blood through these vessels is termed the *minor circulation*. The pulmonary artery is a trunk of five or six inches in length; given off from the right ventricle of the heart: immediately after which it divides into the right and left branches; the right being more considerable than the left, in conformity with the additional lobe of the right lung. Each of these branches is divided upon its entering the lungs into others; which being subdivided ramify throughout the substance of the lungs. From the minute distributions of the artery, the blood is received into

capillaries; by which minute tubes it is conveyed to the pulmonary veins; when the recipient branches increasing ultimately unite into four, five, and occasionally six principal trunks; which all terminate in the left auricle of the heart.

THE VEINS GENERALLY.

Veins correspond with arteries in their common office of carrying the blood; but with this difference; that the arteries distribute their blood from the heart to every part of the body: whereas the veins bring back the blood from the parts the arteries had carried it to, and restore it to the heart. The veins may, therefore, be considered as canals arising from minute tubes, called capillaries; distributed over every part of the body; veins becoming larger, terminate in the heart. Their coats are thin; but tenacious and elastic. Their number and calibre are greatly superior to that of the arteries. We find them distributed in two orders; a *superficial* and a *deep-seated*, which communicate freely with each other. The superficial order run immediately under the skin; the deep-seated accompany the arteries. As a guard against obstruction, as in the jaws, their coats sometimes enlarge into reservoirs (*Fig* 17 . *f*). The want of solidity and resisting power in veins is compensated by internal membranous projections, which form valves. A valve appears to be a duplicature of the lining coat of the vein; raised into two and sometimes three folds: of these, one edge adheres to the inner side of the vein; the other is free. By this formation the blood passing towards the heart, keeps the valves continually open; but when, by pressure, the fluid is stopped in its course, the valves being pressed backward, expand, and prevent its return. Valves are not distributed equally throughout the venous trunks: in some vessels, where the blood has to traverse upward, or against gravity, they are numerous; in others they are entirely wanting. They are found in veins of the extremities, excepting the feet; there are but few in the viscera; nor are there any in parts where the blood has to drop as it were into the heart. A good example of this is the jugulars (*Fig* 17 . *a*); in which the valves are placed looking towards the heart; so that when the horse stands with his head elevated, the blood only has to fall through the

vessel, the valves not acting; but when the animal feeds from the ground, and the blood has to ascend against gravity, the valves are of service, and come into full operation.

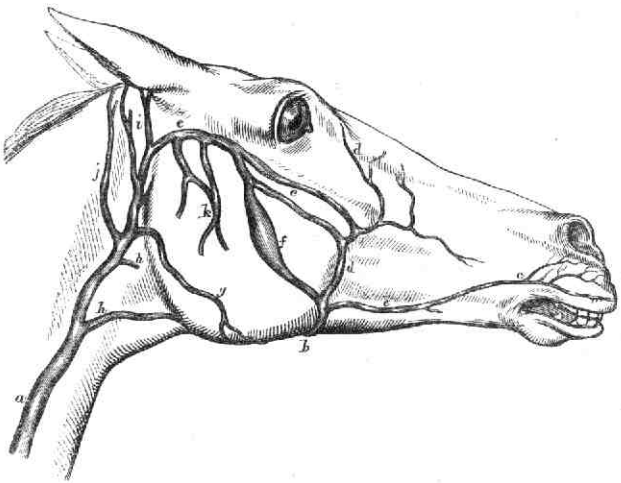


FIG 17.

THE VEINS OF THE HEAD AND FACE.

a, The jugular.
b, The submaxillary.
c, The labial.
d, The facial.
e, The temporal.
f, The sinus, or pouch, within the masseter muscle.
g, The posterior masseter.
h, The parotideal.
i, The auricular.
j, The occipital.

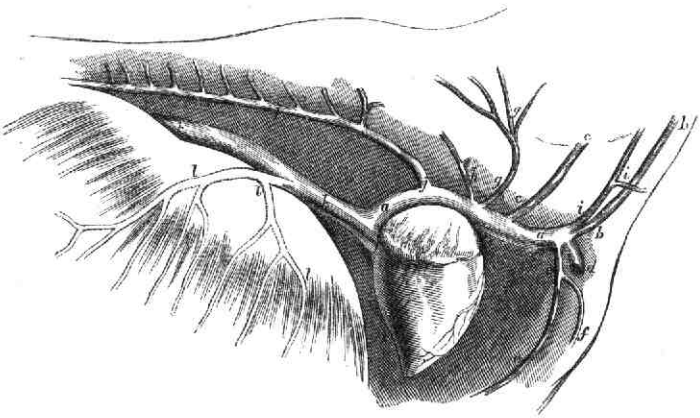
Of the origins of veins, one is from arteries, which have previously terminated in capillaries; and likewise from large cavities or sinuses. Veins are furnished with arterial blood from the vasa vasorum, given off by the nearest arteries; which blood is returned by minute venæ venarum into the nearest veins. The blood within the veins is returned to the heart in a regular flow; at least no pulsation has ever been satisfactorily detected within them.

OF THE ANTERIOR CAVA.

All venous trunks eventually terminate in the *anterior* and *posterior cavæ* (*Fig* 18 . *a*, *k*); in both of which, other veins also terminate. In this detail we shall commence a

description of the veins as vessels terminating in the heart; and bringing the blood to the centre of circulation, to be thence purified.

FIG 18.



THE TERMINATIONS OF THE CAVAS IN THE HEART; RIGHT SIDE.

a, The anterior cava.
b, The jugular.
c, The vertebral.
d, The axillary.
e, The internal pectoral.
f, The external pectoral.
g, The dorso cervical.
h, The anterior intercostal.
i, The inferior cervical.
j, The vena azygos.
k, The posterior vena cava, divested of its covering of pleura.
l, The phrenic sinuses.

The *anterior cava* empties its contents into the right auricle: opposite to the first rib it receives four principal trunks; two of which are the axillaries, and two of which are the jugulars; besides these the internal and external pectorals empty themselves also into the anterior cava, opposite to the first rib (*Fig* 18 . *d*, *e*, *f*). Subsequent to this it receives the dorso cervical and vertebral veins with the anterior intercostal; then the *vena azygos* (*Fig* 18 . *j*); which passes on the right side of the dorsal vertebræ, and receives the blood from all the posterior intercostals; all pour their blood into its channel (*Fig* 18 . *h*, *g*, *j*, *c*).

The *axillary* is a principal trunk, which, having passed over the first rib, assumes the name of the humeral; and is joined by the external thoracic or spur vein; as well as vessels from the scapula and its muscles.

The *humeral* descends towards the posterior part of the humerus, where it takes the name of *radial;* previous to its

doing which it is joined, near to its upper extremity, by a large trunk, called the ulnar. It is also united with a large vein, towards its lower extremity, termed the spiral; and these accessions increase the bulk of the humeral. Just at the point where the vessel loses the name of humeral, a large vein unites with the radial, to swell the bulk of the lower end of the humeral; and this additional vein is called the superficial brachial. All those vessels pass by the title of *superficial brachial*, which may be seen with the naked eye, from above the knee to the point of the shoulder, swelling over the bodies of the extensor muscles. Just behind the knee the superficial brachial unites with the radial; which last, exactly posterior to the joint, forms a venous circle; ultimately becoming the internal metacarpal, to divide above the fetlocks, into the two plantars; which are immediately concerned in bringing the blood from the fore feet.

These vessels originate from the capillaries, in which arteries terminate; and bring back the blood to, or end in, the heart.

The *jugulars*, one of the principal divisions of the anterior cava, run down one on each side of the trachea. The main trunk arises from the foramen lacerum basis cranii; whence it soon after appears at the back of the jaw. In this situation it receives several branches; the most remarkable of which are three vessels from the ear (*Fig* 17); a large trunk (the temporal) (*Fig* 17 . *e*), originating in front of the masseter muscle; where it springs from a junction with the facial (*Fig* 17 . *d*); which chiefly follows the course of the artery; receiving the blood of the labial (*Fig* 17 . *c*). From the junction of the facial and the temporal grows the submaxillary (*Fig* 17 . *b*); which takes the course of the artery in the first instance; and ultimately joins the jugular, at what is generally termed its division into two parts. The submaxillary is that portion which proceeds toward the channel of the lower jaw; and between it and the temporal are numerous communicating trunks. These are necessary, lest the blood should either be stayed in its course, or the vessels containing it be burst, through the strong contractions of the powerful masseter muscle, which is employed during mastication. As a further protection against such an accident, within the substance of the masseter muscle, a

vein dilates, becomes varicose or more properly speaking, forms a sinus (*Fig* 17 . *f*) ; capable of containing a large quantity of blood.

VEINS OF THE HIND EXTREMITY.

The blood from the hind foot is returned by the plantar veins ; which at the fetlock become the metatarsals. The internal metatarsal upon approaching the joint gets in front of the hock ; though afterwards it curves upward and takes a course above the tibia, under the name of the vena saphena minor. This last vessel joins the femoral above the stifle joint. In front of the hock numerous venous twigs originate ; which, increased by branches sent by the external and internal metatarsal veins, become the anterior tibial upon the outside of the leg ; which curves upward to the top of the fibula ; when, after passing under the head of that bone, it becomes the femoral.

The internal metatarsal sends a branch to the front of the hock ; the main trunk, under the name of the vena saphena major, proceeds over the inner side of the calcis ; to be continued upon the upper side of the tibia, near to the bone ; when, having passed at the back of the stifle, it proceeds directly to the flank ; after which it curves backwards, being increased by several fine twigs, and empties itself into the femoral. The vena saphena major, on its approach to the gastrocnemius muscle, gives off a trunk termed the posterior tibial ; which pours its contents into the femoral, just above the stifle ; shortly after this the femoral obtains another branch, the vena saphena minor ; which, however, a little way prior to its junction sends off a trunk, that ascends through the muscles of the thigh to pass through the obturator foramen, and join the femoral within the pelvis, under the name of the obturator vein. The femoral terminates in the external iliac ; which, after receiving the abdominal veins, runs close to the spine into the common iliac ; a very short but thick trunk.

The pudic veins ultimately end in one trunk, which empties into the ischiatic ; and this last vessel pours its blood into the internal iliac ; which being so very short soon ends in the common iliac. The lateral sacral, which receives the sacro spinal, also ends in the internal iliac. The common

iliac receives the circumflex veins, and then blends with the posterior vena cava.

THE POSTERIOR CAVA.

The posterior cava runs along the lumbar region, inclining to the right side (*Plate* IV. *B*) of the spine; when about to leave the loins it receives the two spermatic veins; and immediately after the lumbar veins by one trunk pour their contents into the larger vessel; close to these last the right (*Plate* IV. *F*) and left renal vessels, of a large size, empty their blood into the parent receptacle; which shortly afterwards passes through the top of the liver. The vena cava, as it passes through the liver, is pierced by numerous holes upon its lower surface; which holes permit the return of the blood from the hepatic veins. Having quitted the liver the vena cava passes through the right foramen of the diaphragm; and while going through this, the blood from the venous sinuses of the diaphragm is poured into it. These are the last vessels that communicate with the posterior cava; which afterwards runs within its own investiture of pleura to the right auricle (*Fig* 18 . *k*), where it is joined by the anterior cava; which travels above the heart (*Fig* 18 . *a*), till having reached its hindermost part, it bends or dips downward to gain the right auricle.

THE VENA PORTÆ.

This vessel arises from the stomach, the pancreas and intestines, &c. by capillaries; when having ended in one common trunk, it enters the liver as such a little above the hepatic duct. Within the substance of the liver it again divides and subdivides, and thus once more terminates in capillaries; from which last originate the hepatic veins that empty their blood into the posterior vena cava. The vena portæ then is peculiar for originating by capillaries, running by branches to one common trunk, and then dividing to terminate in capillaries. It is the only vein that has capillaries at both extremities; other veins originate by capillaries, but terminating by means of a large trunk within the heart. Besides this, the vena portæ has another peculiarity; it goes to the liver for secretion. All other veins carry away blood only after the secretion has been

extracted from it. That the vena portæ does go for secretion, the distribution of its capillaries, twining around the minute ends of the biliary ducts, sufficiently proves. Moreover, the hepatic artery is not large enough to furnish all the bile. This artery is not in communication with the parts which would enable it to secrete: it nourishes the substance of the liver; the coats of the vena portæ; and the tunics of the hepatic ducts; but when it has done this, the blood it contained is expended; and its venous blood is brought back by hepatic veins, and mingles with that of the vena portæ. It is the mouths of these veins, which, penetrating the posterior cava as it passes along the top of the liver, give the coats of the vessel the appearance of being pierced by numerous holes.

SECTION XII.

NEUROLOGY.

DESCRIPTION OF PLATE V.

THE BASE OF THE BRAIN, SHOWING ITS NERVES AND ARTERIES.

FIG 1.—*The brain, showing the origin of the nerves:*

A, A, the hemispheres of the cerebrum; 1, 1, the first pair, or olfactory nerves, which confer the faculty of smell; *a*, the sinus, or cavity within the olfactory nerve, exposed; 2, the second pair, or optic nerves, upon the healthy state of which vision is dependent; *b*, the decussation, or rather, junction of the optic nerves; *c*, the corpus albicantium, or pituitary gland; *d*, the infundibulum, leading to and joining the corpus albicantium at the base of the brain; *e, e*, the crura cerebri; 3, the third pair, or motores oculorum, which go exclusively to the eye for motion; 4, the fourth pair, or pathetic nerves, which chiefly proceed to the superior oblique of the eye for motion; *f*, the pons varolii; 5, 5, 5, 5, the fifth pair of nerves, or the first pair of mixed nerves, being distributed principally about the head for motion and sensation; although from these spring the gustatory nerves, or nerves of special sense. The subject from which this brain was taken had the fifth pair of nerves unusually developed; 6, 6, the sixth pair, or abducens, proceeding principally to the abductor muscle of the eye for motion; 7, 7,

7, 7, the seventh pair, or auditory nerves; being the second nerves of a mixed character which have originated from the base of the brain. This pair, however, are only motor and special; and do not include the sentient, as did the fifth pair. They consist of two distinct branches. The portio mollis goes to the internal ear, for the special sense of hearing; the portio dura supplies the muscles of the face with motion; and hence is spoken of as the facial nerve. 8, 8, a third nerve of mixed character, named the pneumogastric, principally connecting the brain with the functions of organic life, presided over by a distinct set of nerves, called the sympathetic. It divides into three branches:—(1) the glosso-pharyngeus, proceeding to the tongue and pharynx; (2) the pneumogastric, distributed to the larynx, thorax, and abdomen; and (3) the spinal accessory (the small nerve seen to join it coming from the spinal marrow), which ramifies upon the neck; 9, 9, the lingual, conferring motion upon the tongue; 10, 10, those which are called the tenth pair do not belong to the cranial nerves, but really are the first spinal; *g*, the medulla oblongata; *h*, *h*, the anterior lobes of the cerebrum; *i*, *i*, the posterior lobes of the cerebrum; *j*, *j*, the small middle lobes of the cerebrum; *k*, *k*, the cerebellum.

FIG 2.—*The arteries of the brain:* 1, 1, the vertebrals; 2, the inferior spinal, about to become a single vessel; 3, 3, the basilar, giving off transverse branches on either side; 4, 4, the posterior cerebellar; 5, 5, the anterior cerebellar; 6, 6, right and left communicating arteries, connecting the basilar with the circulus arteriosis; 7, the middle communicating artery, connecting the basilar with the posterior transverse artery; 8, 8, internal carotids; 9, 9, the ophthalmics; 10, 10, the posterior cerebral; 11, 11, the middle cerebral; 12, the anterior cerebral, dividing into, 13, 13, the right and left anterior cerebral; *a*, *b*, *c*, *d*, represents the circulus arteriosis, or circle of Willis; formed by the carotids, which divide into, *a*, the posterior transverse; *b*, the anterior transverse; *c*, the left lateral; and *d*, the right lateral communicating arteries.

THE BRAIN AND ITS MENINGES.

At the head of the nervous system stands the soft white and reddish mass contained within the cavity of the skull,

called the brain. Of its membranes or meninges, the *dura mater* is the most external; performing the double office of a support to the brain, and an internal pericranium to the bones, unto which it strongly adheres by numerous filaments. It forms several folds or prolongations; such as the falx which divides the cerebral lobes: other expansions form sinuses to receive the blood returned from the interior of the brain; and it is prolonged to line the orbits, and likewise cover the spinal marrow. The *membrana arachnoidea* appears a very fine serous membrane, in connexion with the internal surface of the dura mater; and after investing every vein or artery that runs to or from the organ, it is reflected over the free surface of the brain itself. The arachnoid is in contact with nothing but itself; and here, as in every other case, a serous membrane forms a closed sac, and facilitates motion. With regard to its forming a closed sac; the arachnoid accompanies the spinal marrow out of the cranium; but is not reflected over the nerves which emerge from that canal, or are given off by the brain. With respect to its facilitating motion; the brain, during life, constantly moves, and may be seen to pulsate in the forehead of an infant.

The arachnoid is held close to the surface of the brain, over the convolutions of which it is reflected.

The pia mater is nothing more than cellular tissue; which, entering into the substance of the brain, holds its convolutions together; as well as forms the sheath of every nerve that emerges from the organ.

The substance of the *brain*, by a natural division, divides itself into two portions (see *Plate* V. *Fig* 1 . *a*, *k*). The *cerebrum* is the first and largest portion (see *Plate* V. *Fig* 1 . *a*, *a*); its external or *cortical* part is of a pale dull red colour; and is indented by convolutions. The interior and larger portion, called the *medullary*, is white; and is after death more tenacious than the cortical substance. On separating the hemispheres (*Plate* V. *Fig* 1 . *a*, *a*) the *corpus callosum* appears of a glistening white tint. The centrum ovale is nothing more than the greatest quantity of medullary matter which can be exposed at a single cut; which must be made just above the corpus callosum, removing the top of the hemispheres. Two cavities of an oblong form, one upon either side of the corpus callosum, are called the *lateral ventricles;* and extend throughout the

length of the cerebrum. These ventricles contain a very small quantity of fluid; which is perfectly clear.

The cavities communicate with each other by a canal situated behind the *fornix;* which is no more than another name given to a portion of the corpus callosum, which projects within the lateral ventricles. Upon laying open the ventricles, the vascular web, or *plexus choroides*, is seen. The lateral ventricles are prolonged anteriorly by curved projecting hollows, communicating with the olfactory sinuses. Under the more forward portion of the corpus callosum is a semi-transparent substance; being composed chiefly of two layers of the serous membrane of the ventricles; it is called the septum lucidum. By the sides of the septum are two bulging bodies; which when divided present a streaked appearance; and are therefore termed the corpora striata. Behind these are other and lighter coloured substances; whose edge, waving or forming a curved line, is named the tenia semicircularis. The white substances themselves are called the hippocampi majores; and are very thin. Upon lifting up the fornix, or white arch which connects the hippocampi with the anterior wall of the ventricles, will be seen a communication between the two ventricles; it being perhaps better discovered directly between the two choroid plexuses; spoken of as the foramen of Munro. The plexus choroides are enveloped in a fold of the serous membrane of the ventricles; within this, and connecting the two, is a certain portion of cellular tissue or pia mater.

By cutting directly down the centre of the brain the student will gain the third ventricle; and will behind it behold a small dark coloured body called the pineal gland. In front of the third ventricle is a small hole leading downwards, spoken of as the foramen commune: by gently inserting a probe in the direction of, but under the pineal gland, a communication will be discovered leading to the fourth ventricle under the cerebellum; which is termed the iter a tertio ad quartum ventriculum. Raise the cerebellum; and directly behind the cerebrum lies the fourth ventricle: just above the opening which leads to it are four small bodies called the nates and testes, or corpora quadrigemini; and guarding the opening from the third to the fourth ventricle is a portion of pendulous membrane, spoken of as the velum interpositum.

These are the main particulars of the interior of the brain; the anatomy of which consists only of a quantity of hard words, to which it is hoped future investigations may attach a meaning and a use.

Turn up the brain now to its base. The soft masses extending anteriorly and looking like a prolongation of each hemisphere, are the first pair of nerves or olfactories (*Plate* V. *Fig* 1 . 1) going to the nose, and conferring the sense of smell. They are peculiar for having sinuses within them (*Plate* V. *Fig* 1 . *a*), and also for not taking on the character of nerves till they reach the sieve-like plate of the ethnoid bones; when they divide into a vast number of very fine nerves. The next pair are the optic, and go to the eye for sight (*Plate* V. *Fig* 1 . 2). They are behind the olfactory, and come from each hemisphere to meet in the middle, and there unite (*Plate* V. *Fig* 1 . *b*). They are peculiar for taking out of the cranium a layer of dura mater, also for having an artery within their centres—the ophthalmic (*Plate* V. *Fig* 2 . 9); as well as for their decussation; for if the right eye goes blind the optic nerve withers, and in that state can be distinctly traced to the left hemisphere.

The *cerebellum*, or *little brain*, rests upon the tentorium or bony process given off towards the interior of the cranium by the os triquatrum. The tentorium, however, is only partly formed of bone; and partly of reflections of the dura mater. It is placed immediately behind the cerebrum, which it divides from the cerebellum. It is supposed to be of use to prevent the brain being shaken in animals that leap much. The cerebellum when divided displays the white matter arranged in an arborescent manner; which is called the arbor vitæ. The dura mater, beside forming processes, also enters into the composition of sinuses. The sinuses at the top and back of the brain are first one above, and another at the bottom of the falx, called the superior and inferior longitudinal sinuses. These two are connected at the bottom by the straight sinuses; into which the veins from the interior of the brain empty themselves. These sinuses discharge their contents into the two lateral sinuses, which empty themselves into the jugular veins.

The ophthalmic veins empty themselves into the ophthal-

mic sinuses; between which from side to side there are two channels of communication running around the corpus albicantium, called the circular sinuses. Continuous with the ophthalmic sinuses are the inferior sinuses; between the two of which a branch of communication is named the transverse sinus. The inferior sinuses discharge into the lateral, which empty into the jugular vein.

Besides these there are other sinuses at the base of the brain. A large reddish body lies behind the optic nerves; which is known as the pituitary gland or corpus albicantium; and the white substance that connects it to the brain is spoken of as the infundibulum (*Plate* V. *Fig* 1 . *d*), being nothing more than a hollow portion of the very white matter forming the fornix. At the back of the corpus albicantium is seen a broad white band; crossing the very commencement of what should be the spinal cord, if it were continued so far, and forming the crus or legs of the cerebellum (*Plate* V. *Fig* 1 . *e*, *e*). The broad white band is the pons varoli (*Plate* V. *Fig* 1 . *f*). From this two white streams (the crura cerebri), which seem to flow from the before-mentioned white band, come two strings. These are the third pair of nerves, the motores oculorum (*Plate* V. *Fig* 1 . 3, 3); which go entirely to the eyes for motion. Look now a little higher up, and more backward than the root of the third pair; there will be seen a white thread, which existing upon either side of the front of the pons varoli, forms the fourth pair, motor nerves; the pathetic going to the superior oblique of the eye (*Plate* V. *Fig* 1 . 4, 4). From the sides of the pons varoli, but not very high up or far backward, are seen a couple of large roots, the par trigemini; the fifth a very mixed nerve (*Plate* V. *Fig* 1 . 5, 5). The sixth pair of nerves are situated just behind; and a little below the fifth pair, and go principally to the abductor muscles of the eye, being hence called the abducens (*Plate* V. *Fig* 1 . 6, 6). Upon the posterior part of the brain, behind the pons varoli, is placed a seventh pair of nerves; consisting of two parts, a portio mollis and a portio dura (*Plate* V. *Fig* 1 . 7, 7). The portio mollis being a nerve of special sense, and going to the internal ear for hearing; and the portio dura being a motor nerve; and as such distributed over the face. The eighth pair arise posterior to

the seventh by numerous filaments; being increased by an accessory nerve from the spine (*Plate* V. *Fig* 1 . 8, 8); and are of a very compound description; consisting of three separate nerves: the glosso pharyngeus going to the tongue and pharynx; the pneumogastric distributed to the chest and abdomen; and the spinal accessory, bestowing its chief action upon the neck before and behind. The ninth pair are like distinct numerous white strings; which ultimately unite to form one nerve, and run to the tongue for motion (*Plate* V. *Fig* 1 . 9, 9). These are all the nerves giving off within the cranium. That which is mentioned as the tenth pair, being in fact the first spinal nerves.

The *medulla oblongata* (*Plate* V. *Fig* 1 . *g*) is formed by the continuation of the substances of the brain, and by two pillars from each side; each pillar being composed of three bands: proceeding backward to the edge of the foramen magnum of the occipital bone, it takes the name of spinal marrow, and runs onward; as will be shown presently.

The arterial trunks enter the skull in a very convoluted manner; and anastomose freely with each other within the substance of the brain. The blood is returned by small veins; which pour it into the sinuses, and these empty their contents into the jugulars.

The *structure* of the brain is fibrous. It is not in itself an organ of great sensibility; on the contrary, some portions of it, as of the cerebrum, are nearly insensible: nor is the destruction of a small quantity of it necessarily fatal. It can bear gradual pressure even to the absorption of half its bulk; as is seen in hydatids on the brains of sheep; but a slight sudden pressure, as of apoplexy, destroys its life. Nothing is known of its functions; excepting that the cerebrum confers volition; that the cerebellum bestows command over muscular motion; and that the corpora quadrigemina are the roots of the optic nerves.

THE NERVES.

The *nerves* are white fibrous cords, sent off either from the cranium or spinal canal; the ramifications of which nerves are distributed to all parts of the body; being enveloped in a resistant membranous sheath called neurilema, to give them

firmness. Thirty-six pairs of spinal nerves are given off from the medulla spinalis by appropriate vertebral foramina.

The *cerebral nerves*.—The *first pair*, or *olfactory* nerves, are very large continuations of the substance of the cerebrum; and have a vacancy or sinus within their interior. They appear to be formed of both the cortical and medullary portions of the brain; and take their origin from the anterior of the organ (*Plate* V. *Fig* 1 . 1, 1), to be passed out of the cranium by the very numerous foraminæ in the cribriform portion of the ethmoid bone; after which they divide into filamentary twigs; which traversing the ethmoidal holes, are finally ramified over the surface of the pituitary membrane; by which its exquisite sensibility of smell is furnished. However moisture is essential to this sense, which departs when the nostrils are perfectly dry. There is a connexion between this nerve and the muscles of respiration; as sneezing after taking snuff sufficiently proves. This sympathy, which has been long known, has lately been very aptly termed reflex action; because the irritation of a sentient nerve is carried to the brain or to a ganglion, and thence reflected to a motor branch.

The *second pair*, or *optic* (*Plate* V. *Fig* 1 . 2), arise from four eminences proper to them, called corpora quadrigemina; which are situated behind the lateral ventricles. In their progress forwards they issue posteriorly to the third pair of nerves; and unite anterior to the pituitary gland; as that body was formerly called, from its being imagined to be of glandular structure (which it decidedly is not); in order to supply the nose with moisture. Having joined together they subsequently separate; and leave the skull by their proper holes in the cranium, each being enclosed in a sheath furnished by the dura mater; proceeding with the ophthalmic artery to enter the orbit; when, penetrating the globe of the eye, the nerve is expanded into fine network; and is called the retina, to which we are indebted for the special sense of vision (see *the Eye*).

The *third pair*, or *motores oculorum* (*Plate* V. *Fig* 1 . 3, 3), are small, and arise from the crura cerebri; being behind the second pair: they accompany a branch of the fifth pair out of the skull into the orbit; and, dividing into various

branches, are distributed to the muscles of the eye for motion only.

The *pathetici*, or *fourth pair* (*Plate* V. *Fig* 1 . 4), are nerves which take their origin near to the junction of the cerebrum with the cerebellum: they are chiefly sent to the superior oblique muscles of the eyes; and are called the pathetic, from their supposed power of turning the eyes upwards; which these muscles cannot do. They are the smallest of all the nerves of the brain.

The *pars trigemini*, or *fifth pair* (*Plate* V. *Fig* 1 . 5), are large and very important nerves; having extensive communications. They escape by numerous filamentary twigs from the pons varoli; and pass over a ganglion immediately afterwards. The sentient fibres travel over the top of the ganglion; and the motor filaments pass beneath it. Having done this they unite as a compound nerve having both feeling and motion; and in one large cord, speedily separate, forming three principal branches. First, the *ophthalmic;* which divides into the *supra-orbitar;* the *lachrymal;* and a *lateral nasal* branch; whose destinations we need not follow, seeing their names already signify them. The second, or *anterior maxillary* branch; which is the largest of the three divisions of the nerve, proceeds to the face by the infra-orbital foramen; where it gives off branches; first parting with a twig to the inner canthus of the eye; another along the tuberosity of the upper jaw bone; and two or three more which ramify within the palate; posterior parts of the mouth; and among the upper teeth.—The larger division, communicating with the portio dura, proceeds in a straight course; and divides into small and numerous branches upon the upper lip. The third division of the pars trigemini is the *posterior maxillary*, or the nerve of mastication. It sends off pterygoid branches as soon as it emerges from the cranium; after this it gives the gustatory for taste to the tongue (a nerve of special sense); numerous twigs to the throat; after which it parts with a buccal nerve to the membrane of the mouth; and then enters the posterior foramen of the lower jaw, distributing a dental nerve to the lower teeth; and a medullary nerve to the bone itself; going to the under lip, when it comes forth upon the outer side of the jaw near the symphysis. Of the

three branches of the fifth nerve the ophthalmic is the most motor; and the superior maxillary the most sentient. The inferior maxillary is of a mixed character; presiding over a particular function (mastication); and giving off a nerve of special sense (the gustatory for taste).

The *sixth*, or *abducent pair* (*Plate* V. *Fig* 1 . 6, 6), arise filamentary, to be chiefly given to the abductor muscle of the eye, being purely motor.

The *seventh pair*, or *auditory* (*Plate* V. *Fig* 1 . 7, 7), nerves, consist of two portions: that called the *portio mollis*, enters the auditory foramen in a soft pulpy form, and is distributed to the internal ear. The *portio dura*, which composes the other branch, detaches a considerable twig to the corda tympani: leaving the internal ear by the spiral canal in a firm cord, it parts with branches to the inner and outer parts of the ear: the main trunk then having first furnished the parotid gland, and, being enlarged by uniting with a branch from the maxillary of the fifth, next passes over the hindermost part of the posterior jaw, contiguous to the temporal artery; and divides, its branches diverging into the pes anserinus; distributing muscular twigs for motion about the face; and joining the superior maxillary upon the upper lip.

The *nervus vagus*, or pneumogastric or *eighth pair* (*Plate* V. *Fig* 1 . 8, 8), arise from the edge of the medulla oblongata, in disgregated fibres; and speedily divides into three nerves. The first of these is the glosso pharyngeus; which is principally distributed to the tongue and pharynx. The nervus vagus then proceeds down the neck in the sheath of the carotid artery. Having reached the anterior aorta it gives off the two recurrent nerves. The left recurrent winds round the posterior aorta; and then changes its course, going back again to become the inferior laryngeal nerve. The right recurrent leaves the nervus vagus as it passes the first ribs; and without encircling any vessel, proceeds at once to the larynx. The nervus vagus, now left alone, proceeds to supply the viscera of the chest and abdomen with sensation; blending with the various ganglia of the sympathetic system. The nervus vagus is a mixed nerve; but its sentient branches predominate. It supplies the larynx with motion; and it also gives it its exquisite sensation. It is

the nerve which conveys to the brain the sense of pain, which accompanies complaints of the chest and abdomen. It is joined by another nerve called the spinal accessory; which not being a true cranial nerve we have put in a paragraph by itself.

The *spinal accessory nerves* (*Plate* V. *Fig* 1 . 8, 8) derive their origin from filaments given off by the fourth and fifth spinal nerves. As they enter the skull, they join the eighth; when emerging thence each divides into two branches; one of which pierces the sterno maxillaris, and can be traced within the interior of the muscle as low as the sternum: the other slants off across the neck, and can be followed as low down as the trapezius muscle.

The *ninth*, or *lingual pair* (*Plate* V. *Fig* 1 . 9), take their origin from the corpus pyramidale; and both pass along the branch of the posterior jaw to gain the root of the tongue; and seem thus to be peculiarly appropriate to its locomotion, as the gustatory are to the function of taste.

The *tenth pair*, or *suboccipitals* (*Plate* V. *Fig* 1 . 10, 10), are a pair of the spinal nerves. They arise from the commencement of the spinal marrow; and are distributed to the muscles of the head and neck.

THE SPINAL NERVES.

The *spinal marrow* gives off the spinal nerves in pairs: the names and number of each spinal nerve corresponding with the vertebræ themselves. Hence there are *seven cervical*, *eighteen dorsal*, *six lumbar*, and *five sacral nerves*. Each spinal nerve owns a double origin by filamentary bundles; one coming from the upper, and the other proceeding from the under, division of the spinal cord. The filaments of the upper origin are sentient; that is, they convey sensation only to the brain; and the filaments of the lower origin are entirely motor; that is, they carry from the brain to the muscles the influence which enables them to contract upon the mere wish of the individual. The two filaments, each originate separately; and each being gifted with such opposite powers, are upon the point of leaving the spinal canal when they encounter a ganglion. The superior filaments, as might be supposed, pass over this ganglion; and

the inferior go underneath it; both being adherent to the ganglion as they pass it. Having got by the ganglion, the character of the nerves has been changed; the sentient have become partly motor; and the motor partly sentient. There is no longer a nerve of a pure character to be found; but each travels hereafter as a sentient and a motar nerve, or one of a mixed nature. Therefore, if we want to look for pure sentient or pure motor nerves, we must seek them near to their origin, from the spinal marrow; and before they have passed the adjacent ganglion.

The *cervical nerves* are seven upon each side; and are chiefly distributed to the muscles of the neck.

The *phrenic nerve* is formed of filaments from the fourth, fifth, sixth, and seventh cervicals; and from general ganglionic twigs of communication from the sympathetic: it passes into the chest near the axillary artery; when, having gained the tendinous portion of the diaphragm, it is spread over the whole substance of that organ.

The *eighteen dorsal pairs* are given off by the notches at the extremities of each dorsal vertebra; in the same manner as the cervical pairs, but these last are less considerable. They furnish the intercostal and dorsal muscles with contractility, and with sensation. Besides this the first four are larger than the others, and unite with the last few cervical, to supply the fore extremity with nervous energy.

The *lumbar nerves* are given off from the loins, in the same manner as the former; they, however, are larger; having more to do. They give feeling and motion to the sides of the abdomen; and it is some of these, together with several of the last dorsal, which are seen dividing the transversalis abdominis into sections; after having done which, and having pierced the other abdominal muscles, they enter the panniculus and expend themselves upon the skin. They also give strength and sensation to the lumbar muscles. They also supply the psoas muscles; the iliacus muscle; send off the spermatic nerve; as well as the crural, which sends twigs to the psoas and iliacus; to the vasti and rectus; and a large quantity of filaments to the gracilis; beside twigs to all the muscles inside of the thigh beyond all this.

The spinal marrow does not more than touch the anterior of the sacrum; consequently the lumbar portion has to supply the sacral nerves, and this necessity we shall hereafter see is amply provided for.

The sacral nerves are numerous and large; they form plexuses, which are derived chiefly from the lumbar, partly from the sacral nerves; from one of these comes forth the gluteal, which, accompanying the artery, goes to the muscles of that name. The lumbo-sacral nerves likewise send off a nerve called the obturator, as well as supply all the surrounding parts with motion and sensation. The sciatic nerve, which is by very far the largest nervous cord in the body, arises from a lumbar plexus, and pierces the sacro-sciatic ligament, to get at the back of the femur. We must, however, here for the present leave off, to give attention to the nerves of the anterior limb.

THE NERVES OF THE FORE EXTREMITIES.

The humeral plexus is formed by the last five cervical, and the first four dorsal nerves. By the union of their twigs a considerable bunch is formed, to which the name is given of the humeral plexus. From this bunch compound filaments are sent to all the neighbouring parts. The only nerves that we shall here notice, are firstly the spiral which winds round the humerus, and devotes itself to the extensor muscles of the fore limb.

The radial nerve proceeds to the inner side of the ulna, supplies the flexor muscles, and below the knee becomes the internal metacarpal nerves. The ulna runs downwards also to the flexor muscles, along the course of which it travels, and below the knee assumes the name of the external metacarpal nerve.

The metacarpal nerves journey down the leg upon the edges of the tendon perforatus, giving off a communicating branch with one another when about two-thirds the length of the bone. At the pastern they become the plantar nerves.

The *plantar nerves*, situated to the rear of the plantar arteries, penetrate the back of the foot: each in its passage detaches a branch immediately to the lateral cartilages; a more posterior branch to the elastic frog; and one to

furnish the laminæ. The main trunk then penetrates the coffin bone posteriorly with the principal division of the plantar artery, to be, like that, distributed over the sensitive surfaces of the pedal bone.

THE NERVES OF THE HINDER EXTREMITIES.

We have seen that some of the muscles of the haunch and thigh are supplied with feeling and motion by the sacro-sciatic nerve; which nerve principally divides into the anterior, the posterior tibial, and into popliteal twigs: the posterior tibial and principal branch, passing between the fleshy portions of the gastrocnemii, gains the hock, where it travels to one side of the perforans tendon, and separating, forms the two metatarsal nerves. The popliteal, which consist of a great number of fine twigs, go principally to the muscles at the back of the stifle joint, and to the joint itself. The anterior tibial proceeds towards the extensor muscles in front of the thigh; when, having reached the artery bearing the same name, it travels with it to the middle of the cannon; when leaving it, and passing over the fetlock joint, it spends itself on the surface of the pastern.

The *internal and external metatarsal nerves* pursue a course similar in the hind to those of the fore extremities, so that it is unnecessary to proceed with them further.

ANATOMY OF THE SPINAL MARROW, OF GANGLIA, AND OF THE SYMPATHETIC NERVE.

The spinal marrow has its length decided by the length of the tail. Thus, in baboons, it only just emerges from the dorsal region; in the horse it advances to the beginning of the sacrum; and in the kangaroo, and some monkeys with prehensile tails, it extends even to the coccygeal bones. The order of the red and white matter is opposite in the spinal marrow to that which is displayed in the brain; that is, in the brain, the red substance is the exterior of the two, whereas, in the spinal marrow, the white is externally, and the red substance is internally situated. Though the spinal marrow is anatomically said to travel along the spinal canal: neither the marrow nor the canal are of one size throughout, but the cavity enlarges as its contents become more bulky. This it does in proportion to that which it has to supply,

and the activity of the parts by which it is surrounded. The head and neck being in constant motion, the spinal marrow within the cervical region is of the medium size; however, as it approaches the fore extremity, that is, about the last three cervical and the first four dorsal vertebræ, it gradually and considerably enlarges. Then within the dorsal region it becomes the smallest of all; but, gaining the lumbar, from which the huge hind limbs are supplied, it grows larger than ever, and there it terminates in the horse. Animals with a short spinal marrow have a well-marked cordæ equinæ, or hanging bunch of nerves, from the extremity of the spinal marrow, supposed to resemble a horse's tail. In those with a longer spinal marrow the similitude is less marked; and in those with this part longer still, the most distant likeness is hard to detect.

The spinal marrow receives the same coverings as the brain; or the first having three membranes, these are also continuous over the last organ. There is no difference in their position. In each the dura mater is external; the pia mater internal; and the arachnoid, or a serous membrane, holds the middle place; and in each their structure is the same. There is, however, this difference: the dura mater is not, in the spinal, fixed to the canal, or to the bone; but upon its outer surface is found a quantity of fat. Then the arachnoid does not lie close upon the spinal marrow; but is raised far from it by a limpid fluid, as clear as distilled water, which is situated within the cells of the pia mater. Besides this, however, the spinal marrow is peculiar for having several fine ligaments, which run obliquely from the bone; and a straight ligament, which is continuous through its entire course. They are situated—the straight ligament, which is termed the membrana dentata—within the sheath, and between the true motor and sentient nerves; and the oblique (which have received no name) are external, and belong particularly to the dura mater. Their use will be referred to hereafter.

The ganglia.—Wherever there is found the red and white nervous matter mingled, there is a ganglion. The brain is only a large ganglion; with this difference however, that, unlike the rest, it is able to take cognizance of the sensation conveyed by the nerves with which it is in connexion.

Ganglia feel like hard knots, of a minute size upon nerves; but their substance is in fact as soft and pulpy as that of the brain itself. The feeling of hardness is owing to a very dense covering of neurilema, which acts to each as a tiny cranium. The ganglia are the centres of reflex motion: that is, a sentient nerve is tickled, say of the bottom of the foot, and the feeling is carried to a ganglion; thence it is transmitted to the nerves that set us laughing. The feeling may be painful, but nevertheless we cannot help ourselves but laugh. This is called reflex action, when a motor or sentient nerve is excited; and in consequence of this a different nerve, or opposite set of nerves, are called into action. The ganglia likewise presides over the sympathetic nerve; a nerve which is independent of the brain; and by the continued health of which we may live long and yet exist quite unconsciously.

The sympathetic nerve.—This nerve presides over secretion; and is the centre of those functions which are necessary to life; as the brain is the centre of all acts under the control of volition. Thus, a man may will he shall not feel hungry, and the will may in some degree master the sensation; but at length the sympathetic nerve exerts its power, the abstinence becomes painful, and the sense of pain is conveyed to the brain by the eighth pair of nerves. The sympathetic is most obvious in the abdomen, where it forms numerous plexuses; of which the solar is the largest. From these plexuses it twists round the arteries; and by these is conveyed all over the body, or wherever the blood travels; and where does it not? Wherever the vital fluid exists the sympathetic is known also to be. Beside this, the numerous ganglia from which it derives independence of action, answer the end of little brains, and are distributed throughout the body. They are discerned even within the brain itself; and fresh discoveries render us uncertain where they do not exist. The sympathetic is essentially the nerve of organic life; that is, it presides over secretion, excretion, nutrition; and all those functions which, independent of the brain, are imperative for the preservation of existence. It is well seen along the neck, where it travels within the sheath of the carotid artery; better within the chest and abdomen, as a well defined line below the ribs, upon the

bodies of the vertebræ. It is in constant communication with the spinal nerves, consequently, when other nerves are potent, the sympathetic may be present.

Of nerves.—Nerves are white glistening threads, every where to be found throughout the body. Nerves are of three kinds, motor, sentient, and special. A motor nerve conveys motion only, and is incapable of feeling. A sentient nerve transmits sensation to the brain, and is incapable of conveying motion from it. A special nerve endows a part with one sense, and one sense only. It may go to the eye for sight, as the optics do, but, if compressed or pinched, they feel no pain, and are incapable of motion; the organ then appears to emit a flash of light; thus, people speak of their eyes flashing fire, when they run against any thing in the dark. The four orders of nerves rule the body. The sentient render us cognizant of pain; the motor make the limbs move in obedience to the will; and the special endow certain parts with particular faculties; while the sympathetic nerve, over which the brain can exercise no control, regulates all the functions which go on continually without our knowledge, but are essential to the prolongation of life.

Structure of nerves.—Nerves are composed of very minute filaments, bound up in a sheath of pia mater, or cellular tissue, called neurilema. They receive much blood in proportion to their size; though they never become red. Hence we may infer the importance of the blood, since it is sent to nerves; but no nerves are sent to the blood, though many may be distributed to the tubes by which the blood is conveyed. A nerve never terminates; it passes around a part, and joins another sheath, but it does not appear to end. When cut, nerves have the power of reunion; even though a piece be taken away. It is disputed whether true nervous filaments are reproduced; but something is formed which answers their purpose, since by it is carried on all their functions. There is no immediate physiology attached to the brain, or to nerves, worthy of being inserted in this place. Books are written on such subjects; but all they assert beyond first principles is open to objection, if not to decided refutation. Special nerves terminate in fine bulbous extremities; and though we have spoken of pure motor and

sentient nerves, such however are only to be found within the cranium, or spinal canal. All those distributed over the body are of a mixed character; that is, the sentient and motor are mingled together.

SECTION XIII.

OF GLANDS.

GLANDS are vascular secretory bodies distributed over the animal frame. They are of various sizes; some being very large, as the liver, and others small, as those whose secretions lubricate certain portions of the skin, and are called sebaceous. Their *figures* are varied, and their *situation* undetermined; some being deep-seated, or within cavities, while others are altogether superficial. Glands are divided into *globate*, and *conglomerate;* they likewise receive individual names, according to their office, as *lachrymal, salivary,* &c. The *follicular* are but small glandular bodies, larger glands being composed of a number of follicles; and are variously disposed, appearing either as *sebaceous* or *mucous*. The *sebaceous* are situated near the surface of the body, and produce a semi-solid substance resembling suet; which serves to facilitate motion, or to prevent friction. *Mucous glands* are usually situated in cavities and canals; as those of the nostrils, fauces, and urethra; but in many instances they are not very evident, and the perspiratory may be viewed as a kind of altered mucous gland. Both sebaceous and mucous glands are very small, often consisting of a blind sac, with a duct.

Globate glands are oval vascular bodies, receiving lymphatic vessels at one side, and permitting the exit of the same lymphatics, though less in number, at the other; but these glands are destitute of any excretory trunk, and are peculiar to the lymphatic system.

A *conglomerate gland* is a body composed of several distinct parts, or lobuli, having numerous excretory ducts; which may unite to form one trunk common to the whole: instances occur in the parotid and pancreas, the liver and the kidneys. The glands of young subjects are larger than

those of older; and from the alteration which takes place in the kidney and thymus gland, we see that some change really does take place in their size during life. The nerves of glands are small, and their sensibility is not considerable.

Glands have absorbents, which in some instances, as those of the liver, are very large. Their bloodvessels, both arteries and veins, are usually of a proportionate size; but the magnitude of the vessels is increased when the amount of secretion is considerable, as in the kidneys. In its passage through glandular bodies, the blood is found to be retarded by means of the capillaries being convoluted around the minute ends of the ducts. All glands secrete from the arterial blood, except the liver, which separates the bile from venous blood. Among the phenomena that these bodies present, a sympathetic property is a marked one. The sight of food stimulates the salivary glands. The sympathy of the kidneys with the skin is very considerable; and, when either becomes greatly excited, the secretion of the other diminishes. In summer, when the skin is in full action, and the blood pours out its aqueous particles in great plenty, little urine is made; but in winter the reverse takes place. As the circulation through a gland is increased, so is the secretion enlarged likewise; hence under the first stages of inflammation glands secrete more, because the circulation is quickened; but in the latter stages of it, and when the circulation becomes almost stagnant, the secretion is lessened, or totally stopped. The individual glands will be described with the parts to which they more immediately belong.

The *physiology of secretion* is but little known. Those procured from one liquid (the blood) are so different; as urine, semen, bile, saliva, &c., that their evident distinctions cannot fail to excite our wonder and stimulate our inquiries. Glandular secretion has been supposed to depend on the previous existence of the secreted matter within the blood, and the glands only to separate these component particles. But the blood, it has been answered, possesses the same chemical properties throughout the body; and drawn from whatever secreting organ it may be, it is the same. Nevertheless, the elementary principles of all these

may exist in the blood in a latent state; for to secrete does appear to be a living act of the glands themselves. The sap of trees owns the same chemical properties, yet forms, by medium through which it passes, either wood, bark, leaves, blossoms, or fruits.

SECTION XIV.

OF THE COVERING OF THE BODY, AND OF THE VISCERA.

THE COMMON INTEGUMENTS.

UNDER the name of skin, exterior parts are bestowed on animals to secure them from injury, and to protect them from cold. These components are the cuticle, or insensible skin, and the cutis, or sensible skin; and connected with these, are the adipose, cellular membranes, and the panniculus carnosus. While outside of all are seen hair and hoofs; the former of which we shall first notice.

The hair.—Each hair is a little tube, whose bulbous end arises within the cellular web immediately attached beneath the cutis, or true skin: it penetrates the cuticle, and appears exteriorly of indeterminate lengths, figures, and sizes. Thus those of the mane and tail are large and long; those above the eyes and around the muzzle are stronger, but of diminished length; while those which extend over the body generally are very short and fine. Each hairy tube is formed of an external coat, derived from the cuticle, within which the horny substance is enclosed. The horny portion is so disposed as to form each hair into an elongated cone. Age is accompanied by a change in the colour of the hair, from a darker to a lighter tint; the hair which arises after a wound is usually white; which can be accounted for only by considering the part to be in a state of debility, and to have lost the power of secreting the colouring matter. The inclined position of the hair admirably adapts it to the purposes of protection for which it is designed. This position sometimes becomes disturbed, partly by a derangement in the vascular bulb of the hair; and in a greater degree from a derangement in the skin itself; originating in a sym-

pathetic communication between the outer covering of an animal and the internal parts. The hair is kindly allowed to sympathize with the wants of the body generally, and it grows even thick and curled in some very cold countries. In the Orkneys, the horses retain their long hair all the year, and English horses taken there do the same. But with us, as the coat falls off (the mane, tail, and fetlocks, being permanent), so the animal presents a fine short coat in the spring; which is succeeded by the ample shelter of the winter covering. We have proof there is a sympathetic effect between the skin and constitution, from what takes place in horses that are constantly immured in hot stables: in them, the body not needing any increase to the covering, the summer coat either remains; or, if it be changed, it is for one with the same length of hair. Most stimulating substances have the effect of promoting the change of coat, whether it be heat or physic; and, aware of this, idle grooms give their horses spice and other stimulants to quicken their moulting. The general growth of hair appears to require considerable powers of the constitution; thus horses at the time of moulting usually have an increase of pulse, dry mouth, and other slight febrile symptoms. As the hair appears to be a production of the true skin, so, if by any means the skin itself becomes destroyed, the hair is not reproduced; thus in blisters, when properly applied, the cuticle only is raised: but if the blistering matter act very strongly, and the cutis be destroyed, a permanent baldness is the consequence.

Hair is a long protruding substance, in structure not unlike to a cane; being covered externally with a glistening dense material, and being of a spongy interior, having a canal through its centre. It withers as it projects. It is of itself not sensitive, yet it conveys feeling very speedily. The horse has hairs that appear to be of three different kinds, but all are of the same structure. Those that cover the body; those that hang down from the mane or tail; and those that are placed about the nose and eyes, all are alike; all have the same structure externally, and all originate by bulbous vascular extremities, situated beneath the cutis.

The *cuticle* is a firm insensible covering to the true skin. The substance of the cuticle is by no means equally thick

in every part: on some its quantity is considerable, as on the back and extremities; and on others it is very thin, as over the lips, &c. It is much increased by pressure. Over the knees, the points of the elbows, and hocks, it becomes likewise much increased from this cause, or by the animal constantly rising and lying down. Within the fore arm, and on the inner side, behind the cannon, it produces a substance not unlike horn, which grows to a considerable length, and falls away in scales. The cuticle is a secretion of the cutis, and adheres firmly to the numerous papillæ of its matrix. The cuticle may be separated by maceration and by boiling in the dead subject; in the living, by frictions and stimulants, as blisters. It covers the skin throughout its whole extent, except at the hoofs, which it is probable are themselves only a species of cuticle, and hair assuming another form. The cuticle is also continuous with the epithelium, or outer covering of mucous membrane, with which it blends at the eyes, nose, mouth, and anus. The cuticle is perforated by the perspiratory ducts; and by sebaceous glands, opening within the tubes that shelter the bulbous extremities of the hairs. Through the perspiratory orifices, the insensible perspiration passes off; and through the sebaceous glands, the cuticle is furnished with an unctuous substance which keeps it soft and pliant. Blisters applied, irritate and inflame the true skin, and occasion so great a deposit of serum underneath, that, the cuticle being impervious, the external covering is raised by its pressure in bladders. The insensible skin is speedy in its reproduction, forming itself anew in a very short time after its removal from a healthy surface.

The *rete mucosum* is nothing more than the first secretion of the cuticle. The cuticle is secreted in minute ovoid bodies, that in their new state contain a certain quantity of pigment. This pigment is lost as the secreted cuticle is pushed upwards; while the particles, from being ovoid, become more and more flattened, till, upon reaching the surface, they have become quite flat, quite colourless, and fall off, as scales, or scurf.

The *cutis*, or *true skin*, is a very highly organized membrane, whether we regard its vascularity, sensibility, or the intimate reticulation of its fibres. Its density of structure

will be apparent when we view it as leather. It is not equally thick in every part of the body; but, like the cuticle, is most dense in the parts most exposed; as may be seen in the extremities, particularly over the fetlocks, knees, and hocks; as well as over the back, belly, and some parts of the head: it is also much more loose and flexible in some parts than in others, to admit of motion. It is connected internally, with the cellular and adipose membranes beneath it; and wherever it is so connected it is more loose, in proportion to the amount of cellular tissue dividing it from the muscular substance: in some parts it is thrown into folds, to admit of instant action, as behind the fore legs. Its outer surface is garnished with numerous papillæ, which are small eminences extremely sensitive, lying under the cuticle, which they secrete in a fluid state; and wherever the skin is most sensitive, these papillæ are found most extensive. The cutis, like the cuticle, is perforated by numerous openings, which are the mouths of ducts. The cutis is elastic, as we know by the effects of pregnancy, in which it becomes greatly distended; yet soon recovers its former dimensions. The bloodvessels, nerves, and absorbents of the cutis are most abundant.

SENSE OF TOUCH.

This sense principally resides in the skin, which is *universally affected* by many external circumstances, as those of heat and cold, dryness and moisture. But it is by some particular parts, as the lips, that horses attempt particularly to distinguish objects; and in these it is observed, that the cutaneous nerves are more numerous, and the cuticle much thinner. The irritability of the skin is frequently very great: that mixed sensation between pain and pleasure called tickling is an instance of its susceptibility.

Adipose membrane, or *fat*, forms a considerable portion of the body of most animals; but it cannot in the horse be regarded as a complete investment, since many parts are without it, as the eyelids, ears, sheath, and some parts of the extremities. It appears composed of a membrane, so disposed as to form cells, neither the number nor the size of which are the same in all parts of the body. In the mesentery, omentum, and about the kidneys, they are large

and numerous, and their contained matter is of rather a solid consistency: on the surface of the body these cells are smaller; and in some of the bones, where the medullary juice is nearly fluid, they are very small. The adipose cells do not appear to communicate; which forms a very essential difference between this tissue and the general connecting cellular membrane.

The *fat* is an unctuous juice that is secreted or poured into the cells of the adipose membrane; at first in a fluid form, from which, in particular places, it gradually becomes of a firmer consistence. It appears in greater quantity in some parts of the body than in others; forming in the abdomen suet, while that over the surface of the body, and within the bones, it is semi-oleaginous, and in some almost approaches to oil. Fat is wholly unorganized, having neither nerves, arteries, veins, nor absorbents; and however much it may be involved by general acute disease it cannot itself originate any disorder.

The *uses of this substance* appear to be several: it may be considered as a guard to parts, and its distribution strengthens this opinion: hence it is found covering the nerves and bloodvessels, especially such as are in the neighbourhood of hard parts, and liable to pressure. It fills up most depressions, and thus adds much to beauty: this is instanced in the eye-pits, which in young horses are filled up with this substance: it is useful also in lessening that irritability of the cutaneous nerves so remarkable in young animals; and for which reason we find most of the adeps in early life distributed exteriorly; while that of older subjects is placed mostly within the cavities of the body. In quadrupeds of all ages, the omentum is very plentifully supplied with it; but in some more than in others; in the horse it is proportionally small, and the quantity of abdominal fat *generally* is in him very limited, as it is in most animals destined for extraordinary speed. Even the kidneys of the horse are but sparingly furnished with adeps. In well fed oxen the fat fills up the interstices of the muscles, and is placed in the cancelli of bones, where it is generally termed *marrow*. The most important of the uses of the fat to animals, however, is to form a depôt for the support of the constitution under the accidental want of nourishment:

hence much fatigue produces a rapid absorption of it. It is from this cause that animals who fast long, from the highest state of obesity become wholly lean and impoverished: thus the hybernating bear, who enters his wintry habitation surrounded with an immense quantity of adeps, leaves it in the spring greatly emaciated; having been supported during his torpidity by the absorption of animal oil, and not, as is vulgarly supposed, by sucking his paws; which probably are only wrapped around his nose, but never enter his mouth. Animals living a life of rest appear to have a tendency to form fat, but not in an equal degree; for, in addition to inaction, there must also be a certain disposition to lay on fat. A particular form of body is favourable to its accumulation, of which the circular carcass is the best example.

Cellular membrane forms the innermost layer of almost every part of the body. Its cells freely communicate with each other throughout the whole body; a fact well known to butchers, who blow up the newly killed calf from any one point, until not only the surface, but even the viscera, become distended by the air. This cellular structure is exemplified, likewise, by the emphysematous distention which follows wounds of the lungs; from which particular injuries these cells have a disposition to inflate. Cellular membrane is a more general substance than is supposed, for even ligaments are but a modification of it; nor are aponeuroses, or tendons, in any way dissimilar. We already know that it exists in different quantities, in various structures, but enters into all parts. It is the general connecting medium between distinct parts; it unites the skin to the body; it enters into the interstices of muscles; it connects filamentary substances, and holds together the granulated: it is also vascular and elastic. Anasarca has its seat within its cells; and its uses are various. Feeble as it seems, cellular tissue holds the various structures together. By it nerves are retained in cords; by it arteries are confined; by it muscles are bound up; and by it freedom and independence of motion is secured. It is always most loose and abundant where the action is most extensive or most frequent.

OF THE PANNICULUS CARNOSUS, OR SUBCUTANEOUS MUSCLE.

Providence having denied hands to horses, has given them, instead thereof, a cutaneous muscle; which having an intimate attachment to the integument, and being extended nearly over the whole body, enables them to corrugate the skin; thus to shake off dust, and perform other purposes necessary for their convenience. In the mammalia with short hair, it is, by the extent of its attachments, capable of very powerful and diffused operations. Its centres are usually muscular, and its terminal attachments often aponeurotic; by which, as either or any of these become the fixed point, the action of the whole may be changed at pleasure. *On the head and face* this muscular expansion will be found thin, but strong; being there called the retractor anglioris, it extends over the cheek, stretches itself downwards to the lips, and loses itself in the labial investments. It is entirely wanting upon the forehead, which is in a measure protected by the forelock. *On the inferior portion of the neck* it is evidently muscular; being strongly developed over the windpipe, but deficient in those parts to which the mane might, in a state of nature, be thought a protection.

The *panniculus carnosus of the body* extends from the anterior edge of the scapula, and downwards to the upper part of the arm; but is continued lower by the union of its aponeurotic expansion, which carries the corrugating action along the leg. In proceeding over the sides of the trunk, it may be said to be truly fleshy; but the attachments it sends upwards to the spine are most of them semi-tendinous; as those it sends downwards to the median line of the abdomen are principally aponeurotic. In the region of the flank it radiates, but is continued by a strong aponeurotic expansion into the groin, partly covering the penis; and is then continued inwards, to unite with the fascia of the inside of the thigh. Posteriorly it becomes much stronger, ultimately blending with the fascia lata. It is almost wanting upon the haunches, a part which the tail was obviously designed to protect. The fleshy pannicle is very plentifully supplied throughout with nerves; distributed to it in very considerable branches, and many of

which penetrate it to enter the skin. A very large nervous bundle enters it from under the shoulder, and it receives one or more twigs from between each rib: it is likewise as well supplied with bloodvessels from the intercostals and neighbouring parts. Therefore its general living powers are very considerable; and these are further aided by the length of its muscular fibre, which enables it to act instantaneously, and with irresistible effect. A horse, by the spasmodic power of this muscle alone, can sometimes shake off the harness, which the ingenuity of man has been exerted to fix upon him.

ANATOMY OF THE HEAD. OF THE HEAD GENERALLY.

DESCRIPTION OF PLATE VI.

THE RIGHT DIVISION OF THE HEAD A LITTLE TO THE LEFT OF THE MEDIAN LINE.

a. The septum nasi, or cartilaginous wall which separates the nostrils. The Schneiderian membrane is still upon the cartilage, consequently the ramification of the vessels are faithfully delineated; *b*, the cerebrum; *c*, the cerebellum; *d*, the frontal and facial sinuses; *e*, the tongue; *f*, the soft palate, showing its pendulous condition as well as its inclination backwards; *g*, the fauces. The lines crossing this part denote the courses taken by the food and air as they enter the stomach or lungs to nourish the body; showing, likewise, that these cross each other; *h*, the bag of the pharynx; *A*, the opening of the nostrils; *i*, the epiglottis; *j*, the larynx; *k*, the œsophagus or gullet; *l*, the trachea; *m*, the spinal marrow, covered by the arachnoid: part of the dura mater or outer covering of the spinal cord may be seen immediately above, in a line which waves anteriorly; *n*, the spinal marrow, in its passage through the foramen magnum, divested of its coverings; *o*, the tooth-like process, whence the second cervical vertebræ is called the dentata; *p*, the cup of the atlas, into which the process of the dentata fits.

THE EAR.

The *ears* are formed of an inner and outer part. The form of the outer ear is very wisely adapted to the various habits and manners of the animal. The *external ear* in the horse presents a most advantageous form for catching the slightest sound; it is moveable; and hearing appears to be the only double sense that is equally true when the organ of one side alone is used; for the horse is commonly seen with one ear directed forward and the other backward. The hair, within the tube, is long and fine, and guards it from the attack of insects, and the entrance of dust or dirt; hence the clipping of this hair may prove very prejudicial: the inside of the ear is also furnished with a peculiar kind of gland, which secretes a whitish substance.

The *cartilages* of the ear are three. The *concha* is that conical body which gives to the ear its figure; it is covered by the skin and muscles. This cartilage is attached to the cranium, through the annular cartilage, with which last it is connected through ligamentous union. Within, and at the base of the concha, is the *annular cartilage;* a small moveable body, whereby the external cavity, around which the cartilage is placed, is rendered more tortuous. The *angular cartilage* is situated upon the forehead; upon which it is moved, and with it the other cartilages are connected.

Muscles of the ear. The cartilages are moved by muscles, of which there are several, as the following description will sufficiently prove.

Attollens maximus. *Origin.* From a central line upon the forehead; from the frontal fascia; and from the frontal arch. *Insertions.* Into the triangular and conchal cartilages. *Action.* To adduct the concha, and draw the triangular cartilage upward and forward. This muscle may be separated into several layers.

Attollens medius. *Origin.* By two heads from the zygomatic arch. *Insertion.* Into the angular cartilage, its dorsum, border, venter, and anterior angle. *Action.* Acting by itself to draw the triangular cartilage downward and forward; acting with the maximus to render the angular cartilage firm.

Attollens inferior. *Origin.* From the centre of the

forehead. *Insertion.* Into the hind and lower part of the concha. *Action.* To adduct the ears.

ANTERIOR CONCHÆ. *Origin.* From the top of the angular cartilage and the temporal fascia. *Insertion.* Into the interior of the concha. *Action.* To assist in rotating the ear, and to hold its opening forward.

RECTUS CONCHÆ. *Origin.* From the top of the angular cartilage. *Insertion.* Into the inner side of the concha. *Action.* To adduct the ear, and incline its opening backward.

INTERNUS CONCHÆ. A pair of decussating muscles. *Origin.* From the bottom of the angular cartilage. *Insertion.* Into the lower and hind part of the concha. *Action.* To rotate the ear, and incline the fissure backward.

ABDUCTOR CONCHÆ. *Origin.* From the surface of the parotid gland. *Insertion.* Below the fissure into the concha. *Action.* To abduct the ear.

PROFUNDUS CONCHÆ. *Origin.* Back of the meatus auditorius. *Insertion.* Near the root of the concha into its inner border. *Action.* To slant the ear forward.

CONNECTORES CONCHÆ. Two small slips of fibre upon the concha, passing from one border to another, near to the termination of the fissure. *Action.* To diminish the size of the opening to the ear.

CIRCULATORES CONCHÆ. A circle of fibres also passes round the surface of the concha, near to the middle. *Action.* To keep the point of the cartilage erect, and with the connectores to diminish its opening.

RETRAHENS SUPERIOR. *Origin.* From a white line at the back of the pole. *Insertion.* Into the back of the concha. *Action.* To draw the ear backward; both acting would incline the ears outward.

RETRAHENS MEDIUS. *Origin.* From the back of the pole. *Insertions of the outer head.* Into the outer and lower part of the concha. *Of the inner layer.* Into the lower border and inner surface of the concha. This might be well divided into two muscles. *Action.* To rotate the ear, and also to incline it backward.

The *meatus auditorius* is in part bony, and in part cartilaginous; the outward extremity being furnished with cartilage. The inside of the ear is said to be lined with

common skin; which, however, in this part assumes an altered appearance, and becomes still more fine and attenuated as it lines the meatus auditorius, across the bottom of which it is stretched. This skin has upon it several follicles, to secrete the wax of the ear. The *membrana tympani* is the covering of a cavity called the tympanum of the ear; over which this delicate membrane is expanded, and by which the inner is separated from the outer ear. The tympanum is a portion of the *internal* cavity, being irregularly spherical. It contains four small bones, which are named, according to their supposed resemblances, incus, malleus, stapes, and orbicularis; by whose movements it is conjectured the impressions received by the membrana tympani are regulated; and which impressions receive further modifications within the more interior parts. These bones are moved by muscles, which it would here be a waste of time to describe, as the ear of the horse is beyond those delicate remedies by which deafness is relieved. The internal ear presents several openings; as those of the mastoid cells, the Eustachian tubes, and the communication between the cavity and the labyrinth. The *mastoid cells* are small irregular cavities in the substance of the mastoid processes, of the petrous temporal bone; lined by a fine membrane, and communicating with each other, having a common entrance near the Eustachian canal. The *Eustachian tube* is an opening at the upper and anterior edge of the hollow of the tympanum, forming a duct which is in part bony, and in part cartilaginous; extending from the tympanum to the guttural pouches (*Plate* VII. *j*), at the posterior part of the nasal cavity.

The guttural pouches (*Plate* VII. *j*) are large and empty sacs, whose use is not known; and whose size is by no means equalled in other quadrupeds: but in the horse they are opposed to each other, being connected only by transparent cellular tissue. Each is closed by a valvular opening, which separates it from the nose; and each seems to be nothing more than a bladder of mucous membrane placed within the centre of the horse's head. They may have some influence upon the voice; but the principal service to us at present appears to be to fill up a space which else would be left vacant, and thus to keep up that beauty

which nature preserves throughout the higher order of her creatures.

The *fenestra ovalis* is an opening between the tympanum and the vestibule. The *fenestra rotunda* is situated inferiorly to this, and is the entrance to the mastoid cells. The *vestibule* is a cavity immediately beyond the tympanum. The *semicircular canals* are three bony canals, which communicate with the vestibule; and the *cochlea* is a partially double spiral canal, within the opening into the vestibule and into the tympanum. These spiral convoluted canals, partially divided from each other by a fine membrane, are filled with a thin fluid, to perfect the undulations communicated by the tympanum. The *nerves* of the inner and outer ear are furnished by the portio mollis of the seventh pair. Blood is furnished to the organ, both internal and external, by means of the carotids; which blood is returned by the jugulars.

SENSE OF HEARING.

The collision of elastic bodies produces phenomena which are called sounds; thus a tremulous motion communicated to the surrounding medium extends in all directions, and at length reaches the external ear whose form is admirably adapted to receive a large portion of these sonorous waves; which are then reflected from the cartilaginous sides of the concha, till they reach the bottom of the outer ear. Impinging upon the ear-drum, they force it into similar oscillations; which being communicated to the fluids in the spiral channels of the inner ear, finally act on the acutely sensitive expansion of the auditory nerve, and produce those sensations we call hearing.

THE EYE.

The *eyes* of the horse are not situated, as in the human, directly in front of the face; but have a more lateral aspect, to increase the field of view. Each eye may be divided into eye and appendages.

The eye, which we shall first describe, is situated in a cavity formed by several bones, and called the orbit. Within this cavity, the globe, surrounded by its moving agents or muscles, rests on a quantity of fatty matter, serving to give

prominence and beauty to the orb; while the orbits themselves are lined by a periosteum furnished by the dura mater.

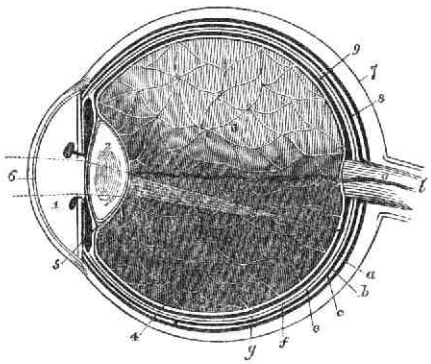


FIG 19.

DIAGRAM OF THE EYE.

0, The optic nerve.
l, The ophthalmic artery.
1, The aqueous humour.
2, The crystalline humour and lens.
3, The vitreous humour.
4, The hyaloid membrane, which secretes the vitreous humour.
5, The capsule of the lens, kept in its situation by the hyaloid and aqueous membranes.
6, The aqueous membrane, which secretes the aqueous humour behind the cornea.
7, The sclerotic coat.
8, The choroid coat.
9, The retina.
a, The tunica vorticosa.
b, The secreting membrane of the choroid.
c, The pigmentum nigrum.
e, The tunica Jacobi.
f, The expansion of the optic nerve.
g, The arterial tunic of the retina.
The black spots upon either side of the pupil, at the corpora nigra.
The thin lines denote the course of a ray of light.
The large lighter space is the tapidum lucidum.

The humour of the eye, upon which the round shape of the globe mainly depends, are three in number; the aqueous, which is most forwardly situated (*Fig* 19 . 1). The crystalline, which occupies the middle place (*Fig* 19 . 2); and the vitreous, holds the most backward or deep-seated position (*Fig* 19 . 3). Of the three, the vitreous is by very far the largest. The aqueous is the next in amount, though able to bear no comparison with the vitreous; and the crystalline is the least in quantity. In density, the crystalline is by very far the most dense. The aqueous and vitreous being equal in this respect, and in the physical qualities resembling the clearest water. But why then is one called the vitreous? Because some of the

old observers imagined it resembled molten glass; which at first sight it does appear to be somewhat like. When the sclerotic, the choroid, and the retina are cut through, the vitreous humour does not flow out like water, which we have asserted it to be; but hangs as a thick clear jelly from the incision. And why is this? Because the cavity of the vitreous humour is lined with a fine, clear, and perfectly transparent membrane, which is formed into cells (*Fig* 19). Each of these cells, which is rather minute, constitutes a closed sac; and in this little bag, without an opening, the water is contained. The reader can now understand why the vitreous humour would appear dense, without actually in this particular exceeding the aqueous humour.

The use of the humours is to distend the globe of the eye; or to keep the sac formed by the sclerotica and the cornea continually on the stretch, or always of a globular form.

The aqueous humour fills a cavity, bounded anteriorly by the cornea, and posteriorly by the crystalline lens (see *Fig* 19). This limited space is divided into two chambers. The anterior chamber is by far the largest, and consists of all that space between the posterior of the cornea and the anterior of the iris. There is, however, a small dark space between the back of the iris and the front of the crystalline lens, which is termed the posterior chamber. When a puncture is made through the cornea so as to let out the aqueous humour, the cornea is corrugated, or thrown into various minute and irregular folds. Yet this cornea, the shape of which appears to depend upon the pressure of the aqueous humour from behind, is a very compound substance. If it be cut out from its situation, and taken between the points of the finger and thumb, it will be discovered to be laminated; because one part will be felt to slide upon another. It consists of several minute layers, as many as fifteen; though it is not thicker than a sixpence. It is also composed of two distinct parts. The most forward of which is fibrous, and the most posterior elastic. This last part is so elastic, that if freed it will maintain its original form, and assume no other.

The crystalline lens (*Fig* 19 . 2), or humour, is retained

in its capsule (*Fig* 19 . 5), which encircles it. A certain water, or liquid, is said to surround the crystalline lens; but this is found only some time after life has departed, and is not present immediately after death. The lens itself, when considered independent of its capsule, is organized. We know this, because it undergoes change; because vessels are seen entering into its substance in disease; also because the crystalline lens itself can be absorbed, and bone deposited in the space a crystalline lens once occupied. It is convex both before and behind, or on each of its sides; though more convex on one side than the other. The crystalline lens is lamellated in structure, and is more dense as the centre is approached. Its use is to refract the rays of light still more than the cornea and the aqueous humour have done; and to transmit them thus refracted to the vitreous humour, which likewise brings them closer together (see *Fig* 19).

The vitreous humour (*Fig* 19 . 3) is all that we have said; but besides this it has an artery which runs along its centre to the crystalline lens, which it nurtures (*Fig* 19 . *l*). This artery likewise supplies the membrane of the vitreous humour with blood for secretion. Besides the parts we have spoken of, there are others named the canal of Petit, &c., which do not exist in a perfectly fresh eye, but require maceration, &c. for their development. Of such fanciful structures, therefore, we shall take no notice.

The coats of the eye.—The *conjunctiva* is a fine, delicate, transparent and mucous membrane which lines the internal surface of each eyelid, and is reflected from thence over the anterior part of the globe of the eye: being thus reflected, freedom of motion is allowed, yet the eye is amply secured within the orbit; and the entrance of any foreign substance beyond the point where the membrane folds is completely prevented. The conjunctive coat, where it is opposed to the pupil, is transparent; too fine to allow of demonstration, so that it may unchanged admit of the visual rays; and here, therefore, although it be not entirely deprived of vascularity, it does not allow, when the organ is in health, of vessels circulating, sufficiently large to be seen. That portion which lines the eyelids, on the contrary, is

more highly vascular; does receive red blood, and forms a secreting surface to defend these parts from the irritation of the tears.

The *sclerotica* (*Fig* 19 . 7) is the outermost of the more complete investments of the globe; and is likewise the thickest and strongest; forming all the posterior and larger part of the globe; the smaller and the more forward portion of the sphere consisting of the cornea. The *cornea* (*Fig* 19 . 6), as part of a tunic, it extends over the anterior portion of the bulb of the eye; being distinct from that portion of which the larger and posterior part of the globe is composed. The cornea, in fact, is that transparent portion which the spectator looks through when he observes the eye of a living horse. The convexity varies much in different subjects; by which the focal distance is adapted to the viewing of near or more distant objects. In man, the focal distance of the eye is less than a foot; thus his cornea is considerably more convex. But the horse has to see objects from the ground; in him, therefore, the convexity is less, and the focal distance of his eye is probably some feet. The cornea in every animal is organized; not highly sensitive; but capable of repairing injuries of a size and importance almost exceeding belief. Its reparative powers are very active; and though less organized than most parts, yet in the speed of restoration it comparatively exceeds all others.

The iris.—This moveable curtain is situated within the eye, near to the cornea; to which it corresponds in outward shape, being attached to the ciliary ligament, that helps to unite the cornea to the sclerotica. The colour of the eye depends on the iris; being wholly governed by a black pigment, secreted at the back of the iris, and called the uvea: the office of this pigment is to absorb all rays of light turned upon it. Wall-eyed horses have none of this pigment; therefore their vision must be deficient; the human eye is commonly grey, black, or blue: in the horse it is usually brown; from the deep colour of the pigment being partially visible through the iris. The space between the inner circumference of the iris is usually termed the *pupil;* the size of which necessarily increases or decreases as the

iris contracts or dilates. The colour of the pupil is dependent upon the quantity of light admitted to the bottom of the eye; being blue or green in a good light; and perfectly black in a bad one. At the margin of the iris are seen some little globular bodies or bags containing a black pigment (*Fig* 19); the largest of which are attached to its upper margin. These bodies are called the corpora nigra, and appear designed to stifle a portion of the rays when the sun is too powerful; which, in a contracted state of the iris, they are able to do by almost filling up the remaining opening, so as to admit but little light; though a crevice may serve for sight. The iris, therefore, it is evident, is a very important part, for by its actions vision is in a great degree regulated. It is stimulated to contract by the excess of light; and consist of two orders of muscular fibre. One is circular, and serves to render the pupil small. The other radiates from the margin of the iris towards the centre, and answers the purpose of enlarging the pupillary opening. Light is the stimulus which causes the circular order to contract; also relaxes the straight order of fibres to which darkness supplies energy, as light stimulates the circular ones.

The *choroid* coat (*Fig* 19 . 8) is a secreting membrane, spread over the internal surface of the sclerotic; and the *ciliary processes* are plaits or folds of it attached to the *ciliary ligament*. The pigment (*Fig* 19 . *c*) is distributed over the greater portion of the internal surface of the choroid coat; but is deficient on a part named tapidum lucidum. The tapidum lucidum is of a green appearance, and has a metallic lustre; it occupies rather the upper portion of the internal membrane of the choroid (*Fig* 19). Its use is to collect the stray rays of light, and by reflecting them to the opposite retina, to enable the horse to see when feeding off the ground during the night; as the use of the pigment is to absorb all rays of light that touch it, and thus render vision single, distinct, and clear. The pigment and the tapidum lucidum, therefore, form one coat. The secreting membrane constitutes another; but besides these two, there is a third called the vena vorticosa (*Fig* 19 . *a*), which is placed most outward, being immediately underneath the sclerotic. This last of the

three coats of the choroid merely consists of a number of veins, which take a very tortuous course; and are therefore imagined to represent an aqueous vortex.

The retina (*Fig* 19 . 9).—The last and most important expansion of the eye is the *retina;* so called from the net-like structure of its nervous layer: it consists of three coats. The first is membraneous, being designed to keep the pigment from falling upon the nerve (*Fig* 19 . *e*). The second tunic is composed of a net-like expansion of the optic nerve; which enters the eye at its most backward part; and upon the healthy condition of this nerve that vision depends (*Fig* 19 . *f*). The optic nerve does not enter the sclerotic coat directly in its centre; but rather to one side; and its expansion extends almost to the attachment of the iris. The root of the optic nerve can be well seen with the naked eye when the horse stands in a good reflected light; and it has been mistaken for a cataract. The third is arterial; the small vessels, which form it, being supplied by the central artery of the retina (*Fig* 19 . *l*).

The *muscles of the globe of the eye* are seven: four of these are termed *recti*, or *straight*, and perform the offices of elevation, depression, abduction, and adduction; and are individually named elevators, depressors, abductors, and adductors accordingly. The four arise from the bottom of the orbit, and are inserted into the anterior part of the sclerotica; the elevator being on the top; the depressor at the bottom; the abductor to the outside; and the adductor on the inside of the eye. They are all inserted by tendons, and these tendons run to the edge of the cornea, forming the white of the horse's eye, and constituting the tunica albugenia. Two others of the seven muscles are termed the *obliquus major* and *minor*. The first of these arises from the inner and posterior portion of the orbit; and passes obliquely through a cartilaginous ring, which is lubricated with synovia, at the anterior and outer side of the supra-orbital foramen: then returning, its tendon passes under the abductor tendon, to insert itself into the side of the globe; this, therefore, can partially rotate the eye. The *obliquus minor* arises from a little posterior to the nasal duct, and inserts itself beneath the abductor muscle. *Use*. To rotate the eye partially downward. The *retractor oculi* forms the

seventh muscle; and is peculiar to quadrupeds; being a large and powerful bundle of fibres, which arising from the bottom of the orbit, envelop the optic nerve; and insert themselves around the posterior middle of the sphere. This muscle acts on the globe of the eye by very forcibly drawing it within the bottom of the orbit; by which means it partially protects it from injury. The *cartilago nictitans* is situated at the inner or inferior corner of the eye; having a distinct fasciculi of muscular fibres running to it from the depressor oculi. It is familiarly called the haw; and has been excised under the idea of thereby curing specific ophthalmia. It is protruded by the pressure forward of the fat behind the eye, whenever the action of the retractor muscle draws the organ within the orbit; and is replaced partly by the pressure of the eye; partly by the fat ceasing to act as a propeller; and partly by the contraction of the bundle of fibres before mentioned. From this description, it will be readily seen that this organ acts as a third eyelid. When any foreign substance gets into the eye, the irritation thereby occasioned causes a copious flow of tears; which wash the body to within the reach of the cartilago nictitans, and at the same time loosens its hold upon the conjunctival membrane, covering the cornea. Then pain occasions the retractor muscle to act repeatedly and forcibly; which propels the little shovel of a cartilago nictitans suddenly and frequently over the eye; by which motion it effectually takes up and removes any particle that may be within the reach of its action.

The eyelids.—The lids are a species of curtain placed before the eye, and exist as an upper and a lower, formed so as to adapt themselves to the globe. The superior is the most considerable; the lower, in the horse, has but little motion: the corners where they unite are termed *canthi;* one of which is the external; and the larger the internal is also less angular, and furnishes an attachment to the muscle of the orbicularis oculi. The thin cartilaginous rims which form the edges of the eyelids, are each pierced by some little holes; which pour out a sebaceous matter from the *meibomian glands:* the upper lid is most furnished with hairs, which are not placed in one, but in several small rows; most abundant on the outer angle, in which direction the

eye most requires a shield: the under has a few long hairs, placed below its marginal edge. The horse has no eyebrows; unless we reckon as such the few straggling long hairs above the eyes. The *muscles of the lids* are three; one surrounding the whole orbit, a sphinctor, termed *orbicularis*, which shuts the eyelids; the others are termed *levator palpebræ superioris*, internus and externus. The externus arises from the frontal bone and fascia, and is inserted into the upper lid, blending with the fibres of the orbicularis. The internus arises from the bottom of the orbit, to be inserted into the upper lid, by a tendon, which becomes very fine and much expanded, as it proceeds forward, to be fixed into the margin of the upper eyelid. These muscles, in all their diversified movements, are much assisted by other fascial muscles. The *lachrymal gland* is a conglomerate body, lodged within the conjunctiva at the upper and outer part of the orbit; in a fossa above the external angle, and in immediate connexion with the frontal arch; its several lobuli, together, send out eleven to thirteen little ducts, which penetrate the conjunctiva, and pour out the saline fluid known as the tears. The lachrymal gland can be stimulated by brutality to a more than an ordinary supply of the tears, which then flow over the cheek: the ordinary supply passes off by an opening termed *puncta lachrymalia;* being guided there by a groove formed by the junction of the eyelids, with a protuberant dark-coloured body, situated between the internal angle of the palpebræ, termed *caruncula lachrymalia;* which is covered with an intermediate structure, between mucous membrane and true skin. Thus directed, the tears are carried into the lachrymal duct; and so pass into the nose by the *ductus ad nasum*. It has been much disputed whether the horse has a lachrymal sac or not. If by a sac is meant a dilatation of the nasal duct, as large in proportion as the human lachrymal sac, then decidedly the horse has none; but if, by the horse having no lachrymal sac, it is meant that the nasal duct in the horse is of one size throughout, then those who make such an assertion are assuredly wrong. The horse has a well-marked enlargement of the duct, where the sac should be; and this we presume to view as the horse's lachrymal sac. The vessels of the eye are arteries, from the external and internal carotids: the external

parts being furnished from the maxillary; and the internal by the ophthalmic, and some branches that penetrate the sclerotic coat; and the veins return their blood to the sinuses within the cranium, so to the jugulars. The optic nerve enters the orbit, and, piercing the globe, forms the retina, having the arteria centralis retina given off from the brain within its centre: the eye receives nervous influence also from the second, third, fourth, fifth, and sixth nerves; of which the fifth alone endows it with sensation. The second is a special nerve of vision; all the rest are for motion.

PHYSIOLOGY OF THE EYE, OR THE FUNCTION OF VISION.

Light is the appropriate stimulus to the functional purposes of the eye; enabling it to take cognizance of the figure, colour, and distance of bodies. The visual rays, in this climate, shoot rectilinearly through space: but when they pass through denser media, they do not preserve this rectilinear course; but are bent in a degree equal to the density of the medium through which they pass. This bending of the rays is called their *refraction:* the tendency of which is to bring them to a *focus* or *focal point;* to which point all luminous rays reach, sooner or later, according to the increased or diminished density of the medium they have to pass through; upon which property most of the phenomena of vision depend. This premised, it will become evident that the visual rays meet with several different refractions, or bendings, in passing through the eye. Their course through the cornea and aqueous humour must form their first refraction; that through the crystalline lens will be the next, the powers of which, as a refracting medium, must be great; and in their further course through the vitreous humour, and the repeated folds of its membrane, they must undergo a still farther bending; till they meet in a point on the retina: thus forming a cone, the basis of which will be the surface of the cornea, and the apex the retina. The rays of light fall upon an object, or upon several objects. They are thence reflected in such a form as conveys to the spectator a sense of colour upon entering the eye; they are so refracted that a perfect image, though infinitely small, is painted upon the retina.

Amidst the wonderful number of objects that present

themselves to the eyes of the animal, it appears as though care was taken, that he should have the means of principally collecting such only as are connected with his views or pursuits. The form of the visual organ is such that no confusion exists from an indiscriminate admission of rays; thus only such enter as are suited to this convergency; or, if any others do penetrate, they become lost in the pigmentum nigrum. It is therefore to be understood that the rays which the refracting power of the humours is able to concentrate, meet upon the retina in a point; or in a very small circle, within which the object is painted; and that the mind takes cognizance of it through the medium of the optic nerves. As the eye must necessarily require to have a vast variety of objects painted upon it, whose distances are widely different; so there must be some optical adjustment of the powers of the part, to enable it to effect a distinct vision of all objects remote or near. On this subject we have first to consider that the outer coat of the eye is formed of a yielding material; such as is disposed to be moulded into a variety of shapes, by the pressure of the muscles which surround it. The eye likewise, not being fixed in its place, is likely to be retracted, or drawn back, by the muscle specially formed for this purpose; as well as to be urged forward by the pressure of the fat behind the organ. Were it not for some adjustment of the optical organs, the rays reflected from objects very near the eye would fall behind it; and those from very distant ones would, from being almost parallel, meet together before the retina. The mechanical adjustment of the focus, it must be observed, is also assisted by the iris; which lessening the opening of the pupil when we look at minute objects, only permits such rays to pass as penetrate towards the centre of the lens; by which they will be very much refracted; but when the eye regards distant objects, the iris becomes dilated; and the rays are then received through the edges of the lens, whereby their refraction is diminished.

THE NOSE.

In brute animals, the organ of smelling is most essential; as it forms one of the means by which they judge of good or evil: consequently we cannot be surprised that the nose

of quadrupeds is very differently formed from our own. In the horse, the nose constitutes a very considerable portion of the head; having two exterior communications with the air, called *nostrils*, and an interior opening to the fauces. The *openings of the nostrils* are limited anteriorly by the nasal and intermaxillary bones. Immediately above the arch of the palate, which is situated inferiorly, the nose communicates with the frontal sinuses, by a species of flap or valve; through which a probe can be easily thrust, but which must admit but little air into the sinuses. The nose is divided in the middle by the septum narium (*Plate* VI. *a*); which is cartilaginous; and rests in a bone named the vomer, that is grooved for its reception.

The *frontal sinuses* (*Plate* VI.; *Plate* VII. *d*, *d*) are formed by the separation of the two tables of the frontal bones. There is usually a bony partition which forms them into two equal portions, and other bony prolongations are seen still further subdividing these spaces: these sinuses communicate superiorly with the nasal cavities, and are lined by a continuation of the same membrane. The frontal sinuses freely communicate with the nasal and the maxillary; each of which are thus named because formed by divisions of those bones.

The highly vascular and sensitive expansion called the *pituitary membrane* lines the whole nasal fossæ throughout all their compartments. It is a portion of the great mucous track, which begins at the eyes, nose, and mouth; extends to the lungs, stomach, and intestines, and terminates at the anus. It is furnished with a mucus secreted throughout the whole extent of its surface; whereby the surface is always kept pliant, soft, and susceptible; and it is reflected over the superior and inferior turbinated bones (*Plate* VII. *a*, *b*), as well as the cartilaginous septum (*Plate* VI. *a*); by this mucus likewise insects are prevented from penetrating into the lungs. The evident use of the pituitary membrane appears to be a medium for the expansion of the olfactory nerves, whereby the effluvia of different substances are ascertained.

Ductus ad nasum.—The puncta lachrymalia are the openings to a canal within the lachrymal bone, called the *nasal duct;* which is continued from the eye, between the turbinated

bones, and terminates by an opening within the nostril, where it may be easily seen. This duct carries off the superfluous saline fluid, secreted by the lachrymal gland; but being lined with the pituitary membrane, in glanders it often becomes obstructed; by which the lachrymal fluid is forced over the face; and, as the ulceration proceeds, purulent matter at length flows out at the puncta lachrymalia. In inflammations of the eye, the puncta likewise becomes so inflamed as to be impervious for a time; hence a horse in this affection is commonly observed weeping.

The common integuments are spread over the upper lip, but without its usual accompaniment, viz. adipose membrane; it is likewise furnished with fine hair to the edges of the nostrils. The integument also is turned for a slight distance up the nostril; being, where it exists, distinctly marked by its colour, which is very different from that of mucous membrane. By an inflection of the integument, a well known pouch is formed upon the external side of each nasal cavity, called the *false nostril.* The purpose of these blind pouches, called false nostrils, is to allow the true nostril to contract or enlarge, without disfiguring the face; thus serving to guard that beauty of form which, throughout creation, nature so jealously protects. The openings of the nostrils are guarded by cartilages on each side; two being a continuation of the inferior turbinated bones (*Plate* VII. 6), besides central ones are attached to the peaks of the nasal bones. These cartilages are directly acted upon by the dilatator narium; the dilatator nari lateralis; the dilatator nari inferior; and the contractor nari, which last is a triangular bundle of fibre, first pointed out by Dr. Knox of Edinburgh, arising from the inside of the intermaxillary bone. Beside the muscles just named, the nose is further influenced by fibres sent from the levator anglioris, and the retractor labii superioris. The muscles of the nose usually act synchronously; and are in a great degree of an involuntary character. The dilatator narium, by its power over the nasal cartilages being attached to each, approximates the nostrils, and elevates the superior borders of both. The inferior dilatator enlarges the opening by contracting inferiorly; the opening at the same time being forced laterally, by the retractor labii superioris, and centrally by the contractor nari. Thus,

simultaneously, is the edge of the nostrils drawn in opposite directions; and of course the opening is enlarged; while the lateralis and the accessories serve to dilate the anterior of the nasal cavity. The blood to the nostrils is principally supplied by branches derived from the facial and the lateral nasal. The nerves being derived from the first, fifth, and seventh pairs.

MUSCLES OF THE NOSE.

The DILATATOR NARI LATERALIS. *Arises.* From the external surface of the upper part of the intermaxillary bone: and is *inserted* into the cartilaginous continuation of the inferior turbinated bone.

DILATATOR NARI INFERIOR. *Arises.* From the inferior border of the intermaxillary bone. *Inserted.* Into the upper surface of the nasal cornu.

CONTRACTOR NARI. *Origin.* From the inner side of the intermaxillary bone. *Insertion.* Into the cartilaginous continuation of the inferior turbinated bone.

DILATATOR NARIUM. A bundle of fibres, stretching from cartilage to cartilage of the nose.

THE PHYSIOLOGY OF THE NASAL ORGANS.

Comparative anatomy shows that the sense of smell is in most animals placed at the entrance of the respiratory organs; by which they are made subservient to both purposes of breathing and smelling; and by the same means are rendered as well voluntary as involuntary agents; for the action of respiration will carry all the effluvia from bodies, whether sought for or not, against the sensitive pituitary membrane. The herbivorous tribes smell vegetable matters, and have an abhorrence of all fleshy odours. In all the vertebrated animals, the parts connected with the organ of smell are, like the parts composing the other organs of sense, double. The cognizance taken of the volatile portions of bodies continually flying off from them, and impressed on the sensitive surface of the internal nostrils, is transmitted by the nervous expansion of the olfactory nerves to the brain; where it produces the sensation we understand by the name of smell.

THE CAVITY OF THE MOUTH.

This cavity in the horse forms all that extensive opening from the level of the eye to the incisor teeth. The mouth is composed of external and internal parts; the external are the lips and cheeks; the internal are the gums, the bars, the teeth, the alveolary edges, the palate, and the tongue. The *lips* form parts of the mouth, and are two in number; an upper and lower; each being composed of fleshy masses which extend around the opening to the mouth; but principally a circular one is apparent, forming the orbicularis oris: the rest are composed of the numerous muscles that influence the various movements of the mouth and lips.

The RETRACTOR ANGLIORIS (*Plate* II. where it is shown turned back) is a portion of the panniculus, and as such has a general action, but no special power over the mouth. The ZYGOMATICUS (*Plate* II. 4) runs from the zygomatic process to, and is the true retractor of, the angle of the mouth. THE LEVATOR ANGLIORIS (*Plate* II. 1) which draws the mouth upward and backward, pulls the upper lip also in the same direction; and at the same time partially expands the nostril; arises from near the inner canthus of the eye; and is inserted into the angle of the mouth, and into the cornua of the nasal cartilages; forming a loop anteriorly, through which passes the retractor labii superioris.

RETRACTOR LABII SUPERIORIS (*Plate* II. 3) pulls backward the side of the upper lip; and also dilates the false nostril. *Originates.* From the upper jaw upon the outer side, and just before the termination of the zygomatic spine. *Inserted.* Into the false nostril, and blends with the muscular fibre of the upper lip.

LEVATOR LABII SUPERIORIS (*Plate* II. 2), a pair of well-defined muscles, one on either side of the face; joining in a common tendon, which at length expands and *goes* to the upper lip; *originating* from the junction of the superior maxillar and molar bones. The two would obviously elevate the upper lip; or one would pull the lip to one side. To the lower lip there are THE RETRACTOR LABII INFERIORIS (*Plate* II. 7), a well-marked muscle, originating near to the margin of the lower jaw; and going by tendons

to the substance of the under lip. This muscle would pull backward the under lip. ORBICULARIS ORIS (*Plate* II. 11), a sphinctor, of use to close the lips. Its fibres encircle the opening of the mouth. LEVATOR LABII INFERIORIS serves to draw upward, and to render firm the under lip. *Originates.* From the incisor alveolars of the lower jaw. *Inserted.* Into the rudimental chin of the horse.

Whoever studies the forementioned muscles will find ample cause for the varied movements of the lips; more especially when he considers that the anatomist deals only with a dead body, and thus makes an entire muscle act at once to determine its action; whereas it is not unnatural to imagine that in a living state muscular fibres do not all act at once, but each has a separate and distinct movement; whereby the motions of the lips would be varied and multiplied almost beyond the power of human calculation.

The lips of the horse are to that animal the prehensile organ, as any one may ascertain who observes a horse feed at grass. The food is then collected with the lips; and so accurate is the sense of touch which resides in them, aided by the smell, that all poisonous plants are rejected, and only the nicest morsel chosen. The most sensitive part in the body of the horse is the upper lip; a fact unfortunately too well known to grooms and farriers, who on every occasion place a twitch on the tender part, and by screwing it tight render the animal afraid to move.

The arteries which supply the internal parts of the mouth are the inferior and superior maxillaries, after they pass through the foramina in the upper and lower jaws. The facial artery,—a portion by the lateral nasal,—the infra orbital, &c., so that they are amply supplied with blood. Their nervous sensibility and sense of touch is imparted by the superior maxillary branch of the fifth nerve. The motion is derived from the portio dura or facial nerve.

Now let us investigate the interior of the mouth. The *gums* are formed of a very vascular compact and elastic substance completely surrounding the neck of each tooth; and, as this substance is also adherent to the periosteum, so it supports the teeth firmly in their situations (*Plate* VII. *c*). They are far more vascular than sensitive, and appear to be formed by cellular tissue amply supplied with

blood vessels. Over this the outer membrane (called the buccal), covering the other parts within the mouth, is reflected; only to protect the gums, during the mastication of hard substances, it is here furnished with a cuticle of considerable thickness. The membrane just alluded to (the buccal) is reflected all over the interior of the mouth; being continuous with that which enters the lungs and abdomen, and is part of the great mucous track. When we say the gums are deficient in sensibility, those parts are alluded to only as in a healthy state. When diseased they become highly sensitive.

The palate of the horse is spoken of as hard and soft. The hard palate (*Plate* VII. *i*) is that part touched and felt by the tongue. The soft palate (*Plate* VI. *f*; *Plate* VII. *l*) falls down behind the tongue, and divides the mouth from the fauces.

The hard palate is highly vascular, and is principally formed of condensed cellular tissue. It is covered by a portion of that thick insensitive buccal membrane which envelops the gums. It is marked across from side to side by curved projecting lines, which are called the *bars* (*Plate* VII. *i*). The convexity of these curves point forward; but the projecting edge of rather more than the anterior half looks backward, and that of the remainder faces forward. The use of these formations (*the bars*) is to keep the food within the mouth; as but for their existence, from the pendent position of the horse's head, it would be very likely to fall out, an accident which now rarely happens.

The *tongue* (*Plate* VI. *e*) is that large fleshy body, for the residence of which the cavity of the mouth appears to be formed. It is covered by (the buccal) mucous membrane, the same as shields the gums and envelops the palate. The very top of the tongue has papillæ, or eminences upon it; which indeed are upon the whole of the superior surface of the organ, only of smaller size, anteriorly and laterally. It is free at its foremost end; but only for a small distance, being then bound down to the bottom of the mouth by a fold of the lining membrane, which is termed the frenum. It is principally composed of muscular fibre and glandular substance, with which, how-

ever, some fat is generally intermixed. The tongue is fixed at its base to the most forward portion of the os hyoides, to which many of its muscles are attached. The muscles of the tongue will not account for all the motions of that organ; that is, if we give to muscles no other property than that accorded to them by the generality of anatomists, viz. contraction. How are we, according to this version, to account for an organ formed almost wholly of muscular fibre, being propelled out of the mouth, or elongated and turned in various directions. We know by feeling the arms of men, but more so by feeling the limbs of animals when spasmodically affected, that muscle, when contracted, can become almost of the firmness of metal or of bone. May not a texture, which has the power of assuming this property of rigidity, be also capable of dispensing with bone; and be gifted with a faculty of extension as well as contraction? Grant this, which assumption the tongue appears to necessitate, for its rightful interpretation, and the entire difficulty is conquered.

This subject of the protrusion of the tongue is little understood. Muscular fibre, however, must act upon every substance, whether it be bone or not, with which it is in contact. Thus much glandular matter and some fat intermingling with the muscles of the tongue; and such substances being pliable, but not compressible it is easily understood how pressure might make them assume another form, and become long, whereas they were originally broad. The HYO GLOSSUS BREVIS, which appears always to act with its fellow at the back of the tongue, has no lateral motion.

The LONGUS is the main agent in retracting it; when one muscle alone acts the tongue would be drawn to one side. The LONGUS is likewise the means by which the tongue is curved downwards. The muscle which twines the tongue upwards is the GENIO HYO GLOSSUS, whose fibres run from the front of the os hyoides to the point of the lower jaw.

The BREVIS, aided by its ACCESSORIES and the LINGUALIS, pulls downward the back of the tongue; thus forming a vacuum which draws water within the mouth, or performs the office of suction. The reason of so many muscles being crowded together for the motion of the tongue, is the extent of surface to be moved; the power required to move

it; the singular movements to be performed; and the small space left for the development of muscular fibre. When all the muscles simultaneously contract the tongue is protruded, as we cannot put out our own tongues without being conscious of an effort. When the BREVIS alone contracts, the tongue is drawn partially backward, though probably other muscles aid this action.

The tongue is a double organ, and all of its muscles except one exist in pairs. If the fibres of these muscles be traced to their destination, they will be found to decussate; those of the right, terminating upon the left side of the tongue. The muscles of the tongue consist of five pairs, and a small single one. The GENIO HYO GLOSSUS (*a pair*) lie immediately between the branches of the lower jaw from the junction of which it proceeds in a direct line to the spur process of the os hyoides. The *insertion* of its fibres is into the top of the tongue. HYO GLOSSUS LONGUS (*a pair*) *arise* by fine tendon from near the joint, formed between the two horns of the os hyoides; and extend to the tip of the tongue, their muscular fibres being *inserted* into the sides of the tongue. HYO GLOSSUS BREVIS (*a pair*) *arise* from the body of, and the spur process of the os hyoides; into the top of the tongue, extending from the velum palati as far forward as the last molar tooth. ACCESSORIES (*two pairs*). The anterior springs from the large horn of the os hyoides, and blends with the anterior fibres of the brevis. The posterior *originates* from the membrane upon the side of the tongue, near its base; and is *inserted* into the upper and internal part of the brevis. The LINGUALIS (*single*), a small band of muscular fibre, *originating* from the most forward part of the body of the os hyoides; and is *inserted* into the upper part of the tongue close to its root.

The nerves which go to the tongue are the lingual, or ninth pair for motion. The gustatory, or branch of the fifth pair, which confers the sense of taste; and the glosso pharyngeus, of which the glossal branch goes to the tongue; but its precise service is not yet accurately determined. We ask, may it not go to confer sensation?

The arteries are derived from the submaxillary branch of the carotids, and the blood is returned into the jugular.

THE PHYSIOLOGY OF THE MOUTH AND THE SENSE OF TASTE.

Taste appears to be derived from contact with the large papillæ at the back of the tongue. Taste does not exist there is every reason to conclude, when the mouth and food are perfectly dry; but then it is difficult to have the mouth in such a state as to preclude the possibility of saliva being secreted; and with regard to food, even the captain's biscuit contains much moisture. Yet liquids are tasted much sooner than solids; which last are not generally relished, until by the process of mastication they have been thoroughly moistened with saliva. Thus moisture can either be taken in with the food, or be contributed by the glands proper to the mouth after the food has been taken in; for in one way or the other fluid must be mingled with the substance eaten before taste can exist. The tongue, which is the organ of taste in most vertebrated animals, possesses an exquisitely modified sensibility, and in brutes is endowed also with a salutary instinct. In man, civilization, by heightening the intellectual, has weakened the instinctive powers, if they ever existed. Taste was given to brutes to regulate their other senses; thus there are few plants or substances whose application to the tongue produces an agreeable effect but are proper for food. It must, however, be confessed, that the discriminating quality in brutes, with regard to food, is greatly assisted by their sense of smelling: the horse will not touch water from a greasy bucket; and his refusal takes place before he has had time to ascertain the true cause. Nature stimulates her creatures to take food by a double motive, —the pleasure of taste and the pain of hunger.

The *soft palate*, or velum palati (*Plate* VI. *f*; *Plate* VII. *l*), is nothing more than an expanded uvula, which adheres to both sides at the back of the mouth. The fixed point whence it originates is the arch of the palate bone, which terminates the hard palate. From this arch it inclines backward till its free edge rests upon the epiglottis, one of the parts of the larynx. Slanting in this direction it is easily raised by any substance coming from the mouth; but is only the firmer closed by any thing attempting to egress from an opposite direction. The air has not body sufficient

to raise the velum palati; whence the horse expires and inspires through the nostrils, save in coughing. That act being a spasmodic effort, the muscles, independent of the will, simultaneously contract when those situated within the soft palate are exerted, lift the velum palati, and the breath is sent through the mouth.

The soft palate is formed by much glandular substance with a small quantity of muscular fibre, which is rather pale in colour. The muscles moving the soft palate are two. The LEVATOR PALATI (*single*), situated in the middle of its substance; and the DEPRESSORS of the soft palate (*a pair*), each consisting of a disgregated bundle of fibres developed upon the lateral and internal portion of the membrane. The action of the last named pair of muscles is to depress the soft palate, or hold it in its place, resting upon the epiglottis. The levator palati is the much more powerful muscle; hence we can understand why, when a horse is much pushed, or approaching to the final termination of life, and nature, striving to prolong existence, causes all the muscles to be spasmodically contracted, the velum palati is frequently raised, and the animal breathes through his mouth.

The sides of the mouth (for as to cheeks the horse cannot be said to possess any) are composed of two muscles, with gland, integuments, &c. The *caninus*, which is the exterior of the two. *Origin.* From a glistening tendon, arising from the inferior maxillar, near to the coronoid process. *Insertion.* Into the inferior border of the superior maxillar as forward as between the molar teeth and the tushes, and into the same part of the upper margin of the lower jaw.

BUCCINATOR. *Origin.* By tendon, from the superior border of the lower jaw, near the joint; and from the tuberosity of the superior maxillar, near to the velum palati. *Insertion.* Into the inferior border of the upper, and the superior border of the lower jaw, and by tendon into the angle of the mouth.

The *fauces* (*Plate* VI. *g*) are a part at which several structures meet. They have no distinct anatomical existence; yet it is found convenient to apply this name to a kind of neutral ground, formed by many different parts joining one another, but properly belonging to none in par-

ticular. Thus behind the velum palati, prior to the commencement of the pharynx, there is a space which is usually the seat of sore throat. From this place it can easily affect the mouth; whence dry mouth is one of the symptoms. It likewise can readily affect the lining membrane of the nostrils; hence copious nasal defluxions are always witnessed. It is situated immediately above the larynx; wherefore cough is generally heard when sore throat is present; and it directly communicates with the pharynx, and thus a difficulty in swallowing is experienced. Further, heaviness and pain in the head are accompanying symptoms during sore throat; and as the fauces lead to the Eustachian tubes and guttural pouches, the affection of either one or the other is sufficient to account for this indication.

There are eight distinct parts open from or into the fauces. The guttural pouches (*Plate* VII. *k*) are two. The Eustachian tubes are two also, and two with two make four. Then there are the pharynx (*Plate* VI. *h*), the larynx (*Plate* VI. *j*), the mouth (*Plate* VII. *l*), and the nasal chambers (*Plate* VII. *n*), both of which have but one common opening, making altogether eight. The reader, however, may be inclined to say, You told us there were two nasal chambers; how comes it, therefore, there are not two openings into the fauces? Because the septum nasi, or cartilaginous division (see *Plate* VI. *a*), does not extend so far posteriorly as to reach the fauces, whence the two chambers enter the fauces by a single opening.

The *larynx* (*Plate* VI. *j*), which is the commencement of the windpipe, opens within the fauces, and forms a kind of cartilaginous box; which is composed principally of five pieces, so connected with the branches of the os hyoides as to have very small lateral motion; but an extensive one above and downwards. The *os hyoides* was purposely omitted in the Osteology, that its relative situation might unite with its description. It consists of five bony portions articulated together. The body very much resembles a common spur; the short prong being inserted into the root of the tongue; and the semicircular portion or body of the bone embracing the larynx. From the posterior ends of its body spring two other short pieces of bone running upward; and joined to these but also proceeding upward are two

longer pieces of bone; there being a synovial joint between each of the different parts, which always describe angles one upon another.

The laryngeal cartilages are, the thyroid, cricoid, the two arytenoid, and the epiglottis. The *cricoid* cartilage is the lowest in position, and in form resembles a thick ring. Part of it is inserted within the thyroid cartilage, and the two arytenoids rest upon its uppermost and most backward portion. The *thyroid cartilage*, the most considerable of the five, being thought to resemble a shield, has a prominence running downward over its front. The epiglottis is connected with its highest and most forward point. The *arytenoid* are two small fibro-cartilages, uniting together at the back of the opening to the larynx: their inferior surface rests upon the superior surface of the cricoid cartilage, and their superior extremities form a kind of point, which is curved backwards. The *epiglottis* is a very elastic body, composed principally of yellow fibrous tissue, attached to the anterior portion of the thyroid cartilage by a strong ligament. In shape it somewhat resembles a leaf which has been bent downward, and its termination thus forms a point which is curved, in the direction we have stated.

The larynx gives insertion to a great number of muscles, being covered by them both within and without; its motions are consequently much more varied than man can satisfactorily account for. The *epiglottideus* is a single muscle connected with the hyoides; and is inserted into the inferior portion of the epiglottis, which it pulls back or stretches open. The other laryngeal muscles act in pairs: the *crico-thyroidæi* draw the larynx downwards, after it has been raised in deglutition, by the action of the *hyo-thyroidæi*. The *crico-arytenoidæi lateralis* and *posticus arytenoidæus* are muscles appropriated to their specified cartilages; by means of which the cavity of the larynx is altered in its figure and dimensions. In consequence of the effect produced upon its internal ligaments, the sounds of the voice thereby become variously modulated. The *thyroid* bodies are situated one on each side of the cricoid cartilage, and are larger in the young than the old subject; but their functional purpose is unknown. The membrane lining the

larynx is the most sensitive of any throughout the body. A grain of salt, or even a drop of water, getting upon it, causes the most sudden and violent spasmodic coughing. The reason for its being made thus sensitive is that it may serve as a guard to the lungs. It is placed on the top of the windpipe; therefore no foreign body can enter without our being immediately informed of the danger. This membrane is thrown into folds, thus forming sacs, spoken of as the ventricles of the larynx; and it also covers ligaments, extended across the cavity, for the purposes of voice, and named the cordæ vocales. The arteries of the larynx are derived from the carotids, and the veins empty themselves into the jugulars. Their nerves are furnished by the recurrents and the superior laryngeal, both of which are derived from the par vagum, or eighth pair.

Uses of the Larynx.—The variations of sound emitted by the voice of quadrupeds appear to be governed principally in the number and form of the laryngeal sacs. There are usually three of these; one of them is seen under the vault formed by the anterior boundary of the thyroid cartilage, having its aperture near the root of the epiglottis. The other two are oblong sinuses contained between the lateral parietes of the glottis and the thyroid cartilage; and are covered in a great measure by the arytenoidei muscles. In the horse these lateral sacs are very long and wide, and are not unlike the usual ventricles of the glottis. The aperture of the outer cavity is very large in the horse; in the ass the opening into each of the three sacs is a small hole, and the anterior sac forms a bag-like cavity. In the mule these organs differ, but their anatomical formation is in general blended between the horse and ass. *Neighing* appears produced by expirations, as are most of the vocal tones from the horse. The vibrations produced by the resonance of different sized cavities, assisted by the tremors of the cartilages of the nostrils, produce the compound sounds which are emitted. *Knuckering*, as it is termed, is only a lesser neigh, with shorter, deeper, and less forcible tones, expressive of affection and joy. The horse has one acute sound, produced by the act of inspiration, which usually expresses either play or lust; but in most other

instances, sound in the horse is produced from expirations; nor does it appear that the tongue or teeth are much concerned in the modulations of his voice.

The *pharynx* is a funnel-shaped bag, having the large end forward. This bag is lined with mucous membrane, upon the outer side of which are well-marked muscular fibres; and is held fast against the superior and the posterior of the larynx by three pairs of constricting muscles, named the anterior, middle, and posterior. The first arises from the os hyoides; the second from the thyroid cartilage; and the last from the cricoid cartilage; and all meet their fellows upon a tendinous line at the back of the pharynx. The dilators of the pharynx are numerous. The HYO PHARYNGEUS SUPERIOR *arises* from the inner side of the large horn of the os hyoides; and goes to the posterior of the bag. HYO PHARYNGEUS INFERIOR *springs* from the lower part of the large horn of the os hyoides; and goes to the posterior of the bag. One of these muscles pulls upward the others, sideways and downward. The TENSOR PALATI *arises* from the styloid process of the petrous temporal bone; and, passing over a synovial pulley on the pterygoid bone, is *inserted*, by expanded tendon, into the anterior of the bag of the pharynx. STYLO PHARYNGEUS. From the styloid process of the petrous temporal bone. To the most anterior part of the pharyngeal bag. This last is a single muscle.

The dilators are excited into immediate action by the pressure of the morsel against the velum palati; and then pulling all at the same time, and in different directions, they hold the bag of the pharynx open; and when the food has entered these muscles relax, and the constrictors one after the other come into action, thus compelling the morsel into the œsophagus.

THE GLANDS OF THE HEAD.

These are mucous and salivary, with the glandular substance that secretes the wax of the ears. The *salivary glands* secrete the fluid we call saliva; and are three upon each side of the head, the parotid, the submaxillary, and the sublingual. The *parotid* (*Plate* II. 14) is a considerable body; situated upon each side, in the hollow formed by the articulation of the head with the neck, stretching around

from the root of the ear to the throat. It is distinctly lobular, its lobes being connected by cellular membrane; and from each of its lobes ramifies an infinity of minute tubes, which finally unite into one common trunk, and thus empty the secretion of the gland into the mouth. The parotid *duct* thus finally formed quits the gland, passing along the inner surface of the jaw; crosses the bone, in company with the submaxillary artery, and pierces the side of the mouth, near to the third molar tooth; forming a bulbous rising at its termination.

The *submaxillary*, though much smaller than the parotid, are still considerable glands, occupying the lower part of the space, termed the channel; a great portion of them being under the parotid gland. The ducts penetrate the buccal membrane, a little anterior to the lingual frenum, by orifices proper to each, which project up in nipple-like risings.

The *sublingual glands* are smaller, but far more numerous, than the submaxillary; and are placed along the under part of the tongue, where, from their lobular form, they become easily detected. They pour out their secretion by little orifices, which may be traced on each side of the mouth. The *labial glands* are placed under the common membrane of the mouth, on the inner surface of the lips, and are small secreting bodies. The *buccal glands* are found on each side of the mouth. *Folliculose* and *mucous glands* are distributed over the interior of the mouth, the surface of the tongue, and soft palate. There are also the *lymphatic glands* common to the head, the principal of which are the *maxillary*. These are situated in the channel towards the superior part.

The uses of the salivary secretion appear to be to moisten the food, thereby enabling such as is dry to be more readily swallowed. It has, however, functional properties of other kinds, and contains, without doubt, *living principles* of action, as well as mechanical: by changing the matters taken into the mouth, it commences the work of digestion. At all times it is useful, likewise, by moistening the mouth and fauces, thereby keeping them in a constant state of susceptibility. From some experiments made, it would appear that the quantity of saliva furnished by the parotid ducts alone, during the process of eating, is more than a quart per hour. The saliva is also of use in entangling air

within its bubbles, and thus conveying a certain portion of the atmosphere, or of oxygen and nitrogen gases, to the stomach. Salivary glands, moreover, to maintain their health, require to be pressed by the adjacent muscles; pressure being as necessary to the health of a gland of this description, as food is to the support of the body.

THE PHYSIOLOGY OF DEGLUTITION.

When a horse grazes, he first places with his lips a tuft between the teeth; when, elevating his chin, the sharp edges of the under incisors become applied to the grass, and cut it through, while at the same time the upper incisors help to nip it off. Oxen and sheep, wanting upper nippers, wrap a tuft of grass round with their tongue, and then apply it to the under incisors, by which it is held fast, while a movement of the head tears the grass up; and thus we find that they are obliged always to carry the chin forward in collecting their grass. When a quantity of herbage is thus gained, it is carried by the tongue and muscles of the cheeks to the upper part of the mouth, to encounter the action of the molars: the matter being conveyed from side to side, to be placed in the most favourable direction for perfect mastication, by means of the tongue. During this process, it continues to be mixed with the salivary fluid, from the parotid, the submaxillary, and the sublingual glands, which pour out their secretions, excited by the pressure of the surrounding muscles.

The vegetable mass having been thus completely masticated, is placed at the back of the tongue; when by the pressure of that organ towards the palate it is squeezed against the velum palati. The soft palate readily yields to force coming from the mouth. The morsel is at the same time driven against the epiglottis, which by its own elasticity released from the downward pressure of the velum palati, is raised, and covers the opening to the larynx. The food is thus propelled into the fauces. Then the larynx, protected by the epiglottis, rises and urges the mass into the pharynx; the contractors of which transmit it to the œsophagus; the muscular coats of which, contracting as it descends, ultimately lodge it within the stomach. The mouth remains closed during the act of swallowing, that

these muscles may find a fixed point. The deglutition of liquids is not very different. The BREVIS and other muscles of the tongue draw it downward, whereby a tendency towards a vacuum is formed: to counteract this, the water is by atmospheric pressure forced into the mouth; when the entire agency which operated in the case of a solid is called into action, the raised velum palati closing the opening to the nostrils, and thus preventing the liquid from returning by that passage.

MUSCLES OF MASTICATION.

STYLO MAXILLARIS (*Fig* 14 . 8). *Origin.* From the styloid process of the occiput. *Insertion.* Into the angle of the lower jaw. *Action.* To assist in gaping, and widely opening the mouth.

MASSETER EXTERNUS (*Plate* II. 8). *Origin.* From the inferior of the zygomatic arch and spine. *Insertion.* Into the external surface and inferior border of the lower jaw. *Action.* To powerfully close the mouth.

TEMPORALIS (*Plate* II. 10). *Origin.* From the superior sides of the cranium and interior of the zygomatic arch. *Insertion.* Into the coronary process and border of the lower jaw. This muscle cannot be fairly separated from the masseter externus. *Action.* To firmly close the mouth.

MASSETER INTERNUS. *Origin.* From the superior maxillary and sphenoid bone. *Insertion.* Into the inner surface and inferior border of the lower jaw. *Action.* To firmly close the mouth.

PTERYGOIDEUS. *Origin.* From the pterygoid process, and from the sphenoid bone. *Insertion.* Into the lower jaw below the joint. *Action.* To rotate the jaw, or give to it that circular motion which is observed when the horse is masticating.

MYLO-HYOIDEUS. *Origin.* From the alveolar edges of the lower jaw. *Insertion.* By a central tendon into the spur process of the os hyoides. *Action.* To draw the bone forwards, and to raise the tongue.

DIGASTRICUS. *Origin.* From the substance of the stylo-maxillaris. *Insertion.* To the inner side of the lower jaw, as forward as the third molar tooth. *Action.* To open the mouth, aided by the stylo-maxillaris and the weight of the

lower jaw. There are two fleshy bellies to this muscle, one at either end, divided by an intervening tendon; which plays through a synovial loop upon the sides of the body of the os hyoides.

GENIO HYOIDEUS. *Origin.* By tendon from the symphysis of the lower jaw. *Insertion.* Into the spur process of the os hyoides by tendon. *Action.* To draw forward the os hyoides.

HYOIDEUS MAGNUS. *Origin.* From behind the large horn of the os hyoides. *Insertion.* Into the side of the body of the os hyoides by tendon, which forms the loop the digastricus plays through. *Action.* To raise the body of the os hyoides, and with it the larynx.

HYOIDEUS PARVUS. *Origin.* From the border of the large horn of the os hyoides, near to its lower articulation. *Insertion.* Into the body of the lesser cornu, and into the body of the os hyoides. *Action.* To raise the lower cornu of the os hyoides.

STYLO HYOIDEUS. *Origin.* From the styloid process of the occiput. *Insertion.* Into the large horn of the os hyoides. *Action.* To pull the large horn backward, downward, and outward.

No one can have attentively read the description of the foregoing muscles, or have any idea concerning them, but must have seen the much greater power of those which close, than those which lower, the jaw. The difference is such as to admit of no comparison; hence during tetanus, when all the muscles are spasmodically affected, the mouth is locked, not because the feebler muscles that lower the jaw escape from morbid contraction, but because these can offer no opposition to the powerful and enduring masses which shut fast the cavity.

Another fact must strike every one; that is, the large number of muscles which go to the os hyoides, and therefore indirectly to the larynx. Yet the last organ is spoken of by most teachers as though it were fixed; while its situation is as loosely pendent, and its motor power as multifarious, as that of any part in the entire body.

OF THE HEAD AND NECK GENERALLY.

The common integuments of the neck and face are similar

to those of the other parts of the body. Upon the crest, or upper margin of the neck, is a line of flowing hair, called the mane; and on the top of the forehead is a tuft of hair termed the forelock.

The *cervical ligament*, or *ligamentum nuchæ* (see *Fig* 14), is a very strong, partly ropelike and partly an expanded or a clothlike substance; which is principally placed between the head and the body, as a support to the head; but extends all along the dorsal spines, even to the commencement of the tail. The muscles of the neck are very strong: but muscles, if constantly kept in action, tire; Nature has, therefore, given a yellow elastic fibrous substance, to support the weight of the head, and take the stress from the muscular fibre, but permit of the freest motions of the head. It is strongly attached, by its anterior extremity; to the posterior part of the occipital bone; passing over the first cervical vertebra, without attaching itself to it, but being intimately connected with the spinous processes of all the rest. The *muscles* of the neck operate on the head; and many of the fleshy masses moving the neck, originate on the shoulders.

The *trachea*, or *windpipe* (*Plate* VI. *l*), is a large canal which arises from the cricoid cartilage of the larynx, and extends down the anterior part of the neck into the thorax: it is composed of upwards of fifty annular cartilages, which taper from their front, terminating in mere slips; having at their extremities a strong muscular band, which unites their substance in the form of numerous circles, but does not fix their form or position. This muscle extends the whole length of the trachea, and is present on every part of the cartilages; only it becomes very thin, and somewhat difficult to detect upon the anterior portion of the tube. The numerous cartilaginous rings forming the trachea are connected at their edges to each other by strong elastic ligaments: thus rendering the trachea perfectly flexible. Externally it is united to the surrounding parts by cellular substance; internally it is lined by a mucous membrane, the secretion of which defends it against the irritating effects of varieties in the temperature. About the third or fourth dorsal vertebra, it divides into two branches or bronchiæ; the principal divisions of which again divide, before they

have proceeded far; and these divisions separate again and again, until the tubes become very numerous, but very minute, ending in very small cavities, termed the air-cells of the lungs.

The *œsophagus* (*Plate* VI. *k*) is the continuation of the funnel-like cavity of the pharynx. It is a muscular membraneous tube, leading from the pharynx to the stomach; it takes a course, inclining a little to the left side, and to the posterior of the trachea, which it surmounts near the head. It then penetrates the chest, and passes along the dorsal vertebræ within the layers of pleuræ; and ultimately pierces an opening in the diaphragm, to terminate in the stomach. Its *coats* are, first, a copious cellular one. Its second coat is muscular, and made up of two strata of fibres, an external longitudinal and an internal circular. The inner coat is cuticular and wrinkled into folds; but has upon it a distinct layer of longitudinal muscular fibres, that it may adapt itself to the expansion or contraction of the tube: this cuticular portion extends over one-half of the stomach.

DESCRIPTION OF PLATE VII.

THE LEFT DIVISION OF THE HEAD, SEPARATED BEFORE THE MESIAN LINE IS ATTAINED.

a, The superior turbinated bone, covered with the Schneiderian membrane and its ramifying vessels; *b*, the inferior turbinated bone in the like condition; *c*, the mouth and gums of the lower jaw; *d*, the facial and frontal sinuses; *e*, the ethmoid cells; *f*, the ethmoid sinuses; *g*, the cavity of the skull, deprived of the brain and its membranes; *h*, the portion of the bony triquatrum which separates the cerebrum and the cerebellum (see *Plate* VI.); *i*, the bars upon the roof of the mouth; *j*, the guttural pouch, formed of merely mucous membrane, which shows the various adjacent structures through its sides; *k*, the opening into the fauces of the guttural pouches; *l*, the soft palate (see *f*, also *Plate* VI.); *m*, a portion of the lacerated submaxillary gland; *n*, the opening of the nostril into the fauces; *o*, the spinal canal; *p*, a mass of confusion.

Owing to the division of the muscles, the pharynx has fallen down and concealed the larynx.

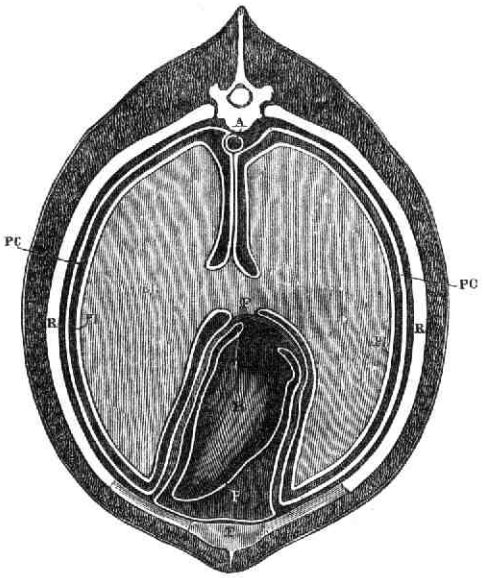


FIG 20.

A TRANSVERSE SECTION OF THE THORAX, SHOWING THE THREE SEROUS SACS WITHIN THE CAVITY.

The dark substance surrounding the outside indicates the flesh, and the white body at the top is the vertebræ.

R, R, The ribs.
E, The sternum, and the cartilages of the ribs.
PC, The pleura costalis.
PL, The pleura pulmonaris.
L, L, The lungs.
H, The heart.
P, The pericardium.
F, The fibrous layer of the pericardium. By tracing the finer white line the reader will discover there are three sacs in this figure. A mediastinum is formed in the centre, where they meet.

VISCERA OF THE CHEST.

The *pleuræ* (*Fig* 20 . *PL* . *PC*).—When the chest is opened, a smooth polished membrane is seen, covering its internal surface, and investing its contents. Each side of the chest has its particular *pleura*, or serous membrane, which is distinct from that of the other. There is, besides, a third serous membrane within the chest, which covers the heart, and lines the pericardium or heart bag (*Fig* 20 .

P). The junction of two pleuræ by means of cellular tissue constitutes a mediastinum (see *Fig* 20). Each side of the chest has its distinct pleura, and the third for the heart lies between the two. The third, however, is but very small when compared with the other two; consequently there are spaces between the two pleuræ where they meet, and each such place is called a mediastinum. The mediastinum is of use in affording egress and ingress to various tubes running to the viscera of the chest, or to that of the abdomen, as well as to various glands necessary to nutrition. The pleuræ are serous membranes; and as such secrete a halitus or fluid, and it is their purpose to favour motion. The pleura on each side of the chest being soft and smooth can take various forms, just as a bladder when fresh will cover the hand, and insert itself between the fingers if pressed upon. The serous membrane on each side of the chest is reflected over the insides of the ribs; thence on to the anterior of the diaphragm; upon the vertebræ and sternum; hence ascending and descending they form mediastinums, or are connected to one another by cellular tissue. Then the lungs bulge out, and force the inner side of the serous bag against the opposite side of the sac, the two surfaces being in apposition; for a serous membrane, in its nature can only bear the touch of itself or its secretion. The pleura reflected over the ribs is called the costal pleura (*Fig* 20 . *PC*); that over the lungs the pulmonary pleura (*Fig* 20 . *PL*); that which covers the front of the diaphragm the phrenic pleura. The mediastinums are four in number. The anterior and the superior; the middle and the inferior. The anterior contains veins, arteries, nerve, and absorbents, going to and from the heart, the trachea or windpipe, and the thymus gland or the remains of it. The superior mediastinum contains the vena azygos and the thoracic duct; the posterior aorta and the œsophagus; the par vagum and sympathetic nerves. The middle mediastinum contains only the heart and pericardiac sac, or heart bag and its fluid. The inferior mediastinum holds nothing; as the posterior vena cava is said to pass through no division of this sort, but to have a fold of pleura to itself: a fact which anatomy corroborates. Of the three serous sacs, that which holds the heart is very

much the smallest. Of the two remaining pleuræ, the left is the smaller; because there is an extra lobe to the right lung, and the right pleura having consequently to make room for the largest contents.

MUSCLES OF THE TRUNK AND CHEST.

LATERALIS STERNI. *Origin.* From the body of the sternum, and the cartilages of the fourth and fifth ribs. *Insertion.* Into the first rib.

SUPERFICIALIS COSTARUM (*Plate* III. *b*), by fine aponeurosis from the ligamentum supra spinalis of the back and loins. *Insertion.* Into the anterior margin of the fifth to the twelfth ribs; and into the posterior borders of from the twelfth to the eighteenth ribs.

TRANSVERSALIS COSTARUM. *Origin of the superficial tendons.* From the first lumbar vertebræ. *Origin of the deep-seated tendons.* From the transverse process of the seventh cervical vertebræ. *Insertion of the superficial tendons.* Passing over the last three ribs into the posterior borders of the fifteenth and all anterior ribs, reaching to the transverse process of the seventh cervical. *Insertion of the deep-seated tendons.* Passing over the first two ribs into the inferior margin of the third and all posterior ribs, reaching to the transverse process of the first lumbar vertebræ.

LONGISSIMUS DORSI (*Plate* III. *F*). *Bifid posteriorly. Origin.* From the transverse processes and ligamentum supra spinalis of the sacral and lumbar regions, and as far forward in the dorsal as the eleventh vertebræ. From the transverse processes of all the remaining vertebræ; and to the tendon of the complexus major. *Inserted.* Into the bottom and margin of both spines of the ilium; into the transverse processes of the lumbar vertebræ; and into the ribs, as well as into the last four, but sometimes five cervical vertebræ.

SPINALIS DORSI (*Plate* III. *G*). *Origin.* From the tendon covering the longissimus dorsi; and from the anterior twelve dorsal spines. *Inserted.* Into the last four cervical vertebral spines.

INTERCOSTALS (*Plate* III. *a*). *Internal and external. Origin. External,* from the posterior border of each rib. *Internal,* from the anterior border of each rib. *Insertion.*

External, into the anterior border of each succeeding rib. *Internal*, into the posterior border of each rib before.

STERNO COSTALES. *Origin*. From the ligament in the centre of the superior surface of the sternum. *Insertion*. Into the bone and cartilage of the second to the seventh ribs. The muscles are within the chest, and covered by the pleuræ.

All these muscles are so blended that it is unsatisfactory to speak of them separately, therefore we prefer to allude to their actions in another place.

First, to speak about the diaphragm and intercostals, which are more especially muscles of respiration, and to which all the others are accessories, used on particular occasions; though some, as the longissimus dorsi, are only used in cases of extreme distress.

The *diaphragm* or *midriff* (see *Fig* 21), is a most important muscle, and, like the heart, is, during life, in constant action. It is a broad, thin, and tendinous expansion in the middle, having fleshy or muscular sides; it is so situated as to form a complete division between the thorax and abdomen; its upper part, opposed to the back, extends posteriorly till its cruræ are under the loins, and even reach the sacrum; while the anterior part is attached to the hindmost part of the sternum. In a state of rest, it is anteriorly convex, and posteriorly concave; the surface opposed to the thorax being covered by the pleuræ, and that towards the abdomen by the peritoneum. From some peculiarities in the disposition of its fibres, it is sometimes described as two muscles; the great and little diaphragm. The anterior or larger portion arises by distinct fleshy fibres from the ensiform cartilage of the sternum; from the internal surface of the cartilages of the eighth, and all the remaining ribs, excepting the last two. From these origins, the fibres are directed like radii from the circumference (*Fig* 21 . 2, 2, 2) to the tendinous centre of a circle; which is perforated by a hole, a little inclined to the right side, called the foramen dextrum (*Fig* 21 . 7), and furnishing a passage for the vena cava.—The lesser portion of the diaphragm fills up the space close to the spine (*Fig* 21 . 3, 4); arising by two different portions from the sixteenth dorsal, and from all the lumbar vertebræ, and are called

crura; between which an interval is left for a transit of the aorta (*Fig* 21 . 5), the vena azygos, the thoracic duct, and sympathetic nerve. Between the two, and rather to the left and centre, is situated a third opening, formed by the decussation of the fibres of the crura, through which pass the œsophagus and the par vagum nerve (*Fig* 21 . 6).

FIG 21.

THE DIAPHRAGM.

1, 1, 1, The cordiform, or tendinous portion.

2, 2, 2, The great muscle.

3, The left crus.

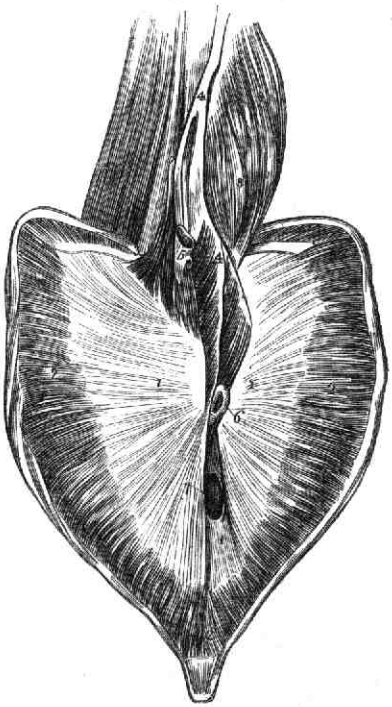
4, The right crus.

5, The aorta, piercing the left or superior opening.

6, The œsophagus, coming through the middle opening.

7, The inferior, or right foramen, for the vena cava to pass through.

8, The sacro-lumbalis muscle.



Vessels and nerves of the diaphragm.—The aorta, in its passage between the crura, gives a branch or two to this muscle; besides which, it receives other rami from the arteries of the ribs and the pectorals. Its veins, or sinuses, are much larger than its arteries; to obviate the effects of pressure during its motions, being formed flat without valves; and finally pour their contents into the vena cava, being the last veins that empty into that trunk. The phrenic nerves arise from filaments given from the fourth, fifth, sixth, and seventh cervicals: other small branches are likewise given off from the surrounding ganglia, which, uniting with it, tend to make it an organ of

extensive visceral sympathy, as well as an important *agent in respiration.* It is indeed a muscle of the chest, there being but two occasions when its action favours the abdomen, and then the other muscles of the chest do the same; that is, during straining, to expel the fœces or fœtus. In cattle, during the propulsion of the morsel into the mouth, which takes place in rumination, a very gentle effort is perceptible when respiration is suspended, and the diaphragm is inactive. The diaphragm is only partially a muscle of voluntary motion.

ACTION OF THE INTERCOSTALS AND DIAPHRAGM. The intercostals, internal and external, cross one another, their fibres running in opposite directions, and being mingled with much tendinous structure, whereby they gain endurance. Each would draw the ribs more closely together, consequently the whole acting simultaneously could but perform that action more energetically. The contraction of the intercostals enlarges the cavity of the thorax; and nature, to prevent a vacuum, sends the air through the nostrils into the lungs. But the air thus received is not sufficient for the perfect expansion of the lungs; wherefore the ribs stop when they have gained their full extent, become fixed points, and the diaphragm begins to operate. This last muscle, which was relaxed, and bulging into the thorax, now contracts; becomes more level, or pushes the abdominal viscera back, and bulges less into the chest. By the retraction of the diaphragm the thorax is still further enlarged, and the quantity of atmosphere now received perfectly expands the lungs. When the lungs are thus inflated, the air within them renders the pressure of the atmosphere without the chest inoperative; but in a short space the breath taken in becomes unequal to this purpose, and the pressure from without is severely felt. The abdominal muscles contract, draw downward the ribs, push forward the viscera, driving back the diaphragm, and thus lessen the cavity of the thorax; they expel from the lungs the inspired air, which by this time is highly carbonized.

ACTION OF THE MUSCLES OF THE BACK. These are spoken of in connexion with the muscles of respiration, because the two are found to be connected. It is impossible to

leap with empty lungs. The inspiration is full, being necessary, not only to fill a large cavity with gas, and thus lighten the body, but to render the ribs fixed; so enabling the muscles connected with them to act with more energy. In this the gluteus maximus operates (*Plate* II. *m*). The muscles proper to the thigh contract, and by this means render firm the pelvis, though at the same time the hindmost part of the sacrum is drawn slightly downward. Upon these fixed points the longissimus dorsi (*Plate* III. *F*), the spinalis dorsi (*Plate* III. *G*), the superficialis costarum (*Plate* III. *b*), the transversalis costarum, &c. contract; and acting together with the gluteus maximus, in the first place draw close the upper part of the ribs and the spines of the dorsal vertebræ, rendering the horse hollow backed; then raise the trunk upon the natural hinge of the vertebræ, or the back upon the sacrum (see *Skel.*); between the which there is an obvious space, and the spines of which abruptly incline different ways. The whole mass of contractile power now comes into play; the forward muscles of the back drawing up the neck at the same time, and the body is raised. The hinder feet then give a spring, and the leap is made; after which the muscles thus violently used as suddenly relax, and expiration takes place.

The nerves which supply the pleuræ are derived from the intercostals and phrenic, the par vagum and sympathetic. The pleuræ have no sensation when in health, but like most parts we are unconscious of when they are well, they become acutely sensitive in disease. The arteries are very small, and are given off from any of the neighbouring trunks; and the veins, which are also extremely minute, empty themselves into the adjacent veins.

THE HEART.

The heart is covered by a double fold of a serous sac, which secretes about an ounce of clear liquid. Like all serous membranes it is closed, touching nothing but its secretion or itself, being favourable to motion. To understand this, let us again suppose we hold in our hand a soft, flexible bladder, twice as large as the heart itself, which has no opening; we then take the heart, and forcibly indent the bladder with it. The bladder adheres to

the heart, from the point to the root of the vessels. But this occupies only a part of the bladder. The rest is brought down towards the sternum, and then up again to join the point whence it started. This serous sac is externally covered by a white fibrous membrane, which is continuous with the cellular investment of the vessels, and is reflected over the serous layer down to the sternum; the whole being within the pleuræ, and called the pericardium.

The heart.—This important organ is a hollow involuntary muscle, or pulsating sac, divided into four principal cavities. Invested by its sac, it is situated obliquely; its base being on a line with the dorsal vertebræ, and its point directed to the left of the sternum between the eighth and ninth ribs (*Plate* VIII. *D*). It presents four cavities, two inferior or ventricles, and two superior or auricles. Each ventricle opens by two spacious orifices: one of which communicates with the auricle or upper cavity; the other forms the mouth of a large artery. There are an auricle and a ventricle upon each side of the heart; or one lower and one upper cavity upon the left, and the same upon the right; or, more properly, one anteriorly and one posteriorly situated. The cavities are separated by a fleshy division, like to the party wall between two houses, called a septum. The *right ventricle* has within it fleshy pillars, called *carneæ columnæ*, from which proceed *tendinous cords*, or the cortina tendinea, attached to the three valves between the right auricle and ventricle, which answer the purpose of keeping each cavity distinct; the *left* or *posterior ventricle*, although altogether longer than the right, reaching to the very apex of the organ, is, notwithstanding, less capacious, but altogether of much greater substance. The auricles are separated from each other by a septum, though externally they appear altogether one cavity, with indented edges. The *right auricle* is irregularly rounded, and has two large openings for blood, which are the entrances of the vena cavas. The *left auricle* is considerably more muscular, though its size is less: it receives the pulmonary veins, usually from three to five in number, and it has also a common opening with the ventricle. The substance of the auricles is both membranous and muscular, and they are also furnished with a few tendinous and fleshy cords to

strengthen them, which are spoken of as the musculi pectonati. The *valves* are strong membranous appendages; and there are valves also to the commencement of each artery, as well as between the auricles and ventricles on each side. The valves to the pulmonary artery and the aorta are called semilunar; the arterial trunk being indented behind each of the three flaps. The indentations are named the sinus valsalvæ. Upon the central portion of each flap may be felt a little rounded body, known as the corpuscula arantii. The use of these valves is to prevent the regurgitation of the blood. The aorta never being quite empty, when the ventricle dilates, there is a tendency to suck back the amount of blood retained within the vessel; but the attempt to enter the ventricle pushes down the semilunar valves, and shuts out its ingress, the corpusculi arantii securing the middle space, which would be naturally left between three semicircles essaying to close a circle. The valves upon the right and left auriculo ventricular openings have different names. That on the right consisting of three flaps, being termed the tricuspid, and that of the left formed by two flaps, being called the mitral. The heart is furnished with blood for its own individual support by the coronary arteries (*Plate* VIII. *n*. *Fig* 13 . 3), which is returned by the coronary veins. Its nerves are gained from the cardiac plexus, principally formed by the par vagum and sympathetic nerves.

THE PHYSIOLOGY OF THE ACTION OF THE HEART, AS THE GRAND AGENT IN THE CIRCULATION OF THE BLOOD.

The *circulatory round of the blood* is a vital action performed by the heart. The round of the blood is divided into the pulmonic and the general circulation.

The pulmonic circulation.—The blood of the two cavas is poured into the right auricle when that cavity dilates. It is sent into the right ventricle when the right auricle contracts. The right ventricle urges it into the pulmonary artery (*Fig* 13 . 2), from which tube it is prevented returning by the valves at the origin of the vessel. By the divisions of the pulmonary artery within the lungs the blood is carried to the air cells; and in the capillaries of the vessel it is changed from venous into arterial blood, or becomes

oxygenated. After the blood has been revivified, or made arterial, it is brought back to the left auricle by the pulmonary veins. Thus much of the motion of the blood is termed the pulmonic circulation. The peculiarity of the pulmonic circulation is that arteries carry venous blood, and veins are the means of conveyance for arterial blood.

The *greater*, or *general circulation*.—We have traced the blood into the left auricle, into which it is poured upon the dilatation of that cavity. The left ventricle dilating, and the left auricle contracting the blood, is urged into the lower cavity upon the left side. From the left ventricle it is driven into the aorta; thence into the right and left aorta; so into the various vessels and their capillaries, to nourish the different parts of the body. Having performed this office, it is returned from the capillaries by the veins, and ultimately by the two cavas into the right ventricle of the heart. It appears that the contraction and dilatation of the two ventricles take place at the same instant; and that at the same time that the blood is driven from the left ventricle into the aorta, the right ventricle impels it into the pulmonary artery: and as the period at which the left auricle receives the pulmonary blood is the same with that in which the right auricle receives the blood of the cavas; so it will be evident that the relaxation of the ventricles and the contraction of the auricles are simultaneous. These alternate contractions and dilatations of the heart are called its *systole* and *diastole*. The contraction of the ventricles, or its systole, pressing the blood into the pulmonary artery and the aorta; it follows, therefore, that when the heart is in a state of contraction, or systole, it is at this period we feel what is termed their *pulsation*. Thus it will appear, that the two nominal circulations form but one direct round of transmission through the body. The nerves of the heart are principally the par vagum and sympathetic.

THE LUNGS.

The cavity of the chest is occupied by two soft and slightly elastic masses, called lungs (*Plate* VIII. *B*, *C*). In a state of distention they completely fill the parieties of the thorax, to which their figure is exactly adapted (see *Plate* VIII.). The lungs have a distinct division into a right and

left mass; each of which presents deep fissures, partially dividing its substance into what are called its lobes (*Plate* VIII. *f*, *g*). The right and largest lung presents four lobuli (*Plate* VIII. *h*), the left three only. As already described, the pleura first lines the thoracic cavity, and is then reflected over the lungs; the lungs during life are in constant motion, enlarging as the air is inspired, and diminishing as it is expired; whence we perceive the use of a serous membrane within the chest: a second reflection from each lung by a union of the membrane, forms an imperfect septum or incomplete division; the two lungs towards their centre partially meeting, and being there only separated by a cellular division. The colour of the lungs varies: in the colt they present a pink hue; in the adult horse they are darker; and in very old subjects they have a greyish cast and granulated appearance. Internally they are always dark in colour and spongy in texture; being formed from the ramifications of the bronchiæ, which terminate in air-cells; and the bloodvessels which accompany them, all being held together by an intervening cellular substance.

The *bronchiæ* are formed from the bifurcations of the trachea (*Plate* VIII. *A*). They are composed of many pieces of cartilage, connected together by fine ligament (*Plate* VIII.); the cartilages becoming almost imperceptible as the tubes grow more fine, or approach the air-cells. The right and larger branch of the bronchiæ given to the right lung, quickly divides into three trunks. The left, which is the longer, from the necessity it has to stretch itself under the posterior aorta, divides into two principal trunks. The bronchiæ are lined throughout by the mucous membrane continued from the larynx and trachea, furnishing a moisture that loads the expired air or breath. The extreme ramifications of the bronchiæ, as has been previously stated, end in minute air-cells; over whose surfaces are spread, in exquisite minuteness, the capillary ramifications of the pulmonary arteries, whose trunks accompany the bronchiæ to the lungs side by side. The pulmonic veins receive the blood from the surface of the cells, whence it is by these last vessels returned. The lungs are themselves nourished by their appropriate arteries (*Fig* 13 . 5), whose blood is returned by bronchial veins. Their nerves are furnished from

the cervical ganglions, consisting of branches from the sympathetic and the par vagum; but, except under inflammation, these organs are not endowed with sensibility. Lymphatics are very plentifully distributed over them, and have been successfully injected.

THE PHYSIOLOGY OF THE LUNGS IN RESPIRATION, AND AERATION OF THE BLOOD.

Respiration.—The fœtal colt subsists by juxta-position between its own organs and the maternal, through the medium of the placenta; and it is by these *secondary* means that its blood becomes partially aerated, for its quiescent state would render perfect aeration injurious; but as soon as separated from the mother, an awful change ensues. The fœtus has hitherto reposed upon the softest of all couches, which has been rendered more luxurious by a temperature of a hundred degrees. Here it has slumbered into life, when it is all at once awakened by the withdrawal of the fluid within which it has rested. It is then squeezed, and punched, and thumped by the violent contractions of the uterus. It is next forced suddenly into a temperature of say fifty degrees, or one half of that which it has been used to; when all at once the umbilical cord, which has hitherto supplied it with breath, or enabled it to perform a function similar to breathing, snaps, and the pains of suffocation are undergone. It is under such circumstances the little being makes a spasmodic struggle for life; and the lungs, hitherto passive, by a natural impulse are roused into action: the muscles of the chest enlarge the cavity; the air rushes in, and the animal now *breathes*. The distention of the chest is a very important feature in respiration, and is effected by an increase of several diameters; by the elevation of the ribs, and by the agency of the diaphragm. This last-named muscle in a state of rest is convex towards the breast, and concave towards the abdomen; but when its muscular fibres contract, it becomes plane-like, which forcing backwards the abdominal viscera, necessarily enlarges the thoracic cavity. The air received into the lungs expands their cells, by which also the blood finds a ready passage through their capillaries. The lungs thus filled, an uneasy sensation stimulates them to

expel their contents; the diaphragm relaxes, and the abdominal muscles contract, and the contents of the abdomen are forced forward: the intercostal muscles also cease their expanding action, and the capacity of the chest is diminished, by which the air is forced out of it. The necessity there exists for air or breath to support life causes the muscles to act once more; the lungs again expand, and in this manner respiration is carried on; both these actions, under ordinary circumstances, being repeated about eight times per minute. There is, indeed, a certain proportion, between the action of the heart and that of respiration; the pulse throbbing about $4\frac{1}{2}$ times to every breath inhaled and exhaled. If more blood be sent to the heart by the stimulus of exercise, &c., the respiration will be also accelerated: thus, in quick motion, or great exertion, there is panting or quick breathing; the air being suddenly expelled, and as quickly inspired, that no obstacle may be offered to the passage of the blood.

We have spoken of the intercostals, the diaphragm, and abdominal muscles, as the respiratory muscles, and undoubtedly they are the chief agents in breathing. There are, however, auxiliary muscles, which, if they were here recounted, would be but seldom read; as the mere list of names would necessarily be without interest. Suffice it then to state, that every muscle, going to or arising from the ribs, is more or less concerned in respiration.

THE PHYSIOLOGY OF THE NATURE AND PROPERTIES OF THE BLOOD.

In essential characters, blood is the same in all animals: it is invariably *red* in the higher orders, though the intensity of its hue varies with circumstances; the principal instance of which is that afforded between the venous and arterial; while it is, in the former, almost purple, it becomes, in the latter, of a bright scarlet colour.—The *specific gravity* of the blood is very differently estimated, it being subject to increase and decrease at different times. Disease and emaciation make it lighter, while in the contrary states, it is found to be heavier. If water be estimated at 1000, the specific gravity of blood may be reckoned at 1050; from which it may, however, be increased to 1120. Venous blood is

heavier than arterial, as 1052 is to 1049; but, as before observed, these data vary.—The *temperature* of the blood in the horse is about 100; and in the ox, 102; but various circumstances tend to increase or decrease it. Arterial blood is usually one or two degrees warmer than venous. Some diseases reduce the heat of the blood, and inflammations are also supposed capable of augmenting it. The *quantity* an animal contains, in proportion to his bulk, has been endeavoured to be ascertained: but the results have been various. Very fat animals are found usually to have proportionably less than lean ones; and in those in a state of close confinement, the quantity is found to be smaller than in the wild. A medium sized horse has lost forty-four pounds.—The *chemical property* of the blood is an important subject to the medical student. It appears to be variously compounded, but is most distinctly separable into two parts; the one solid and red, called the clot; the other fluid and slightly tinged with yellow, termed the serum; or, it is divisible into serum and crassamentum. The process which separates them is termed *coagulation*. The *coagulum*, or *crassamentum*, is found to be composed of two parts: that to which it owes its colour is called its *red globules;* the other component, or that which gives consistence and adherence to the red particles, is known by the names of coagulable lymph, or fibrin. The red particles are connected with the strength of organs; and parts subjected to the greatest exertions, as muscles, are fullest of them; for as muscles are more or less highly coloured, so have they proved stronger or weaker. From known facts, one would infer that the red globules are longer in forming than the other parts. The *fibrin* forms the other portion of the clot, and appears to be the most important part of the vital fluid. After the perfect abstraction of the serum and red particles by maceration, the fibrin will be left white, tough, and fibrous; bearing in general aspect, as well as chemical characters, a close resemblance to muscular fibre when deprived of its connecting membranes and colouring matter. It appears to be that part of which all the solids of the body are immediately framed: it forms the callus of bones, and can become organized whenever extravasated. It spontaneously coagulates, is soluble in alkalies, but insoluble in water, oils, or

ardent spirits; it yields salts by incineration. Spontaneous coagulation is not so rapid in the horse as in man, in whom it is completed in seven or eight minutes; whereas it commonly requires more than twenty hours to *set* the blood of the horse.

The fluid basis of the blood is *serum:* it serves to dilute it, and it forms about four-sevenths of the whole. It is slightly saline, and less putrefactive than the coagulum. It remains fluid in those degrees of heat between 30 and 160 degrees Fahrenheit: with a less heat it freezes; in a greater it partially coagulates. It appears chemically composed of albumen, gelatin, saline matter, and a considerable quantity of fluid which drains from it, called the *serosity.* Serum appears not only the fluid base of the blood, but it also dilutes all the secretions: when morbidly increased, it gives rise to dropsy. The *blood,* therefore, is considered as a compounded fluid made up of these several parts, and which, considered as an aggregate, is the most essential component of an animal. All parts of the body are formed of it; and all parts of the body can be resolved again into it, by means of the absorbents; hence we must conclude that there is a very intimate connexion between the solids and the fluids; whence Mr. Hunter, and many subsequent physiologists, have been led to consider both as governed by the same laws, and as identified with each other in living properties.

DESCRIPTION OF PLATE VIII.

THE CONTENTS OF THE THORAX.

A, the trachea; *B B,* the right lung; *C C,* the left lung, both lungs being deprived of their mediastinums; *D,* the heart; *a,* the œsophagus, or gullet; *b,* the common carotid artery, dividing into the right and left carotids; *c,* the right vertebral artery; *d,* the recurrent nerve of the right side; *e,* the par vagum and sympathetic nerves of the right side, journeying in company down the neck. The enlargement perceptible upon the nerves, marks the situation of the cervical ganglion on the sympathetic; *f f,* the anterior lobes of the right and left lung; *g g,* the posterior lobes of the right and left lung; *h,* the small extra lobe of the right

lung. The portion of lung occupies the space between the inferior mediastinum and the posterior cava; *i i*, &c. the first seven of the costæ, or true ribs, divided; *j j*, the remaining ribs; where the letters are placed would be the posterior lobes of the lungs; *k*, the cartilages of a few of the ribs, and of the sternum sawn through to expose the contents of the chest; *l*, the ensiform cartilage of the sternum; *m*, the skin dissected back; *n*, the coronary artery of the heart, which has been deprived of the outer layer of pericardium.

ANATOMY OF THE ABDOMEN.

OF THE ABDOMEN GENERALLY.

The external parts of the abdomen are the common integuments; the abdominal muscles; the parts of generation in the horse, and the mammæ in the mare. The internal parts are the various viscera and their appendages. The abdominal cavity, when its contents are removed (*Plate* IV.), presents an extensive oval vault, bounded anteriorly by the diaphragm; posteriorly by the bones of the pelvis; superiorly by the vertebræ; laterally by the ribs and muscles of the belly; and inferiorly by the abdominal muscles. This cavity, for the convenience of anatomical and surgical description, is divided into imaginary compartments or *regions*.

The *epigastric region* (centre, right and left) includes the anterior third of the abdomen. Minor divisions have distinct names; and the two sides of the epigastric region are set down as the *right* and *left hypochondriacs*. The central third of the belly forms the *umbilical region:* the lateral parts of the umbilical region are also termed the *lumbar regions*. The *hypogastric region* extends behind an imaginary line, drawn from the anterior spinous process of the ilium upon one side, to the same bone upon the opposite side of the animal; and admits of lateral divisions into the right and left *iliac regions*, intersected by a middle portion, known as the *pubic region;* consequently the term hypogastric is only general, and the subdivisions are in it entirely forgotten. The central portion of these regions is divided by a white line called the linea alba.

The *relative situation of the viscera within the regions*

may be thus stated:—the large intestines occupy the inferior of the abdomen, as well as a considerable part of its sides. The cæcum (*Plate* XI. *A*) rests its large blind end within the right hypochondriac, behind the origin of the colon (*Plate* XI. *B*), lying upon the linea alba. The point of the cæcum being curved forward until it reaches the region mentioned; and it is usually the first of the intestines to protrude, upon opening the abdomen of the horse. When the large intestines are removed from the abdomen, the small intestines (*Plate* XI. *D*), which in a natural state lie above and behind the large, come entirely into view; their situation is within the two last regions, and partly within the first division of the abdomen. The stomach (*Plate* IV. *G*) will be found to occupy the left hypochondriac, and partly the epigastric regions. The liver (*Plate* IV. *J*) is attached to the diaphragm in the epigastric, and two hypochondriac regions, though but a small portion of it is within the left hypochondriac. The renal capsules and kidneys (*Plate* IV. *D*) occupy the lumbar regions: and the bladder, with the parts of generation, occupy the pubic and hypogastric regions in the mare and horse.

The peritoneum is a strong dense serous membranous lining to the abdomen, as well as an investiture and support to its contents, facilitating their movements as they glide upon or over one another. It also secretes a vapour, and thus, like the pleura, favours motion and prevents friction; the vapour vanishing, and dryness being present at the commencement of inflammation, then the motion of its contents is accompanied with intense agony. It may be traced from its anterior connexion with the diaphragm, whose posterior or abdominal surface it partially covers, on to the liver. Without being over minute, it is sufficient to say it passes over all the contents of the abdomen, from the diaphragm to the pelvis, covering only a portion of the uterus, the bladder, and the rectum. In the male it penetrates down the abdominal rings; invests the spermatic chords and the testicles, as well as lines the scrotum. Its folds also form ligaments, as those of the liver; and act as supports to particular parts, as the mesentery to the intestines; within the duplicature of which run arteries, veins, nerves, absorbents, as well as are located numerous small glands, through one or more of

which each lacteal passes. Besides the mesentery which supports the small intestines, there is a mesocolon. Which latter fulfil the same offices as the mesentery. The omentum consists of a delicate duplicature of peritoneum, derived from its reflections, between which fat is deposited. Its use is to favour the motion of the various abdominal contents one upon another; and it is possessed of very low vitality, bearing to be cut or torn with impunity. It arises from the stomach, and is the caul of the butcher. The peritoneum is possessed of great strength as well as elasticity; facts well authenticated by the different shapes which the abdomen assumes when tucked up, and when distended by flatulent colic.

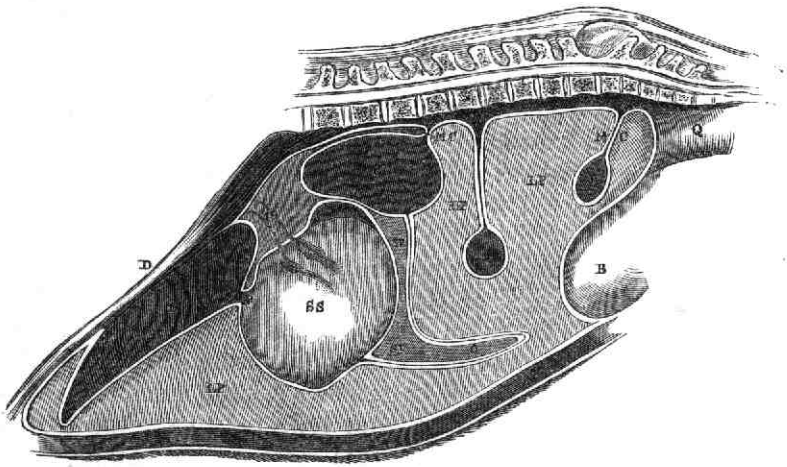


FIG 22.

THE REFLECTIONS OF PERITONEUM.

LP, The larger cavity of the peritoneum.
SP, The smaller cavity of the peritoneum.
D, The diaphragm.
L, The liver.
SS, The stomach and spleen.
C, The colon, supported by *MC*, the mesocolon.
I, The ilium, supported by the mesentery, formed of two layers of peritoneum.
R, The rectum, supported by the mesocolon.
Q, That portion of the rectum which is covered only by condensed cellular tissue.
B, The bladder.
O, The omentum, formed by the union of the two peritoneums.
P, The œsophagus indicated. The lower *P* represents the investiture of the hepatic duct, which goes to the duodenum.

By tracing the white lines the student may learn the reflections of peritoneum, and ascertain the existence and precise situations of the lesser and larger cavity.

THE OMENTUM.

The *omentum* consists of folds of the peritoneum. One cavity is spoken of as the large peritoneal sac (*Fig* 22 . *LP*) ; the other as the lesser peritoneal sac (*Fig* 22 . *SP*). The larger peritoneum floats over part of the anterior surface of the liver (*Fig* 22 . *L*) ; thence upon the posterior surface of the diaphragm (*Fig* 22 . *D*). From this over the abdominal muscles. Afterward upon the anterior portion of the bladder (*Fig* 22 . *B*). Hence to the spine, whence it descends to form the mesocolon (*Fig* 22 . *MC*), and to encircle part of the rectum (*Fig* 22 . *R*). Having done this it proceeds forward, constitutes the mesentery, and supports the small intestines (*Fig* 22 . *I*). After which it covers part of the colon (*Fig* 22 . *C*) ; and then floating loose in the abdomen constitutes one layer of the omentum (*Fig* 22 . *O*) which joins the stomach, over a portion of which this peritoneal layer is reflected (*Fig* 22 . *SS*) ; and then goes to the posterior part of the liver, from which place it winds round to unite with the peritoneum upon the anterior portion of the liver, from which point we first set out. The lesser peritoneal sac is reflected from the top of the liver (*Fig* 22 . *L*) to the crura of the diaphragm (*Fig* 22 . *D*) over the pancreas ; it then descends, constituting one side of the mesocolon (*Fig* 22 . *MC*), and covering part of the intestine, floats loose, forming the inner layer of omentum (*Fig* 22 . *O*) ; whence it joins the stomach, a part of which, together with the spleen, it overlays (*Fig* 22 . *SS*) ; to be thence reflected to the top of the liver, the point at which this description commenced. Within these duplicatures, adipose nodules are dispersed. In the ox and in the sheep also, the folds inclose the four stomachs and part of the duodenum : but in the horse their extent is small ; besides it has attachments to the great curvature of the stomach, which it does little more than cover, as well as to a portion of the colon, to which it is also appended. The horse, therefore, is not subject to epiplocele. The uses of the omentum are to facilitate the peristaltic action, or to allow the abdominal viscera to glide over each other without friction : it likewise serves as a store-house for fat, against a period of starvation, during which the adipose matter would be absorbed.

THE STOMACH.

This important alimentary bag is remarkably small in the horse. Its situation may be described as being immediately behind the liver, its principal portion occupying the left hypochondrium; and a smaller part the epigastrium, with its pyloric (*Fig* 23 . *P*) orifice stretched across the spine to the right side. It has two surfaces; one is posterior, and the other anterior. It has also two openings (*Fig* 23 . *P.K*). The smallest, within the left hypochondriac, is the termination of the œsophagus, and is called the cardiac opening (*Fig* 23 . *K*): the larger, toward the right, is termed the pyloric opening (*Fig* 23 . *P*), and marks the commencement of the duodenum. Its *curvatures* are, a large one, to which the spleen is attached; which curvature extends from opening to opening (*Fig* 23 . from *K* to *P*); and

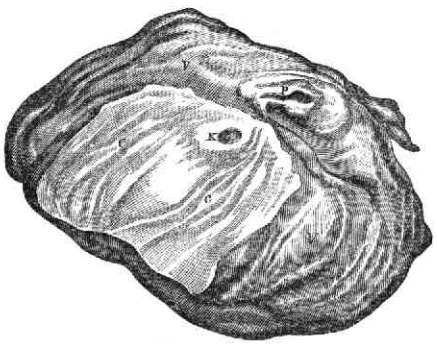


FIG 23.

THE STOMACH OF THE HORSE, LAID OPEN.

CC, The cuticular portion of the lining mucous membrane.
VV, The villous portion of the membrane.
K, The cardiac opening to the stomach, with the œsophagus.
P, The pyloric opening from the stomach.

a smaller, formed directly between its openings. The stomach is formed of three general investing coats. The first or outer coat is elastic, and of much strength, being formed of a reflection of peritoneum. The second, or middle coat, is composed of white muscular fibre, which exists in two distinct and separate layers. The longitudinal and most

external appears to be a continuation of the outer one of the œsophagus, strengthened by additional fibres; which, spreading over the lesser curvature, carry themselves obliquely around the stomach; where they conspicuously form themselves into a kind of vortex encircling the central part of the fundus. The inner layer, and the more abundant, is not quite circular in its direction, but slightly oblique, intersecting the course of the longitudinal fibres; it is very thick and strong around the œsophageal extremity; it altogether exhibits so much structural speciality, as to warrant a conclusion that it was purposely placed there to prevent the return of the food.

The inner surface of the stomach is composed of mucous membrane. This membrane, as it extends over the interior of the viscus, assumes two characters; the one being hard, and called cuticular (*Fig* 23 . *C*); the other, being soft, having numerous fine projections like the pile of velvet, and is termed villous (*Fig* 23 . *V*).

The cuticular coat is a prolongation of that which, commencing with the mouth, extends down the œsophagus, is continued over nearly the first half of the stomach, and ends abruptly by a sort of sudden termination, which separates it very distinctly from the villous coat. From the pharynx to its termination, the mucous lining membrane is plicated, to admit of distention: thus the plicæ of the œsophagus are continued into the cardiac orifice, and in a less regular manner also over the cuticular surface of the stomach. The cuticular covering is whitish in colour, and is perforated with secretory mucous openings; whence a mucous secretion, necessary to perfect digestion, is poured out. It is to this coat of the stomach that bots are so frequently found adhering, and which they sometimes penetrate; though these parasites also attack the other parts.

The *villous portion* commences from the termination of the cuticular part. It is at once soft, vascular, and exceedingly fine in its texture: and, when attentively examined, presents innumerable villi, or projections, which probably are the minute ramifications of the bloodvessels, by which the solvent gastric fluid is secreted. The surface of the villous coat is likewise furnished with waving folds, by which it suffers no injurious pressure when the stomach is filled; but

can easily accommodate itself to the elasticity of the other investitures. The villous rugæ diminish towards the duodenum; and at the pylorus they unite with some muscular fibres to form a valvular apparatus, which prevents the return of the food. The villous portion of the stomach secretes the gastric juice, and within it chymification is performed; a fact which is proved by ruminants, having stomachs wholly cuticular, in which the digestive process does not go forward; and by many animals having entirely villous stomachs, in all of which perfect digestion is accomplished.

The stomach, as a secreting organ, is very plentifully supplied with blood from gastric, splenic, and hepatic trunks; which, with the exception of their main branches, proceed in a tortuous direction, to avoid distending the organ; and, in accordance with the same end, the gastric veins which return the blood possess no valves to impede its progress towards the vena portæ. The nerves are supplied by means of the par vagum, or eighth pair, and likewise from the sympathetic nerve, or ganglionic system. The par vagum endowing it with the necessary feeling, the sympathetic giving to it organic life.

THE PHYSIOLOGY OF DIGESTION.

Digestion may be characterized as that power whereby substances which are received into an animal body lose their own properties, and become endowed with those necessary to support the constitution of the creature that imbibes them. To restore the tone of parts, *rest* is required; and to repair waste, *food* becomes necessary; while *hunger* and *thirst* stimulate animals to take in solid and fluid aliments. That the stomach is influenced by the blind longings of inorganic life is proved by the fact, that the mere mechanical distention of a draught of water will, for a time, satisfy the sensation of hunger; but simple distention, not satisfying an instinctive desire, instead of affording relief, it only adds to the general prostration: it is probably by its distending properties that food taken partly invigorates long before perfect chylification has taken place. This fact is however better established by no man having absolute power to quicken or delay his desire for nourishment. The mere

want of food does not dissipate immediately the strength; but the body can for some space support itself, and desire, though felt before, be actually forgotten; thus the inanition of a *hunter* long employed in reaching a distant cover is no bar to his after-exertions in the chase. The moment he hears the well-known sound, he receives a temporary supply of nervous energy; which acting on his irritability, produces renewed muscular exertions: but the chase over, a double prostration is the consequence; for the nervous impulse being expended, it often happens that the stomach is sympathetic with the general frame, and the horse becomes "too tired to eat."

Thirst differs from hunger principally by its impelling us to receive liquids instead of solids. The instinct, which is independent of reason and superior to the will, calls for fluids often not required for repair: it is true perspiration will produce thirst; and that diuretics will do the same, but these are artificial not natural causes. Drink is also instinctively sought for no cause save that of fickle appetite, induced by long indulgence, which cannot be reckoned among life's necessities. Stimulated, therefore, by the sensations of hunger and thirst, animals seek for matters to which they are instinctively directed by their senses of smell and taste.

The mastication, insalivation, and deglutition of the food have already been noticed. To the saliva, however, by no means is usually given its full merit as an important agent in the digestive process. When we consider the quantity secreted, the chemical nature of the fluid, its remarkable affinity for oxygen, and that a complete mastication invariably produces a direct change in the qualities of the food, it would be most unphilosophical to regard it as a mere *diluent*. The masticated aliments received into the stomach become subjected to the further action of the gastric fluid, the produce of the secreting surface of the villous division of the stomach. The true *gastric juice* is possessed of a solvent power, which is shown in a remarkable manner by the food being dissolved by its action.

The ordinary process is after this fashion with the horse. The masticated vegetable matter is first deposited in the cuticular cavity of the stomach; whence it is propelled for-

ward by muscular contractions of the organ, from left to right, towards the pylorus; being, however, so turned and contorted in its passage, that every portion of the insalivated mass becomes first macerated with the cuticular secretion, and then receive the solvent gastric juice. It is thus that a mass of matter undergoes the chymifying process within the stomach, after which it is hurried onward to be converted into chyle, within the intestines.

Vomition.—A structural peculiarity in the stomach of the horse remains to be noticed; by which, in all ordinary cases, the animal is denied the power of vomition. The whole of the alimentary canal in that animal exhibits uniformity of intention, unfavourable to vomition. The soft palate closes all return of the contents of the stomach by the mouth; and consequently if vomition were to occur, the rejected mass must come out by the nostrils. The next structural impediment may be observed in the œsophagus; which, by having a different arrangement of its muscular fibres, to that of ruminants, evidently proves that regurgitation forms no part of the natural economy of the horse. The obliquity of its insertion, the number, strength, and direction of its fleshy layers, must form a sufficient bar to all ordinary tendency of the aliments to return. And the superior resistance offered by the greater volume of muscular fibre around the cardiac extremity, must, in all cases, effectually prevent it. The dog and cat, which vomit rather freely, have the muscular fibre much the thickest at the pyloric orifice. Were the equine and the canine stomachs handed to a person perfectly ignorant of anatomy or physiological discussion, his sense of touch would be sufficient to decide the matter, so very marked and obvious is the difference. Added to the above reasons, though not of much force, is the circumstance of the horse's stomach being situated far from the abdominal muscles; this prevents these last from directly acting upon the digestive bag in that animal, but certainly cannot prevent their action being felt through the pressure of surrounding parts.

THE INTESTINES.

The remainder of the alimentary canal is continued from the pyloric orifice of the stomach to the anus; forming a long tube, whose varying dimensions have occasioned it to be divided into the large and small *intestines*, both of which are very well marked in the horse (see *Plate* IX.; compare *A*, *B*, *C* with *D*). The length of the tract ranges between twenty-seven and thirty yards; of which proportions the small intestines occupy from twenty to twenty-two yards, and the large from seven to eight. It is not easy to give a determinate place to the intestines, either individually or generally; the large, however, may be said to occupy all the anterior and inferior portions of the abdomen; and the small to range above in the space not already occupied; both occasionally shifting their positions by reason of the peristaltic motion. They are, however, greatly prevented from an unnatural displacement, by membranous productions of the peritoneum; which forms bands, that at different parts serve to fix portions of the intestines. The first intestinal coat is derived from the peritoneum, which receives the tube between its layers; at once protecting it, and affording a medium for the transmission of its vessels, and a moistened surface whereupon to move. The second, or muscular coat, presents organic muscular fibres; by the contraction of which the *peristaltic* action is performed, the longitudinal slightly shortening them, and the circular diminishing their diameter. Of these two coats of muscular fibre, the circular is much the most powerful, as is proved by the intestines always being found contracted in cases of violent death. The inner tunic of the intestinal canal is mucous or villous, and is very vascular and sensitive; its villi presenting an increased surface for the mucous secretion, as well as more space for the ramification of the terminations of the capillaries and lacteals: but it presents no valvulæ conniventes, as in the human, their place being supplied by the increased length of the tract.

The *duodenum* (*Plate* IV. *H*), the first portion of the small intestines, commences from the pyloric orifice of the stomach. It hangs loose and pendulous upon the right side, being attached to the concave surface of the liver;

from which making a turn, it becomes fixed to the vertebræ, and then takes the name of jejunum; but as in this course its length is nearer twenty inches than twelve, it is evident that duodenum is an improper term for it in the horse. It is larger in circumference than the other small intestines, and more vascular; but it is peculiarly remarkable for having the pancreatic and biliary ducts obliquely penetrating it, which they sometimes do by one common orifice, but often by distinct ones, about five inches from the commencement of the intestine. The *jejunum* gains its name from being commonly found empty, and is attached to the mesentery, which follows its circumvolutions; the line of division between it and the ilium is only imaginary. A portion of the *ilium* occupies part of the iliac region, whence it derives its name: it presents no peculiarities of structure; but its circumvolutions are all connected by the folds of the mesentery: it terminates in the cæcum.

The *large intestines* differ widely from the small in structure and appearance as well as in size; having their large volume puckered up by muscular bands into distinct compartments which lodge the alimentary contents, and prevent their too hasty egress. The *cæcum*, or blind gut, as it is called, is the first of them. In this the ilium terminates, protruding itself some way within the cavity, which prevents the return of the contents of the cæcum. From this locality part of the cæcum projects forward nearly three feet, and chiefly reposes upon the umbilical portion of the linea alba. It usually approximates to the right side of the abdomen, and appears immediately on opening the peritoneum. It interposes between the ilium and the colon, dividing one intestine from the other. The head, or part of the gut, within which the ilium terminates, and the colon takes its rise, is commonly near to the diaphragm and liver. The horse has no appendix vermiformis. Through the peritoneal covering, we observe three or four muscular longitudinal bands, reaching from its extremity along the outer side of the intestine; between these bands the coats of the intestine are plaited up, and form cavities called cells. From this gut being frequently found with a considerable quantity of water in it, it has been conjectured to be a receptacle for fluid, and fluid only; but it is not

always furnished with water, for solid ingesta as well as fluid is found within it.

The *colon* originates from the cæcum in the right hypochondriac, whence it reaches across the abdomen into the left iliac; though this end floating free has no absolutely fixed position. Having reached the left side it makes its sigmoid flexure, or bends upon itself to proceed back again, and so terminate in the right hypochondriac, where the continuation of the intestine assumes the name of the rectum. It is connected one part to the other, that is, from the cæcum to the sigmoid flexure; but it is perfectly free at its other side, so that without destroying the integrity of the parts, the colon might trail upon the ground. It is of different dimensions; thus after it has commenced it enlarges, and towards its termination it takes on its greatest magnitude, and at this place commonly loses its muscular bands.

The *rectum* is the continuation of the colon, and passes backwards under the lumbar region to the anus. Its substance is thicker than that of the other intestines; and has a longitudinal muscular band upon its either side; by these it is puckered into cell-like depressions, to prevent a too frequent expulsion of the fæces. The rectum is rather loosely suspended from the spine and sacrum by a detachment of the peritoneum, which is here called mesocolon: yet the peritoneum does not invest the whole of the rectum, but leaves it as it approaches its termination; the place of the peritoneum being supplied by cellular membrane. The *anus* is opened by the force of the peristaltic motion, and is shut by a muscular band around the extremity of the gut, called the sphincter ani.

The mesentery and mesocolon.—These great folds of membrane are simply prolongations of the peritoneum, within the turn of which the intestines are enclosed: these investing folds, uniting at the superior part, form apparently a single membrane, called *mesentery*, and which consequently has two smooth surfaces. Such peritoneal prolongations are very useful; for they not only invest the intestines, and give them their outer covering, but they in some measure keep them within their situations, and furnish a medium through which they receive their blood-

vessels and nerves: the lacteals and numerous globate glands are also situated within these membranous folds. The origin of these folds of peritoneum is from the spine, and is of small extent; but it is so framed, that, as it proceeds, it expands, and is enabled to follow the whole of the intestines through their course; branching out like a fan, from its small beginning at the duodenum to its ample termination at the small intestines.

THE PHYSIOLOGY OF THE INTESTINES AND SOME OF THE VISCERA.

The intestinal canal receives the pulpy mass of the chyme in a partial state of digestion; but this becoming mixed in the duodenum with the pancreatic and the biliary fluids; further changes take place in it: chylification is by these accessions more perfectly advanced, and the chyle more completely animalized. The mass is continually propelled onward by the creeping muscular contractions of the intestinal tract, called their *peristaltic motion*. This motion is not altogether uniform, either in direction or duration; on the contrary, it sometimes acts inversely; occasionally it halts altogether, and often is irregularly agitated. That this propelling force may not hurry the contents too fast, a cellular arrangement exists, evidently intended to delay the chylous mass within the intestines till the whole of its nutritive parts are taken up. The powers of the horse requiring a very complete chylification, he is furnished with a long and large alimentary tract. The *chyle* is separated from the mass by the agency of the lacteals; which vessels directing their course through the mesentery, deposit their contents in the chylous receptacle, by which it is conveyed to the jugular or axillary vein, and mingled with the blood. The intestines own a high degree of irritability, which in their natural state produces vital phenomena; and in their deranged state causes some of the most fatal diseases. The stimuli of the intestines are various; food is the most ordinary, and it is generally supposed to have its activity increased by the biliary secretion. Exercise is also a natural stimulus. The application of particular substances irritates them greatly, and are thence called purges.

THE LIVER.

The *liver* (*Plate* IV. *J*) is so bulky and ponderous a mass, that there seems great wisdom in placing it in the centre of the body. Anatomically its larger part is situated in the right hypochondrium; a smaller portion in the left (see *Plate* IV.), and its centre in the epigastrium; in circumference it is between two and two and a half feet; thick towards the middle, but thinner at the edges. It is divided into two large and several smaller lobes; which are again further subdivided by indentations, the principal of which separates the two large lobes, and is called the *great fissure:* within this may be seen the remains of the fœtal umbilical vein; while a smaller indentation, seen about the centre of the concave surface, forms an opening for the portæ. By its convex surface the liver is attached to the diaphragm by cellular tissue and peritoneum, which last being reflected over it, sustains it. Numerous lymphatics run over its surface; and the bloodvessels pass within its sheath called Glisson's capsule. Glisson's capsule is a thin membrane, formed of white fibrous tissue, and situated immediately beneath the peritoneum. The principal bloodvessels of the liver are the vena portæ, which carries to the gland the venous blood from the intestines; vena hepatica, and arteria hepatica, which last is concerned directly in the nourishment of the liver. Its nerves are derived from the hepatic ganglion, which is principally composed by branches derived from the sympathetic and par vagum.

Vena portæ hepaticæ.—The circulation of the venous blood in the liver presents a remarkable speciality, as may be gained by what follows. The numerous veins of the intestines all terminate in one common trunk, which enters the liver as the vena portæ. This venous trunk, after it has pierced the liver, branches off once more in every direction to be ramified throughout the substance of the gland; it necessarily performs the office of an artery, being distributed to the liver for secretion. The blood being circulated through the substance of this viscus, and acted on within it, is poured from the terminations of the vena portæ and hepatic artery, into the hepatic veins, which empty their contents into the posterior cava by numerous branches.

Hepatic duct.—In the glandular capillaries some great change goes on, by which a fluid substance is separated from the blood. The biliary pores appear to end in small tubes, which unite to form the *hepatic duct;* or, in anatomical language, the pori biliari end in the tubuli biliari, which, by their union, form the ductus hepaticus. As it parts from the liver, it accompanies the hepatic artery, and passing below the vena portarum, it terminates in the duodenum, about five inches from the pylorus. The liver of the horse, has no gall-bladder; whence the bile has been thought to be constantly flowing into the small intestines; when the animal lives off grass, and is feeding the major portion of his time, it may be all very well to suppose the constant supply of food requires a constant supply of the hepatic juice; but what becomes of this theory of a continuous flow with the horse that is manger-fed, with whom eating is a very brief affair; may not the bile be stimulated by the motion of the stomach and intestines, as the saliva is by that of the jaws; and when food is not present either not be secreted or stored up within the biliary ducts, and within the dilatation commonly observed near to the termination of the main duct? The foregoing is merely suggested, not by any means insisted upon.

THE PANCREAS.

The pancreas is a conglomerate gland, of a very irregular figure, lengthened out into three processes, which extend it across the spine, between the stomach and left kidney. Its superior surface is applied to the roof of the abdomen, and its inferior to the great curvature of the stomach; it is also connected with the omentum, liver, spleen, and duodenum. From its substance small tubuli collect into one common duct, which penetrates the duodenum, sometimes immediately with, and sometimes distinct from, the biliary duct. Its use has not yet been satisfactorily explained, but it is very like a salivary gland in structure; in which particular it also resembles the thymus gland, butchers being in the habit of selling this last-named gland and the pancreas, indiscriminately, as sweetbreads.

THE SPLEEN.

The *spleen*, or *milt*, is a viscus of a soft structure, but without an excretory duct; its colour is a reddish brown, but both its hue and its size are variable. In shape it resembles an acute triangle. Its texture is spongy, and consists of erectile tissue; it is so tender, that were it not for its peritoneal covering, it would be liable to be torn by the slightest cause. By its upper convex surface it is attached to the left extremity of the stomach: inferiorly it rests on the abdominal viscera. It is plentifully supplied with bloodvessels, absorbents, and nerves; particularly the two former: but its use is altogether conjectural. It is seldom idiopathically inflamed, although so eminently vascular; but its erectile tissue has subjected it to rupture, and to a species of scirrhous enlargement: it has also been found ossified to a considerable extent.

THE RENAL CAPSULES.

These are two irregularly-shaped bodies, situated each in front of a kidney. Their size in the young subject is very considerable, but lessens remarkably as age advances; internally they seem composed of two substances, one a dirty yellow-coloured compact vascular part; another more pallid, less in quantity and more spongy in texture, from which in the young colt a fluid may be pressed out. They derive their blood generally from the emulgents, and occasionally from the aorta; their nerves are gained from the renal plexus, but their functional purpose is wholly unknown.

THE KIDNEYS.

The kidneys are two glandular bodies, situated in the dorsal and the lumbar regions, at the superior part of the abdomen; the right being generally the most anterior; the left being pressed backward by the spleen. The kidney bean, so named after these parts, serves to give a pretty exact idea of their shape; but which is by no means uniform in every horse. The central notch offers an entrance to their vessels, and an outlet to their veins and ducts. They are sustained in their situation by cellular investiture by their

vessels, and by the peritoneum, which passes over their inferior surface, or over the fat which may cover them. The kidneys lay upon the top of the peritoneum, and consequently are without the abdominal sac; they are conglomerate glands; and when cut into present two distinct portions. The *cortical* or outer part is of a dull dark red, of a granular structure, which dips into the other substance; the cortical mass may be regarded as the convolutions of the emulgent capillaries, around the minute terminations of the urinary ducts. The second substance, called the medullary part, is lighter in colour than the last, and presents a vast number of radiating tubes, which collect into minute cones or *papillæ*. These papillæ are clothed by a mucous membrane, which is cup-shaped, and continuous with the lining membrane of the tubes; each is called a calyx. The calices point into canals, or grooves, continuous with the pelvis of the kidney, and named the infundibula. The pelvis, into which the infundibula lead, is nothing more than an enlargement at the beginning of the ureters, situated without the kidney. The urine then is secreted from the capillaries of the emulgent arteries, coiled round the minute ends of the renal ducts; whence it passes into the tubuli uriniferi, or tubular portion of the kidneys, to flow towards the calices; from which it falls into the infundibula. By the infundibula it is passed to the pelvis, thus into the ureters, and so into the bladder. The arteries of the kidneys are so large as to be supposed to carry one-eighth of the whole blood of the body (see *Plate* IV. *E*) to these comparatively small organs. The large trunks of the arteries emerge from the aorta, immediately behind the anterior mesenteric artery (*Fig* 13 . *f*); the left is much shorter than the right, from the inclination of the aorta to that side (*Plate* IV. *A*); each trunk penetrating its kidney by two or three divisions (*Fig* 13 . *f*). The *emulgent veins* (*Plate* IV. *F*) arise from the capillaries of the artery, and follow the direction of that vessel. The nerves of the kidney are furnished from the renal plexus, formed by the par vagum and sympathetic nerves; its lymphatics are to be seen accompanying the veins.

The ureter (*Plate* IV. *C*) passes out at the posterior part of its appropriate kidney, is continued backwards, inclining towards the bladder; when, becoming connected

with the ligamentum latum, it travels with it to the upper part of the bladder; and finally inserts itself at some distance from the other within that viscus, piercing the coats obliquely, and running between them for a short distance; this mode of entrance performing the office of a genuine valve.

THE BLADDER.

This is a membranous and muscular sac of a pyriform shape under distention, in which state it stretches beyond the pubis, and may be then felt in the belly. It will contain several quarts of urine, but is usually stimulated to an early evacuation. It is surmounted by the rectum in the horse, and the vagina in the mare. The bladder is attached to the parietes of the pelvis by the peritoneum, which forms its lateral ligaments; the peritoneum being superiorly reflected from the bladder over a part of male rectum and female vagina. The bladder has three tunics: the outer consists partly of peritoneum, which is to be seen only over its fundus and part of its body; the other portion being covered by dense cellular tissue. The middle is the muscular coat, whose fibres, longitudinal and oblique, adapt it for uniform and complete contraction. The internal lining membrane is villous, from the vascular surface of which a mucus is secreted, to defend the organ from the irritation of the urine. At its posterior part the bladder is obliquely pierced by the ureters in the manner stated. The neck of the bladder, which is surrounded by yellow elastic tissue, terminates in the urethra. The arteries of the bladder are derived from the minute branches given off by the internal iliacs; its venal trunks return their blood into the internal iliac veins; and the nerves are given from the sacral and abdominal plexuses.

THE PHYSIOLOGY OF THE URINARY ORGANS.

Urine may be considered as a separation from the blood of its fluid part; the separating office being effected by the agency of the kidneys; which organs therefore appear united in function with the skin, and with the exhalant bronchial surface, in affording outlets to the superfluity of the vascular system. But of these three excretions, that

of the urine is the most compound, holding in suspension, in addition to its other chemical constituents, a remarkable one, termed *urea*. Urine in colour is yellow, of a lighter or deeper tint; at times it is transparent; at others turbid in the extreme; its odour is peculiar, sometimes offensive: and its specific gravity is somewhat greater than that of water. The *phenomena* attending the formation and ejection of urine are numerous and important: one of the most interesting of these is the rapidity of its formation after liquid aliments have been received; and the very early detection in the urine of matters taken into the stomach. The regularity of the urinary secretion is a notable phenomenon; it is always going on, as well when sleeping as when waking. The complete distention of the bladder occasions an instinctive attempt at evacuation; but the act remains partly under the influence of the will, and is much regulated by habit. The expulsion of the urine from the bladder is thus accounted for—

The neck of the bladder is composed of yellow elastic tissue. To this the long order of muscular fibres are attached. Distention excites the muscular fibres, which are of the white or organic kind, into action; the bladder having urine within it, more or less, according to its irritability, when the muscular fibres contract. The oblique diminish the diameter of the organ; while the longitudinal muscle, attached to the neck, pulls up the fundus near to the opening; and at the same time drags the elastic tissue, which is the natural cork to the organ and would of itself remain firmly closed, violently apart. The urine thus released, and forced out by the energetic contraction of its muscles, enters the urethra, and thence is discharged upon the ground.

The oblique entrance of the ureters into the bladder, these ducts passing for some distance between the layers of muscular fibre before they enter into the organ, acts in both directions as a perfect valve. When the bladder is relaxed there can be no pressure upon its sides, therefore the urine enters freely, and has no disposition to return; but so soon as the bladder is full, or becomes distended, pressure is made upon its sides, and thus the further entrance of urine is prevented; while the perfect closure of the orifice effec-

tually stays the fluid from returning upon the kidneys. Less urine is formed in summer than winter; for when perspiration has robbed the blood of its watery particles so little urine is passed, as to have led to a supposition that a dangerous obstruction existed. It is also to be observed, that, in our present state of veterinary knowledge, we are not able to obtain many pathognomonic hints from the various modifications of urine. It is true that, when purulent, we are aware that ulceration is present in some of the passages; and when ropy, that mucous abrasion exists in the same. When the urine is tinged with blood, we attribute it to lesion of the minute vascular texture of the kidneys; and that this does not more often happen is much to be wondered at; recollecting that these organs are situated immediately within the sphere of action of the psoæ muscles, whose contractions, under heavy weights, must be continually exposing them to pressure. No observations will be made on the components of æquine urine; but little wonder will be felt on learning that the animal is occasionally the subject of urinary calculi.

THE MALE ORGANS OF GENERATION.

The parts in the male are most of them external; on the contrary, in the female, they are principally internal; but in both they are connected with the urinary organs, by which one structure is made to answer two purposes.—The *scrotum*, containing the testicles, is formed by the integuments of the abdomen: outwardly it is smooth, thin, and scantily supplied with hairs; it is next to the skin enveloped by cellular substance, and then by a muscular layer, called *dartos*, while its substance is divided by a septum, marked by a raphe or external line of division that completely separates the scrotal cavities.

The *testicles* occupy the scrotum, and are two glandular bodies, which are first formed within the abdomen. Internally it is lined by a reflection of peritoneum derived from the abdomen, and called the tunica vaginalis reflexa, which as life progresses is drawn into the scrotum. The coverings of the testicle are, first, a complete external one of peritoneum, which is continued up the cord, and is called the tunica vaginalis; then a partial one from the

cremaster, which is no more than a slip given off by the internal oblique abdominal muscle. The *tunica albuginea* is the first true testicular coat, being of a white fibrous or tendinous nature, and enclosing the gland as Glisson's capsule does the liver. In the centre is situated, like to the middle pith of an orange, a portion of fibrous texture called the mediastinum testes; from which proceed certain layers dividing the gland into separate portions, like to the quarters of the fruit just alluded to. These divisions run from the centre towards the internal surface of the tunica albuginea. The third coat of the testes is a tunica vasculorum, being the nutrient tunic of the gland from which vessels run into each of the divisions. Within the divisions the contents are the same, so that the description of one will serve for all. These spaces are filled with the convolutions of the extreme ends of the duct, within which the semen is secreted, and which are called lobules. The upper portions of these convolutions become imperfectly straight, and are spoken of as the vasa recta. The vasa recta communicate with tubes which run at right angles, but are still very minute. These last tubes are known as the rete testes, which ultimately become external, and then assume the name of the vasa efferentia. The vasa efferentia end in numerous convolutions; and in that form constitute the epididymis, which at length leads to the vas deferens. The testicle is white, firm, and externally smooth.

The *vasa deferens*, or excretory duct of the testes, joins the spermatic cord, and proceeding with it into the pelvis, by means of the abdominal rings, finally gains the lateral and superior surface of the bladder, to terminate in the urethra, either alongside or within the opening of the seminal vesicle. The *vesiculæ seminales* are situated one on each side of the neck of the bladder, immediately behind and contiguous to the termination of the vas deferens: these membranous sacs, which contain a peculiar mucous secretion, have large excretory ducts, that terminate also in the urethra, close to the opening of the vas deferens. The *prostate glands* are irregular in their number: comparative anatomists quote, some two, some three, and others four prostatæ, so indeterminate are their appearances. The *lesser prostates*, or Cowper's glands, are two smaller glandular bodies,

of the size and shape of a chestnut, situated near the greater, and almost lying upon the spines of the ischium. Both the larger and lesser prostates open by numerous outlets into the urethra. There is no doubt whatever that the secretions of all the parts we have just named are assistants to the seminal fluid, but in what degree or in what manner is not known.

The spermatic cord consists of a covering of peritoneum, the vas deferens, the cremaster muscle, arteries, veins, nerves, absorbents, cellular tissue, and a slight fibrous coat beneath the peritoneum, continuous with the tunica albuginea testes. It begins at the internal abdominal ring, passes through the inguinal canal, emerges through the external abdominal ring, and is inserted into the posterior part of the testicle.

The penis is a firm body, two feet in length. The *sheath*, which incloses it from view, is formed of the common integuments, continued loosely from the scrotum to the umbilicus, and marked in the middle during this course by a raphe; forming altogether a very extended envelope. The outer fold of the sheath owes its bulk to a ring of ligamentous substance, which is useful in keeping the orifice open and firm: from this the reflected integuments become thinner and more vascular, and are again reflected over the glans penis, forming its *prepuce*. The substance of the penis is chiefly composed of two portions: each of which are alike in structure, both being formed of erectile tissue. The last tissue is flaccid, and occupies little space when not erected; but when the animal is under sexual excitement, it becomes distended with venous blood, and is then much increased in bulk, and very firm. One of these bodies occupies the inferior portion of the penis, or is situated beneath the urethra; the other fills a place superior to the urethra, or on the top of the organ. At the extremity there is a bulb which appears distinct, but which anatomy proves to be continuous with the lower portion of erectile tissue, and which altogether is called the corpus spungiosum. The upper division is named the corpus cavernosum.

The *urethra* is the canal, which is continued through the body of the penis from the bladder to the point of the organ. That portion encircled by the two prostate glands

is termed the prostatic part of the urethra; after leaving the prostates, till it reaches the corpus spungiosum and cavernosum, it is known as the membranous portion of the urethra; all the remaining part being called the muscular urethra. The reason of this last name is, because under this last division of the duct runs a well-marked muscle, attached to the corpus cavernosum upon either side, and passing beneath, and in close connexion with, the urethra. The name of this muscle is the "*accelerator urinæ;*" its use being to speed the passage of any fluid through the duct. The most posterior parts of the corpus cavernosum are spoken of as its crura, to which, proceeding from the lower surface of the points of the ischium, come two muscles to be inserted, called the ERECTORES, and their purpose is obvious, being implied in their name. The urethra, underneath the crura, is sometimes termed the bulbous portion, because in this particular place it is largest.

The urethra throughout its course is highly sensitive and vascular. It is a mucous membrane, and by its plentiful secretion is protected from the effects of the urine; along its course are several slight prominences, which lead to small mucous glands; these prominences are called lacunæ, being the mouths to ducts. The external orifice of the urethra is known as the meatus urinarius. The arteries of the penis spring chiefly from the pudic, the artery of bulb, and the pudendal; the veins seem to have no settled name. The nerves arise from the lumbar, and from the sacral plexuses.

THE FEMALE ORGANS OF GENERATION.

The perceptible parts of generation in the mare consist of the labia majora or labia; the labia minora or vulva: the clitoris and the meatus urinarius, to which some add the beginning of the vagina; but as we prefer to describe parts as a whole, we omit the last structure.

The genital opening of the mare is surrounded by two full folds of projecting substance, without hairs, but covered by a dark coloured skin. These are the labia, or labia majora, and they are principally composed of fat and loose cellular tissue; within these are situated another fold, but of a much more moist and vascular appearance. The last are the labia minora, or vulva, and are much thinner and more

delicate than the former. They are joined together, that is, the vulva of one side of the body is united to the vulva of the other by what are termed commissures, the interior of which changes its appearance after repeated foldings. The vulva extend downwards, and surround the clitoris; and within the vulva, and the part last named, is to be discovered another fold of membrane called the nymphæ. The two last are studded with mucous glands.

The clitoris is a small projecting body at the bottom of the vulva, surrounded by the nymphæ. The clitoris consists of erectile tissue, a thin layer of which also extends through the vulva and the nymphæ, being prolonged up the posterior chamber of the vagina. The clitoris is likewise provided with muscles attached to the points of the ischium, and called the erectores clitoris. A sphincter muscle is also to be found within the substance of the labia, which muscle is known by the title of the sphincter vaginæ.

The vagina is a canal running from the vulva to the neck of the uterus: it lies between the bladder and the rectum. Near to the middle of the canal the internal lining membrane is constringed; and thus the vagina is divided into two chambers. A posterior or external, which is the most vascular, and the sides of which are covered by erectile tissue; and an anterior or internal, which leads to the neck of the uterus. Within the vagina, upon the floor of the canal, and just past the vulva, is to be felt by the inserted finger a small projecting fold of membrane, which marks the entrance to the short urethra of the female. The erectile tissue of the vagina is covered externally by a substance resembling the dartos in the male. The mucous lining membrane is thrown into various folds, which seem in some subjects to proceed in no positive direction.

The uterus is a rounded body, having two horns or wings; one projecting forwards and upwards from either side; they are lined internally with mucous membrane, which is thrown into various folds. Next to this is a thick layer of white muscular fibre; and beyond this is a cellular layer, which is thin, and connects the organ to the peritoneum, which forms its last covering.

At the extremity of the horns, or wings, are two ducts called the Fallopian tubes. They are small when they spring

from the uterus, but much larger at their free extremities; being there somewhat after the resemblance of the end of a French horn, which they still further resemble from being convoluted. The horn-like extremity is furnished with a fringe called the morsus diaboli, one portion of which is attached to the ovaries, the rest being free. The other pieces of this fringe are in violent motion during the act, and therefore catch the ovum as it falls from the ovaries, and convey it to the tubes. The internal lining membrane of the tubes is continuous with the mucous membrane of the uterus, and is thrown into longitudinal folds, which suggests it is liable to distention. The next coat of the tubes is continuous with the muscular coat of the uterus, which invites inquiry as to why a muscle was placed into this position if not to force something downward? They are situated within the folds of peritoneum which form the broad ligaments of the uterus, and wherefore we are prompted to ask is the outer investiture elastic, if not to permit the passage of some substance? The opening of the free end of the Fallopian tubes into the cavity of the abdomen, is the only known instance of a mucous membrane leading into a serous sac.

The ovaries, like the testes, have three coats; an outer one of peritoneum; a middle one of white fibrous tissue; and an internal one which is vascular. They also somewhat resemble the testes in shape, but here all similitude ceases. Their interior is cellular. Within the cells are numerous seeds of future eggs, which as they approach the surface become matured; and when the act is being performed burst the coats of the ovary, and are carried down the Fallopian tubes. Wherever an ovum has escaped a corpus luteum is established, which consists of a yellow spongy mass, filling an empty space where once existed the ovum. The arteries of the female parts lately described are those named the spermatic, the uterine, the pudic, and the bulb. The veins are the pudendal, the spermatic, and the uterine.

The nerves are derived from the lumbar and the sacral plexuses.

The mammary gland.—This is placed in front of, and inclining to between, the hind legs. It consists of two quarters in the mare, each of which are composed of a bag

and teat. The teat has a coating of muscular substance resembling the dartos in its nature; while the main substance of the bag is made up of vessels for supplying blood, and carrying it away again; or of tubes or ducts for carrying off the secretion. The ducts are lined by mucous membrane reflected inward, and continuous with the integument; the mammary gland being essentially a conglomerate one. The milk is secreted into the minute glands, which unite and unite again, till by an uncertain number of branches they empty into ampulæ, or dilatations; whence the milk is carried away by other ducts which communicate with the tubuli lactiferi, which terminate at the point of the teat, but whose number appears not to be fixed in the mare.

The arteries are derived from the epigastric and the femoral. The veins principally empty into the vena saphena major and femoral trunks. The nerves are given off from various adjacent sources.

DESCRIPTION OF PLATE IX.

THE ABDOMEN LAID OPEN.

An incision has been made through the linea alba and the walls of the cavity reflected back; thereby affording a full view of the intestines. Of course this proceeding has slightly changed their exact relative situations; but they are still sufficiently true to enable the reader to form a tolerably accurate idea of their positions when undisturbed.

A, The cœcum, having its blind extremity pointing downward; *B*, the colon originating and terminating in the right hypochondriac region; *C*, the rectum, showing one of its two muscular bands, and the cell-like structure of this intestine also being prominently exhibited; *D*, the small intestines occupying the upper and posterior portion of the cavity. Only a few of these last come into this view.

SECTION XV.

THE PHYSIOLOGY OF THE REPRODUCTIVE SYSTEM GENERALLY.

THAT the great work of propagation might not be left to chance, all animals are irresistibly impelled to it by the

sensation of lust, called, in quadrupeds, *heat*. The *desire of the mare* is vulgarly called *horsing*, and is known by vascular changes in the generative organs, and by some nervous excitement in the system generally: the vulva swell, and are highly reddened; staling is excited more frequently, and is followed by the ejection of a whitish mucous matter from the vagina, in stable language called the *heats:* sometimes it is slightly bloody. The usual period of the heat in the mare is between April and July; it occasionally appears in the former month, but in healthy subjects is seldom protracted until the latter. It is sometimes scarcely marked in aged, hard-worked, or emaciated mares; and it often continues the whole summer in barren mares, who will, some of them, admit the horse whenever he is put to them.

The *male appetite* is constant, but not uniform: low feeding, cold weather, and absence from the effluvia of mares, greatly mitigates it; but during the season of female œstrum it rages with uncontrolled force. The irritability of the stallion at this time is well known, and his impatience of restraint bespeaks the ungovernable nature of his desires: even the ass, which proverbially dislikes to touch water, will swim wide rivers to prosecute his amours. These effects are, without doubt, produced by the absorption of the semen, which produces its peculiar influence on the sensorium, and thence is transmitted to the sexual organs. The generative functions of the horse, therefore, consist in elaborating a fecundating fluid, called semen. The generative functions of the mare impose on her the necessity of receiving the generating male secretion.

Copulation is the immediate act by which the generative functions are mutually accomplished. By a peculiar sympathy present in the male system, the erectile substances of the penis become distended with blood poured in from the pudic vessels, and retained there by spasmodic constriction, aided probably by pressure of the excited muscles. In this state it enters the vagina; the testicles, drawn up by the cremasters; the acceleratores and levatores are alike spasmodically and sympathetically convulsed; and an emission of semen follows. The mare is also affected by a venereal orgasm, but of less manifest intensity: and although her frame is agitated, her actions are rather passive than

active; and it is, perhaps, to stimulate her into increased energy, that he is seen to seize her by the neck with his teeth, while he powerfully embraces her with his fore extremities.

The cupidity of dealers often tempts them to administer to their stallions stimulants, in order to force the performance of an act which is in its nature exhaustive and emaciative. Farcy and glanders are too frequently the consequences of this foolish system.

Conception and pregnancy.—Conception follows, and most mares require copulation but once in order that they may conceive; which being accomplished the *heats*, as they are termed, cease, and the animal will afterwards refuse the horse. As the *heat* recurs at intervals of eight or nine days; it is usual at those periods to try the mare, by showing her the stallion.

Impregnation is brought about by means of the semen acting upon the ovum; but whether the effect is produced by *actual contact* or by *sympathetic influence*, has not yet been ascertained; although the balance is much in favour of the actual transmission of the impregnating fluid through the uterus and oviducts to the ovarium; which is rendered more probable by the circumstance that the ova of the multiparous animals never reach the uterus, but are retained in the cornua. One of the turgid ovarial vesicles bursts its outer coat, which is received within one of the Fallopian tubes, and conveyed into the uterus, to which it is afterwards found to be universally adherent. A layer of effused lymph is thrown out over the entire surface of the uterus and its connexions: this effusion becomes organized, and is separable into two layers: that layer which is attached to the surface of the womb is called the *tunica decidua uteri;* the other, and which becomes reflected over the ovum, was thence named *tunica decidua reflexa.* When the ovum gradually develops the lineaments of the fœtal colt, it will be found surrounded by the reflected portions of the chorion; within which is an inner and finer expansion, called the *amnion.* Between the amnion and the chorion, in the latter periods of pregnancy, there becomes developed a third membrane, named the *allantoid.*

The placenta.—From the attachment of the outer mem-

brane originates an indirect influence between the parent and offspring. In this the uterine arterial branches terminate; hence the nutrient branches which nourish the ovum originate. The fœtal vessels do not communicate with, or even touch, those of the mother. The finest injection cannot pass from one to the other; but those of the fœtus run close to those of the mother, extract oxygen from them, which partially oxygenates the blood of the fœtus; perfect oxygenation not being required to support its dormant life. The vessels pass from the fœtus near to the uterine arteries of the mother; through the agency of two umbilical arteries and a vein, that occupy a membranous rope, which, when full grown, is nearly three feet in length, an inch in diameter, and is called the *umbilical cord;* this, in addition to these vessels, gives passage also to the *urachus*, the whole being enveloped in a reflection of the chorion. In the early periods of gestation the investing fœtal membranes are by far the larger portion of the uterine contents; towards the middle period the fœtus and membranes are nearly equal, but in the latter months the weight of the young animal greatly preponderates. The liquor amnii, in which the fœtus floats, maintains the same proportion to the placenta. It remains to remark on the increase of the uterus; which, from being completely hidden within the pelvis, advances its fundus beyond its cornua, nearly to the epigastrium; when at length, becoming painfully distended, it essays to rid itself of its burthen by powerful contractions.

Description of membranes forming the placenta.—The membranes forming the placenta are three, which, beginning the description from the outside, consist of the chorion, the allantoid, and the amnion. The amnion must be a mucous membrane, though it is very like a serous one; it immediately incloses the fœtus, and contains a fluid, its secretion, called the liquor amnii, within which the unborn animal floats. The allantoid lies between the amnion and the chorion; it is peculiar for containing sacs, with which the urachus communicates. These sacs are filled with the contents of the fœtal bladder, and the young one's bowels are at birth always full of a yellow pultaceous mass, called meconium. These things suggest that the arterialization of the blood, no more in fœtal than in extra uterine existence,

is the sole support of life. The urachus, which leads from the fundus of the unborn's bladder to the allantoid cells or sacs, snaps at birth, and that part which is retained by the foal dries up, and becomes the long ligament of the bladder. The chorion, which is the most vascular of the three membranes, as well as the most outward, in the mare is intimately connected with the inner mucous lining of the uterus of the mother. This connexion is formed by numerous minute vascular projections upon each, which exactly fit into one another; those developed upon the chorion of the fœtus precisely suiting little spaces left upon the much thickened, and very much more vascular, lining of the gravid uterus of the parent.

Fœtal circulation.—It has been shown that the placenta owns a maternal and a fœtal portion, in which distinct circulations are carried on. In both the arteries terminate in capillaries which end in veins. It is evident, therefore, that the blood received, after having circulated through the fœtal body, and having given out its nutritive principles, must return venous to the placenta, through the umbilical arteries; which, in this case, carry venous blood, as the umbilical veins bear blood of a more arterial character. Thus, therefore, the placenta forms the true fœtal lungs; and the likeness is further heightened by the arteries carrying venous blood, and the vein bringing back arterial blood, as in the true pulmonic circulation. The umbilical vein, it was just now stated, carries arterial blood, which it derives from the placenta: having travelled up the umbilicus, it leaves the umbilical cord, and proceeds to the vena portæ, there to deposit its contents. From the liver the blood, mingled with the venous blood from the intestines, is passed into the vena cava, and thence to the right auricle; but it does not wholly enter the right ventricle, as in the adult horse; a part of it escapes through an opening in the septum of the heart, called the foramen ovale, which lies between the right and left auricles; the blood brought by the posterior cavæ is consequently partly poured into the left auricle, whence it is prevented from returning by the Eustachian valve: this opening begins to close up as soon as birth takes place, and respiration is established. The remaining and smaller portion of the

blood is suffered to proceed, as in the adult, into the right ventricle, and thence into the pulmonary artery; where occurs another structural impediment to the passage of the fœtal blood. The pulmonary artery communicates with the posterior aorta, by means of a lateral branch, which looks, as it were, a continuation of the arterial trunk. This branch of free communication takes the greater portion of the blood, sent by the right ventricle up the pulmonic artery, into the posterior aorta. The small portion of blood which passes through the collapsed lungs is returned by the pulmonic veins into the left auricle; where, uniting with that which had escaped through the foramen ovale, both enter the left ventricle, and pass into the aorta; the major part being sent up the anterior aorta, and the rest in the posterior aorta, uniting with that received by the *ductus arteriosus*, the whole becomes distributed over the body in the usual manner. The umbilical arteries (*Fig* 14 . *k*) of the fœtal colt are very considerable vessels, derived from the internal iliacs, immediately after their origin: in their passage, each towards its appropriate side of the bladder, they approximate and join the urachus, proceeding together as a part of the umbilical cord. The umbilical vein, after birth, dries up, and is converted into a ligament of the liver.

Descent of the testicles.—It is necessary, before we describe this interesting process in the fœtal economy, that we say something of the construction of the track by which these organs reach the scrotum. The *abdominal* rings, for there are an outer and an inner, as there are two ends to the straight and limited inguinal canal, are situated within the fleshy walls of the abdomen. The walls of the abdomen are mainly formed of four pairs of large muscles, whose central line of union forms the *linea alba*, which is seen about its middle, perforated by the umbilicus or navel. The obliquus externus is the most external of these, and arises from the anterior spine of the ilium, and from the fascia lumborum, to be inserted into the posterior border of the fourteenth hindermost ribs. It is externally covered by a yellow elastic ligament of some substance, and inferiorly meets its fellow at the linea alba. From its insertion (see *Plate* II. *l l*) its fibres are directed *obliquely* down-

wards and backwards. One portion of the tendon, or aponeurosis, by which it terminates, goes to the pubis, while the stronger part proceeds to the inside of the thigh. The separation here pointed out in mares shelters the round ligament; but in horses allows the passage of part of the inguinal canal, and helps to form the outer abdominal ring. The internal abdominal ring, and a portion of the canal, intersects the transversalis abdominis, as well as the internal oblique muscles.

The *fœtal situation of the testicles* is immediately behind the kidneys, whence they eventually make their way into the scrotum. When situated within the cavity of the abdomen they are enveloped by peritoneum, and are each of them attached to a ligamentous substance of a pyramidal shape; whose base adheres to the testicle, while its apex is continued through the abdominal rings, to be fixed to the bottom of the scrotum. This ligament, which is termed *gubernaculum testis*, attains its full growth before birth; after which period, it begins to contract and shorten itself; but, as it cannot draw the scrotum within the rings, nor free itself from the testicle, it therefore draws downward the gland, surrounded by its peritoneal covering. This progress is carried on gradually; but when the testicles have been drawn to the abdominal ring, it is evident they must there meet with some obstruction; for the peritoneum, afterwards brought down by the testicle at this period, lines the entrance to the ring. The testicle having, by the contraction of the ligament, been forced down the canal, lines it with peritoneum, and forms the internal coat to the scrotum. This lining of peritoneum has nothing to do with that which covers the testicles; that remains upon the gland; but the extension of the peritoneum also brings with it a covering for the cord. The gubernaculum having fulfilled its office becomes absorbed. Nature, in her economy, refusing to keep any thing which is of no service. By this means an open communication is formed with the scrotal cavity, and which remains free during life; the horizontal situation of the horse's body preventing frequent protrusion of the abdominal contents through the ring.

The *gestatory term* is generally considered to range between eleven and twelve months; these periods forming the

extreme limits; but, according to other observations, in 582 mares, the shortest being 78 days before the expiration of 12 months, the longest 58 days after the full term had passed, making the extraordinary difference between the two extremes of 136 days, or 4 months and 16 days between the births of two animals of the same species.

Parturition or foaling.—The premonitory symptoms of foaling are a sudden enlargement of the udder; sometimes milk may be expressed from the teats; and when such is the case, provided it does not alarm the mare, she should always be milked; the vulva protrude, and become vascular; and when the act has commenced, the tail is erected; a shyness, a restless shifting and change of place, with some heaving of the flanks and some acceleration of the pulse, are also usually present. The painful contractions of the uterus now call in the aid of the abdominal muscles; deep inspirations are made, to enable the diaphragm to assist in forcing the uterine contents backwards, by which the mouth of the womb is dilated, and the attachment of the chorion is separated. As the propelling efforts become more violent, the hind legs are set wide apart: the membranes now protrude in the form of a bladder; which bursting, the liquor amnii floods down, and often brings with it the young one, particularly in large roomy mares, who have had several foalings. At other times the act is more protracted, and the head, with the fore legs, are more gradually protruded into the vagina; when, after several severe efforts, more or less protracted, the foal is born, and its descent to the ground commonly ruptures the umbilical cord; the *afterbirth* occasionally accompanies the foal; and when this is not the case, the whole often comes away very soon after, or may be long and dangerously delayed.

Lactation.—As soon as the foal comes into the world, it is interesting to observe how soon it begins to suck; which, however, with a weakly foal, it may occasionally be prudent to assist it in doing, by supporting it to the teats. The first milk, instead of being prejudicial, is beneficial; as by its purgative qualities it brings away the contents of the fœtal alimentary canal. Sometimes the mammæ refuse their office, or do not yield sufficient milk; or a mother may die:

it is consolatory to know that under such circumstances foals have been successfully brought up by hand. Cade and Milksop, both excellent racers, were thus reared; and either cows' milk, or that of asses, may be employed for the purpose. Should that of cows be found to become sour, it should be boiled; or it may be medicated by having sugar and starch added to it. The udder of the mare does not generally become distended with milk until the fourth day; in which state it continues to yield its secretion until the nippers of the young one enable it to browse the more tender grass; when its secretory store dries up, and the bag resumes its ordinary dimensions.

THE COLT, AND THE PHYSIOLOGY OF HIS ORGANIZATION.

Unlike the young of many other animals, the colt is not born helpless; but, on the contrary, its aptitude and its organs for locomotion are already developed, and it is capable of performing many of the common phenomena of life with dexterity and ease; to enable it to do which, its organization exhibits some specialities worthy of notice.

At what time do the testicles first appear in the colt?—There are great anomalies in the scrotal lodgement of the testicles. However, they are seldom, if ever, found at the *bottom of the scrotum*, until eleven or twelve months have expired; but yet high-breeding, and particularly high-feeding, will hasten the descent five or six weeks, in the same manner that it produces other marks of early development. But it is equally certain that they do make a partial appearance *in the upper portions of the scrotal bag* within a few days after foaling, and in some cases the animal is even foaled with them already there. From that position they are, by the increasing strength of the cremaster muscle, again drawn up, sometimes only to the edge of the ring, but more often to lodge themselves between the inner and outer rings, where they remain three or four months.

The effect which the presence of the testicles has on the masculine character is, evidently, a portion of our present physiological inquiry. The permanent descent of the testicles has a great effect on the exterior form; it has a corresponding one also on the character: it is, however, prin-

cipally in reference to the latter that we castrate; and as we incline to regulate the form between the masculine or the feminine character, so we castrate early or late.

Puberty in both horses and mares takes place, if they have been well fed and housed, as early as the fifth year: neither does it appear that the mare is more early in this respect than the horse. Before that period, the change of the temporary for the permanent set of teeth is confirmed; but all those characters commence in the male which are to distinguish him from the female after this period.

The *adult period* in both sexes may be considered as the sixth year, when the height of the animal is complete; and it is between the fourth and fifth year that the *colt* and *filly* are translated into *horse* and *mare* in the breeders' vocabulary.

Temperament is not confined to man, but is extended to all our domestic animals, and to none more than the horse.

THE ANATOMY AND PHYSIOLOGY OF THE FOOT.

The foot of the horse presents a mechanism admirably adapted to the habits of the animal; for in the horse that complexity of structure, exhibited in the numerous phalanges of other quadrupeds, is found united in one (see *Skel.*). From the various circumstances to which we subject this creature, such as keeping him in stables, riding him upon hard roads, and the attachment of iron shoes, the feet become peculiarly susceptible of disease. At birth, the horny parts of the feet are found less evolved than most other of the external organs; were they more perfected, their hard surfaces might injure the mother: at this early period the pasterns are long and upright, and instead of the extremities ending, as in the adult, in a broad extended base, they are pointed in front, and present only the rudiments of a frog. The bones immediately belonging to the foot are two, the coffin and the navicular (see *Plate* X. *Fig* 1 . *d* and *e*): the little pastern, or coronary bone, which articulates with both, is also partly hidden within the hoof. The *coffin bone* (*Plate* X. *Fig* 1 . *d*) corresponds in shape to the anterior part of the hoof: in front it

presents an eminence, to which the extensor pedis tendon is attached (*Plate* X.; see *Fig* 1 . *f*); its sides stretch back into two lateral processes or wings, to the upper surface of which are fixed the lateral cartilages (*Plate* X.; see *Fig* 2 . *b* and *c*): its superior surface presents two articular cavities, and its lower is vaulted, and to it is attached the perforans tendon (*Plate* X.; see *Fig* 1 . *g*); while its exterior is covered by the sensitive laminæ. It will be seen to be of a loose texture, with small bony ridges extending from above downwards, favouring the attachment of the sensitive laminæ. The *navicular bone* (*Plate* X. *Fig* 1 . *e*; *Fig* 2 . *e*), which in shape is supposed to resemble a boat or shuttle, embeds itself between the wings of the coffin bone, to which it is attached.

The *small pastern bone* (*Plate* X. *Fig* 1 . *c*), articulates with the coffin and with the navicular bones, to both of which it is united by the capsular and other ligaments. The *lateral cartilages* are externally convex, and internally slightly concave, their upper surface stretching superiorly beyond the confines of the hoof (*Plate* X. *Fig* 2 . *b* and *c*). The *laminæ* are vascular, and sensitive productions; possessed of that elasticity which belong to all living matter; situated round the surface of the coffin bone, and between every two lies their secretion in the shape of a horny lamina, which constitutes part of the inner wall of the hoof (*Plate* X. *Fig* 2 . *h*; *Fig* 4 . *b*). The *extensor pedis tendon* passes in front of the os corona into the anterior eminence of the coffin (*Plate* X. *Fig* 1 . *f*), and the *flexor perforans tendon* affixes itself to the posterior of the bony sole (*Plate* X. *Fig* 1 . *g*). The *elastic frog* is situated next to this (*Plate* X. *Fig* 1 . *h*; *Fig* 2 . *a*), on which, and on the flexor tendon, the navicular bone rests. The *sensitive frog* and *sole* lie under the coffin bone and elastic frog, the horny sole and frog covering them inferiorly: while the *hoof* generally covers the whole of the sensitive parts of the foot (*Plate* X. *Fig* 2 . *i*).

The *hoof* is a horny envelopment, secreted from a continuation, although altered state of the cutis (see the continuous white line in *Plate* X. *Fig* 1), exactly as the human nail is formed from that which is termed the *quick*: it is distinctly composed of fibres parallel with each other,

and held together by a glutinous horny exudation which is removed, and the fibres separated by maceration. Inordinate heat and dryness will partially do the same in the living hoof, as we know by what are called sandcracks. The wall of the hoof is divided into two layers, an external and an internal. Taking up a black hoof which has been freed from all its adherent parts, it will be found to be white within; and this white part will likewise be found to be much less hard than, and about a quarter the thickness of, the coloured portion (see *Plate* X. *Fig* 2 . *h*). The hard black external layer of horn is secreted by the coronet (see *Plate* X. *Fig* 1 . *k*; *Fig* 4 . *a*); the internal white and soft layer is secreted by the sensitive laminæ, and it is thrown into projections which exactly fitted into the folds of the secreting surface (see *Plate* X. *Fig* 4 . *b*). The wall is also divided into toe, heel, and quarters (see *Plate* X. *Fig* 4 . *e*, *f*, *g*). The *quarters* are the lateral parts of the walls; the more forward and thickest portion of horn is called the toe; the more backward and thinnest, the heels (*Plate* X. *Fig* 3 . *d*). In the usual formation of feet, the inner side of the hoof is observed to be weaker than the outer; and, as the inner side receives most weight, this proves the care taken to secure elasticity in the horse's movements. The horn yields to pressure, and the thinnest, of course, yields most. The density of the hoof materially decreases as it approaches the heels, evidently to favour the descent of the elastic frog, which likewise favours elasticity of motion. The superior marginal part of the hoof is softer and thinner than the rest; and if our eyes be directed inward, we shall perceive an indentation called the *coronary ring*, within which the *coronary ligament* once reposed; the thin and soft part is horn just secreted, and in a single layer; whereas where the horn is thicker, the coronary ligament is more bulky, for the horn is secreted in several layers.

To finish our description of the hoof, we must turn our attention posteriorly; where we shall find the laminæ inflecting themselves abruptly inwards and downwards, forming what are termed the bars; which are nothing more than continuations of the horn of the heels, stimulated and thickened by pressure (see *Plate* X. *Fig* 3 . *f*). So also

the frog is little else than an adaptation of the coronet turned downward, and forced to bear a certain amount of weight (*Plate* X. *Fig* 3 . *g*; *Fig* 4 . *c*).

The *horny sole* is not so brittle as the crust; it is thicker at the circumference, where it unites with the outer wall of the hoof, than it is towards its centre. Its concavity enables the foot to retain its situation upon the ground; while it forms an arch which yields by its elasticity, thus affording an admirable spring. The *horny frog* is the triangular portion that fills up the natural excavation of the sole (see *Plate* X. *Fig* 3 . *a*). This horny frog swells out, but not so much in general cases as to extend beyond the level of the outer surface of the crust; it however is sufficiently prominent in every healthy foot as to receive secondary pressure. An inferior view of the foot will show that the frog (see *Plate* X. *Fig* 3 . white line between *a* and *b*) presents a distinct mark of separation between it and the other part, which is called its commissure; wherefore connexion is principally kept up by an internal prolongation of the secretive substance of the coronet (see *Plate* X. *Fig* 3 . *g*). The horny frog is intimately connected to the sensitive frog, of which last it is indeed the secretion. The frog is divided, or indented with a deep fissure, which is called its cleft (see *Plate* X. *Fig* 3 . *e*), within which are numerous sebaceous glands. It is these glands, when diseased, which pour forth a stinking fluid which rots the horn, and is known by the name of thrush. The sensitive part of the secretive frog is covered by the elastic frog.

Horn is entirely unorganized, and when once divided can never again unite like flesh. It does not bleed when cut. It has no feeling when a knife is drawn across it. It has none of the properties of living substance, and consequently cannot be expected to possess the reparative function that appertains to living matter. Horn, although a secretion, and as such pretty much the same, is not all of the like hardness. The horny frog is the least hard, and the most pliable; the horny sole ranks the next in these qualities. Then come the horny heels; afterwards the quarters and bars; and lastly, as the most hard, the toe. The inner crust is throughout softer than the outer,

but both crusts are originally secreted in a fluid state, and subsequently become of the requisite consistency.

If we take an extended view of the matter, and call in the aid of comparative anatomy, we shall be led to consider the uses of the frog as of a mixed nature. Eminently simple in form and structure, it combines even more than the qualities possessed by the tendo-cartilaginous balls at the posterior part of the feet of the digitated tribes, as dogs, cats, &c. It is more dense in structure, to resist the weight imposed on it; yet more truly elastic, to enable it to preserve its own integrity under the increased pressure of so large an animal, and to transfer the shock of motion more uniformly over the limb. It is peculiar also in being united at its apex; but it is wisely disunited by its *cleft* at its posterior portion, where it can best act on the yielding walls of the hoof. This union, or separation indeed, arises from the frog being formed of a continuation of the coronet (see *Plate* X. *Fig* 3 . *g*; *Fig* 4 . *c*). The frog claims, likewise, importance as a natural wedge, to prevent slipping and sliding on smooth surfaces. It is reasonable also to suppose, that it forms a valuable antagonist to the downward and backward direction of the internal parts of the foot; and in this way it may offer a point of solid support to the flexor tendon, and an important protection to the navicular bone; it also most unquestionably acts very favourably in promoting the expansion of the hoof.

The bars (see *Plate* X. *Fig* 3 . *b b*).—We have already fully explained that the crust of the hoof does not terminate at the heels, as a superficial observation might lead one to conclude; but that having gained the heels, it turns inwards and forwards (*Plate* X. *Fig* 3 . *b b*), decreasing in extent, and laying itself on each side of the frog.

THE INTERIOR OF THE FOOT.

The part that presents itself when the hoof is removed, is the *sensitive* or *fleshy sole* (see *Plate* IX. *Fig* 3 . *c*); which is a vascular expansion covering a considerable portion of the under surface of the coffin bone, and extending beyond its posterior part, but leaving a triangular space for the vascular expansion of the sensitive frog (see *Plate* X. *Fig* 3 . *a*). As the sensitive sole passes

behind the coffin bone it becomes thicker, and attaches itself to the inferior cartilages. The sensitive sole upon its upper surface is of a ligamentous nature, but the underneath is vascular; and from it is secreted the horny sole. The vascularity of this part renders it very susceptible of inflammation. The *sensitive frog* presents a very curious structure of ligamentous and tendinous expansions above; but covered underneath by a horny coating, corresponding in shape to the sensitive frog, and secreted from it. It lies in an interval within the sensitive sole, attached by its point to the inferior surface of the coffin bone, with its heels expanding posteriorly; being a continuation of the secretive coronet, and attached to the cartilaginous substance, united with cellular and fluid matter. The *lateral cartilages* (see *Plate* X. *Fig* 2 . *b*, *c*), one to each side, are fixed into a groove, upon the upper surface of each wing of the coffin bone. Independent of their bony attachment, they are also retained in their situation by means of ligamentous fibres, and by lateral connexions. They are externally convex, internally they are concave; highest in the centre, but thinner and smaller towards the extremities: their inferior portions pass under the wings of the coffin bone, and unite with the semi-cartilaginous substance of the elastic frog. The lateral cartilages are partly within and partly without the hoof; are covered at their lower portion by the coronary ligament, which, by being extended over them, prevents their too great dilatation. To the lower part of their external surface the laminæ gain an attachment; and within their internal portion is lodged the substance forming the upper and posterior part of the elastic frog (see *Plate* X. *Fig* 2 . *a*, *b*). The *uses* of these cartilages, as before observed, are considerable, and divested of them the coffin bone appears but small, compared to the hoof that encloses it; but, increased by the attachment of the cartilages, the whole is made more proportionate, equally useful for support as though they were altogether bony, yet yielding and elastic. The cartilages themselves appear particularly intended to operate in expanding the upper horny portions of the hoof; and they also assist in the preservation of the cavity of the coffin joint.

The sensitive laminæ (see *Plate* X. *Fig* 4 . *b*).—In describing the hoof, I observed that its internal surface was lined with numerous horny lamellæ. The subjects of our present inquiry are, on the contrary, highly sensitive and vascular. The whole circumference of the coffin bone is covered with these sensitive leaves, each of which is received between and firmly attached to two of the horny laminæ of the hoof (see *Plate* X. *Fig* 2 . *h*). It is, therefore, evident that the surface of attachment between the hoof and the internal parts must be in an extraordinary degree strong. A partial observer of the foot of the horse would be led to suppose that the sole endured the weight of the animal; which opinion would be erroneous; on the contrary, we find the sensitive sole can bear little *continued* pressure, though its elasticity and form enable it to bear a *momentary* force.

DESCRIPTION OF PLATE X.

FOUR VIEWS EXEMPLIFYING THE VARIOUS STRUCTURES OF THE FOOT.

FIG. 1. *The pastern and foot divided through the centre.*—*a*, The cannon bone; *b*, the large pastern bone; *c*, the small pastern bone; *d*, the pedal bone; *e*, the navicular bone; *f*, the insertion of the extensor pedis tendon into the coronary process of the pedal bone; *g*, the insertion of the flexor pedis perforans, passing under the navicular bone, to gain insertion into the sole of the pedal bone; *h*, the elastic frog; *i*, the horny frog; *j*, the hoof; *k*, the coronet.

FIG. 2. *The hoof sawn off below the coronet.*—*a*, The elastic frog; *b b*, the posterior portion of the lateral cartilages; *c c*, the anterior portion of the lateral cartilages cut through; *d*, the flexor pedis perforans tendon, running under the navicular bone, but above the elastic frog; *e*, the navicular bone, the anterior portion of which has been divided; *f*, the superior surface of the pedal bone, showing the indentations for the reception of the prominences at the inferior extremity of the small pastern bone; *g*, in the separation of the hoof a removal has taken place of the coronary process, which consequently projects above the horny box in the living subject; *h*, the interweaving of the sensitive and of the horny or in-

sensitive laminæ; the dark lines representing the sensitive laminæ, and the white the horny laminæ, which form the inner wall of the crust; *i*, the outer wall of the crust, consisting of dark horn.

FIG. 3. *The sensitive parts exposed—the sole of the foot shown after the horn has been removed.—a*, The sensitive frog; *b*, the sensitive bars; the white line between the bars and frog representing the part of the foot which secretes the horny commissure that unites the bars and frog; *c*, the sensitive sole; *d*, the heels; *e*, the fissure of the frog; *ff*, the reflection of the sensitive laminæ forming the bars; *g*, the reflection of the coronet forming the frog. The spongy substance, represented to the left of the spectator, between $\frac{e}{a}$ and *b*, show that the subject whence this drawing was taken was only saved by death from an attack of canker.

FIG. 4. *The sensitive lamina exposed by removal of the horny box.—a*, The secreting coronet; *b*, the sensitive laminæ; *c*, the reflection of the coronet going to form the sensitive frog; *d*, the reflection of the sensitive laminæ going to form the sensitive bars; *e*, the toe; *f*, the quarters; *g*, the heels.

THE

PRACTICE OF VETERINARY MEDICINE;

OR,

A DESCRIPTION

OF THE

CAUSES, SYMPTOMS, AND MEDICAL TREATMENT

OF THE

DISEASES OF THE HORSE;

TO WHICH IS ADDED,

A MORE CONCISE ACCOUNT OF THOSE OF NEAT CATTLE AND SHEEP.

OF DISEASE GENERALLY.

DISEASE is a morbid affection of a part or of the whole of the body, whereby the exercise of some of its functions is altered or suspended. The *causes* of disease are various; some of them are evident, others are obscure. We call the cause remote when it can only be guessed at or surmised. It is termed predisposing when inherited, or the consequence of a particular formation; thus small carcassed horses are prone to constitutional diarrhœa, and those with oddly formed hind legs are said to be predisposed to curb. There are also *proximate* or *exciting* causes constantly acting in the production of disease; thus a horse, violently heated during hunting, plunges into a river, and inflammation of the lungs follows. Here the violent action of the lungs had predisposed them to become diseased; but the cold bath was the exciting cause of the disorder. A nipping wind, with sleet, blows on cattle purposely fed high for sale; they take a cold, for they had been hitherto not exposed to so frigid a temperature. Here the excessive feeding predisposes, and the cold excites the malady.

Diseases for many centuries were principally attributed to an affection of the fluids or humours of the body, and this theory was termed the *humoral pathology*. The blood then was the favourite agent which diseased the entire body; but by advanced knowledge we now comprehend that the blood, though apparently a fluid, contains no inconsiderable portion of solid particles, and also that gas, fluid, and solid are but names for different states which any form of matter may under favourable circumstances assume. There are now living physiologists who reject entirely the fluids, and attribute every thing to the solids, and these, for the reasons stated above, are as far wrong as their predecessors. The bone, which is the most solid substance in the body, is deposited and absorbed in a fluid state; which instance may serve to show how both systems are united by nature, since

the framework of the whole carcass is known to exist in two separate conditions. Diseases, however, vary in appearance according to the part attacked: thus phrenitis is the consequence of morbid vascular action of the brain, and enteritis depends upon the like state within the substance of the intestines; but phrenitis and enteritis are diseases very dissimilar in their symptoms. Each disease, moreover, is liable to individual peculiarities dependent on the immediate state, age, and temperament of the object attacked.

The *systematic division of diseases* is termed *nosology*, the simplest arrangement of which is the alphabetical. Anciently, diseases were divided according to their duration, and this laid the foundation for the *acute* and the *chronic;* but which subjected the founders to call in the aid of the *subacute*, for those which ranged in the intermediate spaces. It has also been attempted to arrange diseases simply according to the parts of the animal frame; which suits well with the plan of uniting the anatomical, physiological, and pathological considerations together. At the present time there is an evident disposition to disregard all systematic or arbitrary arrangement of natural causes and effects. Men are now rather inclined to view each disease as a perfect whole in itself, which, though connected with the affections of other structures, is not necessarily joined to one more than to another. Any system, however, which may serve to smooth the path of the student is so far of service but no further.

The division of diseases into epidemic, endemic, sporadic, and specific, is still acknowledged. *Epidemic diseases* are such as prevail generally at a particular time among all ages and kinds of our domestic breeds of animals, spreading as though they were imbibed with the air. Of this form of disease the affection so lately fatal among cows is an instance; as the foot lameness which attacks our cows, sheep, and pigs is also an example. *Endemic diseases* are those which confine their attacks to a certain locality; as the glanders, which was confined to certain badly ventilated stables, sadly illustrates. *Sporadic diseases* stand in opposition to the two former, and are a very extensive class, comprehending all such as affect particular constitutions or ages: thus strangles becomes a sporadic disease. *Specific diseases* are

such as are peculiar to a particular class of animals: thus the majority of diseases are specific; as being peculiar to one description of animal does not prevent something of the same kind being common to another.

To a proper knowledge of the management of diseases we consider the cause, symptoms, diagnosis, prognosis, and cure. The *cause* is frequently involved in obscurity; at other times a moderate portion of attention will discover it; while in some instances it is evident at once. The *symptoms* of a disease are the effects which it produces; thus an inflamed brain, being productive of delirium and redness of the eyes, makes delirium and redness of the eyes a symptom of inflamed brain: but this does not hold good with regard to results caused by disease; for death is frequently a result of this disease; only death is not a symptom of, but a termination to, an inflamed brain. From the symptoms we form our *diagnostic* of the disease, that is, we judge of its present state; being masters of which, we are enabled to form a *prognosis*, or opinion of its probable termination. The *cure* forms the most important part, and frequently consists in attempts to assist Nature in her efforts to produce a natural remission of the disease. If these efforts are wanting, we endeavour to promote artificial ones, or we attempt to resist the effects of the disease, or tendency to die.

CHAPTER I.

FEBRILE DISEASES IN QUADRUPEDS,

OF PURE FEVER.

THE existence of pure fever was by Coleman and his disciples denied to ever occur to the horse. This opinion was formed without due observation, though both in man and in animals fever far more frequently is witnessed as a symptom of disease than alone. To have fever it is necessary to endure a cold stage, followed by a hot one. The cold stage with horses creates the difficulty. The animal's skin being covered with hair, the temperature of its body is not easily ascertained. However, a staring coat,

without other signs, usually begins most disorders; and this staring coat alone would justify us in concluding that the cold stage were present. The peculiar mode of standing, and the blowing kind of breathing, are moreover each characteristic of the sensation of cold. When the heat commences, or the warm stage supervenes, other symptoms, with equal force, declare the change which has taken place. The horse appears in a state of dejection, and sweats on every exertion, however trivial. His extremities, in all probability, are cold at the onset. The pulse, before slow, and its stroke feeble, becomes quick and at length throbbing. Breathing is quickened, and the dejected animal looks around as though he implored relief, yet is watchful and sleepless. His thirst is in most cases urgent, but his appetite is diminished. He stales little, his urine is high-coloured, and the dung he voids is hard and in small balls. Fever, when first observed, is often promptly treated by the abstraction of blood. But this method, though often successful, is no less imprudent. It leaves the animal weak, and retards his perfect recovery. A better plan is to give, when the staring coat alone is witnessed, the following drink:—

Nitrated spirits of ether (sweet nitre)	four ounces.
Acetate of ammonia.....	eight ounces.
Water	one pint.

If this does not succeed in a quarter of an hour, the drink may be repeated, and thus continued till the coat is smooth, or other symptoms are exhibited.

Supposing the fever to have gone on to the warm fit, a quickened pulse is generally imagined to demand immediate venesection. But a quick action of the heart portrays bodily weakness, and the following drench will answer the end desired much better:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Water	one pint.

And this may be repeated at intervals of a quarter of an hour, till the recovery is confirmed.

DIFFUSED OR GENERAL INFLAMMATION IN HORSES, &c.

Inflammation is a diseased state of the capillaries. Some authors have regarded these vessels as in a condition of excitability, but if contractility be a sign of life, the reverse must argue a loss of vitality. During inflammation the dimensions of the capillary vessels are enlarged; in consequence more blood passes through them; to make up the demand for more blood the heart's action is increased, and more is propelled through the body. The blood passing through the capillaries gives forth caloric, and hence the inflamed part is hot. The increased quantity of the fluid distends the capillaries, and causes them to press with force upon the nerves, hence the part is enlarged and tender; the quantity of red blood traversing an inflamed part causes it to be red, hence redness is one of the symptoms of inflammation. However, the horse being a thick-skinned animal, and its skin being covered with hair, the last sign is not usually perceptible in him; but when it is situated in a thin and naked membrane, as that of the nostrils or of the eyes, we are then made sensible that colour is not wanting to characterize inflammation in the horse.

Inflammation is divided into diffused and local. Diffused inflammation is aggravated fever. Local inflammation is beheld when a part is injured, and inflammation, confined to the spot which has been hurt, ensues.

Inflammation is further characterized as acute and chronic. The acute kind is best illustrated by abdominal inflammation; which is sometimes so acute, or quick and active, as to run its course and terminate in death within nine hours from the commencement of its attack. Chronic inflammation is aptly shown in the diseases to which bones and ligaments are subjected; which, though painful, are usually a long time before they either yield to medicine or destroy the life.

Inflammation is further spoken of as healthy and unhealthy. It is of the healthy kind when a horse receives a gash upon any part of the body, and the lips of the wound, upon being brought nicely together adhere, and through inflammation repair the injury; or when the wound granulates, and throws out pus, and by this kind of inflammatory process restores the loss of substance. It is witnessed, of

the unhealthy description, in the majority of tumors, as well as in all sinuses or pipes; which last throw out a sticky glary fluid, very unlike healthy pus.

When the inflammation has lasted a longer or shorter time it terminates; and the terminations to inflammation are six: namely, resolution, adhesion, suppuration, effusion, gangrene, and mortification or death; omitting all mention of ulceration and sloughing, neither of which can terminate inflammation, though both are recorded as performing such an office.

Resolution occurs after diffused or general inflammation, and means when the diseased condition is resolved, or cleared away or ended. This, of all terminations, is the one most to be desired, as it restores the body to a state of health.

Adhesion is when a wound has been inflicted, and the bleeding having ceased, the divided surfaces is then sticky. If brought together in this state they adhere, or are glued firmly together. This adhesion takes place through the fibrine thrown out by the divided vessels. This fibrine is glutinous in its nature, and will hold the parts together until the vessels penetrate its substance, and it becomes a part of the living body, or is converted into cellular tissue. There are also internal adhesions, which are by no means so desirable as that just referred to.

Suppuration ensues upon all torn wounds, or when the flesh is bruised as well as cut. Suppuration may throw off a portion, the integrity of which is perfectly destroyed; or it may proceed, and gradually fill up a cavity by means of granulations, which are little bodies of a highly sensitive and vascular nature secreting pus. The suppuration may take place into a kind of bag, or closed sac, when an abscess results. The commencement of suppuration is attended with much pain, and pus appears to be sent forth after much labour, or at vast expense to the system.

Effusion is when the inflamed part takes on the process of throwing out fluid, and is seen in dropsy, within internal cavities.

Gangrene occurs when the vitality is nearly conquered in a part; and this termination affords the latest, though it is a very desperate chance to the veterinary surgeon; for if it goes on but one stage further, the structure is broken up, vitality is lost, and mortification with death ensues.

There is another termination classed among the endings of inflammation, but which we cannot view as lawfully belonging to the list. It is named metastasis, and means the change of place, or removal of inflammation from one part to another. This evidently is not a termination, but a change in situation. It is well seen in inflamed lungs. The practitioner leaves his patient very bad at night; he comes next morning expecting to find the animal dead, but is surprised to discover him apparently quite well. He is rejoiced, but his eye accidentally rests upon the feet; the horse stands oddly. An examination takes place, which shows the animal has inflammation of the feet. The disease has left the lungs to settle in the feet, and this change of locality is called metastasis.

The liability to these various terminations of inflammation is not the same in all parts of the body; on the contrary, some are more prone to one, and others to a different kind. Deep-seated parts, and the great serous cavities of the body, appear peculiarly liable either to the adhesive effects of inflammation, or to that modification of it which produces effusion. The adhesion here implied entirely differs from that already alluded to. It is seen when a lung adheres to the walls of the chest, or one intestine to another, and is always the result of inflammation. Effusion really means dropsy, or water poured forth upon the cessation of inflammation within the cavities of the abdomen or chest.

Ulceration used to be reckoned among the termination of inflammation, but it, like sinuses, is the consequence of a chronic kind of inflammation which is not now under consideration: it is the result of unhealthy or imperfect inflammation, and its cure chiefly depends upon our being able to excite active inflammation in the part affected.

The *causes* of inflammation are said to be predisposing and exciting, remote and proximate; the points, however, where one ends and the other begins, are by no means easy to define. Such occasional causes which act by their outward effects as stimulants, we can readily comprehend: but the more remote agencies we are at a loss to explain. Inflammations, and febrile affections generally, were wont to be attributed to the effect of cold. Modern pathologists

have been led to consider this as erroneous. But it is probable that in attempting to prove too much, as is usually the case, they prove too little; for daily observation of plain facts convince us that the application of cold, under various forms and circumstances, is an active agent in the production of inflammation. The predisposing cause is, however, of the most consequence, and to this the generality of people pay little attention. Few persons think at all about an agency, which though fatal in its ultimate result, is followed by no immediate effect. The predisposition, however, once established, any circumstance may become the exciting cause; but because this last is nearer to the effect, it attracts the attention, and fixes the observation of the great majority of horse-owners.

The treatment of general or diffused inflammation.—In attempting the reduction of diffused inflammation, whether existing in the form of inflammatory fever, or in the inflammation of some vital and important organ, the first remedy formerly employed was bleeding. The practitioner was so confident in this resort, that he drew blood with the same complacency he would extract beer from a barrel, and quite as often, even supposing him to be very fond of the exhilarating beverage. In the present day, however, either the character of disease has changed, or it is perceived the practice alluded to was founded upon a mistaken basis. Horses could not now bear the loss of half that quantity of vital fluid, which is on good authority believed to have been formerly taken from them. Many an animal now, having influenza has been bled into hydrothorax. Many an animal has been so reduced by repeated bleedings, that he has ultimately sank, not from the disease, but in consequence of the measures pursued for its reduction. Bleeding had better now be entirely put out of the means of cure; for any disturbance of the circulation is easier and more safely equallized by the administration of a stimulant, than only apparently tranquillized by the abstraction of a fluid, of which the animal very rarely has a drop too much.

Purgatives, in the human subject, form the next active agent in combating arterial excitement; but there are some peculiarities in the structure and functions of the horse, which render these medicines less eligible than in man. To

produce active purgation in the horse is to cause great irritation, and to destroy much more of the powers of the constitution than under some circumstances can be spared. It also requires so great time to effect it, that our dependence on it is lessened.

Diaphoretics and nauseants are by some veterinary surgeons thrust down the animal's throat, as though a horse which was seriously ill was determined, if it were not prevented by physic, to devour all before it. Of this we may be certain, that in every inflammatory state the appetite is lost. The return of a desire to feed is to be looked for and hailed as a symptom of recovery, not prevented as though it were an actual danger, and demanded physic to delay its return. Diaphoretic are all nauseants, and were they not, are very weakening. The quantity of tartar emetic administered to an animal in disease is often sufficient to injure the texture of the stomach. These medicines are given without rhyme or reason, simply because something must be done. The inflammation may by such means be reduced, but so is the animal at the same time, and a long loss of services with a long course of tonics is the consequence, even if the life be not destroyed.

Diuretics also affect the strength, which is always weakened in disease, and therefore these agents are to be avoided.

Diluents are of no use to the horse, as the animal in sickness will partake of no form of sustenance. A pail of chilled, or rather warmed water, should however be placed in the manger, and changed several times during the day.

Every horse, in almost every state of disease, should be placed in a loose box, the air of which should be free and cool. Draughts are to be avoided, neither should the wind blow upon the animal, but the current of air ought to be constant, and the clothing light. Rugs are improper, and a sheet is at such a time sufficient. All noise or excitement should be suppressed, and the sick horse be made as comfortable, and kept as quiet as though a Christian, and not an animal, were suffering.

EPIDEMIC CATARRHAL FEVER, OR INFLUENZA, IN HORSES.

This fever purposely heads the description of diseases, as being one of the most frequent which attacks horses.

With regard to its cause, it is more honest to confess our ignorance, than to talk largely about atmospheric influence, of which we know nothing: though excessive fatigue, particularly on young horses, and more so during a variable spring, when heat and cold, drought and moisture, quickly alternate, may have something to do in generating the disorder. It is decidedly epidemic in its nature; is more frequently encountered in spring than in autumn; more often in autumn than in summer; and in winter more rarely than in either of the other quarters of the year.

The *influenza* or *distemper*, as it is occasionally called, is singularly prevalent in some seasons; and although it exhibits general characters in common, yet the epidemic of one year will be marked with some particular symptoms which will not appear in the epidemic of the next. Horses of large cities and crowded towns are more obnoxious to it than those of the country; and in the country, those are most liable to be attacked which are most confined. It has been disputed, whether it be contagious or not, and both the negative and affirmative may be maintained with some show of reason. In some seasons it exhibits little or no contagious characters; in others it is apparently infectious, particularly among young horses.

It is of great consequence to distinguish this complaint from pneumonia or inflammation of the lungs; for, if bleeding and other parts of the depletive system, which are usual in pneumonia, be carried too far in this, the consequences nearly always are dropsy of the chest. To an attentive observer even, such a mistake is likely to happen; even the defluxion from the nose, and its tendency to become purulent, is exhibited too late to prevent the mischief; the tenderness and swelling of the submaxillary glands, with the early prostration of strength which generally accompanies the disorder, rarely sufficiently early characterize influenza; the pulse is by no means to be depended upon; and although often small and frequent, yet it often has the wiry, oppressed, and indistinct feel usual in pneumonia.

Catarrhal symptoms. — The disease occasionally commences with a rigor, or shivering fit, which is frequently

not observed; to this succeeds increased heat, with hurried respiration. At the period, however, when the veterinary surgeon is generally called in, the true nature of the symptoms few can venture to determine. There is, however, one sign which will justify caution; this is a yellowness of the membrane of the eye; and in a day or so a serous defluxion from one or both nostrils ensues, which become quickly heightened in colour; the eyes themselves appearing at the same time heavy and moist. The serous exudation from the nose, however, soon loses its thin character, for cough comes on, and the discharge becomes purulent. All mucous surfaces have a tendency to sympathise with one another; therefore in influenza, not only may the disease extend to the interior of the air cells of the lungs, but it almost invariably affects the lining membranes of the great digestive canal and generative organs. Sore throat is a very frequent accompaniment to the complaint, which shows itself by a difficulty in swallowing. The hay which is taken is chewed, or '*quidded*,' as it is termed; then falls out of the mouth. The disease extending itself makes the cough more harsh, dry, and frequent. From the tumefaction about the rima glottidis, the cough is often almost incessant, as well as deep and sonorous; it is frequently so painful as to occasion much impatience and violent stamping in the horse during the effort. In its progress throughout the extent of the nasal membrane it often affects the frontal sinuses, in which case the head is pendant, the eyelids are nearly closed, and even slight appearances of coma present themselves. The general affection makes it very common for the submaxillary glands to become much tumefied, extremely tender, and on rare occasions to suppurate. The same tendency likewise produces tumours in various parts of the head, which greatly protract the disease. In some instances also pendulous swellings appear on the chest, belly, or legs; but which often prove critical, and announce the termination of the disease in dropsy of the chest. The pulse varies in different subjects and under different modifications of the disorder: it is, however, quickened in all instances, and the breathing is usually accelerated in the same proportion; but it is only occasionally that the pulse is full or hard.

A remarkable prostration of strength soon follows the suppurative process. Thus about the third or fourth day, after pus has exuded from the nose, the horse, on being moved from his stall or box, will usually be found much weaker than the violence of the accompanying symptoms would give reason to expect.

As the purulent discharge becomes confirmed and increases in quantity, the disease grows milder, and all the symptoms may be expected to abate. The cough and soreness of throat will lessen, the pulse moderate, the heat of the body will become equable, the countenance more lively, and the horse will now probably be disposed to eat some favourite food. The dung, which has been before dry and in small quantities, and the urine, which has been also spare and high coloured, return to their natural states, and the horse recovers gradually, but seldom rapidly. The disease, however, does not always take this favourable turn; on the contrary, by injudicious treatment, or by the violence of the attack, or by a translation of the inflammatory action, the respiration sometimes becomes greatly disturbed, occasioning much heaving at the flanks; the legs, ears, and muzzle become cold, the pulse is found greatly quickened, and the weakness excessive. The nasal membranes now often look in some parts livid, and in others of a fiery red: the discharge from them also is tinged with streaks of blood. In these cases, unless relief be speedily obtained, the pulse will proceed to falter, cold sweats appear, and the animal often sinks on the fifth, sixth, or seventh day. In other cases, these fatal symptoms are not so rapid; but, eventually, the horse becomes emaciated, and dies after ten, twelve, or fourteen days. Very frequently, also, when the inflammation has extended to the lungs, serous effusion pours forth, as in pleurisy, and suffocation closes the scene. In some instances a partial recovery takes place; but the horse remains thick winded, or he proves a roarer, or he becomes altogether broken winded; which several terminations are more fully detailed in Pneumonia.

Causes.—It is better to confess these are unknown, rather than by a laboured and pretended explanation to endeavour to conceal our ignorance.

Prognosis.—This will altogether depend upon the stage at which we are called in, and the measures we intend to pursue. If before the nasal discharge appears, and we mean to adopt mild remedies, our opinion may be favourable. Even if the discharge has appeared, and the horse has not been tampered with, we may promise a desirable issue. But if the animal has a forlorn aspect, a quick and feeble pulse, and numerous swellings about the body, at once declare an adverse judgment; or if you mean to use energetic measures, you may safely prognosticate the horse will die, no matter at what stage your services may be required.

Treatment of the Influenza or Catarrhal Fever.—This complaint was formerly very destructive, as all the accounts left us by old practitioners sufficiently testify. It has, however, under modern treatment, been stripped of very much of its terrors. The chief thing to be remembered by the veterinary surgeon is, that influenza is a simulating disease, and that the animal labouring under it would be killed by one half of the means lawfully pursued to eradicate other disorders. Old writers mention a malignant catarrhal fever, in which the body was edematous, the breath fœtid, and all secretions and excretions offensive; but it may be doubted whether the malignant catarrh they speak of was not simple influenza, made to assume a typhoid or putrid type, by the bleedings, purgings, blisterings, sweatings, diuretics, nauseants, &c. &c. in which they indulged.

If the pulse be quick and feeble, the membrane of the nose deeper than usual, the mouth clammy, and the lining of the eye of a yellow tint, the practitioner must be cautious. The other symptoms may declare pneumonia, laminitis, laryngitis, bronchitis, enteritis, or any other form of disease, but he must entirely disregard them. He must run every risk, upon the hazard that influenza may be lurking beneath the obvious symptoms. Let him give the drink composed of sulphuric ether, laudanum, and cold water, and leave the horse for an hour: at the expiration of the period he will return, and if the disease be influenza the horse may be a little better, or at all events no worse. He will then retire, leaving another drink of the same kind,

and directing it to be administered at night. The next day, and the next, he will repeat this drench, administering with it a scruple of calomel. The powder he will shake upon the tongue, and then wash it down with the drink; and this he will persevere with till the character of the pulse changes, becoming more quick, and so weak as hardly to be felt. Thereupon he will discontinue all medicine, and order the horse a quart of the best London stout, night and morning. The cure altogether seldom lasts a week under this mode of treatment, and the recovery is not only soon accomplished but perfect.

With regard to stabling during the height of this complaint, a stall is every bit as good as a loose box, for the horse that has influenza will take no kind of exercise. He should not be moved from the stable where he stands, as loss of a companion has aggravated the complaint. The stable doors and windows should be left open, and the animal have light summer clothing put upon him. A good bed should be under him, and a pail of good whitened water, or thin gruel, placed in his manger: this last should be changed twice every day, although it be not touched. Silence should be maintained as much as possible, near to and about the animal prostrated by this disorder. Influenza renders horses extremely nervous, and the slightest noises seriously affect them. So soon as the strength of the complaint has subsided, a loose box may then be of advantage. His drink may be made rather thicker; carrots chopped fine, and fresh grasses should compose his only food for the few first days, then a few crushed and scalded oats may be allowed; and at any time give any kind of provender, rather than the horse should consume his bed. Good wholesome stimulating food is, after all, the best tonic; and plenty of this, with a quart of the best London stout morning and evening, will soon leave the horse none the worse for having had influenza.

SYMPTOMATIC FEVER OF HORSES.

By this is to be understood those general febrile appearances which often accompany local inflammations; that is, when any one or more organs are extensively deranged, and the vascular system is violently disturbed by the injury.

It is evident, therefore, that fever, in this instance, is not to be regarded so much a disease as a symptom; and such it is to be considered in practice; nevertheless, it sometimes runs so high as to supersede all other symptoms, wearing away the strength of the animal, so as to render him unable to struggle with the real injury. It is the most frequent fever of horses; because it is attendant upon all serious hurts and attacks.

When the veterinary surgeon is visiting an animal suffering from any disease or injury, it is always a bad symptom when defluxions or excretions suddenly stop; the eye brightens; the pulse becomes much stronger, but not much quicker; the nasal and visible membranes grow red and dry; the mouth gets hot, and the horse exhibits excitability, which is shown by his being attentive to every shadow, and starting at every sound. This is symptomatic fever, and a little blood may then be taken. This is best done by an assistant, the principal standing apart to note the effect produced by the abstraction; and so soon as he remarks the animal display any change, such as gaping, or becoming evidently less excited, to command the operation to cease. All food must be removed except a bran mash and chilled water, both of which may remain in the manger. Either of the following may be given immediately:—

Linseed oil	one pint.
Chloriform	one drachm.
Powdered Barbadoes aloes	three drachms.
Extract of gentian	three drachms.

All noise must be suppressed, all strangers forbidden to enter the stable; none must approach the animal but the groom it is accustomed to, and he must move as quietly as possible. If in twenty-four hours the bowels have not acted, six ounces of the solution of aloes, with one ounce of sulphuric ether, and a pint of cold water may be given, and ten grains of aconite (*Wolfsbane*) in powder be shaken on the tongue, four times a day. These measures must be continued; for symptomatic fever is the first step in the horse towards tetanus. All disturbance by backracking, &c. must be strictly avoided; and whatever is resolved upon must be accomplished as quickly and as quietly as under the circumstances is possible.

PURPURA HÆMORRHAGICA.

This is generally a very fatal disorder in the horse. There is only one known case of cure upon record, and that one occurred in the practice of Mr. Gowing, of 1, Stucley-terrace, Camden Town; which, by the kind permission of that gentleman, we are enabled to give in the words of him by whom the treatment was conducted.

"On Saturday, March 12, nine o'clock A.M., I was requested to visit a brown cart mare, the property of — Gladdish, Esq., at his wharf, Camden Town.

"The history I received upon my arrival was, that they supposed she must have been cast in the night, as there were some enlargements upon the face and lips, also under the jaw. Serum was oozing through the skin of a straw colour in places, and also in other parts of a bloody character: the near fore, and hind leg, were enlarged, or swollen to some extent. The case is evidently one of purpura. I now informed the proprietor that it was a disease which might end in death, and I had no doubt the mare's sufferings would considerably increase; that the depositions or enlargements would become more extensive; that there would probably be hæmorrhage, which might take place in other parts, and speedily prostrate the animal. I requested that she should be removed to my infirmary, which was acceded to, the distance being about half a mile, which she accomplished with difficulty; her pulse was seventy-eight, and feeble; I ordered her sp: æther nit: ℥ij., with liq: ammo: acce: ℥viij., and to be repeated in an hour. The enlargements about the head and legs to be douched with cold water, by the means of a double action pump, which was constantly kept playing upon the swollen parts, for an hour. I thought this produced a beneficial result, as the swellings seemed to diminish. She was now rubbed dry and placed in her box, but in less than thirty minutes the depositions became larger than before. I ordered her a ball composed of aloes Barb: ʒiijß., hyd. chloridi ℈j.: crot: ol: gt: j.

"Three o'clock, P.M., repeat the pumping as before.

"Six o'clock, P.M., the swellings are considerably increased.

"Nine o'clock, P.M., the pulse 110; head and legs still becoming larger, and she presents in reality a most pitiable appearance. White water was offered her, and sloppy mash placed before her.

"Sunday, March 13. The depositions about the nose have become slightly reduced: the mare appears thirsty. Ordered whatever fluids she will drink should be given to her; lbss. carbonate of iron, in two pails of water; and allow her what she will take in the shape of diet; pulse 100 to 105.

"Second visit. The head and face swollen more, and the difficulty of breathing greater.

"Monday, March 14. Legs more enlarged; head, chest, and face, about the same as yesterday; will eat a mouthful of hay, but with difficulty, as the effusion about the head prevents the masticatory process. She has purged twice; order her four ounces more of the ferri carb: in water, of which she partook freely. The pulse taken at the temporal artery is very feeble and quick.

"Tuesday, March 15. The fæces have become again firm; the cathartic ball as before; pulse, as near as I can take it, about 100; the mare still takes a little hay. The head has become somewhat reduced; she consequently can feed a little better; but the enlargements are increased about the chest and legs, more particularly inside of the thighs, the effusion extending up to the mammæ; still the mare appears cheerful; she turns in her box, although with difficulty; blood still oozing through the skin.

"I am now determined to try the effects of turpentine ℥iv., to be beaten up with the yolk of an egg, and to be given in gruel. The conjunctival membranes are injected, and have a scarlet appearance, approaching the colour of vermillion. Diet continued as before.

"Wednesday, March 16. The tongue has become considerably enlarged, so as to prevent the mare from feeding; she has bitten the end, and there appears such a loss of vitality, that I am fearful it will take on a sphacelated condition; deep scarifications to the tongue, and order ℥iv. of turpentine to be given in gruel, as before; she has passed her fæces during the night; urinates freely, the kidneys being acted upon by the agent. The turpentine was also repeated the last thing at night.

"Thursday, March 17. The tongue much more enlarged, so that she cannot feed; she is continually laying hold of the manger, and then resting her lips and tongue upon it, which apparently seems to afford relief to her sufferings; she cannot get the tongue within the mouth; the kidneys acting freely, the turpentine perceptible in the odour upon entering the box; scarifications, and fomentations; the tongue to be slightly manipulated, at intervals, and placed if possible within the mouth; she cannot take any thing; will make the attempt, but has not the power of deglutating, in consequence of the enlarged state of the tongue.

"Six o'clock, P.M. There is now a perceptible difference, the legs being reduced, also the chest and face; but she cannot yet retain the tongue in the mouth. I once more scarified the tongue, gently manipulated it, and steamed the head with bran in a bag.

"Friday, March 18. The tongue can be used more freely, appears lively; picks a little hay, which evidently gives her pain, as the tongue is very sore; she retains the hay in her mouth for a second or two, and then drops it; eats a few mouthfuls of mash; the swellings have become larger under the abdomen, and there is a difficulty of giving any fluids by the mouth; order ℥iv. of turpentine in gruel, as an enema; the mouth and tongue to be gargled frequently, with a weak solution of the chloride of lime; she has dunged, and urinated, but not so freely as before.

"Ten o'clock, P.M. The mare has eaten some mash, and drank three parts of a pail of water; order the mouth and tongue to be gargled; some mash, and whitened water to be placed before her. She urinated while I was present; very high-coloured, and also some coagulated blood in it.

"Saturday, March 19. The tongue is in an improved condition; feeding better; but clots of blood still passing from the bladder, and the urine of a dark coffee-like appearance. It is evident that some of the renal vessels have yielded. Omit the turpentine, and order one ounce of the ferri sulph: in water; this she took voluntarily; the enlargement under the belly not reduced; the parts again are scarified.

"Sunday, March 20. Still improving. Order the ferri sulph: in water as before; her taste is now returning, as,

after emptying half the pail, it was evident that she knew there was something in it besides water; but it was again offered to her when thirsty, and she took the remainder.

"Monday, March 21. Improving. No medicine; there is fœtor from the tongue and mouth. Order the gargle as before, and to be used two or three times a day. There is some appearance of sloughing of the integument in several parts, such as under the jaw, legs, and belly.

"Tuesday, March 22. The separation of the skin has taken place. The integument has fallen off, leaving surfaces of a pale unhealthy character. Ordered the parts to be dressed with chloride of lime in solution. Liberal feeding with malt mashes, and medicine to be discontinued.

"Wednesday, March 23. She is not improving so fast as I should wish. There is evidence of great debility; reels in her walk; also the depositions under the chest and belly not wholly absorbed; the granulating surfaces of the wounds still bear a pale appearance, denoting a want of power in the system. A malt mash to be given; also an additional feed of corn allowed; and a ball composed of ferri sulph: ℥iij., ex: gent: ℥ij., pulv: zingibi ℥j., pulv: capsisi gr: x., to be continued daily. This treatment was continued until April 3, when the wounds were filling up with new matter, and assuming a healthy character; allow her four feeds a day, and all further medicinal treatment discontinued.

"*Remarks.*—I think the recovery of the mare depended principally upon the action of the turpentine. It is an agent, in such a disease, that I in future shall place my principal dependence upon; but, if given at all, it must be administered in large and repeated doses, as its action and the state of the patient requires. The enlargements about the nose and lips were so extensive as to give those parts the appearance of being the largest portion of the head. In consequence it assumed a curious aspect, and a person sent by the owner compared her head to that of the hippopotamus, only larger in comparison with the animal. The hind extremities were of enormous size; the inner part of the thighs were of such magnitude that they touched each other, so as entirely to exclude the sight of the mammæ."

FEVERS OF HORNED CATTLE.

The fevers of neat cattle have many absurd, though, under some points of view, expressive names, as *Hoose, Distemper, Black quarter, Joint felon, Quarter evil, Quarter ill, Shewt of Blood, Joint murrain, Striking in of the blood, Black leg, Blain of the tongue, &c. &c.* In some years these febrile affections rage as epidemics, either from too luxurious pasturage, or it seems sometimes through a sudden removal from a meagre to a more nutritious feed; hence they are very common among the droves brought from the north into the luxurious southern, midland, and western districts. Fever is sudden in its attack, and rapid in its progress, in its early state presenting highly inflammatory appearances, which are very apt to degenerate into a low and putrid type. The first symptoms usually betrayed are general stiffness of the limbs; a dull heavy countenance; red eylids and nostrils; pulse sometimes quick and hard, at others not much altered in number; breathing accelerated and sometimes difficult, evinced by the open mouth and outstretched head; stools either in balls or slimy, and usually of a drier consistence than natural. It is often attended with great stupidity and disinclination to move, but occasionally there is much restlessness; debility comes on early, particularly in the hinder quarters; and by the second day the animal can only remain standing for a short time. Rumination and inclination for food cease; the breath emits a fœtid exhalation, and frequently on the second day a critical deposit takes place, which terminates the inflammatory action. This deposit, in some animals, proves to be an universal diffusion of bloody serum throughout the cellular membrane; in others, tumours form on the joints, or on the back or belly. From the putrid tendency in some instances, a quantity of gas is likewise let loose within the cellular membrane, which produces a crackling under the skin when pressed upon by the hand. The secretions are stopped, and the mouth, &c. emit a horrible fœtor. Under which symptoms, unless speedily relieved, the animal sinks.

Wood-evil, pantas, and moor-ill, may with propriety succeed the above. Variable symptoms, however, will, without

doubt, mark each of these diseases; but their grand febrile characteristics will bear similar features, and the diseases will require a treatment based on their degree of morbid malignancy, the ages and strength of the animals attacked, and the organs principally affected. It is not the local names that should be attended to by the practitioner; nor can the localities themselves, as woody districts or the open moors, have such decided power over these disorders as are stated. The herbage of the lowlands, particularly in wet seasons, may somewhat vary the symptoms; but the more important indications will remain, and similar treatment must for every case be persisted in. A cold wet season has much influence in engendering these diseases: nor, from what we have seen of them, is marsh miasmata without a powerful influence thereon. Thus it is, that in the lofty moorlands of the north they prevail equally as in the lower and moister grounds of the south.

The Treatment.—This disease has so great a tendency to run into the typhoid stage, or to assume the putrid character, that though it be detected at the very earliest period, yet blood must be withdrawn with extreme caution; perhaps the venesection had better be let alone, as all the blood in the animal's body will be wanted hereafter. A mild purge, consisting of two ounces of gentian, ten ounces of Epsom salts, one ounce of sulphuric ether, one ounce of the solution of chloride of lime, and one ounce of ginger, or rather the tincture of ginger (if it can be procured), with a pint of cold water, may be horned down the beast's throat immediately.

For sheep, one-tenth of the above may be administered.

If this does not answer to open the bowels in four hours, or at furthest six—for animals in this condition, if they are going to do so, will respond to medicine quicker than in health—give a cow half a pint of linseed oil and half a drachm of chloriform, or to a sheep one-sixth the quantity; continue to repeat this last dose so often as the period recurs.

When the disease first shows itself in the mouth slit up the bladders upon the tongue, extract the glutinous contents, and rub the sore place left with borax and honey; or, if nothing else be at hand, a little tar and salt, or yeast and salt, may be put upon the exposed surfaces.

The murrain, or pest, is but the latter stage of the above disorder, probably aggravated by wrong treatment. The person who undertakes to master a case of this kind must therefore not be idle. The body must be protected, and the skin kept warm by the best means ready to the hand; but the beast must not be loaded with clothing. This is more essential if any pustules should appear upon the surface of the body. These last should be freely opened, and well rubbed with the application hereafter to be mentioned. If there is any crackling under the skin, or any part of the body appear to have lost its power of contraction, and to feel cold, let it be slit up, and the wounds, as well as the skin, freely rubbed with the wash named below.

WASH FOR FEVER IN CATTLE.

Chloride of zinc	two drachms, two scruples.
Strong solution of oak bark	one pint.
Tepid water	three pints.

This is to be applied to all raw surfaces; the borax and honey, tar or yeast and salt, being only named in case the wash has to be brought from a distance, as time is valuable in this disorder.

When swellings appear about the joints these may be well and repeatedly rubbed with the following embrocation :—

Tincture of cantharides	four ounces.
Liquor ammonia	half a pint.
Tincture of capsicums	four ounces.
Soap lees, or solution of soap	two quarts.

With the above external applications, which are to be almost constantly employed, the following injection is to be thrown up at least once every two hours, or better still every hour :—

Yeast	half a pint.
Solution of chloride of lime	a quarter of a pint.
Sulphuric ether	one ounce.
Cold linseed tea	a pint and a half.

If expense be a consideration the sulphuric ether may be omitted from the above; but of course the medicine is improved by its addition. While the above is being tried the following may be given by the mouth every hour :—

Solution of chloride of zinc	one ounce.
Solution of oak bark	one ounce.
Sulphuric ether	one ounce.
Or, chloriform	one drachm.
Linseed oil	half a pint.

After the first dose the oil and chloriform may be withdrawn, and its place supplied by good linseed tea; the oil being again added as needed, at intervals of six hours each.

By an energetic pursuit of these measures the proprietor may hope to save some of his stock; but no earthly skill will probably be able to snatch from death every animal that is attacked. The disease, when mastered, will however leave the beast very weak. Boiled food, linseed tea, and tonic medicine twice a day, will all be required for its ultimate recovery.

It will be necessary, during the ravage, to remove the diseased cattle from the healthy; these last should have their pasture changed so often that at length one may be found on which the stock are exempt. If none such is to be found on the farmer's own land, he will act prudently to hire a portion at a distance, and of an opposite character to his own. To this last the healthy cattle may be very carefully driven; the diseased animals being taken to the homestead, and there placed in a dry shelter. Here they must remain until they are perfectly recovered; the house in which they have been located, and every thing they have used, be washed with a liquid formed of a scruple of chloride of zinc to a pint of water.

One-sixth of the above quantities is proper for sheep of the full size, and less in proportion to their diminutive stature.

DROPPING AFTER CALVING IN CATTLE.

This name, which represents the disorder, is given to an affection which cows are subject to. Short horns, good milkers, and animals in high condition, or stuffed just about the calving time, are the most exposed to its attacks. Young cattle escape from it; the fourth calf being usually the earliest time when it commences.

Symptoms.—The animal is quiet in his house and feeding, when it suddenly leaves off, stares about, and the respiration is hurried for a few minutes. This over, the animal appears to regain its consciousness, and falls to feeding again. It again stops, and again commences eating, which may take place an indefinite number of times. At length the beast drops, attempts to rise, and then remains quiet; or has the

head thrust out or turned round to the shoulder, or raised quickly up, and then dashed violently down again. After a time hoven commences; the entire abdomen swells, and the animal dies without any dung having passed.

Prognosis.—It is unfavourable if the head be dashed about, the milk lost, and sensation even to pressure upon the eye quite gone. It is good if the purgative medicine acts speedily; if the milk is still in the udder; if sensation is retained; if the animal moves, but keeps her head still, and if the beast appears to be at all conscious of what is passing around her.

Treatment.—First order the calf to be removed; then, if the cow be still up, extract so much blood from the milk vein as makes an obvious impression, and then give a strong drench; if down, order the animal to be well trussed-up on either side with straw, and have a man constantly watching, and the shed kept moderately warm.

DRINK FOR DROPPING AFTER CALVING.

Epsom salts	one pound.
Powdered gentian	four ounces.
Tincture of capsicums	one ounce.
Warm water	a quart.

Repeat half of this every six hours, till a copious motion is obtained, when very often the cow will rise and walk. If the medicine, however, does not act, repeat the half doses at the periods stated; or change it for half pints of linseed oil, to which half a drachm of chloriform is added. At the same time be attentive to the drawing of the udder thoroughly thrice a day; if no fluid be obtained, have the teats gently stroked six times daily, as the return of the milk is one of the best symptoms. Rub in a stimulating oil, to which one-fourth its quantity of liquid ammonia is added, all over the spine, from the pole to the root of the tail; and, watching the effect of the application, cover the whole with warm sheep skins, which must be changed every twenty-four hours, or oftener as they demand it, supposing the blister not to rise. See that the animal be carefully propped up with clean straw, and be raised rather higher forward, so that the urine and dung may not pollute her. Whenever hoven appears insert the flexible probang, to withdraw the gas, and use the same instrument to inject

some thick gruel, made warm with ginger, if all appetite be lost. Withdraw the urine by means of a catheter, and do all in your power to ameliorate the condition of your unfortunate patient.

There are two forms of this disease: one is simple paralysis of the hind extremities, and is attended with small danger; the other consists of an effusion of blood upon the brain, or spinal marrow, and calls for the most active measures, which however are rarely successful. When the bowels are fully emptied, the following may be given thrice daily:—

Sulphuric ether	one ounce.
Acetate of ammonia	four ounces.
Solution of chloride of zinc	two ounces.
Cold water	a quart.

This disease might in a great measure be anticipated, would the proprietor draw the udder so soon as it fills. To this milkmen are very averse; it is true the cow, in a state of nature, could not have the udder drawn until the calf is born, but the domesticated cow is not in a state of nature. Man has made her a mere milking machine, and it is but fair that man should relieve her of that which is the consequence of his act. To purging and blood-letting before calving we shall say nothing, having had proof of their inefficacy, and being violently opposed to such measures.

INFLAMMATION OF THE UDDER, OR GARGET, IN COWS.

This subject may with much propriety follow dropping after calving in cattle. It is certainly not a very uncommon complaint, but as it usually attacks cows with the largest udders, and the best milkers, so it deserves our notice. It is also frequently met with after calving, when the evil practice is followed of allowing the milk to accumulate for several days before the time of parturition. There is a disease called weeds in Scotland, which greatly resembles true garget, only it is not so much to be dreaded in its results.

Both require the same measures for their relief. Garget is likewise very annoying in attacking fatted cows, or animals nearly fit for the butcher, if such, as is frequently the case,

yield a little milk. The inflammation in this case is almost entirely to be traced to the excessive feeding, and the same cause is most probably at work when the disease comes on immediately after calving.

The first symptom to be remarked is loss of appetite and rumination,—standing apart,—dry muzzle,—hot root of horns, &c. These signs, however, only denote the constitutional disturbance, but attention is soon directed to the part inflamed by the very peculiar walk and mode of standing, or of lying down; all of which are so effected as to allow the hind legs to press in the least possible degree upon the diseased gland. In whatever attitude the cow may be found she generally changes it with reluctance, and sometimes blows even will not induce her to alter it. If she have a calf by her side the little one must be removed. In all cases a small quantity of blood should be taken from the milk vein; then a brisk purge administered, composed of Epsom salts 1½ lb, and half doses afterwards to be given every six hours until it acts freely. A canvas, made to pass under the udder having holes cut for the teats, should be fastened on the loins, in order to take off part of the weight of the diseased glands. Within this canvas hay steeped in hot water, or chaff or bran likewise made hot, may be placed, and they will answer better than any fomentation. Or if the cow be a favourite, and situated near to a town, a piece of spungeopiline may be procured, soaked in warm water, and applied to the part. If, in a day or so, fomentations appear to do no good, those applications must be discontinued, and the following liniment should be rubbed at least six times a day into the udder.

Soap lees, or solution of soap	half a gallon.
Strongly camphorated spirits	one pint.
Liquor ammonia (fortis)	one pint.
Tincture of capsicums	a quarter of a pint.

In the mean time the animal itself must not be neglected. After the physic has acted, the following may be given in good gruel:—

Aconite (wolfsbane)	half a scruple.
Nitre	one drachm.

These should be rubbed well together, and may be shaken dry upon the cow's tongue. If the milk (for the glands must

all this time be assiduously drawn) prove mingled with blood and matter, the liniment should be discontinued, and the following ointment rubbed in instead:—

Iodide of lead	a quarter of a pound.
Good lard	two pounds.

If, however, all our efforts should fail, and the milk should entirely cease, and a thin watery exudation drop from the teat; the veins upon the diseased quarter become small and hard; the part changing to a white or blueish aspect, and at the same time feeling cold, a free incision, the whole length of the udder, immediately over the place thus affected should be made, and the mortified quarter allowed to drop out. The wound, and the vacancy left, may be dressed with chloride of zinc and water, of the strength of two scruples of the salt to the pint, and it will heal speedier than would be imagined.

Sometimes the gland suppurates; abscesses are formed; when these point or come with a slight protuberance to the surface, and are soft to the touch, when such is the case, the abscesses should be opened by plunging a sharp pointed lancet into the centre of the forward point, and cutting outward.

After the cow has lost a quarter she requires supporting with nourishing food and tonics. She will afterwards tax the best care that can be given.

One means of preventing garget is to thoroughly draw the udder every night and morning, no matter whether the cow give much milk or little, whether she be fattening, on the eve of parturition, or in any other condition.

Another preventive is, never to allow a stranger to attempt the milking. Cows have a strange power of withholding the greater portion of the meal of milk, when one, to whose presence they are unaccustomed, attempts to draw them. At all events, observe the dispositions of the animals in your shed, and never permit a stranger to attempt the milking of a cow which has a nervous, excitable, or easily alarmed constitution.

HOOSE, COLD, COUGH, INFLUENZA, OR EPIDEMIC CATARRH, IN CATTLE.

There is one cause given in most books which treat of cattle, to account for all their diseases, and accordingly we find it in many set down as the reason for influenza. Fat cattle, certainly, are not exempt from the disorder, but the editor has found poor, exposed beasts, the most liable to be attacked. There is no known cause for the disease. We do not know how to check it, or how to encourage the spread of it. It is, therefore, entitled an epidemic, and supposed to consist in something peculiar in the air. This is a very convenient explanation under which to conceal our ignorance.

Lean cattle, much exposed, are the most liable to be attacked by, though no description of beast is altogether free from, the ravage of this complaint. The animal is first seen to neglect its feed; to look dejected, and altogether to present a very rugged appearance. Shortly afterwards, some part or parts of the body begin to swell. It may be one, or all four legs. The eyes, the glands under the jaw, &c. &c., in short any one of these, or all together, may begin to enlarge. They are seldom very tender, though of course the animal does not relish to have them handled. The weakness is excessive. The cow can hardly stand or crawl, and a sense of uneasiness forbids it to be quiet. The nose takes to running at first a clear fluid, which shortly grows thicker, because of white bodies floating about in it, and then takes on the purulent stage.

Such, with the signs of general constitutional disorder, is a description of the influenza. Much force has been laid upon the cough, but though usually, it is not always present; and when it is, being loud at first, it quickly becomes suppressed and sore, the pain it occasions causing the poor beast to stamp with the fore foot.

The practitioner called into such a case first feels the pulse, which he finds weak and quickened, indicating the presence of debility. He next looks up the nostrils, which he finds inflamed if he be called in early, or clogged with a copious purulent discharge, if his patient have suffered long. Ropy saliva may be hanging from each side of the mouth,

and the lips and inside may be ulcerated. He then obliges the cow to move a pace or two, and she will stagger in her efforts to progress. His mind is made up. It is a case of influenza, and he therefore proceeds with caution.

Treatment.—The terrible accounts left us of this disease were most likely either produced by utter neglect, or caused by wrong measures pursued for its relief. The modern practitioner refuses to bleed; the strength cannot bear it; and likewise to purge, for excessive purgation and death are commonly the result of exciting the bowels into action. If the beast be out in a field, he gently gets her under shelter, which he renders warm, placing a good bed of straw under the animal, and a pail full of thin gruel in her manger, with a hot bran mash before her. These, though she has touched neither, he orders to be changed thrice daily; viz., morning, noon, and night. He shakes half a drachm of calomel powder upon the tongue, and gives the following drink night and morning:—

Sulphuric ether	an ounce.
Acetate of ammonia	eight ounces.
Tincture of ginger	two ounces.
Cold water	a pint.

This is the only medicine he ventures to give during the violence of the disorder; so soon as it has abated, and the pulse become faster and very weak, he leaves it off, and gives in its stead a quart of warm, not hot, ale into which has been stirred half an ounce of tincture of capsicums.

In this disease the practitioner will do well to inform the proprietor that every thing depends on attention and good nursing. These two things are even more essential than medicine, for many an animal will survive that has not been taking a particle of physic, but has been assiduously tended during its sickness.

VESICULAR EPIDEMIC OF 1841-42.

This disease attacks cattle, sheep, and swine. It was formerly regarded with much terror, which has of late years considerably abated. Its characteristic symptoms, besides those of general constitutional disturbance, which are always first exhibited, are vesicles appearing upon the mouth, teats, and feet of cattle; and upon the feet of sheep,

or the teats of ewes. The animal first appears strongly averse to feed or walk much; and, if a cow, she is resistful during milking. Then follows smacking, loud and unmistakable smacking, of the lips: taking up of the fore foot and shaking it. If the udder about this time be observed, little bladders will be seen upon it, and the same vesicles will be upon the outside and inside of the mouth, and larger ones upon the tongue. The horn between the claws will also appear sapped, and bulging out. These bladders or vesicles, and swollen horn, will ultimately burst, and a highly vascular, or very irritable surface will be exposed. Recent authors mention complications of this complaint; but either the treatment has improved, or the disease has of late abandoned much of its virulence, for none are now to be met with.

Treatment.—As part of this disease affects the feet, in the first place get the animal under shelter, with plenty of clean straw beneath it. Then cut off the cuticle from those places where the vesicles have burst, and also pare away the horn wherever it is detached; but be careful to remove too little rather than too much. With regard to medical measures, so much debility quickly follows this disease, that both bleeding and purging are out of the question. Moderately thick gruel may be placed before the beast, which will sometimes drink freely. Boiled carrots or turnips may likewise be put in the manger. Both of these must be repeatedly changed, although neither are touched. The sore places upon the feet, mouth, and teats, may be gently dabbed several times in the course of the day, with a piece of soft rag wetted with the following lotion:—

Chloride of zinc	one drachm.
Pure water	a pint and a half.

Nothing by the mouth is to be given, excepting a stimulating and soothing drink, which may thus be formed, and administered once every day:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Water	a pint.

Nothing more is necessary for a perfect cure in most instances; when complications do appear, they must be treated as directed in other parts of this work. Every

possible means must be tried by gentleness and frequent attempts, with an enduring patience, to drain the udder thoroughly. The cow will resist much, but all depends upon this act being well performed.

CHAPTER II.

MADNESS, OR PHRENITIS, OR INFLAMMATION OF THE BRAIN IN HORSES.

WHEN this springs from blows, causing inflammation or abscess of the brain, all medical measures are useless. It is better to order the horse which is thus injured to be immediately shot, than to hazard any kind of hopeless treatment. If, however, this advice be rejected, the medicines should be such as are calculated to check most violent and speedy inflammation; and further than this, we have no recommendation to submit to the reader. The time for adopting measures intended to relieve the injured animal, is during the comatose stage, that usually precedes the violent one, which last, when it has once commenced, sets all remedial treatment at defiance.

MAD STAGGERS, SLEEPY STAGGERS, STOMACH STAGGERS.

It was common to consider these as distinct diseases; but morbid anatomy and a more extended field of observation have taught us that they are only modifications of one affection. The *sleepy staggers* of farriers is usually but the first stage of mad staggers. It is true it does occasionally run its course, either fatal or otherwise, under the first form, but it is much more frequently the precursor to the last.

The *symptoms* will vary as the attack is more or less acute, or as its approaches are slow or sudden. When slow, it is ushered in by a loss of the usual attention to objects around, and an accompanying drowsiness, which increases into lethargy; the appetite at first is rather interrupted than lost. When the attack is sudden, the horse is at once found with his head hanging between his legs, or rested in the manger, or forced against that or the walls of the stable; or if it occurs at grass, he is often found thus resting his

head against a tree, or pacing around it; his eyelids are likewise partially closed, and when elevated, the pupil is seen dilated, and around it increased redness and vascularity of the conjunctival coat; likewise of the nasal membranes. Stubborn costiveness is also present, and almost invariably the pulse is below its natural standard. The breathing is slow, laboured, and evidently sleepy in the early stage; stertorous breathing only occurs in extreme cases. These lethargic appearances sometimes increase rapidly; the horse occasionally falling down, sleeping with food in his mouth; and when roused, relapsing into stupor until nervous excitement is totally suspended; and the animal dies in two, three, or four days, or may live to the sixth or seventh; or the disease may give way to a natural or to an artificial cure. The *post-mortem* appearances of such as die in this state or stage of the disease show the cerebral membranes, usually turgid with blood throughout all their envelopments; the plexus choroides more particularly so; and the stomach greatly distended with undigested food, and partially inflamed.

The *mad staggers* occasionally makes its appearance without the former stage being prominent or observable; but in the majority of cases the lethargic state is followed by phrenitic symptoms of more intensity: the pulse rises; there is much watchfulness and irritability of manner; occasionally stamping of the feet, and a delirious look. The mouth is hot and dry; the nasal and conjunctival membranes are much heightened in colour, and the breathing is greatly quickened: as the disease advances the pulse is full and frequent; sometimes it is peculiarly hard and irregular, scarcely remaining the same for an hour together: the horse bounds from side to side; delirious fits occur, which make it dangerous to approach him; the violent convulsions which suddenly seize him rendering it not uncommon for him to rear and strike out his fore feet with great violence; or he will sometimes in so doing fall backwards, in which state he will lie sweating at every pore, apparently with the intensity of the pain he suffers: small hard dung-balls are forced out at such times, or a small quantity of highly coloured and sometimes offensive urine is expelled; from which he may experience slight

relief, and he will rise again to renew the same scenes, until exhausted by the irritation.

Phrenitis may be mistaken for the phrensied symptoms apparent in the rabid malady: but the following observations will sufficiently indicate the difference between the two. In the *rabid phrenitis* the symptoms evidently betoken, not only a frantic, but a decidedly *mischievous* disposition, which prompts him *purposely* to attack every thing living and dead: all around him suffers; rack, stall, and manger, are all laid prostrate. In the true staggers nothing of this kind appears; the horse is wild, and beats himself about, and endangers every thing around him, but not by premeditated design: on the contrary, he simply labours under spasmodic contraction of his muscles, which force him into violent efforts; he rears, plunges, falls prostrate, or kicks, from mere excess of pain.

Post-mortem examination will not unfrequently present an altered structure in the cerebral mass itself. Mr. Percivall notices his having seen a remarkable yellowness of the substance of the cerebellum. In some instances, particularly where death has early succeeded to a very violent attack, the cerebral pulp has been tinted with an inflammatory blush; the membranes, but particularly the plexus choroides, have also been intensely vascular. In protracted cases, and especially where serous effusion has taken place, the whole cerebral mass has been found more pale than natural, as well as soaked and tender with serosity. It is remarkable that in all instances which have been examined, there has been abdominal affection also. The stomach either being distended with food, or violently inflamed; the inflammation extending down the intestines. Sometimes the stomach is found ruptured, and a portion of its contents within the abdominal cavity.

The *cause* is, in every instance, the allowance of an undue quantity of food, or the too tempting quality of the pasture, which induces the horse to eat too much. This disease was frequent in the agricultural districts formerly, but since the introduction of the nose-bag it has now become, happily, very rare. It is now not unusual among the horses which draw the London night cabs, a long abstinence in them creating an uncontrollable appetite.

No *prognosis* can be pronounced upon merely seeing the horse. The condition is one of extreme danger, and every thing depends upon the susceptibility of the animal to the action of medicine.

The cure of stomach staggers.—This is far easier talked about than accomplished. The sluggish stage, however, affords the only hope of doing good. From the known congestion of the brain, it would seem indicated, to the general notion, to abstract blood largely; but after such a bleeding, as in this case alone could be of service, the horse very probably would never afterwards be of any use to his master, even though its life were saved. The veterinary surgeon is wanted to restore active health, and not to save life; and he, therefore, does wisely, who lets the fleam or lancet rest in his pocket. The blood in the body, moreover, if all of it were drained, would leave a congested brain behind it, as animals bled to death sufficiently show; and the blood is required to restore that vital activity, on the return of which the only hope of cure depends; while its sudden abstraction might remove present pressure, and enable the brain to act without restoring it to tranquillity.

The medical attendant, therefore, does not bleed. He places his main hope in counter-irritants and in purgatives. He administers six ounces, or even eight, if the horse be large and in working condition, of solution of aloes, blended with an ounce of extract of gentian. Next, he applies a cloth, saturated with liquor ammonia, diluted with only half its quantity of water, to the abdominal surface; and obtains four men, with rather dull noses, to hold a blanket or blankets, several times doubled, over the cloth whereby it is kept close to the part. Warm sheep skins, as soon as they can be procured, are to be placed all along the spine. A pint of turpentine, in strong soap and water (about a gallon), is to be thrown up as an enema. The feet are to be well rubbed with oil of cantharides, rendered more mild by the admixture of thrice its quantity of simple oil, and then to be closely bandaged up as high as possible. In four hours, one-third of the former quantity of the physic may be given by the mouth, or if the horse should be likely to fall when the head is raised, the tube of a human stomach pump may be passed through

the nostril into the pharynx or œsophagus, and thus the physic be administered. However, sulphuric ether one ounce should be added to the physic. In four hours afterwards, a pint of linseed oil, in which a drachm of chloriform has been mixed, may be tried. If that produces no change in another four hours, it may be repeated. The next four hours having expired, a scruple of croton seed may be placed upon the tongue, followed by an ounce of sulphuric ether, in a pint of cold water. Then the various substances may be tried over again.

The ammonia, used as a blister, is to be repeatedly observed, to mark its action; otherwise, it may dissolve the skin, instead of blistering the belly. It must, on no account, be retained longer than a quarter of an hour; but re-applied, as well as the feet again stimulated, and the enema administered with every dose of physic.

This treatment is to be pursued till the physic seems to have worked some good. But how is this to be ascertained, as it is impossible to purge a horse in less time than sixteen hours? Why, by the countenance: when that brightens; when the blister rises; when all the symptoms abate, and the general aspect appears improved, then we are justified in doubling the periods between the doses, and reducing the strength of the physic by one-half; also to discontinue the blister to the abdomen, and liniment to the feet; and to let the glysters consist of mere soap and water. Hopes may then be entertained, but to confirm them the bowels require to act, and the purgation that ensues to be regulated; directions for doing which will be given hereafter.

Oxen and sheep are occasionally objects of a phrenitic attack, which is called by graziers, farmers, &c., as in horses, *fever of the brain*, *frenzy*, *staggers*, &c.; in which there is little difference in appearance, consequence, or necessary treatment.

INFLAMMATION OF THE LUNGS.

Inflammation of the lungs was long a great stumbling-block to the practitioners of the old school; the devastating effects on these organs, seen in such as had died of it, being usually mistaken for the effects of some chronic affection

of a *rotting* tendency. A more extended acquaintance with the art has taught us the true nature and progress of the disease; but it appears also to have produced a conviction in the minds of many veterinarians who wavered on the subject, that pleurisy, independent and distinct from inflammation of the lungs, may and occasionally does exist in the horse; and that therefore, in a systematic point of view, it is proper to consider the various chest affections under distinct heads; to which also may be added that of pleuro-pneumonia, or inflammation of the lungs and pleura existing at one and the same time; as no one will deny that this is by far the most usual form of disease.

INFLAMMATION OF THE SUBSTANCE OF THE LUNGS, OR PNEUMONIA.

When we consider how totally we have removed the horse from a life of nature to one of art, in which the lungs, more vascular than any other organs, are subjected in an extraordinary degree to the extremes of exertion and temperature, we cannot be surprised that they should in a great measure form the seat of acute inflammation.

Causes.—The *predisposition* may be looked for in constitutional plethora, occasioned by high feeding, hot clothing, stabling with high temperatures, and by accelerated exercise; all which render the lungs more susceptible to congestion, and less able to resist the effects of it. Among the various causes *alternations* between heat and cold are probably the most common; and we have the more reason to believe that it is the alternations themselves which provoke the disorder, as we find that horses bear the extremes of both heat and cold, in different countries, with seeming impunity. Heat suddenly applied may be supposed to heighten the circulation *generally*, and produce congestion *immediately* within the lungs. Cold suddenly applied may act instantly also by driving the blood from the skin to the deeper-seated organs. A very fertile source of it is also occasioned by inordinate exercise, as regards quickness of progression, which wears out the vital activity of the lungs; thus it frequently follows severe runs in hunting; and thus also horned cattle, which are unused to any motion, are liable to it, when they, in a high state of con-

dition, travel great distances to markets or fairs. A cause is observed to particularly operate in some seasons: cold moist spring seasons are often marked with pneumonic attacks, which rage in an epidemic form.

Symptoms.—This disease sometimes attacks the horse very suddenly, and he exhibits, with one or two shivering fits, the excited breathing which is symptomatic of the complaint; at others, it steals on, and is almost unobserved for two or three days; but whether the approach be sudden or retarded, the general functions will appear disturbed. One that first shows itself is the unequal distribution of heat; the legs and ears being much colder than the other parts of the body. The coat stares; the horse loses his appetite; is evidently uneasy, and occasionally looks gently round towards his chest. In the early stages the nasal linings look paler than usual; but as it advances they become of a leaden hue; and although the general surface of the trunk may vary in its temperature, the extremities, as the legs, ears, and tail, and sometimes the muzzle, are found uniformly cold. Cough is by no means a pathognomonic symptom; many cases are without it; but when it does exist, it is at first short, dry, and frequent, and becomes eventually heavy, thick, and painful; occasionally some mucus with bloody striæ is thrown up in coughing, particularly when the bronchii participate in the affection. The respiration becomes disturbed as soon as the disease is formed; the first febrile attack will hurry it, but, the exacerbation of that over, it becomes simply laboured. The local inflammation having pervaded the substance of the lungs, thickened the lining membrane of the tubes, and lessened the calibre of the air cells, respiration now becomes permanently quickened; the flanks are found to heave, and the breathing is carried on with labour and irregularity; the inspirations being delayed to retard the pain produced by the distention of the chest, while the expirations are more hurried to relieve it from distress. The cavity is, however, no sooner emptied, than a new source of distress, in the stagnant condition of the heart, forces the horse to renew the breathing. The state of the pulse is variable in this disease, according as the lungs or the pleura bear the greatest share in the complaint. It is,

however, almost always quickened, sometimes to 100 even, from the irritative state of the aortic system; it is also in most well-marked cases small and oppressed, the pulmonary congestion preventing the free passage of blood through the lungs. We have, however, occasionally found it moderately full and bounding, dependent probably on the membrane being more diseased than the substance of the lungs. The horse is now seen to look more anxiously round to his trunk; the whole body also seems stiff and sore: partially elevating the head occasions great pain, and he is altogether disinclined to move; on the contrary, he stands fixed with his head extended forwards; his nostrils outstretched; his fore legs somewhat apart but forward; and he seldom if ever lies down, or if he does, he rises again quickly. The chest, if tapped with the hand, emits a dead sound; while the ear applied to the side of the chest will detect a dull but more urgent murmuring. As the complaint increases, the pulse becomes still more oppressed and irregular, so as to present, at the region of the heart, nothing but the faintest flutter; the legs, ears, and muzzle, feel still more intensely cold, although partial sweats may visit the carcass. The nostrils change to a still more livid hue, and the air they expire is chill. The mouth now becomes cold and pale; convulsive twitchings affect the breast, neck, and face; the teeth grate, and death ensues earlier or later, as the disease has been more or less rapid; occurring sometimes as early as the second or third day, but more often between the third and seventh, being also sometimes prolonged to the fourteenth or fifteenth.

The *terminations* of pneumonia are more varied than in most other complaints: *resolution* is that most to be desired; in which the symptoms gradually subside, either spontaneously, or aided by the curative treatment. *Congestion* is the termination to be dreaded; which sometimes suffocates the patient on the fourth or fifth day, by filling up the air cells with grumous blood. In the epidemic pneumonia, where a considerable degree of malignance is occasionally present, instead of blood, the air cells often become choked with serosity.

Gangrene is not a frequent termination of true pneumonia; the irritation or the congestion usually destroys

the animal before the tissues are completely broken up. The grumous black blood effused into the air cells has been mistaken for a gangrenous state; but which state rather belongs to those cases which are marked with typhoid symptoms. It must here be observed, that, although rare, a gangrenous state of a portion of the lungs is occasionally present in pneumonia. *Suppuration* is sometimes one of the sequelæ to pneumonia; in cases of which there is also a deceitful remission of the symptoms, but not so great as in hydrothorax; it is further marked by an irritating cough, a purulent discharge from the nose, with a hard, hurried, and an irregular pulse. In these cases a speedy termination follows by suffocation, or a more protracted one, in which the animal dies emaciated. *Hepatization* is also not an uncommon termination; in which the substance of the lungs becomes so blocked up and solidified as to make them, contrary to the usual state, sink in water. When the condensation is only partial, the affections called thick wind and broken wind are the consequence; or an increased irritability of the lungs themselves, or of the mucous membranes of the bronchii and trachea, may be left, which subjects the horse to a long-continued or permanent cough. It is also the parent of the tuberculated condition, which ends in phthisis pulmonalis or glanders.

On the subject of symptoms, it remains to guard the practitioner against mistaking pneumonia or inflammation of the lungs for such other affections as it may be confounded with; as with influenza, bronchitis, or other diseases of the mucous membranes. In influenza, the extremities do not continue invariably cold; the distress of countenance is not so great; sore throat is commonly present; the breathing, though quickened, is less laborious, and the pulse seldom oppressed. The cough in influenza is generally deep, sonorous, and very painful: a weakness, not corresponding with the violence of the symptoms, is very early seen in influenza; and though the lining of the nostrils may be inflamed in influenza, it is seldom so much so, as to present a purple hue. The principal necessity which exists for making a careful distinction between the two diseases, arises from its not being found prudent to

push the treatment so far in influenza as in pneumonia; for if the two should be confounded, and the milder be treated as the severer case ought to be, then it is a thousand to one but disease of the chest supervenes, hydrothorax sets in and brings the mistaken disorder to a termination. Inflammation of the lungs has also been mistaken for *colic*, from the horse sometimes expressing considerable uneasiness, and often looking round to his sides; but in colic the horse evinces acute pain, by stamping with his fore feet, or kicking at his belly with his hinder legs: by turns, he lies down and rolls, and then suddenly rises, appearing quite well for a certain space, during which he will fall to eating; while, on the contrary, in pneumonia, he never lies down, but stands stupidly quiet, except now and then, when he may look at his trunk, but without any of the impatient indications of pain, or intervals of perfect ease: it may also be added, that in inflammation of the lungs the pulse announces danger from the beginning, while in colic it is at the commencement of the healthy character. From *pleurisy* it will be more difficult to distinguish pneumonia; but true pleurisy is seldom if ever marked with the oppressed pulse; but, on the contrary, with one hard, full, and less increased in frequency, at least in the early stages. Further distinctions may also be drawn from the greater pain manifested in pleurisy, by the twitchings in the fleshy panicle which covers the muscles, and by the sharp manner in which the breath is exhaled; as also by the absence of the inflammatory tinge of the pituitary membranes, they not being a continuous portion of the affected organ, as in pneumonia.

Post-mortem appearances.—These, like the symptoms and terminations, vary, being, like them, dependent on circumstances connected with the nature and duration of the attack. When the disease is severe, it destroys within the first three days. The cellular texture of the organ will be then found choked with dark venous blood, and irregular spots or patches of inflammatory colouring on the surface: if protracted longer, other parts may have been involved in the disease; there will then be superadded adhesions to the pleuræ, with increased interstitial fluid mixed with masses of coagulable lymph; the substance of the lungs, when cut

into, ejects a sero-sanguineous frothy fluid; or it sometimes pours out a purulent matter. In the fatal cases of hepatization, lymph appears diffused through the cellular texture, solidifies and glues up the bronchial ramifications, and gives to the lungs the granulated aspect of the liver, with its weight, consistence, and incapacity to float in water.

The *prognosis* must be formed from the progress the disease has made, and the intensity or mildness of its symptoms; when some warmth can be restored to the extremities by friction; when the nasal linings do not approach a livid tint, and the horse can bear to be turned, or does not obstinately maintain a standing posture, but on the contrary shows an inclination to lie down; if his blisters rise or his rowels maturate, we are warranted in offering hope to the owner, and more particularly if the disease does not increase in intensity by the fourth day. But if the breathing continues very laborious, if rattling in the throat comes on, with partial cold sweats, and an intermitting or irregular pulse, a fatal termination may be expected. It is always a most unfavourable sign when the blisters and rowels remain inert; and we hardly remember to have seen a horse recover where such has been the case: it bespeaks at once the intensity of the inflammation, and the diminution of vital power.

The *treatment of pneumonia* must be prompt. The old practice was to extract blood immediately upon entering the stable. The first blood-letting was to the amount of two gallons at least; the second of one gallon, and two, or even more, subsequent withdrawals of half or three quarters of a gallon each; thus, at all events, four gallons of blood, or more, were taken away. A full-sized horse has but eight gallons of blood in his body, and one moderately fat has not that amount. Here, however, the veterinary surgeon withdraws half the blood from the poor horse's body, under the impression that the animal's disease announced it had too much of that fluid, to regulate the quantity of which is the care of the whole system. After this, he used to look upon the subsequent signs of excessive debility as natural results.

The antiquated notion about a horse having too much blood is now in a great measure exploded; many excellent

practitioners do not bleed at all; but if you resolve to take any, watch the animal; never mind the pulse at this time; and at the first sign of change, though it be ever so slight, pin up the vein, and on no account repeat the experiment.

The next point to be considered is counter irritation, and most practitioners blister both the sides largely, choosing for their agent cantharides, which is uncertain and slow in its action. Against blistering it is urged that it acts as a stimulant; for that is the very thing we avoid, in order to enable the horse to throw off the disease. But then as to the sides being the place. This is getting very close to the seat of the complaint, and appears to be quite as likely to extend its action as to prove a derivative. Besides, one of the signs of improvement in inflammation of the lungs is the animal lying down, which during health it always does upon its *sides*. The rendering of these parts sore seems to be opposing an obstacle to the animal resuming the recumbent attitude. The better plan would be to reject cantharides, and spare the sides. A more active vesicatory, and a safer place for its action can be found. We proceed to have the hair clipped from off the entire length of the back; then we take liquor ammonia, diluted with four times its amount of cold water; and with this we thoroughly saturate the place from which the hair has been cut. We next cover the part with cloths several times folded, to prevent the ammonia from evaporating. This needs to be watched, but will often raise a blister in ten minutes, whereas cantharides rarely has any effect before the next day: the ammonia is likewise more certain than the Spanish fly, and is altogether to be preferred, as in inflammation of the lungs in the horse there is no time to be lost before remedial measures are adopted.

While this is doing, we procure four men if possible, and place one at each leg, to rub the part with their hands as hard and as long as they can. Four thick woollen bandages are then produced, and one wound gently, not tightly, round each leg. A hood is then put upon the animal's head, but the whole of the body left uncovered.

The next thing is to procure a cool loose box, not *a cold* one, but *a cool* loose box, and to have the horse gently led

into it; and then to look about and observe that no draughts blow directly upon his body; this being ascertained, provided the weather be favourable, the door and windows may be left open throughout the day.

All this accomplished, you may order the following drink to be prepared and administered:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Ext. of belladonna	a drachm.
Tincture of aconite	two drachms.
Cold water	a pint and a half.

Rub down the belladonna in a little of the water. Then mix with the other ingredients. The aconite (Wolfsbane) should be of the strength of a drachm to an ounce. If stronger or weaker, make the due allowance, so as to have but the virtue of the fourth of a drachm in the drink.

The above drench, to those who allow their minds to be controlled by names, will appear a strange mixture. Sulphuric ether is called a powerful stimulant, yet it has not been proved to have any influence over the pulse, to which, however, it certainly communicates character or tone. Laudanum is a decided sedative; but as the brain is here unaffected, it certainly does lose that property when blended with sulphuric ether. Its action is in some mysterious manner rendered more mild. Belladonna is also called a sedative, but it has a wonderful influence over the mucous membranes of the respiratory tract, and over the lungs themselves. Aconite is almost the only drug we know of which can, in a decided manner, lessen and improve the pulse. Yet, according to the general practitioner, here we have blended four powerful sedatives with one powerful stimulant. So much harm is done by christening or arranging medicaments.

Should the foregoing be rejected, either of the following may be employed:—

Tartar emetic (in the form of the antimonial wine of the Dublin Phar.)	one drachm.
Digitalis, made into a decoction	one drachm.
Nitre	two drachms.
Cream of tartar	three drachms.

Mingle with a pint of warm water and give; or the annexed may be tried:—

Powdered white hellebore	ten grains.
Powdered ipecacuanha	half a drachm.

Make the last prescription into a drink, with half a pint of thick gruel. Either of the above drinks is to be given four times daily at the commencement, and to be gradually lessened as the disease abates.

Great caution is required, in giving a horse with inflammation of the lungs any thing in the shape of a drink. Time and patience accomplish wonders. Lower the horse's head the moment it begins to cough. This last direction is most important, and should not be neglected; or the horse may fall dead from the fluid having fallen upon the lungs, which the examination after death is certain to disclose. The best plan is to proceed with firmness, and yet gentleness, dividing the drink into four portions if necessary, and allowing the animal to take its time over each.

All food should be removed. No trouble should be expressed because the horse does not eat. The animal, with inflammation of the lungs, generally has no disposition to feed, or if the inclination remain, it should not be gratified. Starvation is one of the most active means of cure, and one of the surest agents in cutting short the complaint. The horse will lose more flesh in one day from the wasting effects of the disorder, than he can in seven days from actual abstinence. Warm mashes, not hot, however, may be placed in the manger, because in inflammation of the lungs it is dangerous to give any physic, lest the bowels sympathize, and the animal perish. Two ounces of Epsom salts may be dissolved in every pail of water, which should be repeatedly changed, and placed continually before the horse. Enemas of simple soap and water, in conjunction with backracking, may also be tried, in order to excite the bowels into action.

If debility should appear, all tartar emetic should be withheld. If, in spite of this, the weakness increase, the horse may have linseed tea made thick, placed before it, with two quarts of stout per day. The aconite, likewise, should be withdrawn, and attention paid to the legs, rubbing them whenever they are cold. In extreme cases, brandy and ammonia are admissible.

When the disease abates, which it generally does in forty-eight hours, the care must not lessen; for the disease is likely to recur, or remain in a chronic stage as thick or

broken wind, or even to degenerate into glanders. It is apt to involve other structures in its progress, as the pleuræ, when the symptoms will be somewhat confused, being between pleurisy and pneumonia. In such a case, the terminations may be either those of inflammation of the lungs, or of the pleura.

It is a bad sign when the flanks heave, and the horse's head is put out of the window; and a much worse one, when the head is withdrawn and the eye becomes amaurotic; when the animal keeps walking round and round his box; and breaking into partial sweats, sometimes raises its head and neighs, proving he is delirious, and in imagination answering the call of his species. In this last case be certain death is not far off.

PLEURISY.

Pleuritis, as a distinct disease, will not occupy very much of our attention, as the treatise on pneumonia embodies most that is practically necessary to note in it. Speaking of the *causes* of pleuritis, one is external violence, particularly of punctured wounds, which injure the costal pleuræ without disturbing the integrity of the lungs; as is not unfrequent when the injury is inflicted by a blunt instrument entering in a slanting direction, as a goad or a cow's horn. In such a case, the affection may continue confined to one side only, but in most others it extends to both sides, though not always in an equal degree. It may be occasioned also by any of the causes which produce pneumonia: exposure to wind, rain, or snow, we believe to be one of the most common among these; and it occurs far oftener from this last cause, than from those which have been dwelt upon at greater length.

The *symptoms*, like those of pneumonia, make a rapid attack, or they do not arrive at their intensity for three, four, or five days. The respiration is generally sharper and quicker, but not more full. The breath makes a sawing noise. The exhalation is sudden, the ribs being allowed to fly back with a sort of jerk. Cough is here more invariably present than in simple pneumonia, which, *à priori*, might not be expected; but it is short, suppressed, and painful: sometimes the horse stamps, as in the cough of

influenza or bronchitis. The skin also has a corrugated appearance after the cough. The nostrils are dilated, as in pneumonia, to aid the difficult respiration; but the nasal membranes are but little tinged. It is particularly characterized by the pain which pressure on the sides produces. The pulse is usually hard, full, and but slightly accelerated, until the constant pain has weakened the system. From this detail of symptoms, as well as from what has already appeared in the account of pneumonia, the distinguishing marks between pleurisy and inflammation of the substance of the lungs may be gained. If the symptoms quoted do not become aggravated by the fifth or sixth day, a favourable termination may be expected; but if, on the contrary, the pulse becomes much quickened, small or wiry, and indistinct, and great restlessness with irregular sweating come on, it will prove fatal, and the post-mortem examination will detect indications of severe hydrothorax.

Hydrothorax, or serous effusion within the cavities of the pleura, is either acute and rapid, or rather gradual. In the former it occurs from the third to the fourteenth day; the pleuræ secrete a serous fluid, and pour this forth in a diseased quantity, until it fill one or both cavities, the animal dying from suffocation. This termination is usually betokened before death by a yellow serous discharge from the nose, without fœtor, and may always be detected by placing the ear to the side: the pulse in these cases is irregular, but the general symptoms are so little intense as frequently to deceive the practitioner. The *less acute hydrothorax* frequently does not occur until the third or fourth week, and sometimes even a longer period from the pleuritic attack, and is even more deceptive than the other; for it seldom commences until there has been for a considerable time, perhaps two or three weeks, an apparent remission of all the inflammatory symptoms; and it is only by an aural examination, aided by the eye and touch of the experienced observer, that any remaining disease can be detected. To such a one the disposition to effusion will manifest itself; the pulse will give a peculiar vibratory stroke, with some hurried irregularity; and as soon as only a moderate portion of fluid is collected, it may be felt by means of the hand applied to the region of the heart, which

will then evidently convey the sensation of a pulsatory stroke through a watery medium. A smart rap also given by an assistant on one side of the chest will produce to a hand, held on the other, an undulation similar to that received from a tap given to a bladder filled with water; and if the like experiment be at the same time made on the sides of a healthy subject, a still more satisfactory proof may be obtained. The hydrothoracic state of the chest may be also suspected from the staring look and harsh feel of the hair, as well as from a yellow serous discharge from the nostrils usually present, at first thin, but afterwards thicker and glutinous. Any sudden exertion also alarms such a horse; he avoids turning, and resists holding his head up from fear of strangulation, by altering the direct course of the trachea. In this state he will continue, without much variation, to eat, and will thereby deceive his attendants: at length, however, he will be suddenly seized with aggravated symptoms, which though seldom so acute as at first, yet hurry the poor brute out of the world very suddenly, he falling down dead.

The *treatment* does not differ from that of pneumonia in any other particular, than that we may here call in the aids of mild purgatives and diuretics, with the addition of full sedatives.

PLEURO-PNEUMONIA, THE LATE COMPLAINT AMONG CATTLE.

Pleuro-pneumonia has destroyed its hundreds of thousands. At first it was much misunderstood; and formerly was treated by bleeding, blistering, sedatives, purging, and setoning. The remedies were very energetic. But between the force of the disease and the power of the cure the animal died. The means of restoration became quite as fearful as the complaint, till the owners grew desperate, and resolved to have no doctor at all within their sheds. By this resolution they were considerable gainers. Fewer animals were lost. Deaths, though still frequent, were not half that number they were at first; and those that did die cost nothing for being killed by physic. Thus all ways the proprietors gained by getting rid of veterinary surgeons. But, upon his dismissal, the true mode of treatment was discovered by the veterinary surgeon, which in the bustle

of administering medicine, with the symptoms under his eyes, he had never found out. Gentlemen then began to consider whether heaving flanks, panting and painful cough, were really the commencement of the disorder. They now had time to review their former proceedings, and to find out they had been quite wrong. In the quiet of their studies they found leisure to recal, and to ponder over the symptoms; and when the cattle were absent, they found out that they had attempted to relieve the disorder, only after it had become confirmed. The first stage during which the complaint was easiest to attack, and most readily to be conquered, they had entirely neglected; and this led them to reflect upon the nature of the disorder which, though they still regarded as febrile, they now were content to view as typhoid, and even putrescent in its later stages.

Pleuro-pneumonia is a disease, in the first stages of a remarkably active character, but soon becoming virulently typhoid. It has no set beginning. There is no first chord struck, like to the overture of a Christmas pantomime, invariably the same, and always forcible, but the first stage steals upon us, and can come from every possible point. With young stock at grass, it is frequently announced by constant battles or by precocious desires. Bulling out of season is no unusual sign with cows in the shed. The animal, from being remarkably quiet, may in the first stage of pleuro-pneumonia become restless and excitable, striking at her neighbours with her horns, or jumping about at the slightest sound. Often the owner is surprised by an uncommon yield of milk, but more often he is disappointed by an evident falling off in the quantity given, especially in the morning. Heat of the skin, and warmth at the base of one of the horns, is no unusual commencement; neither is coldness of the parts about the tail, and particularly of one or more teats, with heat, or even tenderness, of the bag. A refusal to eat commonly is the first symptom, but not usually a ravenous and unscrupulous appetite is the same. Some cows suddenly grow very picky or nice in their feeding; others become quite the reverse, and they will gobble up filth: in short, any change in the customary habits or ordinary behaviour of an animal, when pleuro-pneumonia is known to be abroad, should be immediately attended to.

If the beast be excited, let a vein be opened, and blood taken till a change is produced. The pulse here is no guide. The animal itself must tell us when to stop. When its excitability is lost; when from being furious, it has become tame; when there is a marked alteration from that which was, to something else, then, though only the first spurt has been taken, enough has been abstracted; pin up immediately; the animal cannot bear the loss of much of the vital fluid; she is in no condition to stand a drain upon the system, and the less blood produces the effect we desire the better. Let the veterinary surgeon, therefore, keep his eye upon the beast, while any bungler may strike a vein, which if the abstraction of blood is warranted at all, will swell up as large as a cart rope. It is of a size then rather to throw stones at, than to poke at with a fleam.

In the second, or inflammatory stage, all excitement vanishes. The strength rapidly fails. The cough is now certain to be constant. We did not mention the cough among the first symptoms, because it is not invariably present, and if present, it has no character during the early stage. But now every thing becomes characteristic, so that a child, or even a blind man, could accurately point to the beast having the disease. The cough is short and distressing; evidently painful; but often against the will of the animal, emitted four or five times in succession, after which the poor cow is ready to fall. The eyes are protruded and glassy; often suffused with tears. The conjunctiva is reddened, attesting the state of the other mucous membranes. The nostril looks inflamed. The muzzle is moist, and often water, as clear as any drawn from a well, drops off its surface. The appetite is fickle. The beast will repeatedly pick the nicest morsel of hay, but after its having been chewed, the quid drops from the mouth. Green meat is invariably refused; hay is preferred. There is no thirst. The breath is hot, short, quick, and catching. The flanks heave, and the appearance is marked by evident signs of acute distress. If the hand be now run along the back, the wretched creature grunts; so she often does between each breath, and always upon being turned in the stall. Now the pulse can be felt quick; a grating sensation is imparted to the hand, if placed against the side; and the

ear, even more readily than the hand, can detect the symptom. In certain places the bellows' murmur of health is entirely lost, and in its place there may be no sound perceptible, or an unhealthy crepitation may be audible. If both lungs be effected the animal endeavours to lay down, being well-nigh incapable of longer standing; but her endeavours to rest, though frequent, are of very brief duration. Should the beast, however, remain down for any time, be certain then that only one lung is affected, and the diseased side of the chest is lowermost. The duration of this stage is uncertain, but in longer or shorter space the symptoms change. The tears cease. The eye brightens. The visible mucous membranes assume a leaden tinge. The breath is drawn with difficulty. Often respiration is stopped for a short period, and then suddenly commenced with energy, but almost immediately subdued into its former quick, but short, and comparatively quiet method. The coat now is very unthrifty. If it be tried along the margin of the neck, or at the end of the tail, it will sometimes come out by handfuls. Food, as before, is taken, but rarely swallowed. Hoven may in this, or in the preceding stage, have appeared. Water is declined, although from the symptoms thirst must prevail; but probably liquids are refused from their being the cause, when imbibed in large quantities, of difficulty in breathing. From the mouth, constantly a thick ropy mucous hangs. The tongue is seldom retained within the lips; and in this state the animal may remain for a week, or only a few days, or for a month.

The last stage to the non-medical man is very deceptive. The eyes, to a superficial observer, become more cheerful. The breathing evidently less painful. The cough not so frequent; but blood and various substances are brought up with the cough at times. The animal is inclined to feed, but she may show a marked preference for dung and urine, though sometimes she will take a mouthful of hay. The hay is masticated with a relish almost too violent to be perfectly natural; but upon attempting to swallow, it sticks in the gullet, and if not speedily removed with the probang, the beast would die hoven. The breath now stinks. The action may be wild, but during it the animal may fall.

The tongue ultimately swells. Light is lost. The cow obstinately stands in one place, and in one position, and ultimately sinks to die suddenly.

Such are the main features of this fearful disorder, which, since it has been better understood, has appeared as though it became of a milder character. A beast might, however, during the severest times have two, or even three attacks, and ultimately survive and do well. There is one marked peculiarity about the disease. The cow never entirely loses her milk; it may be reduced to half a pint, but the half pint is to the last to be obtained. The bowels are always irregular; but if the disease begin with purging, the case generally terminates the sooner. If the cow be in calf, abortion is a very bad sign; but should the fœtus be retained, the youngster will be born with the disease from which his mother has recovered, and he will assuredly die, almost in his birth.

If the disease be detected in the first stage, should the animal be abroad, let it be brought home, but with the utmost care; and if at home, let the shed in which it stands be made scrupulously clean. Remove every thing of a dirty, foul, or putrid kind. Scrape and wash the walls. Damp in this disease is not desirable, but it is infinitely less to be dreaded than tainted air. Having made clear the place in which the beast is to reside, let her enter it; though, if the animal be already in the shed, do not remove her; as the one that stands next to her is not more likely to be taken, although she should die of the complaint; and cows are proved to pine, and thus aggravate the disorder, when placed by themselves. Withhold all food, even though the animal be inclined to feed, which generally they are not disposed to do. It is not that which goes down the throat that does good, but that which is converted into chyle alone nourishes the system. We should be very glad could food be appropriated, but in this disorder nothing is digested, and whatever is swallowed remains in the rumen to decay. Decaying vegetable matter sets free much gas, and hoven is one of the worst symptoms, especially in the latter stages. Unfortunately, the appetite is often extraordinary towards the commencement of this affection, and the consequence is (nothing being digested) a loaded

stomach; which makes the breathing still more distressing. After death, the rumen is mostly found crammed with stinking, undigested food, and the effect even upon this almost insensible compartment of the stomach, is shown by its lining membrane peeling off as the mass is emptied out.

The examination made after death generally displays both sides of the chest, and the heart bag, full of fluid of a bloody tinge. Loose flocks of lymph, about two inches in length, adhere to the inside of the ribs, the outside of the lungs, and the anterior surface of the diaphragm. The lymph is of a dirty straw colour; it likewise lines the heart bag, and sticks to the outside of the heart itself. The blood within the body is darker than usual; and occasionally the cellular tissue is injected, especially upon the surface of the frame. The characteristic appearance which marks the complaint is, however, found within the lungs. These, when cut into, are of various tints, from the palest pink to the darkest modena. Their variegated aspect pleases the surgeon as well as surprises him, especially when he first cuts into the lungs, for then the colours are very bright, and the distinction between them very marked. Between these hues travel eccentric whitish lines, taking no definite course, or being of no definite thickness; but running here and there, and being of all imaginable breadths. It is this difference of hues, divided by numberless whitish lines, which has gained for the lungs the term of marbled; a word that very well prepares the imaginative spectator for the sight which he will behold. Added to all which, we have said the air tubes and cells are plugged up with a thick frothy mucus; and whoever sees the organs of respiration in such a state requires nothing further to make him comprehend the cause of death.

With regard to medicinal measures, these must be very gentle. Every caution is necessary to husband the strength; and active measures will not always check the disorder. During the first stage the symptoms merely denote general irritability, and the treatment required is merely such as will check that which the symptoms suggest. If the loss of a very small quantity of blood will produce an effect upon the disposition, something may be suspected as lurking behind the irritability; but if the animal endures a full

bleeding before the symptoms succumb, we may hope they portend nothing but what they at the first glance suggest. Nevertheless, if pleuro-pneumonia be in the locality, do not depend too much upon this sign; neither is that which is termed a full blood-letting prudent, wherefore proceed with the greater caution. Shake a drachm of calomel, blended with two drachms of opium, upon the tongue of the animal, and leave it to be licked down at leisure, as the beast has no power to spit it out again. Three hours after this give the following drink:—

Epsom salts	half a pound.
Sulphuric ether	one ounce.
Liquor ammonia acetatis	six ounces.
Aconite (in powder)	one scruple.
Cold water	one pint.

If this has not operated in six hours, repeat the physic; and after the lapse of another six hours give another dose, only this last time administering half the quantity of Epsom salts, and add one ounce of powdered gentian root; in another six hours, once more repeat this last drink.

Let nothing more but repeated drinks, composed of sulphuric ether one ounce, laudanum one ounce, cold water one pint, be given, till the pulse become stronger, till the cough appears, and the entire symptoms change. With the earliest indication of this alteration, new medicine must be administered; then exhibit the following mixture thrice a day, which must be persevered with during the continuance of the active stage:—

Extract of belladonna	half a drachm.
Aconite (in powder)	one scruple.
Emetic tartar	one scruple.
Nitre	one drachm.
Sulphuric ether	one ounce.
Cold water	one pint.

Rub down the belladonna with a little of the water; dissolve the emetic tartar and the nitre in a little more of the same liquid; then mix, add the other ingredients, and give.

Should the disease continue, and the pulse grow weak, with the other signs of the third stage having supervened become evident, withdraw the nitre and tartar emetic. A pint of good ale, blended with half an ounce of extract of gentian, may now be added to the other components, instead of the former weakening agents. The ale, it is

true, we would rather dispense with, but every thing now depends upon keeping up the strength, which we must endeavour to accomplish even at some risk. Should the bowels have continued costive, repeated half pints of linseed oil, with each of which half a drachm of chloroform is blended, and in each of which a scruple of camphor must also be dissolved, should be administered at intervals.

Every thing now depends upon cleanliness. A dung-heap near the cowhouse; putrid matter or stagnant water near the building; a foul drain, or even a rotten thatch, will defeat the very best of medicinal remedies. The farmer is too apt to terminate all his own exertions, when he whom the tiller of land calls a doctor is in attendance; whereas this is the precise period when he should most bestir himself, as without the proprietor's supervision the veterinary surgeon only leaves directions to find they have been neglected; and only sends "physic" to discover it has been put upon one side or thrown away. In pleuro-pneumonia, the owner's inspection, or that of his wife—if he have a kind, open-hearted partner, who will freely of her own accord undertake the nursing—is of every import; since the veterinary surgeon has often been reproached with the loss of an animal, for the death of which, could facts be ascertained, the farmer would be condemned as the rightful culprit. The attendance upon the animal must now be constant, but should be so given as not to disturb or excite her. Every thing must be done gently; with feeling for the really distressing situation of the beast, but with the utmost caution and perfect silence.

The better appearance of the creature; her altered and even cheerful aspect; her readiness for exertion, which on narrowly watching her, will, however, demonstrate her greater weakness; the entire absence of any thing like pulse at the jaw; the strange smells that are perceptible about the beast; the cessation of cough, and a bloody, foul exudation from the nostrils, with a partial inclination for food, will bespeak the gradual starting up of the fourth and last stage of the disorder. Solids, probably, would be retained within the rumen, therefore fluids alone are worthy of reliance. Now withdraw the belladonna, and the aconite as well as the emetic tartar, and the nitre from the

drink; to which add one quart, instead of one pint, of sound ale; half an ounce of laudanum, and six ounces of the liquor ammonia acetatis, and give the whole as a drink. Let there be no hay or straw near or under the animal: notwithstanding her weak state and desire to feed, she must lie even upon the bare stones. Were there any substance she could attempt to eat at hand, she would seize it perhaps with avidity; masticate it with eagerness; but in her attempt to swallow it, her strength would suddenly fail; the morsel would probably stick in the gullet, produce hoven, occasion confusion, frighten the cow, and do all the injury we are careful to avoid. She may be anxious to get loose, but keep her tied up; her efforts to free herself will soon subside. Should she become hoven in this disorder, you must pass the probang; and down the tube, when it has entered the stomach, pour a dose of chlorate of potash, dissolved in water (see HOVEN). If the fœtor prove offensive, give a scruple of the chloride of zinc, dissolved in a pint of water, which may be repeated as often as it is required. Double the quantity may also be mixed with some flour and water, to be used as injections, if any stinking diarrhœa accompany the later stage; and cloths, saturated with the solution of the chloride of zinc, should be hung about in various parts of the house. The same liquid may be of service to sprinkle any part of the cow's body upon which any soil may have fallen, the dirt being first cleanly washed off.

The return of the cough. The re-appearance of pain, as denoting a return to consciousness; the revival of the pulse; in short, the restoration of the symptoms of the third stage, though in a softened form, will denote amendment. After this, every thing will depend upon the farmer himself. For a short period the last drink, with the addition of half an ounce of extract of gentian, must be continued, and then mineral tonics gradually substituted. Nothing must be done suddenly; nor if the symptoms that have been recorded are properly observed, will any violent change be necessary, however much so these directions, compressed for the sake of brevity, may seem to direct. Of the mineral tonics, the sulphate of iron in two drachm doses is the best. It may be dissolved in water, with

which half an ounce of the extract of gentian has been rubbed down, and thus compose a drink. No ginger, though that stimulant is justly a favourite, must be given, for fear of recalling the inflammation, which we have too much reason to dread has not been entirely subdued. The food must not be too large in quantity, but of the most digestible kind.

INFLAMED LUNGS IN NEAT CATTLE.

Horned cattle are also subject to pneumonia, but not by any means in an equal degree with horses. Cowleeches and graziers call the complaint *rising of the lights*, and it has also other provincial names unnecessary to be noticed here. Various *causes* may occasion it; as exposure to inclement weather, over-driving from fairs, &c., in which the vicissitudes of temperature they undergo, acting on their plethoric state, distend the pulmonary tissues. We have also seen it in calves. The *symptoms* are the same as in the pneumonia of horses: we know of no difference, but that the mouth is moistened by a discharge, and held constantly open to assist the breathing. It must also be observed, that the low type is apt to prevail in all their diseases; and that, from the increased volume of their aortic system, their inflammations hurry to their termination, be it bad or good, sooner than those of the horse. Hence it is more common for pneumonia to end in gangrene in cattle than in horses. The *treatment* differs in no respect. It may also be remarked, that structural peculiarity in the alimentary track makes it proper to give all cattle medicines in a liquid form.

INFLAMED LUNGS IN SHEEP.

Few of the writers about cattle notice this disorder as a disease affecting sheep; but it may be seen well marked, and in these animals also its origin could be clearly traced to exposure to inclement weather. The first appearance is loss of appetite, which is soon succeeded by a fixed stare; the head is elevated in the air; the mouth opened; the flanks heave violently; the conjunctival and nasal membranes are much injected, and a fluid distilled from the nostrils, mucous in some, and purulent in others.

They are occasionally seized with fits, will fall backward, and when recovering from it the teeth may be heard to grate together. The *post-mortem* exhibits the substance of the lungs highly inflamed; in some the whole of the lobes, in others those of one side only, are affected; but wherever the inflammation reaches, that part is condensed almost into a solid mass by the congestion; some of the air cells also contain pus: the costal and mediastinal pleuræ were little affected. The liver is also sometimes slightly inflamed. If seen early, bleed the sheep to a small extent; and, as soon as it can be procured, a drink may be given, composed of nitre one drachm, and tartar emetic one scruple.

INFLAMMATION OF THE HEART.

This disease is very rare in the horse: but combined with pneumonia and pleuritis, particularly with the latter, it is not so uncommon. Mr. Blaine saw two cases, which were both of them uncombined with pericarditis or inflammation of the heart-bag and with pleurisy; both terminated by serous effusion into the pericardiac bag. Mr. Percivall has also met with cases of carditis, but all of them combined; and he notices that he found the pericardium coated with lymph, and in one instance thickened into a semi-cartilaginous substance. The symptoms in the cases which fell under our own notice differed so little from those present in pneumonia, that we considered them as such, and treated them accordingly. There is, however, one symptom characteristic of inflammation of the heart: the throb or beat of the organ is very loud, and there is also a peculiarity in the pulse. It is marked by oppression, as in pneumonia; but superadded to that, a peculiar wiry yet fluttering feel is observable, totally distinct from any other; and, above all, it is markedly intermittent, or the continuation of the beats is every now and then stopped for a short time. The countenance and manner were also marked by an expression of anxiety and alarm; but acute pain did not appear present. The *treatment* of carditis, thus combined, would in no respect differ from that of pneumonia, excepting that digitalis is to supply the place of belladonna; but were we assured of its true character, we should blister and

rowel the under surfaces of the chest; we might push the nauseants to their full extent, and purge the bowels. But no treatment is likely to do more than to prolong life and increase the owner's cost. Medicine has yet to discover a cure for inflammation of the heart, or to tell us how a being thus afflicted can be restored to working health.

INFLAMMATION OF THE STOMACH.

If by the above term we are to understand an inflammatory attack on the mucous surface of the stomach, wholly exclusive of inflammations produced by poisons or acrid substances admitted within it, or of that consequent on mechanical distention, called stomach staggers, it may be regarded as an unheard-of disease in the horse. However, it is sufficiently common from the exempted causes, and every case is attended with great danger, though unmarked by any characteristic symptom. It cannot be easily distinguished in its severe stage from twist of the intestines, stone in the bowels, &c. The symptoms of distention, and the mode of treating it, have already been detailed. The symptoms from poisons are, so far as they are noted, extreme distress and restlessness, a loathing of food; for if any thing be given by the mouth it creates increased pain a long time afterwards. The animal breaks out into cold sweats, lies down and quickly rises again, as in inflammation of the bowels; becomes early and greatly prostrated in strength, and has a pulse usually quick and much oppressed. There may be purging, and generally is, though the opposite state may also exist. The signs are also materially shaped by the nature of the substance swallowed. The treatment will depend on timely detection of the true cause. Our tests, however, are of more use to find out the reason of death, than to save life. The general treatment consists in a rejection of blood-letting, the administration of plenty of gruel, starch water, chalk and water, and abundance of opium.

INFLAMMATION OF THE INTESTINES.

Inflammation of the bowels, or the *red colic* of farriers, involves either the peritoneal or muscular portion of the intestines; or it has its seat in both these portions, but is

more frequently located in the latter than in the former. Observations on a great number of cases will also show that the villous coat is not unfrequently a participator in the affection: in fact, the abdominal inflammations in the horse, as well as the thoracic, seldom exhibit exact lines of demarcation; but are very liable to stray by continuity, and even by contiguity; hence we have some *characteristic* symptoms or signs; many more which are *mixed* and *indefinite;* and some altogether *irregular* in all acute visceral affections. There are, however, sufficient grounds for a general division of the inflammations of the bowels into *enteritis*, or that which principally affects their middle *coat*, and is generally accompanied by costiveness; and that which primarily attacks their *villous surface*, and is productive of diarrhœa or dysentery. Between these states there is a sufficient mark; but between inflammation and spasmodic colic the distinctive lines are familiar only to the experienced observer. When the gripes, or fret, as spasmodic colic is called among farriers, attacks a horse, it is usual and useful to give him powerful stimulants, active motion, and strong friction, all which would be extremely baneful in the red colic. A careful distinction should therefore be made between the two diseases, which may be readily done by attending to the characteristic marks of each, as particularly detailed in spasmodic colic.

The *causes* are various: the application of cold is certainly among the number; as washing when hot, or plunging into a river; the drinking of cold water has likewise produced it, though more frequently this occasions spasmodic colic. Neglected costiveness, or retention of impacted fæces; improper feeding, dry food, and little water, are also causes: worms likewise may, now and then, bring it on; or it may be produced by neglect after clipping for the winter season; or by metastasis, or the translation of the inflammatory state of one set of parts to another. Spasmodic colic neglected or improperly treated is not an unfrequent cause, and calcareous concretions always occasion it before they produce death.

The Symptoms.—It is known sometimes to commence by a shivering fit, to which succeeds heat of skin, restlessness, loss of appetite; the mouth being particularly hot, and dry;

the inner membranes of the eyelids, and the linings of the nostrils, being rather redder than natural. As the inflammation advances the pain increases, so as to force the horse to lie down and get up again frequently; yet, unless the pain be very acute, he seldom rolls on his back or remains stationary there; but, as he will occasionally do so in particular cases, this should not be considered as a criterion between this disorder and gripes. He will kick at his belly, stamp with his feet, scrape his litter or stall with his hoofs, and look wistfully round towards his sides. The pulse in most cases is frequent, as 90 or 100, and invariably very hard, small, and wiry. The breathing is accelerated: the belly is sometimes painful to the touch, which never occurs in colic: it is also hot to the feel, and the pain, instead of remitting as in colic, is constant; the extremities being cold, while the surface of the body is often warm. The bowels are usually constipated, and if any dung be evacuated, it is small, hard, and in dry masses. The anus, if examined, will be found very hot; and if the hand be obtruded up, it will be felt sometimes even internally inflamed; it also, in many cases, quivers with the intensity of the general affection. Frequently, towards the later stage, there is some tympanitis or distention of the belly, which much aggravates the general tenderness evinced on examination. The urine is painfully evacuated in small quantities, and very highly coloured; sometimes it has much mucus suspended in it. In the progress of the disease these symptoms increase in intensity: the distress of the horse is expressed by his groans, his violent efforts to change his position, as if to fly from his malady; while perspiration, partial or general, breaks out, and is then succeeded by a chilly state, with muscular twitchings; the pulse becomes more and more hurried, intermittent, and at last nearly imperceptible: the respiration is as quick and irregular as the pulse, and occasionally interrupted by a convulsive sigh. The vital powers are now fast ebbing, and the animal sinks after a few feeble struggles, or he parts with life with more violent convulsive movements.

Post-mortem examination of these cases presents inflammatory marks, sometimes confined, sometimes general. In most cases the large, but in a few the small, intestines are

the principal victims; the external surface of the affected parts is generally heightened in colour: sometimes the redness is intense, at others it assumes a purple hue, as the approach to gangrene is nearer or farther off; and occasionally it is black or nearly dissolved, when fully established: in some cases an internal hæmorrhage from the inflamed vessels has filled the tube, particularly of the smaller intestines, with blood, and all the diseased bowels will be much increased in weight.

The Prognosis.—If the costiveness be early removed; if the pulse become softer, more full, and less frequent; if the pain remit; if the heat of the body and extremities appear equal, it will terminate favourably. But if the costiveness remain obstinate, or otherwise a voiding a black fœtid matter appear; or should the costiveness readily yield, but violent purgations of watery, slimy offensive ejections ensue; if the pulse become more quick, and wavers also; if the extremities continue invariably cold, the danger is great. And when added to these, if there be a peculiar earthy, cadaverous smell from the mouth, with cold sweats, delirium, and extreme debility, and particularly if the belly become more and more tense, the termination will almost to a certainty be unfavourable; and as soon as the pain ceases in such a case, gangrene may be known to have commenced.

The *treatment* in enteritis should be singularly prompt and active, as inflammation of the intestines has run its course and terminated fatally in eight hours. Bleeding must be the first remedy adopted, but no quantity can be stated to which amount blood may be taken. The vein must remain open till the animal evinces that some effect has been produced, and then pinned up. The bleeding may be known to have a salutary effect by the pulse becoming softer and fuller. As soon as the bleeding is over, proceed to back-rake, to remove any hardened dung that may obstruct the passage, which, if suffered to remain, would infallibly aggravate the complaint, and which indeed in many instances is the cause of it: the distressing strangury that sometimes accompanies the red colic is also frequently produced by the pressure of hardened excrement, as by a renal participation in the inflammatory affection. It is not the dropping a few balls of hardened dung, nor

the passage of some thin glairy matter, which shows that no obstruction exists: on the contrary, when these are present, a most obstinate costiveness may yet remain farther up in the canal; and a flow of thin fæces may escape by a groove formed by the side of the obstructing portion of dung, as has happened when very large fæcal accumulation has taken place within one of the pouches of the colon. Unless there be evidently a free passage throughout the whole canal, it is always proper to back-rake; for it must not be lost sight of, that costiveness in true enteritis is always present, and when not its cause, is always its most aggravating symptom; and until it be removed, a resolution of the inflammation cannot take place. It is also necessary to bear in mind, that the state of the bowels being such as not to render it prudent to give strong purgatives, the case is beset with difficulties. Injections of thin gruel, or of warm water, may be afterwards occasionally exhibited. The quantities composing the clysters should be very considerable, so as to penetrate beyond the rectum, and to enter, if possible, the colon and cæcum, which intention can be best fulfilled by the injecting syringe. Tobacco clysters have likewise proved beneficial.

The next indication is to raise a brisk external inflammation over the belly, to lessen thereby the internal affection; and in this case the cantharides are not quick enough in their action: but a more speedy determination to the skin may be gained by applying—firstly, a cloth saturated with liquor ammonia, diluted by four times its amount of water, and retaining it in its situation by means of a blanket several times doubled, and held by four men with not very fastidious noses. This form of blister, however, requires to be constantly watched, as else it may dissolve the skin. Afterwards a fresh sheep skin may be laid upon the back and loins. With regard to medicine by the mouth, in the first place give three ounces of solution of aloes, and an ounce of extract of gentian, with a pint of cold water. At the same time administer half a drachm of calomel, with a drachm of opium, made into a ball with linseed meal and treacle. The ball may be repeated every hour, till the symptoms abate, when the calomel may be diminished to a scruple; and shortly afterwards given at wider intervals, till it is gradually

discontinued. If the symptoms do not amend in three hours and a half after the first drink, give a pint of linseed oil, blended with a drachm of chloroform, and continue the enemas. The calomel and opium is to be persevered in throughout the disorder, till the horse either gets better and the case terminates. After the attack has ended, the bowels will be closed for some time, and they must be allowed to remain in that state, rather than resort to mashes or to physic, which at this time are too apt to start up undue purgation. The diet should be spare. It should consist of grasses, roots, boiled potatoes, good gruel, but nothing hard, like oats, hay, or chaff, &c. The temperature of the stable should also be moderate; the same care should be bestowed on equalizing the circulation as prescribed under pneumonia, by rubbing the extremities, proper clothing, and a loose well-littered box; and as it leaves, like inflammation of the lungs, a liability to recurrence, let not the animal be worked or exposed. The horse, after some time, may be as capable of work as ever he was, if not put to it too early.

DYSENTERY, OR INFLAMMATION OF THE MUCOUS SURFACE OF THE INTESTINES.

As the former affection consists of an inflammatory attack on the middle coat of the intestines, this latter is usually an affection of their internal surface; having for its *cause* irritations applied in various ways; as by translations of obstructed perspiration; the continued use of certain aliments; but more particularly the administration of improper purging medicines, either as to quantity or quality, by which such irritation is brought on as ends in inflammation. It is commonly accompanied with purging, whereas the former is almost always associated with costiveness; neither is the pain so acute in dysentery, consequently the horse seldom expresses his uneasiness by rolling or stamping; the pulse is also quick and small, but is seldom very hard, even from the beginning. However urgent may be the symptoms, and whatever the pulse may denote, no blood must be withdrawn in this disorder; for it is inflammation of the mucous membrane, and after all we can do to support the horse, he will hardly have strength to get through the attack. Stimulants should, however,

be applied to the bowels, as in inflammation of the intestines, properly so called; the stable and the clothing also should be warm, and means should be taken to keep up the circulation in the extremities by hand-rubbing and bandaging. The following drink may be given every two hours:—

Prepared chalk	one ounce.
Laudanum	two ounces.
Liquor potassæ	one ounce.
Tincture of catechu	half an ounce.
Tincture of ginger	one ounce.
Tincture of capsicums	two drachms.
Water	one pint.

Throw up frequent injections of rice water, and have a pail of thin cold gruel in the manger, which, however, should be repeatedly changed, though most likely the poor animal will drain it almost as fast as it can be prepared.

PERITONITIS, OR INFLAMMATION OF THE OUTER COAT OF THE INTESTINES.

This disease is very similar to enteritis. The distinguishing characteristics are: the horse is more full of pain from the commencement of the attack. He suffers almost as much as during an acute fit of spasmodic colic. The pawing, rolling, kicking at the belly, is more continual than in enteritis. The breath is sharper. The eye more wild, the mouth more clammy, and altogether the symptoms more aggravated. The pulse is full, and more throbbing. The fæces are passed in small hard lumps, mingled with much slime of a thickish consistence, which covers the dung. Violent purgation does not generally appear when the costiveness gives way. Towards the end the horse experiences a remission of pain. He becomes more tranquil, and altogether seems better. The belly then begins to swell, but it is not pushed out evenly from all parts. The enlargement takes place at the inferior part only, the extra weight of which appears to hang heavily upon the loins. Gradually the enlargement increases. If it be smartly hit on one side, and the practitioner place his hand upon the other, water may be detected, and the animal dies ultimately suffocated by the weight of the fluid forcing the diaphragm

into the chest, thus preventing that cavity from expanding. The period for the duration of the disorder is, however, generally longer than in enteritis.

The treatment is much the same as for enteritis. The only difference is, that the animal will lose more blood before he displays any symptom of uneasiness. We may also be more bold with purgatives. The three ounces of solution of aloes may be increased to five, the pint of oil enlarged to a pint and a half, and if this produces no signs of its having acted on the bowels, it may even be repeated when another three hours and a half has elapsed: all the other measures are alike in both cases.

INFLAMED BOWELS IN NEAT CATTLE.

This disease is not unfrequent among kine. The enteritis of horned cattle presents symptoms which do not materially differ from those displayed by horses; neither in all essential particulars is any variation in the proper treatment necessary. There is, however, one material distinction, the bowels are never wholly costive, but small portions of liquid fæces are ejected with much straining. Opening the bowels freely, however, is essential. The disease mainly depends on the clogged or hardened state of the ingesta in the many-plus, and this must be got rid of. The drink prescribed for horses may be given, only substituting a pound of Epsom salts for the aloes. This may even be repeated. If the double dose does not act, give half a pound of sulphur, and half an ounce of cream of tartar, with an ounce of sulphuric ether. If that, after being again tried, has no effect, next try linseed oil one pint and a half, with a drachm of chloroform; and this likewise may be repeated; for the bowels, at all expense, must be forced open. In the mean time, give half a drachm of calomel, and a drachm of opium, every hour; stimulate the belly, &c.; in fact, the other directions may be taken from those which have already been given for the horse, under the head of Enteritis.

The *inflamed purging state* is likewise not unfrequent among cattle; and derives its origin less from any external irritant than from a diseased condition of the natural exciter of the bowels – the bile; to which disease they are found peculiarly liable. The curative plan must be the

same as just detailed, with this exception, that the external stimulants need not be so hurried on, or so general. Moreover, one dose of purgative medicine is ample. The opium and calomel need only be administered thrice per day, and then carefully watched, for salivation is to be much feared when created in cattle. If the purgation continues after this purgative, and two or three doses of calomel, try some of the astringent drinks, one of which will be found at the end of the article of Dysentery in the horse, and others under the heads of Rot in cattle.

INFLAMMATION OF THE LIVER.

Acute hepatitis is not a frequent occurrence in veterinary practice, for the liver of the horse is but seldom *primarily* affected with inflammation; though, when other great abdominal inflammations take place, then this gland often participates; in which cases the only difference shown by the symptoms is a yellow tinge in the conjunctival, nasal, and buccal membranes.

The chronic or torpid state of the disease which is very common among high-fed, and slightly-worked carriage and brewers' horses, may be unsuspected till the animal is suddenly seized with gripes, or otherwise shows signs of being seriously ill. These symptoms are caused by the rupture of the fibrous case of the liver, called Glisson's capsule, and the escape of blood into the peritoneum or serous covering of the huge gland. It is then almost too late to try calomel. A few days' quiet, and a dose to open the bowels, will be all that can be ventured; and the horse is returned to its owner, with a caution to work him gently and feed him sparingly for the future. Such cautions, however, are rarely long attended to. Nevertheless, the peritoneum stretches, and at the same time thickens in substance, containing, and at the same time restraining, the fluid that is poured into it. Another rupture in time takes place, and the same measures are repeated; however, the peritoneum at last gives way. If the rent should be large, the animal may suddenly fall dead. If small, he is sent to us apparently labouring under a severe fit of colic, but the dilated pupil, the inability to bear the head lifted up, and the tinge of all the visible membranes declare the truth; for

the examination after death exhibits the true cavity of the abdomen, full of thin black and unhealthy blood.

INFLAMED LIVER IN NEAT CATTLE.

Store cattle and young stock, turned upon rich pastures, are most subject to this disorder, though occasionally it will attack milch cows, kept much within the shed of a London dairy. It however always comes in the chronic form, and usually combined with other diseases. The animal seems dull, stupid, staggers, or falls about as it walks; while the secretion of a milch cow is discoloured, and of a ropy consistence; the visible membranes and skin being markedly yellow. Give a mild purge if the bowels are loose, and a strong one if the bowels are costive. Then give a scruple of calomel, with twice its amount of opium, each day. But be careful of salivation. When the gums seem tender, give a purgative and tonics, with good food. The following tonic will serve the purpose:—

Iodide of potassium	a scruple.
Quassæ	one ounce.
Ginger	half an ounce.
Oak bark	one ounce.
Grains of Paradise, in powder	two drachms.

Form into balls, with a sufficiency of treacle and linseed meal, and give morning and night.

INFLAMMATION OF THE KIDNEYS IN THE HORSE.

This, as a primary disease, is not a very common complaint among horses; but by its fatal tendency, it becomes an important subject. Small as these organs are, they are very essential to life, and the quantity of blood passing through them is very great; therefore, we cannot wonder at their aptitude to inflame, nor the great derangement that inflammation occasions the machine.

The *causes* are exposure to cold; standing in the rain; water dripping on the loins we have known bring it on; a heavy awkward rider by his motions, or even the action of the psoæ muscles in great exertion, may bruise the kidneys; and occasionally it may be caused by metastasis of inflammation. Mow-burnt hay, musty or even kiln-dried oats, in common with other diuretic substances, which under the name of staling or urine balls, are such favour-

ites with every groom, may produce it. It may terminate in resolution, suppuration, or gangrene.

Symptoms.—Dull appearance; pain expressed by looking at the flanks; urine made frequent and in small quantities, with much effort or groaning; often red or bloody, and as the inflammation increases almost wholly suppressed; still attempts are made by the bladder to evacuate, and the mucous secretion from the organ and urethra only are pressed out with much pain. Pulse at first rather hard, frequent, and somewhat full; but, as the disease advances, it becomes smaller, oppressed, and intensely quick. The animal stands with his legs wide apart, as though going to stale, and shrinks when the loins are pressed. If it be an entire horse, the spermatic glands are alternately drawn close to the belly, and pendulous or relaxed. To distinguish it from inflammation of the body of the bladder, or from spasm of the neck of that organ, the horse should be examined by passing the hand up the rectum; when, if the inflammation exists in the kidneys, the bladder, whether it contain any thing or not, will not be hotter than the surrounding parts, or more tender: but should the affection be confined to the body of the bladder, it will be surely found empty, but very hot and painful to the touch: if again spasm of the neck of the bladder, as sometimes happens, should be the seat of the disease, no heat or tenderness will be felt, but the bladder will be found distended with urine. The horse shows much disinclination to move, and when forced out straddles as he progresses.

The *treatment* must be directed to the equalization of the arterial action. Back-rake; throw up frequent clysters, consisting of cold water, in every gallon of which one ounce of sulphuric ether, and one ounce of crude opium, are dissolved; both with a view to promote a soluble state of bowels, and to act as a fomentation to the inflamed organs; and if any costiveness be present, give a purgative without any diuretic substance intermixed. It should, because aloes contain resin, consist of linseed oil a pint and a half, in which a drachm of chloroform is mingled, and one half of this may be repeated in six hours, if the animal display no improvement. It will be prudent also to endeavour at exciting an external inflammation on the loins. The use of

Spanish flies are here questionable, from an alleged disposition in them to stimulate the kidneys. Turpentine, for the same reason, should not be applied; but no such fear prevents the use of liquor ammonia, in the manner before directed, when treating of enteritis: neither can any objection be formed to the application of a simple mustard poultice, which may be renewed every two hours; and, if a newly-stripped sheepskin be laid upon the place the liquor ammonia or mustard poultice has occupied, the activity of each will be increased. Without any attempts at actual diaphoresis, which would increase the action of the heart and arteries, we should attempt to moderately determine the blood to the skin and the limbs by clothing, friction, and bandaging up the extremities; as well also by considerately nauseating the stomach with white hellebore. Diluting liquors are among the best means of lessening inflammation, for which reason a pail of tepid gruel should be kept constantly in the manger. These cases, however, generally last some time, during the whole of which the efforts should be continued, and exertion only relax as death, from known and well-marked signs, appears certain.

HŒMATURIA, OR SO-CALLED RED WATER, IN NEAT CATTLE.

Red water, which is the cowleech's and grazier's name for what is now usually considered as the consequence of inflammation of the kidneys, is much more common among horned cattle than it is among horses: while, in some cases, it has been observed to be accompanied by an affection of the bowels also. Graziers attribute it to low damp situations. Or the eating of particular herbage is very generally assigned as a cause, which by the acrid qualities are supposed to injure the secreting structure of the kidneys. It is also known to follow great alternations of temperature in a marked manner: in some instances it has been attributed to drinking impure water, particularly that which is found in peat mosses.

The *symptoms* and treatment of inflamed kidneys do not differ from those observed in the horse: the urine, at first almost suppressed, soon in cattle becomes bloody, whence its name of red water: and as the disease advances, particularly if it terminates fatally, the urine becomes

darker, almost of the colour of venous blood. The *treatment* consists in giving sugar of lead, or acet. plumbi, two drachms twice a day. Should this fail, the sulphates of zinc, of copper, or of iron, may be tried, and at the same time a seton applied over each loin. Balls made of camphor one drachm, opium two drachms, are said to have been beneficial.

If the disease is produced from over-driving, and blows over the loins, or follows calving, some hopes may be held out to the proprietor. But in cases of all kinds the food should be changed, and the animal may have water, in which sulphuric or hydrochloric acid, one drachm to the gallon, has been mixed; but in chronic or mysterious cases, it is safer to introduce the owner to some neighbouring butcher.

Sheep now and then have *red water* also, both of the acute and the more chronic kind: housing, and feeding on any sweet root, as carrots, parsneps, or in default of these upon turnips, form the best means of cure, with the occasional use of one-sixth of the medicine recommended for cattle.

INFLAMMATION OF THE BLADDER, OR CYSTITIS.

Inflammation of the bladder is said to be, but not proved, to be more common among mares than horses; but of all the causes of this affection, none can compare with the powerful diuretics in general use with every stable man or groom. The symptoms are frequent, nay, continual, emissions of small quantities of urine, voided with much straining, during which the dung commonly is passed. The bladder will be felt by the greased hand passed gently up the rectum, hot, tender, and contracted into a firm substance of about the size of a cricket ball.

The treatment is the same as for nephritis, and equally as urgent; every precaution pointed out, when treating of inflammation of the kidneys, should be rigidly adopted; in addition to which, warm water, in every gallon of which a quarter of a pound of gum arabic, and an ounce of crude opium having been dissolved, may be injected into the blad-

der, by means of Reid's pump, with the elastic catheter attached to it.

SPASM OF THE NECK OF THE BLADDER.

Sometimes the neck of the bladder is spasmodically affected, and this is said to occur more frequently to horses than to mares. It is to be distinguished from inflammation of the kidneys and the bladder, by the urine being for the most part retained, and the horse making frequent ineffectual efforts to stale; while the true character of the affection is discovered by passing the hand up the rectum; the bladder will be found distended: often the distention may be felt in the front of the pubes. The retention of urine, however, is the principal symptom, although in spasm of the neck of the bladder, there may be a small quantity of urine evacuated at different times: for after the bladder is distended, there will be, by the force of the accumulation, a few drops now and then squeezed out. But in this disease the frequent or copious staling will not take place, whereas in the previous disease it will be continual. The *causes* of this complaint we are in the dark about; but it may be reasonably supposed that the spasm of the part is occasioned by morbid irritation, and our opinion of the probable *termination* must depend on our capability of emptying the distended bladder, and recovering the lost tone of the organ. Every effort must be made to accomplish this, or the animal may perish under irritation; he may sink through gangrene of the distended bladder supervening, or he may, as he usually does, die of the rupture of the bladder, in consequence of the kidneys continuing to secrete urine, but the spasm offering an obstacle to its emission. Attempt therefore to accomplish the ejection, by introducing the hand up the rectum, and gently pressing the fundus of the bladder forwards, which may force open the neck. If this fail, the urethra must be opened by a catheter. In a mare, the catheter may be easily passed up, and the water drawn off; but, in the horse, to effect this, a flexible catheter must be introduced, and gently guided forward. When a horse is affected with spasm the penis is generally much retracted; but with a little patience, aided by a handkerchief wrapped round the hand, inserted up the sheath, this may be over-

come. The part is then given to an assistant to hold firmly, while the practitioner inserts the point of the catheter, which he pushes forward with his right hand, while he places his left beneath the anus, in order to turn the tube by manipulation when it shall have reached the perinæum. The rest is straightforward work, only be careful to make steady continued, rather than sudden or violent pressure. After the urine has been evacuated, inject a gallon of cold spring water, with which an ounce of tincture of gall nuts has been mixed; and if this last is, at the time, or shortly afterwards ejected, no fears need be entertained about the lost tone. If it is not cast forth, draw it off, and inject another gallon, and continue till the bladder freely contracts. At the same time you may give a clyster, composed of two quarts of cold water, with two ounces of sulphuric ether, and the same quantity of laudanum, which may be repeated for three times. Mild food and good water, both procured from a new source, is all that is required to perfect the cure, excepting it may be thought proper to give a dose of physic upon recovery.

INFLAMMATION OF THE WOMB.

We know that the womb is liable to become inflamed by participation with extensive abdominal inflammations. When the disease is so universal as to involve this part, the case must be hopeless; and we therefore shall abstain from giving any directions as to treatment. We know, however, that inflammation occasionally attacks mares after abortion; after difficult foaling also, when injudicious efforts have been made to produce delivery; in which cases the animal never recovers from the prostration into which the act of labour has cast her. The general signs of intense fever are exhibited. The animal appears wild or delirious. She blows much; and the young one by her side is entirely neglected. A dark fluid, having a strong smell, drains from the vulva. These are most dangerous cases, nor are we able from the exhausted state of the patient, to adopt all the measures we might think of. A mustard poultice, however, followed by a sheepskin, may be placed upon the loins, and an ammoniacal blister applied to the belly. A gallon of tepid water, in which half an

ounce of crude opium, and half an ounce of tincture of arnica is mingled, may be injected into the womb every two hours; and if the stench is very offensive, five grains of chloride of zinc may be added, while warm clysters are thrown up the rectum, that they may act as fomentations to the part. If the bowels are at all costive, a laxative ball may be administered, after which two drachms of calomel, and one drachm of opium; to be followed every hour with half a drachm of calomel, and a drachm of opium. Wolfsbane or aconite is the best sedative, and may be given in ten-grain doses four times a day. The practitioner need not fear the activity of the measures recommended. The case speedily terminates, or the animal becomes better, when the severity of the treatment can of course be ameliorated.

CHAPTER III.

INFLAMMATION OF MUCOUS MEMBRANES.

COMMON COLD.

INFLUENZA, or catarrhal fever, as an epidemic, has already occupied our attention at p. 277. The direct cause of common cold is some *accidental alternation* between cold and heat, when it finds the constitution partially or generally, from certain causes, incapable of resisting its effects. In very young horses it frequently ends in *strangles*, and when its symptoms assume a more than ordinary intensity, it becomes influenza. A simple attack on the Schneiderian membranes, known as a *common cold*, first shows itself by a thin watery secretion from the nose, and from the eyes also in some cases. The lymphatic glands become inflamed, tumefied, and tender; symptomatic fever follows the inflammatory action; and the tendency observed in mucous surfaces to take on the formation of pus without ulceration begins, after two or three days, to show itself; first by a coagulable deposit of lymph in a flaky form, and next by a regular flow of yellow muco-purulent matter from the nose: some cough is also usually present. In a few days these appearances vanish, and the horse is con-

valescent. The treatment is very simple. Extra clothing, and a warmer house, will in general effect a cure. Occasionally a cathartic ball, with mild, soft food, may be necessary. In more severe cases, balls composed of common tar and linseed meal, or a drink of linseed tea, in which has been stirred an ounce of ipecacuanha wine, may be given twice a day when the cough is annoying.

SORE THROAT.

To the above symptoms of common cold there are often added those which betoken sore throat; in which cases the inflammation has extended itself to, or perhaps primarily attacked, the mucous surfaces of the pharynx and the upper part of the larynx. The mouth is hot, but at first dry: there is an evident disinclination to eat, or to swallow what is masticated: he therefore '*quids*' his hay, i.e. lets fall the masticated bolus; he sips his water, and moves it about with his lips rather than drinks it; or he utterly refuses it. The region of the gullet and fauces is exceedingly tender and hot; the salivary glands throughout become swollen and tender; and from the laryngeal connexions the cough becomes frequent and painful. The treatment must here be more active, as the pain and symptoms are more severe. The nostrils may be fumigated by means of a hot bran mash placed beneath the nose, the steam from which is inhaled. A blister, or a mustard poultice, should be applied to the throat. A fever ball, containing half a drachm of tartar emetic, and a drachm of nitre, should be given night and morning. Cathartics had better be omitted; but the food should be soft, and the water chilled.

BRONCHITIS.

When the catarrhal attack extends into the bronchii or divisions of the trachea, it is called by the above name. There will be *hurried* and *embarrassed* breathing, and, in a great degree, the sense of pulmonary obstruction; it will be accompanied by a rattling sound or wheezing noise during the respirative acts; with a muco-purulent discharge from the nose; a pulse at first harder and quicker than natural, but gradually becoming still more increased in frequency, but

decreased in volume. Cough is present which is very severe, though so far as may be possible suppressed.

Treatment.—Apply a blister under the throat, over the course of the windpipe, and along the chest. Clothe well, and let the stable be rather warm than cold, though by no means hot. Foment the nostrils with hot bran in a nose-bag. Give the animal a drink composed of sulphuric ether one ounce, laudanum one ounce, liquor ammonia acetatis six ounces, solution of aloes four ounces, tincture of gentian two ounces, and cold water one pint. Then three times daily administer the adjoined, in the shape of drink, also being careful to lower the horse's head that instant he coughs:—

Extract of belladonna	one drachm.
Liquor potassæ	one ounce.
Liquor ammonia acetatis	six ounces.
Tincture of cantharides	a scruple.

Give thrice a day till the appetite is lost. Then discontinue.

Every night the drink composed of sulphuric ether and laudanum and water may be administered, omitting, however, the liq. amm. acet. and the solution of aloes. Should the cough be distressing, let the horse take a tar ball night and morning.

During the progress of such a complaint we need not wonder if some diseased alterations of structure in the air-passages should be the immediate consequences; or otherwise, that such an irritable state of them may remain after the more active symptoms have ceased, as to give rise to ruinous chronic affections. The inflammation may thus leave *roaring*, wheezing or whistling, as a sequel; and *thick wind* may result.

CHRONIC DISEASES OF THE PULMONARY AERATING PASSAGES.

ROARING.

The artificial habits of life to which we subject the horse occasion numerous morbid changes in his organs, yet in none more than those connected with his respiration: and not only do the grand masses of the lungs suffer, but the very passages to them are altered in structure, and rendered incapable of transmitting the air with its proper freedom. The obstructing matter, on the principle of wind instru-

ments, produces sounds modulated according to its figure, extent, and the precise locality where the opposition is situated, which horsemen call *wheezing*, *whistling*, *roaring*, *&c.;* terms sufficiently expressive. A horse wheezes when any obstruction is offered to the passage of air within the nostrils; he whistles when the foreign body is situated in the hind part of the nostrils, or is but slight, and is located near to the opening of the larynx; but he roars when the larynx is malformed, or hindrance is offered to the free current of air within the windpipe.

The *causes* of roaring are remote and proximate. The *chronic causes* are mostly inflammation in the tracheal tube itself. Occasionally it is brought on by the effects of inflammation on other parts; as by the swelling and consequent pressure of the salivary glands in strangles, or of those abscesses which not unfrequently occur in violent catarrh in the vicinage of the pharynx. Obstructions accidentally formed by exostoses, cicatrizations, &c., or extraneous substances lodged in the interior of the trachea, may any of them occasion it. The *acute* causes might, with propriety, include these accidental obstructions, but they are mainly to be looked for in an extravasation, partial or extensive, of coagulable lymph; which, becoming organized, forms a permanent obstruction. When it is extensively spread over the larynx, it produces whistling; when it constringes the rima glottidis, a whistling sound is the consequence, and is often heard in our own respirations under catarrh; or in the ordinary respirations of some asthmatic persons. Whoever has handled the throats of many old horses, must have observed a hardened state of the larynx, which almost resisted all attempts to what is termed "cough them." This ossification of the laryngeal cartilages is not an uncommon cause; and a similar state in the cartilages of the trachea is productive of it also. A cause also of roaring is a band of lymph stretched across the tracheal tube; at others, an internal ring of the same matter simply diminishes its diameter. The obstruction is sometimes so considerable as to excite the sound upon the slightest exertion; in general cases, however, roaring is only exerted when forcible inspirations and expirations are made; for it is, we believe, equally produced by the one as by the other. Mechanical

obstructions to free respiration may eventually be productive of roaring: the custom of tightly reining in our carriage-horses, especially such as run in pairs or double harness, there is reason to think produces it; the practice of using tight throat-lashes or neck-straps may likewise have induced it. In furtherance of which last opinion it may be recollected, that horsemen have a very general supposition that cribbiting ends in roaring, in thick wind, or in broken wind: may not the tight collar, strapped around the throat, here tend to the former of these affections? The custom of '*coughing*' horses, and so frequently as it is practised in fairs, may be readily supposed as a cause. A horse passes from fair to fair, having his unfortunate throat brutally pinched thirty or forty times each day. Is it to be wondered at if inflammation takes place, and adhesive deposit follow?

The *treatment* must be regulated by circumstances. When it is acute, and depends upon the diseased state of neighbouring parts, the inflammation of those parts must be relieved. When it can be discovered to be the consequence of recent inflammation of the laryngeal or tracheal cartilages, a physic ball may be given, and the seat of the disease blistered, while, from day to day, some sedative medicine is administered. Every case of roaring, however, excepting the very acute, is undertaken with fear and trembling, and the cure depends quite as much upon chance as upon skill.

CHRONIC COUGH.

Coughing is a spasmodic effort of the diaphragm, intercostal, and abdominal muscles, producing a forcible expiration of the air from the chest, with such violence as is calculated to remove any extraneous body that may intercept the free passage of the air. Whenever it accompanies a general affection of the constitution, it is regarded as simply *symptomatic*, and the original disease is attended to for its removal. Thus catarrh is accompanied by a cough, but we attend principally to the general affection, as the best means of subduing it. A *chronic cough* is often symptomatic of some affection of the air-passages; it is also an attendant upon the state called broken wind: it likewise accompanies glanders; and appears when worms are in the stomach and

bowels. But besides these cases, there exists at times, without any attendant difficulty of breathing (the horse at the same time eating well and thriving), a permanent cough, usually more considerable in the morning and evening, after meals, particularly after drinking, or on first going out to exercise. A cough of this description is very common, and it will remain in this state, without otherwise affecting the horse, for years; sometimes it will even be continued with no obvious injury for his whole life. Young horses, when first brought into stable, are generally found coughing, which, however, subsides, leaving behind it no perceptible evil effect. In other instances it does not end in so harmless a manner, but upon any occasional cold being caught is aggravated; and each cold makes it worse and worse, until at length, by repeated attacks, the respiration, or '*wind*,' is permanently affected. An irritable state of the bronchial passages often remains after catarrh and bronchitis, and coughing occurs whenever the horse moves out of or into the stable; for the inspired air is colder or warmer than what was before breathed, hence becomes a source of irritation: drinking cold water produces the same effect, for a similar reason; as does any hurry or irregularity of motion. In some cases the irritability of the bronchial membrane itself does not seem so much increased, as the mucus secreted from it appears altered, either in quantity or quality. It may become inordinate in quantity, as is often observed; such horses, when they cough, throw off much mucus by the nostrils: or it may be more acrid in quality, and hence by these means prove a source of continual irritation; or the secretion of mucus may be lessened to the injury of the passages.

The *treatment* of *chronic cough* must depend on our view of its causes and consequences. When it appears to arise from a want of mucous secretion, expectorants which excite such secretion are premised, as No. 1. When a redundancy of the mucous secretion is apparent, tonics are required. When the secretion is acrid, give No. 2. The cough, which is the effect of an irritable state of the parts, is sometimes relieved by stimulating the throat externally, and by giving internally opium with bitter tonics. In horses naturally of a full habit, and grossly fed, without sufficient exercise, our

attempts must be directed to lower their general plethora, by moderate feeding, and exertion enough. If at grass, a less luxuriant pasture should be chosen. In the stable, the bloated horse should be muzzled at night, to prevent him eating his litter, and his water should be given in moderate quantities only: all sudden exertions likewise ought to be as much as possible avoided.

When worms in any large numbers are present in the stomach, or intestines, a continued cough generally exists, with irregular appetite and unthrifty coat, stools fœtid and slimy, at one time loose and another hard and dry; for which turn to the head under which those parasites are specially treated of. In all chronic coughs the best effect sometimes follow from feeding with carrots. Turnips, parsneps, beet, and potatoes, may be beneficially used where carrots cannot be got; and a mash with bran and linseed, or malt, may be occasionally given.

No. 1.—Calomel ..... one scruple.
Gum ammoniac ..... two drachms.
Balsam of Peru ..... one drachm.
Powdered squill ..... one drachm.

Make into a ball with honey, and give every morning fasting. In some cases the following has been found efficacious:—

No. 2.—Tar ..... one drachm.
Powdered squill ..... one drachm.
Linseed meal ..... a sufficiency.

Make into a ball and give every morning, or try the following:—

No. 3.—Powdered ipecacuanha ..... half a drachm.
Camphor ..... two drachms.
Extract of belladonna ..... one scruple.

Make into a ball with honey, and give every morning.

THICK WIND

Is also a common consequence of either acute or chronic pulmonary inflammations. In some instances, it is the immediate consequence of violent or long-continued exercise, and particularly if the exercise be taken upon a distended stomach and bowels, or after full drinking; or it may be brought on by the application of cold. It is often connected with a plethoric state, and is therefore very common among pampered animals and gross feeders; and more particularly in low-bred and thick-set horses. The post-

mortem examinations of such cases exhibit, in some instances, a slight hepatization of lung, the consequence of repeated congestions; in others, the minute bronchial cells are filled with adhesive matter, or the general substance may be pervaded with minute granulations of a blueish colour.

The *symptoms* of thick wind are sufficiently known to any one at all conversant with horses. The capacity of the air-cells being diminished, renders it necessary for the air to be more frequently taken in, because, being acted on by a less surface, the blood is not sufficiently oxygenated; and a sufficient number of air-cells not being expanded, the animal makes hasty inspirations to remedy the default: the force with which these are effected, occasions the sound so well known as the distinguishing mark of thick wind. In this affection, the obstruction to both being equal, the inspirations and expirations are alike, which serves to distinguish it from broken wind. Thick wind is, however, very apt to degenerate into broken wind; and the post-mortem appearances of such horses as have been examined for thick wind would readily, by an increase of the disorganization, account for the symptoms which are characteristic of broken wind; but these can only spring from a hepatized lung which is in the emphysematous state.

The *treatment* of thick wind can seldom be more than palliative, for once established, it remains permanent. The remedial means are more in the hands of the proprietor than of the veterinary surgeon. The food must be moderate in quantity, and of such a kind as will occupy the least possible space. No hay should be allowed; and as thick winded horses are gross feeders, the muzzle ought to be put on as soon as the manger has been emptied.

BROKEN WIND.

This peculiar affection has long excited the attention not only of veterinarians, but of the curious in general: and as a cure for it holds out the certainty of a plentiful harvest, both of credit and emolument, it has been a subject of much experiment and more conjecture. The older writers indulged in the most absurd and extravagant notions respecting it; into the detail of which I shall not follow them. On the

Continent it long occupied, in later times, the research of many eminent veterinarians, but with little satisfactory issue. It has been attributed to external and internal causes; to a defect, and to a superabundance, of vital energy; to altered structure of the heart, of the lungs, of the diaphragm, the stomach, the liver, &c. It is lesion with some, nervous with others, and simple distention with a third. Among our own writers the discrepancy is equally great: Gibson attributed it to an enlargement of the pulmonary mass generally; Dr. Lower to a rupture of the phrenic nerve; but in later times it has been mostly attributed by our writers to structural change. Yet to proceed somewhat methodically, we will cursorily inquire into its more probable causes.

The cause of broken wind is hereditary or constitutional predisposition. A certain form of body is unquestionably favourable to its production, and it is from this circumstance that it proves hereditary. The narrow confined chest, and the pendant belly, which mark low-bred horses and gross feeders, predispose towards the affection. It must be the subjecting horses to a long-continued unhealthy course of feeding on dry food, as chaff, bran, barley meal, &c. &c. that brings it on; as also working in mills, where much dust is necessarily inhaled. It is seldom the immediate consequence of pneumonia; but frequently it results from those states of disordered respiration which succeed to it, as thick wind, chronic cough, &c. We are much in the dark about its origin: we see that it gradually steals on a horse, occupying months, and even years, with a slight occasional cough, which ripening into a state of impeded respiration, at last ends in broken wind. We see it also follow one hard gallop; and we can leave a horse well one day, and find him broken-winded the next. With these facts in our every-day experience, can we readily name any universal cause?

A *post-mortem examination*, in most of the subjects, has brought forward an emphysematous state of lungs, and we need not to have looked further for the cause; but, on the contrary, it is not by any means uncommon to meet with broken-winded horses whose lungs after death are neither emphysematous or otherwise structurally deranged; and

which, with the exception of their lighter colour, and greater bulk than natural, cannot well be distinguished from the sound lung, although they crepitate or crackle when pressed by the hand. It must, however, be acknowledged, that it is seldom they are seen even thus free from disease; for if not emphysematous, they are hepatized, or congested; sometimes tubercular. From two cases cited by Mr. Percivall, emphysema of the lungs can also exist without broken wind. It appears likely that rupture of the air-cells is the cause of broken wind, because it is not always sudden, but gives some years of a warning cough, or of thick-winded wheeze. Although an emphysematous state of the lungs is common, it is by no means constant, and consequently will not afford a structural solution of this difficulty.

There is another view of the cause of this disease, namely, that it depends upon derangement of the digestive canal; and if the irritability of the larynx favours the opinion advanced with respect to the lungs, the constant passing of flatus supports the other conjecture. Horses with broken wind will eat almost any thing, which again is opposed to the conclusion that the lungs are the sole seat of the disorder. The belly is enlarged, the stomach distended, and its coats much thinned, which last-named facts would seem to decide the question. But the truth is, broken wind appears to be a universal derangement, and it is not one structure that suffers, but the entire body undergoes more or less alteration.

The *symptoms* of this complaint are well marked: the cough and the manner of respiration may be considered as conclusive. The sound emitted by the cough is peculiar, and is often forced out with a kind of grunt, in a short but vibrating feeble tone compared with the usual cough of sound-winded horses. The respiration is conducted with a remarkable difference between the inspirations and expirations. Inspiration is effected quickly; and the lengthened laborious strain of expiration, which is performed by two distinct efforts, in one of which the usual muscles operate; and in the other the abdominal muscles come into violent action, to complete the expulsion; after which the flanks fall with peculiar force, and the air is again inspired as by

a spasm. An auxiliary symptom is the peculiar flatulence of every broken-winded horse; which is strikingly characteristic of that disordered state of digestion so common in these cases, and of that constant thirst also which is invariably present.

The *treatment* of broken wind can seldom be more than *palliative*. Whatever increases the distention of the stomach and bowels, aggravates the complaint by increasing the difficulty of expanding the lungs. Therefore, avoid stimulants, and promote regular evacuations; abstain from over-distention of the lungs by too violent and too sudden exertions, particularly after eating. By carefully attending to these principal indications, a broken-winded horse may be rendered comfortable to himself and useful to his owner. The food should be regularly given in moderate quantities only; but most particularly it should be of such a nature as will contain much nutriment in a small space: hence corn is more proper than hay, and, above all, a manger food composed of one part bran, one part bruised beans, and two parts bruised oats, agree particularly well, if given somewhat moistened. On a quantity of this food no horse will need hay. When they can be got, give also carrots, mangel wurzel, Swedish turnips, parsneps, or cooked potatoes, which feeding will be found to combine both medicine and nutriment, and render little water necessary. Turning out to grass commonly aggravates the symptoms of broken wind; and a neglect of moderate exercise also aggravates the complaint: water should be sparingly given, particularly in the working hours; at night, a moderate quantity should be allowed, but on no account let the broken-winded horse drink his fill at a pond or trough. *Medicinally*, benefit has been received from daily small doses of foxglove; under these circumstances it has been given to the amount of a scruple of the drug; and a piece of rock-salt placed in the manger, has seemed to do some good.

MODES OF DISTINGUISHING SOUNDNESS AND UNSOUNDNESS OF THE WIND.

These various affections of the *wind* are very important to the veterinarian, nor can he be too well informed of the appearances that characterize each distinctly; because, as

their existence affects the legal soundness of horses, so he will be very often forced to decide peremptorily on very slight appearances. To *detect thick wind* it is generally necessary that some time be spent with the horse; and it is often requisite that he should be examined under various circumstances. Does he bear moderate exercise immediately after eating or drinking without blowing high? Does he cough in so doing, or is he observed to do it on every change of position, or temperature; particularly after drinking? And does he when in the stable, field, or when completely at rest, occasionally cough short, hollow, and not followed by that firm effort we call *clearing?* In such a case the horse has *chronic cough;* and as his breathing is more or less accelerated beyond the ordinary standard, he is more or less *thick winded* also. *Roaring* may be immediately detected by a brisk gallop; but the person who is to judge of its existence should be on the ground. We have seen horses whipped into a momentary cessation of the roaring, therefore they should pass him several times, but without restraint; and the veterinary surgeon should place his ear against the trachea as soon as the animal is pulled up.

Broken wind can hardly be mistaken; the cough accompanying it conveys a peculiar sound; it is short, vibrates within. The breathing is hurried in the extreme by exertion, and is remarkable by being made up of *three* efforts instead of *two*. In the first, the air is drawn in naturally, and the flanks fill up as usual; but in the next, after the ribs have acted, the rising of the flanks to expel the air is most unusual; for it is not done with a gradual contraction of the muscles, but takes place at once by a momentary effort, and then a third action ensues, which is a slow but strong drawing up of the muscles of the belly, as though to force out remaining air. Broken-winded horses are also observed to be peculiarly greedy after water: and a little hurried motion distends the nostrils, and produces evident distress. Rogues at country fairs have a method of setting broken wind; and of giving the horse affected something, which for a time shall render the animal superior to his symptoms, or cause him to conceal them. Fat, shot, opium, and in short any substance that

will act as a sedative is used; but these agents are not always harmless, as they frequently result in the death of the horse which takes them. However, all these arts are set at nought if the horse be taken to a pond, and there allowed to swill at his pleasure. The characteristic cough returns. The sedative is overpowered for a short time by the refreshing draught, and broken wind is detected as the natural state predominates.

GLANDERS.

This fatal and loathsome disease has long been the scourge of a noble race of animals—horses.

The editor's account of the nature of glanders and farcy will be short: we have every reason to believe that glanders and farcy are but modifications of each other, and that both originate in one common poison: innumerable facts and well-conducted experiments have set this matter beyond doubt; for horses have been inoculated with the matter of farcy, and the glanders has been the result: glanders has also been produced by inoculating with the matter of glanders: farcy has been brought on likewise by inserting the matter of farcy: and, lastly, the artificial introduction of the matter of glanders has occasioned a true appearance of the farcy. Some authorities, however, deny that any weight is to be attached to such results, and assert that these diseases can even be produced *artificially*, by means foreign to contagion or to individual poison. In answer, we would remark, that it is the very essence of all poisons to be governed by their own laws, and to own only certain modes of operation. Small-pox, syphilis, and the rabid poison have remained the same in their symptoms, mode of propagation, and terminations for ages. We have always, therefore, ourselves, felt convinced of the specific nature of this affection, which for variety in its mode of production, continuation, and termination, has no parallel; and to which only we can attribute the unsettled state of the opinions concerning it; but which do nothing to uproot its claim to the character of a *direct and peculiar poison*, that can always beget its like, and its like only. It is quite true glanders can be produced by great debility, induced by any cause, as abortive strangles, influenza, or even by the injection of

acrid substances into the veins. But glanders once induced by any cause that undermines the constitution, can then by inoculation generate nothing but glanders or farcy, and this is all and every thing the opposed party contend about.

The forms of glanders have been called *acute* and *chronic*. A very ingenious veterinarian, Mr. James Turner, has proposed a third kind, which he calls the *insidious*. This last kind ensues upon the clearing off of catarrh, influenza, &c.; a protracted gleet remains from one or both nostrils, watery, mingled with small particles of mucus, invariably in very small quantities, but the discharge of which is constant; and instead of an enlarged submaxillary gland, the size of a walnut, which leads to suspicion, in these cases it is diminished to the size of a pea or horse-bean, but is indurated, and is frequently loose, not being adherent to the jaw-bone. Another deceptive circumstance is the general state of the animal, which is that of good health, in coat, flesh, and spirits. In this state no one suspects glanders, and yet at any time inoculation with the effusion will produce glanders in another horse. Mr. Turner deserves the thanks of the profession at large for putting them on their guard against this treacherous disease, whose Protean shapes require all our vigilance; but, as he candidly observes, it is not a new species of glanders, but the true chronic form in one of its most occult shapes, of which we have too many instances. The disease is, however, marked with different degrees of malignancy; in some cases running its fatal course in a week, and in others continuing for years with little alteration, and perhaps spontaneously disappearing at last; and under this view there is room for a systematic division into acute and chronic: that which Mr. Turner calls the insidious, is, as he justly states, but a slight modification of the latter. Acute glanders are seldom clearly marked; but when they are the effect of some extraordinary circumstances, acting on a number of horses at the same time, as in a state of unusual deprivation of pure air, their consequences are appalling. Asses and mules afford the most complete instances of acute glanders; they seldom have any other kind.

The *causes* of glanders and farcy have occasioned as much diversity of opinion as the nature of the complaints.

Both glanders and farcy originate in *contagion*. An hereditary defect in the structural capacity of the aërating organs, there is great reason to suppose, is a remote cause of much importance in glanders. Whatever acts noxiously on the air-passages for a considerable time by its irritation, fits them to develop it also; and thus either acute or chronic glanders may arise, as the cause is active or insidious. In this way it is that the impure air of close confined situations probably acts, by wasting the strength and destroying the constitution. In populous towns and cities, in crowded unventilated stables, we therefore meet with this disease in the greatest numbers and worst forms. The debilitating effects of common inflammations of the mucous surfaces of the air-passages and their dependencies, is a general source: even wounds of these parts have brought on glanders. A remote cause is a cold humid state of atmosphere, acting upon a debilitated frame; and thus it is more frequent in winter than summer.

The *contagious* nature of glanders has been altogether disputed by some. Bracken was among the number: but many more think it only contagious in a slight degree; none suppose it is contagious to the extent that was once imagined. All horses, however, are not equally susceptible to take the disease. It must be remembered, that there is a non-susceptibility in some constitutions, and also in the same constitution at particular periods to receive it, when at other times, the fatal disorder would be readily imbibed; to which facts much of this discrepancy of statement is owing. The generation of glanders has been alleged and denied; but the question seems to be at once set at rest by the breaking out of acute glanders among the horses on board the transports bound for Quiberon, in consequence of the necessity of fastening down the hatches for three days during a storm; of these horses none were known to be affected with the disease at the time of embarkation. Whence then could the infection be derived? All were exposed to the impure air, or all imbibed the same cause, which none but the very strong and robust could withstand. But it is not possible for a single horse to infect the air around, so as to give the disease to a healthy one near him: horses have lived thus together for

months without injury: on the other hand, we would not venture to deny, that a sound horse, shut up in an unventilated stable, where the air became contaminated, might not himself generate the disorder. In its general character, however, it is contagious; and its contagious nature is exerted by the actual application of the morbid virus to some part of the body, and that generally an abraded surface.

The *Symptoms of Glanders* are, an increased secretion from the membranes of one or both nostrils, which continually flows in small or large quantities. This discharge is seldom at first perfectly purulent, but is more glairy, thick, and not unlike the white of an egg; it sometimes continues thus for a long time; at others it hastens to become muco-purulent, and then purulent; but there always remains a peculiar degree of viscidity and glueyness in it that sticks the nostrils together, as it were, from its tenacity, differing from all other mucous or purulent secretions, the very nature of which strongly characterizes the complaint. The general colour of the Schneiderian membrane becomes changed; first to a violet colour, often a dingy yellow, and afterwards to a leaden hue. As ulceration ensues, the discharge becomes tinged with shades of green and yellow, intermixed with blood, and is often sanious and offensive, which is always the case when the bones become diseased. From absorption of the morbid matter by the lymphatics, near to the part, the maxillary glands under the jaws become swollen and tender; when one side of the head only is affected, the absorbent glands of that side, and that side only, grow tumefied. The enlargement of these bodies is too much relied on as an absolute criterion of the existence of glanders; for though, when the disease has existed some time, they are very generally tumefied, yet, in mild cases of some standing, they are not invariably so: and again, there are other complaints besides this that will tumefy them; whatever inflames the Schneiderian membrane, as catarrh, strangles, &c. may cause the glands to enlarge. Neither can a *certain* criterion be drawn from their attachment to, or detachment from, the bone: occasionally they will remain unaffected, or the whole will form a tumid mass, tender, but not adherent to the maxillar on either side. They are, however,

seldom found in this condition; for after the disease has attained any virulence, a distinct lymphatic glandular knob or two will generally be found in contact with the branch of the jaw-bone upon the affected side. The disease sometimes remains long without producing ulceration in chronic glanders, and cases of this kind prove very puzzling to the practitioner: at other times, on the contrary, an ulcerating process is speedily exhibited; which in acute glanders invariably appears. The ulcers of glanders have a very peculiar character, and their appearance cannot be too attentively studied: they usually commence by minute bladders, which at first may contain pus or a clear fluid, but which soon form small cavities, internally deep with abrupt prominent edges; and they are seen in greatest numbers upon the septum nasi, and sometimes uniting into broad continuous patches, which spread and deepen until the cartilages are absorbed, and the purulent secretion fills the frontal sinuses and the ethmoidal cells. Sometimes the ulceration exists so high up the nostril, that it is very difficult to discover; yet, with the head held up to a full light, more particularly towards the sun when shining, it may be detected if within any moderate distance; and when it cannot, the varied appearance of the discharge will lead to a suspicion of its existence. The junior practitioner must not allow portions of the secreted matter which may adhere to the membrane to mislead him into a belief of existing ulceration; he should, when in doubt, pass up a probe armed with tow, and wipe away such glutinous deposit; and had not the error actually occurred in the practice of more than one veterinarian, we should be almost ashamed to insert a caution, that the opening of the nasal duct ought not to be mistaken for a chancre. The situation of this opening is found a little way up the nostril upon the reflected skin, and not upon the mucous secreting surface. At an uncertain period of this form of the disease, occurring sometimes much sooner than at others, the lungs become tubercular, and hectic symptoms follow the bursting of abscesses within them: large abscesses commonly form within the lungs; and now the health is evidently impairing fast: there is cough, increased and most offensive discharge by the nose, loss of appetite, emaciation, and weakness in the loins; the

hair feels dry, and falls off on being handled; the matter from the nose increases in quantity, becomes sanious, stinking, or bloody, and is coughed up by the mouth also; the animal has a bloated aspect; the cellular tissue pits; the conjunctiva is infiltrated; the caruncula lachrymalis grows discoloured; the eye has the expression of a sheep suffering from the rot, and the gums are pallid. If put to hard work, such horses rapidly decline in condition; and yet, should they be destroyed, fat is found in abundance upon their bellies and about their hearts.

From the very serious effects which follow the spreading of this disease, the veterinary practitioner is often called upon to give a prompt and definite opinion relative to it. The principal intricacy that will present itself, arises from the similarity of appearance that frequently exists between the true disease and a diseased and increased muco-purulent secretion which sometimes remains after a severe cold, or is the consequence of repeated catarrhal attacks. Local inflammations also, from various causes, occasionally take place within the nasal sinuses; which although by no means glanderous, yet are accompanied by such a regular and continued flow of pus as to mislead the practitioner. In such cases, however, the matter secreted is distinct from the glairy pus of glanders; and we may further be led into a suspicion of the cause by the quantity of the discharge, if the horse be allowed to feed from the ground, as well as by the absence of visible ulceration. In present colds the difficulty cannot be great, for then the general health is commonly affected; there is some fever, loss of appetite, thirst, and cough, which are seldom so well marked during the early stages of glanders; and those which are more advanced require but little to distinguish them; for although in catarrh the submaxillary glands are sometimes swelled, yet they are in these cases hot also and moveable. But when colds have been severe, or often repeated, there occasionally remains in the mucous membranes of the air-passages, particularly in that of the nasal cavities, a disposition to a morbidly increased secretion of a muco-purulent nature, which will continue to flow from one or both nostrils. We have seen cases of this kind which have existed one or two years, and in one instance it had

lasted three years, but eventually disappeared. In these instances, however, our principal reliance was upon the nature of the discharge, which presented distinguishing characteristics, that, attended to, proved tolerable guides. The matter of glanders is tenacious and sticky, like glue; semi-transparent, and hangs about the rim of the nostrils in a peculiar manner; but more particularly it is continually flowing: whereas in that state resulting from catarrh there is not a regular discharge, but the flow appears now and then, as when the horse coughs, or when after trotting he *clears* himself by snorting, or when he stoops the head to feed off the earth; at which times a large quantity frequently comes away, and then perhaps no more appears for some hours after. And though the matter of glanders may flow some weeks even, without apparent ulceration, yet in general cases there will occur a more early appearance of chancres, and commonly a swelling and fixture of the lymphatic gland also; to all these considerations should be added, an examination of the general health of the horse, and particularly of the state of his coat or hair, which we have always observed unthrifty and disposed to fall off in confirmed glanders.

The practitioner need hardly be cautioned on the score of the common tricks practised in horse fairs and markets to conceal the appearance of glanders. It is common with the lowest orders of the salesmen to gallop a glandered horse in some private situation, which forces him by accelerated respiration and cough to throw off the collected secretion immediately formed: some powerful astringent, as alum, vitriol, &c. is then blown up the nostrils, or in some cases the discharge is temporarily stopped by a plug or pledget of tow, cloth, &c. &c. thrust up the nose. But in all these cases the enlarged lymphatics still remain, and the coat will in all probability come off on handling; but particularly there is a constant uneasiness in the manner of the horse, for he attempts to cough or sneeze to rid himself of the plug.

The Treatment of Glanders.—The philosopher's stone was scarcely sought for more earnestly by the ancients, than a *cure* for glanders by recent veterinarians. The great reward held out has stimulated many practitioners into

unnumbered experiments, and occasional success still gives a spur to the energies of new experimentalists.

Glanders, however, is something more than a mere disease; it is the termination of all other diseases. Supposing the discharge from the nostrils could be stopped, the glanders would not be cured. The discharge is but a symptom, glanders being a general break-up of the constitution. The pulmonary disease would remain untouched. The tubercles and abscesses in the lungs would continue, and when this is considered, we cannot wonder that glanders in horses, like consumption in the human being, has defeated the best efforts of science.

We will, however, cursorily run over the most reputed remedies which have been or continue to be tried, dwelling longest on those which offer most hope. Injections and nasal applications, on a view of its being a purely local affection, have been too long and too fully tried to mislead; and had not a spontaneous cure every now and then occurred, and had not nasal gleets been mistaken for glanders, no one would have depended on the cure of the disorder. Our neighbours, the French, have been equally, perhaps even more, unfortunate than ourselves in their curative attempts. Internally, mercurials in all their forms have failed; nor have they succeeded better externally, though M. Bollestra, of Turin, professes to have witnessed benefit from ungt. hydrarg. ℥i rubbed into the inside of the thigh daily until five or six pounds have been used. Huzard and Biron were employed by the French authorities to try both the muriate and carbonate of barytes, and the exhibition of both drugs produced, in most instances, a remission of symptoms; but when pushed to what was deemed a necessary extent, the animals usually died from the effects of the medicine. Similar results have followed in the practice of many other veterinarians. M. Moiroud, veterinary professor at Alfort, has given ℥ij of chloride of soda in a liquid form, which he has gradually increased to a very large quantity, and with very flattering appearances of amendment; but the future cases did not correspond. Camphor in daily doses of an ounce seemed to benefit a horse much. Mr. Coleman has given 'the various preparations of arsenic, antimony, copper, zinc,

mercury, &c.; hellebore, aconitum, digitalis, hyoscyamus, cicuta, belladonna, &c. &c., but all without any specific or curative effect.' The late Mr. Sewell appears to have been more successful with the sulphate of copper (*blue vitriol*); but as the benefits were generally confined to cases not marked with much constitutional affection, so the value of the remedy is necessarily much limited. To increase our remedial means, Mr. Vines also has lately revived the stimulating plan of treatment, and given it new publicity by his reasoning and experiments. He observes, the remedies which are to be employed in those cases that are likely to run into, or have already become, what is usually termed glanders or farcy, are those which possess stimulating and tonic properties, separately or united. Of these a reference to Mr. Vines' work will show that he places his principal dependence on cantharides; which have long been before the public as a remedy for nasal gleets, but have never received such ample elucidation as by this author. He gives them every or each other day, in the form of a ball; either morning or evening (he, however, prefers the evening), with ginger, gentian, and caraway seeds. He commences with four or five grains of the cantharides, in fine powder, according to size, age, condition, &c.; and, if well borne, the dose, after ten days or a fortnight, is increased to eight grains, according to the circumstances alluded to. When this larger dose has been in use some time he desists altogether from the medicine for four or five days, and then recommences, but with the smaller dose.

Mr. Bracy Clarke's formula of administration of cantharides, in conjunction with mineral tonics to be given daily, is as follows:—

Sulphate of zinc (*white vitriol*)	fifteen grains.
Powdered cantharides	seven grains.
Powdered allspice	fifteen grains.

We cannot conclude without recommending the reader to turn to the encouraging account of the effects of barytes in glanders, administered by Mr. W. Percivall, which will be found fully detailed in his most excellent work entitled 'Hippo-pathology.'

Glanders is communicable to the human subject.—Ample experience will demonstrate the necessity there is that the

human attendant on diseased horses should be very careful to avoid any contact with *the matter of glanders;* which if by any means it should reach an abraded part, or the surface of any mucous membrane, will fatally inoculate the individual. After all, from the numerous remedies which have been tried to cure glanders, we may learn that none have been very successful; all may warrant hope, but not one justifies confidence. If, however, we have not learnt to cure glanders, modern science has found out means to prevent the disease. By perfect drainage and free ventilation the glanders is, in a great measure, to be set at defiance. The other part of the remedy is never to pursue the depletive mode of cure too far; but to stay before our measures intended to master a complaint undermine the constitution: by following these two rules, we may keep the glanders in subjection.

FARCY.

From what has preceded, it will appear that glanders and farcy are fully proved to be modifications only of each other. Farcy was long considered to be a disease of the veins; which error was natural enough, seeing the absorbent vessels, in which the virus travels, were then considered as a species of veins. We are now, however, aware that this disease, in its local or early state, is a *specific inflammation of the superficial absorbents:* experience has also taught us, that as long as its attack remains thus confined to the surface, it is not difficult to cure; but when it has entered the constitution it generally proves fatal, and invariably ends in glanders: and then, in return, acute glanders is very apt to end in, and almost invariably does, in farcy. Farcy is, however, not confined to the superficial parts of the body alone, for it may be occasionally met with in every part of the frame; but the head, neck, and extremities, particularly the hinder ones, are the parts most generally affected; by which it would seem to choose those situations in which absorbent glands are most numerous, or are furthest from the heart, and therefore most active in absorbing. It is usual to feel for farcy buds, in a suspicious case, upon the inside of the thighs, where, though none shall be found, the hard corded absorbent vessels may gene-

rally be detected. When the virus of farcy is absorbed it sometimes occasions inflammation in the immediate lymphatic vessel, which it first tumefies and then ulcerates. In other instances, its progress seems to be arrested, the vessel becomes inflamed, hardened, and then forms the lump which is called a *farcy bud*. At length, however, if nothing be done, these tumours increase, become hot, then burst, sending forth healthy pus; after which they ulcerate, and discharge a thin sanies; from one bud it passes on to another; inflaming the lymphatic vessels in its progress, and giving them a hardened feel like a cord under the skin. Sometimes the larger lymphatic trunks proceed to suppurate, when they form extensive sinuses, which the farriers call '*farcy pipes*.'

Farcy is subject to varieties in form and character. It has assumed an epidemic feature; and it often appears compounded with, and modified by, other complaints. Two distinct varieties of farcy are very common; one of which is entirely superficial, and confined to the lymphatics of the skin, and is often called the *button* farcy. The other commences usually in the extremities, and generally the hinder ones: the lymphatic tubes throughout become inflamed, being incapable of their usual office, and hence engorgement of the whole limb takes place. This farcied enlargement of a limb is not, to a partial observer, unlike the ligamentary thickening of a gorged leg; neither is it much unlike the swelling from œdema or effusion. But swellings, when they arise from farcy, will present an uneven surface; increasing and decreasing suddenly; they are further characterized by much pain and exquisite tenderness. The lymphatic glands of the skin will here and there point themselves into small buds; and it is further worthy of remark, that such swellings are more likely to exist in definite masses, and *between* the joints, than *on* them or *near* them; which is not the case in ligamentary enlargements arising from over-exertion or strain. To distinguish farcy from surfeit, which likewise covers the body with small tumours, in the last affection the swellings are broader, flatter, and generally more diffused over the trunk than the extremities; besides never being tender; and when found on the extremities, they are usually situated on the outer side, whereas

the farcy buds are more frequently on the inner side of the limb. In some cases, however, œdema or actual dropsy of the limb does occur, dependent on the obstruction offered to the passing of the absorbed serum: a horse thus affected is often said to have *water farcy*, which is treated of in another place as a distinct disease from true farcy.

The infected lymphatic glands or *buds* will sometimes also, instead of suppurating, take on a scirrhous induration, and remain thus hardened for a long time; but eventually it happens that they either, by absorption, produce tubercles and pulmonary vomicæ; or are translated to the nose; or end in a diseased thickening of large masses of the skin, neck, withers, and croup.

A variety of farcy remains to be noticed, which is usually passed over by authors, and which is also one wherein the poison is self-generated probably. It often puts on a chronic protracted form, and shows itself by the affected horse becoming suddenly lame in one limb, the tumefaction and heat of which will recede and attack the other limb in the same manner. In this way he may remain for months, with his health very slightly affected; at length, however, the disease assumes a more marked character, some of the swellings ulcerate, and glanders eventually closes the scene. Old horses are more frequently the subject of farcy than younger ones, which does not appear to be the case with spontaneous glanders.

The *causes* of farcy, with the exception of contagion, are of the same complexion with those of glanders, but are more varied, and numerous. It is necessary, for the production of farcy, that there be an actual application of the matter at least to a bare surface; probably also it requires either a mucous or an abraded surface. Long continued grease will sometimes degenerate into it; thus showing us that the morbid poison is dependent on any thing that weakens the constitution, for the filth and impurities that generate grease are likely in the end to produce glanders. Long continued canker will do the same: in fact, whatever debilitates may occasion it, particularly when combined with neglect in cleanliness and by living in contaminated stables, which last is supposed to be capable of producing farcy, as it produces glanders.

The Treatment of Farcy.—In the very early stages of this complaint, when it has been taken by inoculation, or has originated in diseased extremities,—in such cases it is not invariably found difficult of cure; but when farcy has suddenly broken forth without cause or warning the virulence and obstinacy of the affection is hard to subdue. It is almost equally difficult of cure when it enters by means of the mucous membranes of the head, for in these cases the stage between farcy and glanders is so short as to admit of little being attempted. There is, however, a pause in some cases between the taking on of the full character of glanders, during which pause a treatment of it judiciously exerted sometimes proves beneficial: but having once assumed the full glanderous characters, the case becomes hopeless. Nevertheless, we are not prepared to say that it is never removed after it has tainted the constitution; but when it has propagated its morbid effects to the lungs, whatever may become of the farcy, the horse invariably dies of glanders. Unless it be accompanied with confirmed glanders, many practitioners consider every case of farcy as purely a local affection, and their treatment is accordant with that idea. It was once hoped that it might be effectually arrested in the first instance, by simply employing topical means, and that nothing more than the destruction of these vessels was necessary to effect all that was desired; but, unfortunately, it is very usual in these cases for the disease to reappear, and commonly in a more malignant form. We would therefore recommend the student always to *treat* it as a constitutional affection. In the acute form of farcy attend first to symptoms and obviate their effects; which done, proceed to attack the disease itself. Do the same by that tumefied state into which the limbs sometimes fall. In the true chronic form of the disease, where the superficial lymphatic vessels and glands are the seat of the affection, the cure should be commenced by opening every one of the farcy buds, and dressing the exposed surface first with a solution of chloride of zinc four grains to the ounce, and after the first three days further diluting it to the strength of two grains to the ounce. The quickest mode is to divide them with a sharp pointed knife, particularly such as are directly superficial: if deeper seated,

an opening may be made into each with the same, and afterwards dressed as directed. The internal remedies used are various. Nearly all the mineral acids have been found useful and some of the vegetable ones. All the different forms of mercury have been tried with some success: but *corrosive sublimate* appears to have answered best; and, when determined on, should be given to the full extent the stomach and bowels will bear, without salivation, or symptoms of inflammation being brought on. Ten or fifteen grains may be commenced with, ground very finely with sugar, and given night and morning in gruel as a drench. If this occasion no distress, it may be increased to a scruple, and from this to half a drachm, if it be borne with ease; but the utmost care and watchfulness should be exerted when the dose is considerable. When the weakness and irritability of the horse are too great for the exhibition of the corrosive sublimate, give half a drachm of calomel twice a day, or the blue pill, or the sulphuret of mercury may be substituted, still carefully watching the salivating process. Should the stomach suffer much under the use of these active agents, either join with them bitter tonics, or alternate them with each other. We would also recommend that they be in these cases given in solution, and further sheathed by some ingredient of a mucilaginous nature.

After the trial of mercurials, arsenic ought next to claim the attention, as that has also proved efficacious in farcy, and it may be given in the form of liquor arsenicalis, or Fowler's tasteless solution. *Verdigris* was for some time a favourite remedy at the Veterinary College, in doses of a scruple three times a day, increased to a drachm. We have witnessed also good effects from this preparation; but we have found it most efficacious when given in a ball in conjunction with the *blue vitriol*, half a drachm at a dose. Some practitioners choose to employ several articles in conjunction, and they assert the cure is speedier from the combination than from any one article separately. In this case, give the following:—

Corrosive sublimate	five grains.
Arsenic	five grains.
Verdigris	five grains.
Blue vitriol	half a scruple.

Mix into a ball with palm oil and linseed meal; give every morning.

Should the subject be slight or weakly, begin with a smaller dose of each of the articles: but in any case, when the quantity is found to sit well on the stomach increase the dose of each article, daily, one or two grains, carefully watching the effects produced, occasionally resting a day or two; and however well the ball may seem to agree, do not increase the agents beyond fifteen or twenty grains each. It has been thought prudent by some to divide the dose, and to give the half, night and morning. It may be also remarked, that some horses can take three or four times more than others; and therefore, although great caution be necessary in proceeding with the use of the mineral agents, it is equally necessary that the dose should be augmented, in all cases, to as much as the constitution can bear. During their exhibition it is also absolutely imperative that the patient should be supported liberally; nor should the stomach and bowels ever be suffered to remain empty for any great length of time.

In addition also to the use of the mineral acids, much benefit has been experienced from the following drink given in conjunction with the ball before mentioned every day, but not at the same time of the day; the ball in the morning, for instance, and the drink in the evening:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Tincture of quassæ	one ounce.
Tincture of oak bark	one ounce.
Tincture of capsicums	two drachms.
Water	one pint.

Mix.

Green meat should be particularly sought after; but if it gripe, add hyoscyamus, one ounce of the tincture, to the drink, and to the food a quantity of bean meal or split beans. When green meat cannot be got, feed on carrots, mangel wurzel, boiled potatoes, turnips or parsneps: and even spear the corn, or give malt. It remains to add, that we have received benefit in two or three instances, from the use of molasses to the amount of four pounds per day; but it has in other instances altogether failed. Sea bathing, with daily doses of sea water, we have also experienced beneficial effects from in the long protracted cases of farcy, with enlarged limbs and œdema.

DYSENTERY.

Dysentery in the horse is not recognised by some veterinarians, both among the French and English: but if a catarrhal inflammation of the mucous surfaces of the intestines, which under certain circumstances, seasons, and situations assumes epidemical and also endemical characters, can lay claim to the appellation, then has the horse dysentery. Others consider it in the light of a diarrhœa; but its characters are distinct from a simple increase of the peristaltic motion. It consists in an inflammation of the mucous linings of the intestines, attended with a thickening of this coat, and an increased quantity of their natural mucous secretions; and as the disease advances, of a morbid alteration of that secretion. This increased secretion being frequently discharged, was mistaken for adeps, and was regarded as a further proof that the fat of the body was at these times in a state of general solution, hence its name of *moulten grease.*

The *symptoms* that characterise dysentery as a *primary* affection, are the frequent voiding of fæcal discharges in stringy portions, excessively slimy or loose, and fœtid, with considerable uneasiness from constant inclination to stool, and perpetual straining after the motion has passed. The mucus is mixed in general with the fæces, which are not retained, but voided involuntarily. If the disease increase in violence, membranous films, like sodden leather, are thrown out; while in very aggravated cases, the ruptured vessels eject blood; and now and then the intestines become ulcerated. The pulse is variously affected: as, when the inflammation is not intense, it is quickened, corded, and hard, but weak and not wiry; yet, when the case is very intense, or it is about to degenerate into peritoneal inflammation, as it sometimes does, the pulse becomes wiry and oppressed. The mouth is always dry, the appetite lost, the flanks heave, and there is usually much thirst.

Causes.—It is usually dependent on an inflammatory habit, acted upon by some immediate excitement; and, as such, it is more often observed in the young and robust, from a sudden check to the perspiration, a change of food, cold, fatigue, &c.: acrid substances, as mineral poisons,

may occasion it; and, not unfrequently it is the effect of drastic and improper purgatives, in which cases it commences in diarrhœa. One other cause also remains to be noticed, but which is seldom taken into the account, and that is *metastasis*, or the translation of the virus of fever to the intestines; and which is, we are disposed to believe, far more frequent than is generally imagined. It also has been brought on by eating improper herbage; and appears now and then the produce of some low marshy situations, particularly in cold rainy seasons; in which cases it partakes of a typhoid type.

Treatment.—There will be liquid or mixed evacuations of the natural fæces and the intestinal mucus. It will, in such cases, be the practitioner's duty to form a true distinction between inordinate diarrhœa and dysentery; and it is from the mucus quality of the stools, mingled with membranous masses, that he must assure himself of the dysenteric character: in which case, notwithstanding the odium which castor oil has lately obtained, it will here prove his sheet anchor, with the following accompaniments:—

Castor oil	eight ounces.
Chloroform	one drachm.
Powdered ipecacuanha	one drachm.
Powdered opium	two drachms.
Powdered chalk	one ounce.
Rice water	half a pint.

Mix, and repeat once or twice, after intervals of six hours. After which, should the discharge continue unchecked, for the castor oil substitute thick boiled starch, and continue to give night and morning, till the discharges have returned to their usual state. Should this not succeed, calomel a scruple, with opium a drachm, may be given every hour, and the following drink at night time:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Chalk	one ounce.
Tincture of catechu	one ounce.
Liquor potassæ	one ounce.
Tincture of capsicums	two drachms.
Cold water	one pint.

If green meat can be procured, it should be tried, but with some caution. It has proved the best remedy; and the same has been observed of carrots in the winter season: but succulent food has done harm; in which cases sub-

stitute malt mashes. When the inflammatory symptoms run very high, the belly may be fomented with hot water, and a new sheepskin, if at hand, may be applied to the loins. Or the mustard poultice is by no means an improper application to the belly, when the inflammation of the bowels appears considerable. Warm clothing is proper, with a moderate temperature; and when convalescence approaches, every care must be taken to give easily digested food.

ROT, OR DYSENTERY, IN CATTLE.

In oxen and cows this is called *scouring rot*, *scouring cow*, *braxy*, *bloody ray*, and *slimy flux*. Some of these names are peculiar to this complaint. The dysentery is characterised by a peculiar discharge from the bowels of a frothy slimy nature, of an olive colour, and with much bad smell: sometimes it looks red or brown, and sometimes more yellow, with stringy patches of mucus in it; and if observed when voided, it is very hot, and smokes. These appearances of the matter discharged should be particularly attended to, as well as the evident straining both before and after passing the dung, as they will serve readily to characterise the disease; also to distinguish it from simple diarrhœa, in which there is nothing more than a liquid discharge of dung, composed of nutrient matter, in a state of solution, expelled by the stomach. Dysentery in cattle seems to hold the place of glanders in the horse; to be the winding up of every thing that impairs the constitution, and of every hopeless disease. The disorder needs every attention from the attendant, whose industry must not be influenced by what he thinks about the animal getting well. He must have a good stomach, not an over-sensitive nose, and he must be content to labour continuously. "The disease," we are told by Mr. T. W. Mayer, V.S., of Newcastle, Staffordshire, "was ushered in by a dull anxious appearance; the eyelids and dewlap were of a yellow tinge, and in dairy cows there was a total suspension of the secretion of milk; a slight muco-purulent discharge from the nostrils was also observed; the appetite was indifferent; the bowels costive; the dung of a dark colour, having portions of blood diffused through it; but the urine was not much affected. The pulse for the first twenty-four or forty hours,

when the disease came on more gradually, was not much affected; but afterwards it became frequent, small, and hard, beating at the rate of seventy or eighty pulsations per minute. In extreme cases the febrile action set in from the first, accompanied with violent dysentery and tenesmus; the fæcal discharge being intolerably offensive, and consisting of a thin, watery, dirty, green-coloured fluid, full of shreds of coagulable lymph, mucus, and grumous blood. In some, it consisted of a blackish green mucous discharge; in others, it was principally mucus, coagulable, lymph, and blood, with, comparatively speaking, no portion of fæces along with it. The extremities were alternately hot and cold; the surface of the nose sometimes dry, at others having a dew upon it; occasionally during the cold fit the eyes would become sunk in their orbits, the features collapsed, the nose, inner part of the lips, and tongue were of a deadly pallidness, which would be followed up by reaction, and a consequent hot fit again. The bowels were affected, in some of the extreme cases, with colicky pains; and in every case there was obstinate constipation and obstruction in the second and third stomachs. If relief was not afforded, the disease terminated fatally on the third or fourth day."

Treatment.—If the disease is discovered while costiveness and a hard pulse exists, a little blood may be taken, but the animal were better left alone: a drink administered, consisting of Epsom salts half a pound, sulphur a quarter of a pound, nitrous ether two ounces, tincture of aconite half an ounce, cold water a pint, will do good. After this. medicines which act upon the liver are to be given, viz. a scruple of calomel and a drachm of opium twice a day. The beast must be housed, and the food partially digested by boiling; while the drink must consist of warm water, in which starch has been dissolved or flour stirred. The shed must be kept scrupulously clean. If none of the above medicines act, the following astringent may be tried, which when it fails, may be changed for any other scattered throughout this work:—

Ipecacuanha (powdered)	half an ounce.
Colchicum (powdered)	one ounce.
Tincture of galls	one ounce.
Tincture of capsicums	half an ounce.
Water	one pint.

Patience throughout the disease must be exerted, and the animal by no means neglected until it dies.

DYSENTERY IN SHEEP.

Sheep are also troubled with a dysenteric affection called *braxy*, in which there is a frequent stooling of soft dung, mixed with blood and mucus. When it terminates fatally, these motions become dark and fœtid. If the inner surface of the eye be very red, and the animal easily excited, take two ounces of blood away; give two or three ounces of castor oil, with thirty drops of laudanum, and two drachms of tincture of ginger: or one ounce of salts, with the same quantity of opiate as before: after which administer night and morning, the following:—

Powdered ipecacuanha	fifteen grains.
Prepared chalk	one drachm.
Powdered opium	one scruple.
Boiled starch	four ounces.

House the sheep, give gruel or starch in case the cud is lost, and tend the animal with the greatest care; also pay every attention to cleanliness, even to clipping the wool away from the poor creature's anus, that the purging may not soil it.

ROT IN SHEEP.

Rot in sheep is a disease the public in general, and the agriculturist in particular, are deeply interested in. Poor clayey and moist lands are most liable to beget the rot; for on such lands the water which falls not being able to soak through, nor yet evaporate, remains upon the earth stagnant, and begets miasm as it exhales; it likewise generates, as some suppose, the germs of insects, viz. flukes, &c. &c. which are received with the food. As sheep affected with *rot* present flukes, it is not an unnatural conclusion that they have much to do with the diseased symptoms, and the fatal issue which succeeds to them. It appears this disease is known throughout every part of the world where this valuable animal is cultivated. In Egypt it is very common, and is not there confined to sheep, but it also attacks horses, cattle, and most of the lesser animals; it particularly is common upon the whole of the borderings of

the Nile; the immense annual floods of which spread a frightful mortality among the numerous grazing tribes which browse on the plants affected by this overflow. The Arabs are reported to affirm, that this pest annually destroys not less than sixteen thousand sheep. These shepherds, we are told, readily distinguish the sheep affected by rot from others, by the presence of a bagful of water found under the jaw. This is no great performance, for every carter in England could point it out when the dropsy had gained so great a head, as to appear in so marked, and visible a shape. As the disease progresses, the affected animals become debile in the extreme, and are mostly found lying down; their wool falls off in patches; a sanious matter of varied colour issues from the nose. When dead, the body is found œdematous throughout, and the liver is usually choked with flukes; a cough, accompanied with diarrhœa, are premonitory symptoms of an early mortality.

All recognize one common cause of this disease, which is low marshy pasturage. Indeed, although in every country it is agreed that the eating of vegetable matter growing in low marshy situations, particularly in such as are only occasionally flooded, is an active agent in producing the rot, yet but few hint at any certain curative practice. Prevention is, however, in our power, by a removal of the animals from the localities specified to others which are dry. A farm well sheltered is an excellent situation, and dry food their best sustenance. Hay is good, and when it is alternated with a few carrots, turnips, and parsneps, such food often proves restorative. Should the owner reside within a reasonable distance of salt marshes, let him by all means remove his flock there. Common salt has also been given as a remedy, and as it is stated has been found serviceable. Iron filings should likewise be put in the water from which the animals drink, in the proportion of a pound to a gallon. The iron should be left exposed to the air when the buckets are empty, which should be filled again an hour before the watering time arrives. On every third day there should be given, morning and night, about ten pounds of dry bran, mixed with half a pound of culinary salt; six ounces of aromatic plants cut small, as thyme, sage, juniper, rosemary, lavender, or orange leaves,

may also be mingled with the bran; to which must be added five ounces of anise, of fennel, and of coriander seed. This quantity will be sufficient for thirty sheep. Every animal attacked, which is to be discovered by turning up the eyelid, when the conjunctival membrane will be seen of a yellow colour, should have the following drench daily:—

Oil of turpentine	two drachms.
Carbonate of soda	one drachm.
Water	four ounces.

CHAPTER IV.

DISEASES OF THE BRAIN AND NERVES.

We shall commence a consideration of the individual diseases of this class by some general observations on the origin of affections of the nervous system generally. In the horse, the nervous mass is greatly superior to the cerebral; and we find that affections of the spinal cord are in this generous animal more numerous. An apoplectic termination to human life is by no means uncommon; in the horse it is little known; but the frequency with which spinal affections occur, bear little proportion between the two; and taking all the circumstances into consideration, are more than equal to the nervous affections of mankind. Dissections of morbid subjects have also shown that the causes are various, but are usually referrible either to pressure on the spinal cord, or otherwise are attributable to a morbid alteration of structure in the cord itself.

Pressure on the spinal marrow may be the consequence of either wounds or over exertion; or it may originate in the existence of parasites within the canal. *Lesions*, occasioning wounds, are very common from fractures of some of the vertebræ, or from dislocation of the same bones: an aneurism of the aorta has produced it; exostosis and poll-evil have also done the same; the one by ulceration through the articular membranes, and the other by an osseous deposit within the canal. Debility, resulting from over exertion, causes either sanguineous congestion, or otherwise it is accompanied with an increased effusion of inter-

stitial fluid within the spinal sheath. It is said that the sanguineous congestion of the membranes often precedes inflammation of the spinal cord itself, in which cases a rapid paralysis follows. We are led to believe, the membranes can inflame independently, and the same with regard to the spinal cord; also that each may be productive of a series of symptoms of greater or less intensity. When the substance both *superiorly* and *inferiorly* is inflamed, then it is usually found that both *sensation* and *voluntary motion* are destroyed; but when the inflammation is limited to the *superior* portion, the *sensation* is principally impaired; and when, on the contrary, the *inferior* half of the cord is affected, then *motion* is prevented. A *morbid alteration* in structure also takes place in the spinal cord; this change has been found in most domestic animals, as in rabies in dogs, stomach staggers in horses, &c. The spinal cord in these cases becomes soft, and converted into a greyish pulpy mass, losing its original fibrous structure, where paralysis has been present. But we must not be misled by this observation to attribute all the affections of this class to the spinal marrow: we attribute many of the most important to morbid states of the cranial brain, as apoplexy, which is attended with *complete* paralysis. Nor must we lose sight of the retrograde march of some nervous irritations, which spring from neither the cranium or spinal marrow; but originate in the extremities of the nerves, and are transmitted to one or other, or to both the sources; which then become secondarily affected, as in the case of lock-jaw, produced by wounds, &c. &c.

APOPLEXY.

Apoplexy does not very often occur in the horse; but as it does take place, although usually irremediable, it merits a place in this treatise. It appears to consist in a lesion of some of the vessels of the brain, which, by pouring out their contents, produce pressure and irritation. Foreign veterinarians have divided it, after the human, into sanguineous and serous; but as far as we have learned, it is the former which has been principally met among horses. The usual *causes* are such as, were it not for the length of the neck, must operate more frequently than they do: these

are cerebral congestions, commencing in the chest from inordinate exertions; occasionally, but less frequently, it may have other sources.

The only case of this affection which happened in the practice of the editor of the present edition, was attended with no premonitory symptoms. The horse was of the Flanders' breed, and was slowly recovering an attack of influenza. No change was observed in the animal, when it threw up its head, stiffened its legs, died, and fell down. After death, examination being made, one of the middle cerebral arteries was found ruptured, and a considerable quantity of blood effused.

MEGRIMS

May be considered as a minor apoplexy from interrupted circulation; and is known among farriers and horse-men by the additional names of *sturdy*, or *turnsick*. It frequently attacks horses during their work, particularly in harness: it is, however, now and then seen, in hot weather, in the stable or at grass. When it seizes a horse in exercise he stops short, shakes his head, looks irresolute and wandering; in this state he remains for a few minutes, and then proceeds as before. In more violent cases he falls at once to the ground; or first runs round, and then sinks senseless; or the limbs may continue to move after consciousness is lost, when the animal thus affected becomes very dangerous: in either case, the whole system appears agitated by strong convulsions; the horse may dung and stale insensibly; he sometimes is violent, at others more passive, but is equally unconscious to every thing around: after remaining so a longer or shorter period, his faculties return, and he rises. It is frequently brought on by mechanical causes, which produce a momentary congestion of the brain; as tight reining up, or the pressure of the collar in ascending a hill, which obstructs the return of blood from the head. It may also be occasioned by a morbid pressure produced by constitutional causes. Such are found in the plethoric, over-fed horse; particularly when subjected to long confinement.

The *treatment* must be regulated by the cause: if it be mechanical, remove it, or the affection may become habi-

tual. If plethora or full habit be the apparent cause, purge; or give a course of mercurial alteratives, followed by, or alternated with, purging medicines. It is said that this affection may be prevented, by covering the skull of the affected horse with a wet cloth.

PARALYSIS.

Palsy of the whole muscular frame is very unusual in the horse, except some actual pressure or irritation be made on the sensorium by blows on the skull, by portions of bone forced in, or by cerebral tumours: sometimes it is constitutionally brought on by agencies unknown to us. Palsy of one side is even of more rare occurrence. Palsy of half the body, most frequently of the hinder parts, is sufficiently common, and is either primitive or secondary. The *causes* are often involved in much obscurity; in some cases they are sufficiently obvious: mechanical injuries are of this kind, as casting in the stable, turning round in a confined stall, blows on the spine, sudden falls or slips may, any of them, luxate, or more likely fracture, the vertebræ, and by occasioning pressure upon the spinal cord, produce paralysis: ulcerations of these bones, or exostoses, abscesses, or tumours within them, may be the cause of the affection. It may be altogether secondary, as being derived from accidental lesions of other organs, or from inflammations in them: it may and does occur from a diseased state of the stomach, bowels, liver, and more particularly from those of the kidneys, bladder, and womb. The *symptoms* are total or partial loss of either the *mobility* or the *sensibility*, or both, of some part of the body, usually of the hinder quarters and limbs. The secretions are sometimes lessened or almost stopped, or the urine flows involuntarily; convulsive twitchings affect the skin, partial sweats present themselves, and the animal remains utterly helpless, although he may fatigue himself with fruitless efforts to rise. These are, however, extreme cases.

The *treatment* of paralysis must, in a great degree, follow the cause. If mechanical injury have occasioned fracture in any part of the spinal column, the case is hopeless. If the injury be less severe, it is possible that extravasated blood only, or serous deposit, or coagulable lymph, are

effused into the spinal canal, and disturb the functions of the part; in which case, topical applications are requisite, to encourage an absorption of the obstructing deposit. When the paralysis can be traced to some visceral affection, or to disease of the stomach, kidneys, bladder, the result is not necessarily unfavourable, although our hopes of a recovery are lessened. We should, in these cases, primarily attend to the exciting cause, if it can be discovered. But when there is loss of sensation without loss of motion, the limbs being cold and the horse insensible that he is in possession of such parts, and moving them only when absolutely forced; or otherwise, when they are entirely paralytic, and yet sensitive, it is probable that the nervous irritation originates within the spinal canal; and though we may with propriety use external stimulants, yet there will be but small prospect of success. Of internal remedies, strychnia has been found sometimes useful, in one grain, gradually increased to three grain doses; and it may be united with other tonics, as gentian, or aromatics. This, with purgatives as required, blisters, sheepskins, or a charge over the loins, has often effected a cure, when the paralysis has been confined to the hinder limbs only.

SPASM

Appears to be a morbid interruption of the ordinary movements of the general muscular fibre, whether it be local or diffused; and as these movements are effected by influence derived from the nervous system, so we look to these sources for the acting cause of all spasmodic affections. Of *spasm* we have instances in gripes. We witness the violence of the muscular contractions under the mental influence in vicious and in terrified horses; we see also the same under an inflammatory state of the brain in phrenitis, rabies, &c.; and we know that mechanical irritation can produce it.

In the *treatment* of spasm two indications present themselves: either to allay the *nervous excitement*, or to render the part attacked *above* or *below* the disposition to be excited. The first indication takes in such remedies as are direct sedatives to nervous excitability, as opium, hyoscyamus, belladonna, tobacco, &c. The second indica-

tion is fulfilled by using such remedies as act by altering the susceptibility of the part, which are purges, and other evacuants, whose action diminishes the excess of power; these last therefore are proper in plethoric subjects, or when the spasm is united with vascular action. When, on the contrary, the spasmodic affection attacks a debile part, we use stimulants, to bring the part to a state to resist the impressions.

LOCK-JAW, OR TETANUS.

Tetanic spasm differs from all the affections we have lately noticed, inasmuch as the muscular contractions are not alternated, with periods of relaxation; on the contrary, here they remain permanent, or with very little, and never entire, remission. *Lock-jaw*, so called from the rigid closure of the mouth, may be considered as a morbid irritation of the whole or a part of the nervous system.

Idiopathic tetanus is the most frequent in the horse, and its causes are all of them, more or less, conjectural, never self-evident. One of the most common is that of cold; particularly when the heat of the body is abstracted by evaporation, or when moisture is applied to a relaxed system: thus it has followed plunging into a river during a run in the hunting season, or injudiciously allowing a horse to stand still during a check after a severe burst; and more particularly it has been brought on by a partial but continued application of water, as when it makes its way through the roof of a building and falls in a continued drip on the body; even the drippings from the eaves of a hay-rick, standing in the field in which a horse was grazing, has produced it. It has succeeded visceral affections, and is supposed to be occasionally the effect of worms within the alimentary canal. *Traumatic* or *symptomatic* tetanus is the consequence of some external injury, and it follows all kinds of lesions. Castration, nicking, docking, punctures, particularly of the feet; lacerations, and even contusions, will bring it on. The size of the wound is of no consequence: it may ensue upon the smallest abrasion; and it may not follow the largest possible lesion. Cuts or bruises upon the orbital arch, where the nerve emerges from the bony ring, immediately above the

eye, are more likely in this country than any other injury to cause it. In America, it is not an unfrequent result of castration; and in some tropical climates compression of the cord in the operation must always be avoided, so apt is any irritation to produce it. It is by many considered as most apt to follow wounds of tendinous and ligamentous structures, but a wound on any part may start it up.

The symptoms.—If a good physiologist were told that tetanus was a spasmodic contraction of all the voluntary muscles, he would describe the following symptoms without having seen the disease, so exactly are they characteristic of such a state. It may originate from no perceptible cause, or it may be produced by a wound, in which case the part injured has healed kindly, and the opening is nearly closed before this terrible complaint makes its appearance. It commences usually by a certain stiffness about the head, and a peculiar mode of standing. Upon raising the head the haws of both eyes are pushed out, giving to the countenance of the animal a strange expression; but sooner or later it extends all over the body. By the tetanic action the haw is drawn partly over the globe, at the same time that the tension of other muscles gives the eyes a vivid appearance, which ill accords with the more placid effect of a protruded haw. The jaws are not invariably fixed, though from their being generally closed springs the popular name of the disorder. As the disease extends over the voluntary muscles of the trunk and extremities, the appearances are distressing in the extreme. The head is raised, the ears pointed forwards, the nostrils dilated, and the nose is protruded. The legs straddle wide, the tail is cocked, and quivers; and the abdominal muscles are drawn tight over the belly, giving to the horse an appearance of having just completed some extraordinary exertion. The complaint presents a few moments of imperfect relaxation sometimes, from the extreme contractions of over-strained muscles; while profuse sweats mark the distress of continued convulsion. The circulation is, in most instances, at first not much affected; but as the disease increases, the pulse quickens, and becomes tremulous and irregular. The respiration also gradually becomes hurried and intermittent; costiveness is usually present, and the urine is sparingly

voided. In this state the suffering animal may remain from six to ten days, when, worn out by inanition and irritation, he expires in convulsions. At others, either remedially or spontaneously, the contractions give way slightly; feeble attempts are made to eat, the limbs become more supple, and a very slow recovery ensues.

Post-mortem appearances have often exhibited no change from a healthy state throughout the nervous system at large. In some cases, however, there have been marks of cerebral inflammation, and in others the spinal marrow has presented similar features; this last has been found soft in structure, and with its vaginal coats injected. We have seen the lungs and stomach both highly inflamed; and a slaughterer of horses told us that he seldom if ever cut up a horse which had died of lock-jaw, without finding inflamed lungs. The intestines also usually present inflammatory marks about them; and, the veins throughout the body, particularly the superficial set, are turgid with blood.

Treatment.—Although the greater number of instances prove fatal, yet still a sufficient number recover to warrant our utmost endeavours; and the more so, as most of those who do survive appear to do so from the beneficial effects of the treatment adopted. The very different means which have been successfully tried might stagger the sceptic, and make him attribute the recoveries under these discordant medical agencies to the constitutional strength of the animal. This, however, is not the only instance wherein very opposite means are beneficially employed for the cure of the same disease. Every practitioner is aware of the benefit derived from cold applications in some inflammatory cases; and every one is equally aware how salutary hot fomentations prove, apparently, in similar inflammations. A curative end is equally produced by both; the *modus operandi* to us is not evident. This circumstance should make the veterinary practitioner not absolutely wed himself to any one plan of treatment. When one has been pursued without appearance of success, let another be adopted. If a lacerated wound be the cause of the disease, it may be prudent to excise the part, removing not only the injured surface, but a portion of the flesh beyond, and making sure of taking away a piece of the irritated nerve, which is the

cause of the disorder. In the case of a punctured wound, particularly in the foot, if there be a confined sinus, have the horn thinned, and slit it up with a knife. When tetanus follows docking, it is advisable to dock anew: if nicking be the cause, deepen the sections, and actively stimulate the old wounded edges. Where castration has preceded it, remove all ligature, if any remain, and foment incessantly. Having pursued this intention, it next follows to attend to the *constitutional* part of the complaint: or if it be a case of true *idiopathic tetanus*, that, of course, must at once engage the attention. It was some years ago very usual to employ cold as a medical agent in the disease; this was done by removing the horse into the open air, and dashing him with the coldest water for twenty minutes, repeating the same every two or three hours, and in the interim suffering him to remain uncovered, and in the open air. In every instance this was found to mitigate the severity of the symptoms. Ice also has been applied; the relief obtained being usually in the exact degree of heat abstracted, it was no wonder that it continued a favourite, though generally a delusive practice; for as warmth returned, almost invariably the convulsive contractions returned also; therefore this method has very properly given place to others which have proved more useful; though the former need not be lost sight of, as instances have occurred of permanent benefit having been derived from it. It may, therefore, be still tried, when the means which follow are not attended with success; but in that case, with the cold bath or application of ice should be united some of the other means pointed out.

The general curative practice in tetanic cases among veterinarians, leans to opening of the bowels, and to a liberal administration of opiates, as being every one of them powerful antispasmodics, but in this painful affection proving doubly so conjointly; to which are added, blistering the spine. Tetanus, at first, not materially affecting the vascular system, there is no necessity for bloodletting, but by all means commence the treatment with a purgative. The croton nut, acting more speedily, offers itself first to notice; it is also small in compass, and may therefore be administered in substance, under circumstances of almost

entire closure of the jaws. Twenty-five or even thirty grains of the farina of the nut may be given at first, and one-third of the quantity first administered should be repeated every ten or twelve hours, until full purgation occurs. If aloes be preferred, it will be not only more convenient, but they will operate more quickly, if they be given in solution. If a prejudice exists in favour of a mercurial purgative, calomel may be given previously, to the amount of two drachms. The powder being blown into the mouth by means of a proper tube for the purpose; and in this case six or seven drachms of aloes will suffice; but without calomel ten or twelve drachms in substance will not be too much for a strong, full-sized horse; and it will probably require three drachms more, repeated two or three times at intervals of five or six hours, ere a complete emptying of the bowels is made, such is the usually constringed state of the intestines at these times; laxative clysters (after the back has been properly raked) must also assist the attempts, and should be thrown up in large quantities frequently repeated. We know it to be a practice with some veterinarians to unite digitalis and camphor with aloes, but it does not appear that any marked benefit has resulted therefrom. With others, extensive vesication over the spine from the poll to the tail has succeeded.

It is certainly desirable that the bowels should be first opened; but if the irritation be extreme, and the back has been raked, clysters thrown up, and an active purgative have entered the stomach, we should recommend not to wait the operation of purging, but to give the sedative, and then renew the attempts at unlocking the bowels.

No. 1.—Powdered opium	.....	half an ounce.
Sulphuric ether	.....	one ounce.
Camphor	.....	two drachms.
Tincture of aconite	.....	one ounce.
Spirit of turpentine	.....	two ounces.
Strong ale	.....	a pint.

Mix the turpentine with the other ingredients by means of yolks of eggs, and repeat either the half or the whole of a similar dose, as the urgency of the symptoms may require, every two, three hours, or longer.

If the case is far advanced, and the animal is neither a

plethoric nor a young one, it might be well to try the full effect of the tonic plan. The tetanic irritation being confined to the motor organs, so the digestive faculties usually remain undisturbed; and if the horse could eat, it is probable that, in many cases, he might become so nourished as eventually to wear out the disease without medicine. Liquid nutriment should, therefore, be artificially and liberally supplied by means of the human stomach pump, the tube being inserted through the nostril: now and then quantities of the mash itself, if offered, will be sucked in by the hungry animal. We have also given gruel as clysters, in which way much nutriment may be thrown into the constitution. But in pursuing the tonic plan, the necessity of avoiding costiveness throughout must not be lost sight of; on the contrary, the moment it appears it must be again combated, as it immediately aggravates the tetanic rigors. The directions here given are very well, but horses have recovered under all kinds of treatment. They have been packed in dung-hills, driven over cliffs, into rivers and made to swim, knocked on the head by the knacker's poleaxe, and all have yet survived. The favourite treatment at present is to give the animal a fearful purgative, and then leave him with food before him in perfect solitude, not even looking at him for a week, or longer. More cures are reported to have taken place under the last mode of treatment than any other. However, there are new agents, which certainly demand a scientific trial—we allude to sulphuric ether, chloroform, and aconite.

STRINGHALT.

Mr. Feron informs us, that this singular spasmodic affection is esteemed graceful in some continental countries; at least when it exists in both hinder legs, as it frequently does, being however usually confined to one side: very seldom indeed is it found in the fore, of which we have seen but one or two instances at the most. It is evidently a spasmodic contraction of some one or more of the flexors of the leg, which usually ceases after the animal has been some time in motion; it is the consequence of local irritation or of pressure on some nervous fibrila, which the excitement of

exercise renders less acute; and generally restores the action of the legs to its natural condition. It is not hereditary or congenital, and seldom appears until the approach to the adult age. It is injurious inasmuch as it unfits the horse for certain purposes, as racing, delaying the start so long, as to give away every advantage. It is considered incurable; and therefore any and all treatment is useless, save for experiment.

CHAPTER V.

DISEASES OF THE ALIMENTARY CANAL.

SPASMODIC COLIC.

SPASMODIC COLIC is the disease known to farriers by the terms *gripes*, *cramp*, and *fret*. The muscular tunic of the intestines renders them very susceptible to the action of spasm, and the vascularity of their villous surface also makes them very liable to become primary agents in the production of this irritation. Spasmodic colic appears more apt to affect the small intestines than the large; but instances are not wanting to prove that the large intestines have also become occasionally affected; and when the spasm extends to the posterior part of the cæcum and rectum, the bladder also sometimes participates in the convulsion, and frequent ejections of urine occur. That colic is dependent on a spasm of the muscular structure of the intestines, we have proofs from the appearances which present themselves after death, in fatal cases, when different portions of the alimentary track will be found forcibly contracted; and in the instances where much flatus has been present (although it is improperly in the horse called flatulent colic), the post-mortem appearances have proved that the cæcum and colon were the principal sufferers; arising apparently from the disengagement of an injurious gas from undigested herbage.

The *causes* are various: the sudden application of cold either to the surface of the skin when hot; or to the intestines under similar circumstances in the shape of cold water drunk hastily, and when the horse has been warm; in which latter case the attack often soon follows. Costive-

ness will bring it on. Tumours in the mesentery, and strictures in the bowels, are also the sources of occasional colic. When a horse is found to be subject to repeated attacks, something of this kind, or abdominal concretions, may aptly be suspected; and we have known many instances where habitual colic was dependent on this last cause. Horses long confined to dry food will sometimes get out and suddenly gorge themselves with green meat; and with others, a constitutional tendency from some occult cause gives them a predisposition to colic.

The *symptoms* of spasmodic colic are usually sudden in their appearance, and not marked, as in inflammation of the bowels, by previous indisposition; but the horse is observed to be at once attacked with considerable uneasiness, shifting his position from side to side, pawing his litter, and stamping with his feet impatiently. After a few minutes thus passed, the pain remits, and leaves the horse perfectly easy; he then resumes his eating. In enteritis no perfect remissions occur, but all is one scene of nearly equable pain and distress, though never actually amounting to the agony of spasmodic colic. As the colic advances, the remissions are less perfect, and less frequent: the horse now lies down occasionally, and on rising shakes himself, looking round to his sides, at which sometimes, in desperate cases, he snaps with his teeth; but more frequently he is seen to strike with his hind feet at his belly, as though determined to remove by force the cause of his pain. In enteritis this acuteness of sensation or violence of temper is seldom seen. When on the ground, it is not uncommon for the horse to roll on his back. In colic the pulse is seldom much altered from its natural state, unless the colic has existed some time, when it occasionally presents marks of general irritation, and is not only quickened, but also somewhat hardened. If it can be felt also during the intensity of the paroxysms, it will likewise be often found to be disturbed even in the early stage; but this is momentary only, and ceases on the remission of the pain. Under the immediate influence of the existing spasm, it will in some instances present a full bounding accelerated stroke; but more often a wiry thready though quickened beat, both of which may be mistaken for inflammation. The extremities, as the legs and

ears, in colic are not often much affected, and they never remain intensely cold for a considerable period, as in enteritis; but the coat stares, and the horse breaks out frequently into cold sweats. Sometimes he is seen to attempt to stale without effect, at others he stales frequently, with momentary relief. In colic, also, relief is obtained by friction and motion, but both aggravate the distress in enteritis.

Treatment.—Having reason to believe that the patient is labouring under simple spasm of the intestines, unmixed with inflammatory tendency or symptomatic irritation from inversion, involution, invagination, or introsusception of the intestinal track; proceed at once to administer such one or more of the numberless antispasmodic remedies as custom and experience have warranted. Numerous as they are, there is not one that has not its advocate; and perhaps not one that does not deserve to be commended, so simple are the means sometimes required; and so much is the constitution prone, in some cases, to assist itself or our efforts. While, at the same time, other cases occur frequently obstinate and sufficiently fatal to require all our energies and all our discrimination in the choice of our remedies. Upon an animal being seized with spasmodic colic, immediately prepare and administer the following:—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Cold water	a pint.

If this has no effect, repeat the drink in twenty minutes. If the second dose has no effect, give a third at the expiration of an hour; but with the third drench administer the ether and opium in the quantities named, along with six ounces of solution of aloes, and only three quarters of a pint of water. Should this have no effect, try the draught again at the expiration of forty minutes; and if no result be obtained by all this medicine, mischief behind the outward symptoms may be anticipated.

Copious clysters having been thrown up previously, and the rectum emptied, the ammoniacal blister may now be applied; the liquor ammonia being mingled with six times its amount of water, and carefully watched (see *Enteritis*). Then, at the expiration of another hour, a drachm

of calomel may be shaken upon the tongue, and the drench first-named persevered in immediately afterwards. If still no abatement of the pain be observed, and the general symptoms and appearance indicate nothing but colic, at the expiration of another term repeat the physic last advised, and place sheepskins along the back.

By this time the pain, if it has throughout the period been acute, must have changed the symptoms into those of enteritis; and we accordingly proceed as in that disorder, only every hour not forgetting to give the ether and the laudanum, together with the other medicines pointed out as fit for inflammation of the bowels.

Other things have also to be attended to. In the first place when the horse is attacked, he ought as quickly as possible to be got into a loose box, well littered down, and the sides of it amply guarded by trusses of straw placed upright against the walls. The patient is then to be back-raked; and after the medicine has been administered, a simple enema of soap and water is to be thrown up. All exercise, friction, pepper, and spice, is to be avoided, because we can never reckon accurately as to what colic is going to become; by the by, we knew a case in Mr. Gowing's practice, in which a prolonged fit was cut short by the administration of a pint of turpentine as a clyster.

COLIC IN HORNED CATTLE.

This complaint occurs in cattle, but on account of the intestines of those animals being bound down by the peritoneum, is of no consequence; as is aptly illustrated by a question put by the grinder, when preparing the pupils of the Royal Veterinary College for their examination.

Q. What would you do if you were called to an ox having the colic?

A. Make haste, lest the animal should get well before I reached the place.

CHRONIC INDIGESTION.

Horses are subject to dyspepsia, or loss of appetite, either from some morbid change in the stomach, being induced by some disease in its secretions, or some extraneous matter. We have had many occasions to advert to the sympathy

existing between various parts, and the present is a prominent instance of the kind; for in every case of stomach affection the skin is found to sympathize; and these states are therefore always accompanied with staring hair, dry, and but little unctuous: it also presents that inelasticity of cuticle termed *hide-bound*. The horse continues to eat without appetite, or with one irregular in its desires; and what is taken in is frequently passed away in the state in which it was swallowed, viz. undigested.

Causes.—In spring and autumn, when a renewal of hair takes place, the sympathy between the skin and stomach produces the phenomena of weakness so usually observed, viz. faintness, perspiration, and irregular appetite. It is sometimes occasioned by the presence of worms, when the number is great: more often, however, it may be attributed to improper food, as musty hay and corn; or to injudicious lodging, as unventilated or over-heated stables; or improper management, as too great a quantity of clothing, the injudicious use of spicy stimulants, &c. &c.

Cure.—Its removal must, in a great measure, depend on becoming acquainted with its cause. In spring, feed succulently; and in autumn, feed liberally; while, in both cases, encourage that particular growth of hair which the season requires.

ACUTE INDIGESTION IN CATTLE, CALLED HOVE, OR BLOWN.

When cattle have become fatigued by driving or by long fasting, and suddenly find themselves with plenty of food before them, particularly of such as requires little mastication, as chaff, bran, grains, &c. &c.; and also at all times when they meet with food they have long been deprived of, as various artificial grasses, particularly red clover, they are apt to eat greedily, and omit to stop for the purposes of rumination; by which means the rumen or paunch becomes so distended as to be incapable of expelling its contents. From this, fermentation begins to take place, and a large quantity of gas escapes, which increases the distention, until the stomach, by its pressure on the diaphragm, suffocates the animal.

The *symptoms* are uneasiness and distress, with quickened respiration; sometimes there is a degree of phrensy pre-

sent. When it is occasioned by green food, the evolution of gas is enormous, and the tympanitis gives a drum-like distention to the belly; but when dry food, as chaff, bran, &c. &c. has been taken, the impacted matter does not distend so quickly, and the symptoms are less acute; they resemble those of constipation; and sounding the side, gives back a response as though a solid matter were hit against. It is thought to be more likely to occur in warm and wet weather than in any other; and if such be the case, it must arise from the state of the vegetable matter and the surrounding warmth both being favourable to fermentation.

The *treatment* will consist in attempting to lessen the distention by *evacuating* the distending gas, or otherwise try to neutralize it. Purgatives have little or no effect. The evacuation of the gases is caused by the introduction of a probang, which is passed down the œsophagus; or it is brought about by puncturing the side, when the distention is urgent, or the want of assistance, renders it imperative to evacuate the gas immediately, to prevent suffocation; a puncture is therefore at once made into it, which, among graziers, is called *paunching*. When nothing better is at hand, this may be performed with a lancet, or even a penknife; the wound made being kept open by the introduction of a piece of hollow elder or common wood; the place of puncture being midway between the ileum or haunchbone and the last rib, a span below the transverse processes of the lumbar vertebræ on the *left* side, to which the first stomach or paunch inclines. A cattle trochar will, however, permit the gas to escape with certainty and speed, and should always be used to make the puncture, in preference to any other instrument. As soon as the air is perfectly evacuated, and the paunch is observed to resume its office, the *trochar* may be removed; the wound being carefully closed by a pitch plaister, or other adhesive matter. It is necessary to observe, that this operation is so simple and safe, that, whenever a medical assistant cannot be obtained, no person should hesitate a moment about doing it himself. The domestic remedies for lessening the distention, by condensing the gas, have been various; as oil of turpentine, and particularly ammonia, a strong solution of

which in water has been found serviceable. The alkalies generally have long been used with variable success. Vinegar, in the *Quarterly Journal of Agriculture*, is strongly recommended; but as it is observed that the elastic fluids developed are not always alike, so the effects resulting from the most reputed agents have too often failed. Mr. Youatt recommends the introduction of the chlorinated lime given in doses of from ℥ij to ℥iv suspended in water.

But it is to a foreign veterinarian we are indebted for the best agent for neutralizing the gases given off when the rumen is distended. M. Charlet has recommended the chloride of potash, which substance has a great affinity for the compounds of hydrogen, that usually form the major portion of those which exist in the stomach. This substance is to be given in doses of an ounce to a horse, half an ounce to a cow, and three drachms to a sheep. Occasionally, however, from the contents of the stomach being in a state of fermentation, no gas will escape, upon the probang or trochar being introduced. The chloride of potash is then to be poured down the probang or trochar, whichever may be used, and this substance must not be mixed with either mucilage or aromatic bitters, but sulphuric ether and cold water may be joined to it without injuring its effects.

LAMPAS.

The symptoms of this imaginary disease are, the horse quids his hay, or refuses his food. It is most common in young horses; and the groom looks into the mouth of the animal, when perceiving the bars to be almost on a level with the incisor teeth, he pronounces his charge to have the lampas, and takes the poor creature to be burnt within its mouth accordingly. It is true the animal has recovered its appetite by the time the effects of the burn have passed away, but so it would have done had no hot iron been cruelly employed. The fact is, the young animal is then cutting a molar tooth, and a day or two having elapsed, all the fever and pain occasioned by the process would have been over. No man should allow his horse to be burnt for the lampas. It is a torturing, an idle, and a wanton operation, and tends rather to do harm than good. If an old

horse be reported as having the lampas, examine his mouth, and something may be found wrong with his grinders, or, to a certainty, the cause is to be sought in another part of the body than the roof of the mouth.

WORMS.

Every part of animated existence appears subservient to the purposes of other portions of it; and therefore every thing living may be considered as parasitic, clinging around other living matter for support. Insects, in an especial manner, appear to deserve this character; for many of them actually entomb themselves within other animals, even as if the bowels were their constant habitation, or their temporary residence during particular states. Such, however, is the case with worms, whose lives are passed within the intestines of most animals. These parasites, annoying the horse, are of several kinds. The *Lumbrici*, which resemble the earth-worm, and are not uncommon in the small intestines, where they occasionally do mischief by their irritation. *Ascaris*, or thread-worms, so called from their filamentary figure, are darker and larger in the horse than in man, and reside in the rectum and cæcum occasionally; when they exist in large numbers they may prove prejudicial. The late Mr. Percivall attributed the death of two horses to their presence. *Tænia*, or tape-worm, is but seldom found, and its effects therefore have been little noticed. *Bots* are the larvæ or grubs of the œstrus or gad-fly: and our knowledge of the natural history of this genus has been much extended by that able naturalist and veterinarian, Mr. Bracy Clark. He is, however, mistaken, when he asserts that they are always innocuous: on the contrary, they have even brought on fatal terminations. Mr. Coleman relates an instance which, nevertheless, has no equal to support it, where they had eroded the stomach, and thence had penetrated the diaphragm also. Mr. Cartwright, of Whitchurch, also describes a case illustrative of their injurious consequences.

Horses, however, which are turned out during the summer months, are alone subject to bots. Upon a fine day, a fly may be seen buzzing about the lower portion of the horse's body which is at pasture. All at once the insect

steadies itself by a very rapid flutter of its tiny wings; then it darts at the horse, generally touching his knee, and is away again in a moment; but in that brief space the little creature has found time enough to deposit an egg, and to glue it to the animal's hair. The horse, either stung by the parent fly, or annoyed by the fastening down of his hair, licks the knee to ease the part, and thus conveys the egg into the stomach. The greater number of the eggs swallowed must be lost, but some are hatched by the heat of the horse's stomach, and these become bots; and are often found, when making examinations after death, in vast numbers clinging to the stomach, from which, until their time of change arrives, they have no power to release themselves.

Symptoms of worms.—The most popular is a dry yellow matter under the tail; but it is not invariably present even when worms are known to exist. When worms are hurtful, there is unequal appetite, and an irregular state of bowels; at one time costive, and at another loose, with glair or mucus around the dung-balls. When ascarides prevail, the horse is much disposed to rub the tail, to ease the itching of the fundament. The presence of bots is seldom detected by any distinct signs, except in the spring, when one or more may be detected half protruded through the anus; the reason of its appearance being, that the time has arrived for it to quit the state of a grub for that of a fly. The lumbrici, or round worm, is probably the most generally hurtful; but it is only when it exists in great numbers, or itself becomes morbidly irritated, to seek a change of situation; this symptom applies to ascarides, in which cases both may interfere with digestion and the regular alvine discharges; the provender of the horse, although he eats heartily, does not digest healthily. The skin also, sympathising with the stomach and intestines, occasions a staring coat and harsh feel of the hair. There are frequent attacks of slight gripes; the horse stands with his legs wide apart, and his belly hangs low. The breath is often hot and fœtid, and it is not unusual for a short dry cough to be present. Worms, however, do exist without any of these symptoms. Whoever will take the trouble to visit a knacker's, and to turn over the dunghill in his yard, will

find it to be composed quite as much of worms as of excrement. This dung is taken from the aged horses sent to be slaughtered, and is sufficient proof that worms are much more common than is generally supposed.

Treatment of worms.—Nature has endowed these animals with such tenacity of life, that no matters known to us will effect their destruction, though a few may answer the purpose of their expulsion. Bots are so hardy as apparently to survive immersion in oil, in alcohol, spirits of turpentine, and even powerful solutions of mineral acids. The continued use of salt mixed with the food appears, however, obnoxious to them, for sometimes under its use their hold gives way, and they are ejected. Bitters, purgatives, and the mechanical irritation of pointed bodies, as pewter, tin, &c., have no effect whatever upon bots: but with regard to the other parasites, rather more success may be expected from medical aid, in the form of vermifuges. It has been attempted to effect the removal of worms mechanically, by dissolving the mucus they are supposed to be imbedded in, for which purpose lime-water, oil, solutions of aloes, &c. have been injected by clyster up the rectum, and which practice is most to be depended on for the ejection of ascarides when in the rectum. This practice of washing away the mucus of the intestine, and thus to deprive the intestine of the secretion given for its protection, is not to be recommended, though oil for this end would be harmless. Strong purges are given with the same intent, which may remove them also from the whole alimentary track. Remedies have likewise been exhibited to destroy them within the body, by the mechanical irritation of their spiculi; under which view, tin, brass, iron, pewter, are thought remedial. The Indian caustic barley, and Indian pink, are reputed vermifuges against the teres and ascaris. The oil of turpentine has also been strongly recommended as an excellent general vermifuge; but, except for the destruction of the tænia, or tape-worm, it certainly does not appear to deserve that character.

The mode most in favour with modern practitioners, is to give the horse having worms a drachm, or two drachms of tartar emetic, for six mornings running. The tartar emetic is to be administered in the form of ball, and to a

fasting stomach. Upon the seventh morning, administer to the animal a strong dose of aloes, which drives out the parasites that the previous medicine has enfeebled.

Of other worms and parasitic animals which are found in the horse, the *Filaria* may be noticed, from the peculiarity of its being in India occasionally found within the globe of the eye. It has also been discovered inside the cellular tissues, and within the cerebral, abdominal, and thoracic cavities. A variety of the *Strongylus* has been found in the cœliac artery, and *Fasciolæ* have also been met with in the iliacs. Hydatids likewise, though not very common, are also occasionally observed in the horse, presenting all the characters of the acephalocystes; and to their presence within the spinal canal we are to attribute some of the paralytic affections of the animal.

PARASITIC ANIMALS IN CATTLE.

Of these we shall give a very condensed account. The *œstris bovis*, one of the gad-fly species, to produce what are called *wornulls* or *wormuls*, punctures the skin of cows and calves, and occasionally the hides of horses; it deposits its eggs beneath the integument, between that and the cellular membrane; the hatching of the eggs matures; the abscess formed by the grub is called *puckeridge;* this is ignorantly attributed to a wound inflicted by the goat-sucker, or night hawk. When arrived at their full size, the larvæ make their way out at the external opening, and fall on the ground. From the mischief which they do to the hides, their destruction should be attempted; this may be effected by introducing a penknife to enlarge the openings, and by pressing the insect out. *The œstrus ovis* lays its eggs on the margin of the nose of *sheep*, which becoming larvæ, creep into the frontal and maxillary sinuses, occasioning great irritation. The continental shepherds trepan their sheep, and remove them; but our shepherds have not been successful with this method. Sheep are also obnoxious to a worm called the pallisade, which locates itself within the trachea and bronchii. The *fasciola hepatica*, or fluke-worm, is also a parasitic insect, whose ravages are supposed to be most injurious, but they are to be discovered in most healthy sheep. Horses, asses, and

mules, are occasionally found with them also, as well as rats, mice, &c.; but in sheep, goats, and deer, they are common. Yet what connexion the animal has with disease is involved in much obscurity: certain it is, however, that both rot, and the vast increase of the fluke, are connected with a moist state of the pasturage. Salt marshes never produce it; and salt is supposed to be a remedy in the early stages. It seldom attacks sheep on high grounds; but the sheep having once received the infection, of whatever nature it may be, removal to another pasture is then almost too late.

Hydatids, as producing what is known as *staggers*, or *turnsick*, in sheep, are less common but sufficiently fatal. This vesicular animal, which is found within the cerebral cavities, produces effects which have received various provincial but characteristic names, being called *gid*, *starers*, *goggles*, *sturdy*, &c. They are universal throughout Europe, and, indeed, infest the flocks of most quarters of the globe. Hydatids also make their way, now and then, into the spinal canal, when they occasion paralysis. The vitality of the *tænius globuleux* or *cœnurus cerebralis* is fully evinced on being put into water, which, if it be warm, excites lively motions in the animal, whose size varies from that of a pigeon's egg to the minutest vesicle. They are found sometimes solitary, and at others two or three are placed together within the ventricles of the brain; occasionally they are discovered within the substance of the cerebellum; but more frequently immediately on the surface of the cerebral hemispheres: and it is said they are more common to the right lobe than to the left; their effects are generally produced on the opposite side to that on which the parasitic animal is situated; it is usual to find the hydatid on that side of the head towards which the sheep inclines in his revolutionary gait. When this disease has existed some time, the ravages it occasions are very great: one of the cerebral lobes has been found almost destroyed; one of the ventricles has been distended to ten times its original magnitude: while in other instances, one of the parietal bones has become so absorbed by the pressure of the hydatid, when situated on the cerebral surface, as scarcely to offer the smallest resistance to the touch. It is

more frequent in sheep under two years old than at a later period; and is known by the staggering gait of the affected animal, and its separation from the rest of the flock; the head is held unnaturally low or high, and is carried more to one side than the other, inclining also the general movements of the body to the same side. As the pressure of the hydatid increases, the functions become still more deranged: the sheep staggers about almost unconscious, with dilated pupils, and loss of cud; until coma or convulsions close the scene. Of the *cure* we would remark, that, notwithstanding the hopes held out, it is not often obtained; for the situation of the hydatid is so diversified and so obscure, that it is only when it directly points itself out by its effects on the cerebral parietes, that we are able to detect it with any degree of certainty. In such cases it may be attempted to puncture the vesicle by means of any instrument that will penetrate the bone with safety, after a slight opening has been made through the integuments by a scalpel. A rude instrument is a fine sharp gimlet, which will effect a sufficient opening if passed as far as its screw, or until the hydatid fluid flows, and will prove effective, by evacuating the vesicle without danger of wounding the brain. After the operation, in whatever way performed, should the symptoms not mitigate, there will be reason to suspect that a second or third hydatid remains, in which case the trephine must be resorted to. Subsequent to its use, stitch up the integuments, and secure the head from the effects of cold, violence, or insects. Continental shepherds attempt a rude cure by introducing a long pointed instrument up the nose, through the frontal sinuses, and into the cerebral cavity, by which means the hydatid is often effectually destroyed, and ill consequences less frequently result than would be supposed likely from such treatment.

COSTIVENESS.

Some horses are habitually costive, which arises either from a defective secretion of the fluid of the bowels; or, that the absorbents act too strongly, and take up too much of the liquid contents, by which the fæcal mass becomes dry, hard, and difficult to pass; or it may, and frequently does, arise from a defect in the formation of the bile, either

as to quantity or quality. This we know from what occurs in jaundice, in which, from a loss of the bile by extravasation, there is always present a strong disposition to a costive habit. Some food is prone to occasion constipation, as whatever is stimulating or heating. Corn of all kinds, therefore, has this tendency, but beans more than all. *Habitual costiveness* should not be counteracted by purgatives, as they generally increase the evil; but attention should be paid to the habit itself, and the peculiar tendencies of that should be counteracted. Dry food should be remedied by occasional bran mashes. Green meat is particularly useful in these cases in summer, and carrots in winter. A costive state of bowels may sometimes be remedied by placing a lump of rock salt within the manger. When costiveness arises from defective bile, treat as directed under jaundice.

Occasional or *accidental costiveness* must be treated differently. First, back-rake, next throw up a large laxative clyster; and then proceed to give a mild purgative by the mouth.

DIARRHŒA.

This complaint is, when properly considered, an increased power of the peristaltic action, with a greater secretion of a watery fluid within the intestines; or, otherwise it may arise from a want of a proper absorption of the fluid part of the intestinal contents; whereby there follows a frequent evacuation of the dung in a very liquid form; or it may also spring from the irritability or slight inflammation of the mucous membrane. It is distinguished from dysentery by the purging being incomplete from the very first; by its being less copious, having all the fæces in solution without any glairy mucous matter; and, also, by being seldom accompanied with fever, or any great affection of the general health. Some horses are very liable to purging on every exertion, and such are termed, by grooms, *washy*, having usually narrow chests and lank bellies, by which the intestines have not sufficient room for their natural processes; but are pressed on, and thus forced to a hasty expulsion of the unassimilated contents.

Causes.—Diarrhœa may arise from mechanical pressure,

resulting from the last cause; thus a light belly is often found with occasional diarrhœa; or it may arise from a debility in the intestines themselves. A weakened state of the bowels, inclining to this affection, is often brought on by drastic purges. It may likewise spring from the intestines containing some offensive matter, which nature is striving to cast out; little dung being emitted at a time.

It may also be occasioned by the sudden application of cold, whereby the exhalent vessels of the skin becoming checked, more fluid is necessarily thrown on the intestines; and which operates not only by increasing their quantity, but likewise by the addition of something foreign, hence irritating to them. In these cases, which are marked with thirst and increased pulse, the restoration of the healthy action of the skin is necessary to a cure; and as the balance of power *has been* in favour of the intestines, it would be desirable *now* to turn it in favour of the skin, by making use of the few horse diaphoretics we know of, as *antimony*, *warm clothing*, &c. &c.; and by avoiding the use of outward astringents.

The treatment.—In general cases, when the motion is copious, little need be done. Nature is then relieving herself, and requires little more than warmth and a change of diet. If constitutional, we must palliate by a mild but constant check on the existing causes: a light-bellied horse should not be worked severely several days together; avoid too much water, or too early labour directly after meals. Let the fæces be examined: if the food passes away undigested, the stomach requires tonics to restore its tone; but if it be a recent attack, examine well for the probable cause. Has it followed any undue exposure, any violent exertion, any change of food, any great difference in the warmth of the stable? Is the water good in quality; are the oats, or is the hay new? If none of these causes operate, we must first make ourselves aware that it is the fæcal discharge which passes, for such appearances have concealed an obstinate constipation. Being convinced of the diarrhœa, commence the cure by mild astringents. It sometimes happens, when diarrhœa has been long continued, it seems to pervade the whole alimentary track, so that, at the last, the cæcum and rectum become equally affected; then dysentery is esta-

blished, and a distressing tenesmus prevails. In such cases give astringents by the mouth, as well as by injections. Commence, however, the cure of general cases of diarrhœa by giving the following drink once or twice a day, according to the violence of the complaint:—

Prepared opium	half an ounce.
Powdered catechu	one drachm.
Prepared chalk	one ounce.
Sulphate of iron (*green vitriol*)	half a drachm.
Starch, boiled thin	a pint.

Mix.

Should the horse be weak, boiled starch, or arrow root, or boiled bean meal, may be horned down the throat frequently. Give no cold water to drink, but, instead, give thin gruel or rice-water, tepid. Clothe warmly, encourage a fine temperature also, and carefully avoid exposure to sudden currents of cold air. Green meat has been known to check diarrhœa which had resisted every other attempt. To the more intimately understanding of this complaint, under its several varieties, see the subject of Dysentery.

DIARRHŒA IN CATTLE.

Looseness, scantering, scouring, is much more frequent in kine than in horses. It is occasioned by intemperate and long-continued travel in hot weather, or by cold supervening on heat, damp and wet, lying out, &c. &c. Sometimes, however, it springs up without any obvious cause, and while the cow is apparently doing well, milking well, feeding well, and laying on flesh within the shed. The conditions under which the disease makes its appearance must always be ascertained. If the animal be weakly, as the generality are when they exhibit diarrhœa, a tonic every day, with a change of food, and an occasional walk about the yard for exercise, will be beneficial. If strong and healthy, give the following:—

Sulphate of magnesia (*Epsom salts*)	half a pound.
Powdered ipecacuanha	a drachm.
Sulphate of iron (*green vitriol*)	a drachm.

Feed liberally, and give bean meal in a mash or otherwise: the prepared rust of iron has been given in doses of half an ounce in a ball, with advantage in these cases. If the colour of the external membranes declare the liver to be

affected, the case must be treated as one of a mild hepatic affection, cautiously guarding, however, against any approach to salivation.

SCOURING IN CALVES.

From a morbid stomach secretion, calves are very prone to diarrhœa. The chief cause, however, is irregularity in the feeding, both as to quantity and quality; the slightest inattention to these points soon brings on this disorder. To remedy diarrhœa, graziers give the calves chalk to lick. When looseness has appeared they also give chalk in milk (which is a good domestic remedy), as well as starch or bean flour boiled in their food. But when these fail, give the following, which is almost certain in its good effects :—

Prepared chalk	half an ounce.
Powdered opium	half a scruple.
Powdered catechu	a scruple.
Ginger	a scruple.

Sheep are subject to scouring; and *lambs* are also liable to a similar looseness with calves. In either case, the rules already laid down exactly apply, making one-sixth of the quantities of the previous dose.

CRIBBITING.

This peculiar action is very generally, but is erroneously supposed to arise from a small quantity of air drawn into the stomach: and is hence called *sucking the wind*. On the contrary, it consists in the simple eructation or forcing out of a small quantity of gas, let loose from morbid combinations within the stomach; which gas, as it proves a source of irritation, the horse, to aid its expulsion, applies his teeth to a fixed point, whereby to help the effort he is about to make. To prevent the action, it is common to place a tight strap around the throat; this, by compressing the œsophagus, effectually hinders the animal from indulging the habit.

It is considered a vice, an action acquired, &c.; but we believe it always commences in dyspepsia. We never knew an instance of its being contracted at grass; but turning out in a straw-yard is a very common cause. It

may certainly be traced to idleness; but then it cannot be supposed that the mere action of cribbiting, were it either a vice or an amusement, could tend to deprive a horse of flesh. The faulty digestion at once keeps them thin, and makes them prone to assume this dyspeptic symptom, which, once acquired, is lasting from habit, even although we could remove the original cause. To prevent the cribbiting, nothing more is necessary than to place a strap of two and a half inches broad around the throat, tightened only to the degree necessary to prevent the action; this it does by rendering it painful to distend the œsophagus. The first symptom of cribbiting is usually the licking of the manger, which habit the horse about to crib will indulge for hours together. If taken at this point, and a piece of rock salt placed before him, the animal will apply his tongue to it; this usually prevents him from becoming a cribber, by giving him employment and strengthening his stomach. Most persons imagine that cribbing rounds the teeth, which is an unfounded prejudice, though horses of a nervous temperament, which snap and bite much while being dressed, generally have the incisors very much rounded. Some horses, notwithstanding they are inveterate cribbers, get fat, and perform the work briskly, even to the end of prolonged lives.

MORBID DISPLACEMENTS OF THE INTESTINES, &c.

RUPTURE, OR INTESTINAL HERNIÆ.

Hernia, in its strict sense, is a protrusion of any viscus out of its natural cavity; hence we have hernia of the brain, of the lungs, and of the various viscera of the abdominal regions. Hernia, as we propose to consider it, is a displacement of the intestines from the abdominal cavity, either through some of the natural openings or through artificial ones, the effects of accident. When such protrusion takes place through a moderate opening, and the portion of gut can be readily returned, it is called a *reducible* hernia; but when it occurs through a small opening, and the intestine cannot be replaced, it is termed an *irreducible* hernia. If the mouth of the opening, round the

intestine, constringe, and prevent the return of the bowel, it then forms a *strangulated* hernia, and usually proves fatal, unless relief be promptly obtained.

The hernia by far the most common in the horse is the *inguinal*, of which the scrotal, or when the bowel descends into the scrotum, is most frequently observed in the stallion. *Bubonocele*, or that of the groin, is a very rare form of disease, but is occasionally witnessed in geldings. In the former, the intestine accompanies the spermatic cord by the inguinal canal through the abdominal rings into the scrotum: in the latter the bowel alone lodges in the groin. The ruptures we have named may be considered as the only ones common to the horse. Some of them are very rarely seen: hernia is more frequently on the right than on the left side; and scarcely ever appears in mares. However, ventral hernia or rupture of the muscles of the abdominal sides, and protrusion beneath the skin of a portion of intestine, is sometimes beheld in either sex, and perhaps of the two, is more frequently witnessed in the female.

The *causes* which produce herniæ are various, but all arise from violence of exertion, or the effects consequent upon external injuries. With us the efforts used in racing, and the leaps taken in hunting, are causes, as we may readily suppose; when we consider that the dilatation of the abdomen, restrained as it is by weight and tight girthings, must press backwards the intestinal mass. Rearing and kicking also, and being cast for operations, particularly the rising up after castration, have all brought it on. Blows with a thick stick, or from the horn of a cow, may likewise induce it.

The *symptoms* of strangulated hernia are very similar to those of an acute enteritis: there are the same uneasiness, shifting of position, getting up and lying down again. The horse rolls in the same manner, and in turning on his back sometimes seems to get a momentary respite from pain; yet it is but momentary, for the suffering is not one of remission; it is constant; this will serve as one distinguishing mark between it and spasmodic colic, with which it has been confounded. In stallions, a pathognomonic symptom is, that the testicle on the hernial side is drawn up to the abdomen, and is retained there, with only mo-

mentary fits of relaxation; towards the last the pulse is quick and wiry; the horse paws, looks at his flanks, but seldom kicks at his belly. We assure ourselves of hernia by an oblong tumour in the groin, of larger or smaller bulk; hard or soft, as it may contain either fæces or gas, in which latter case it will also be elastic. When the tumour is raised by the hand, or pressed, a gurgling sound is emitted; or if the horse be coughed, it will be sensibly increased in dimensions.

The treatment of strangulated hernia.—The horse suffering under the affection we will suppose to be a stallion, and then describe the various manipulations for his relief: firstly, the examination into the state of the hernia; secondly, the application of means preparatory to the application of pressure; thirdly, the application of pressure itself; also, the operation of removing the stricture; and, likewise, the application of the various processes to hernia in the horse.

The treatment of hernia in a stallion.—First, *the examination of the hernial sac.* In this manipulation both hands are employed; one is introduced into the rectum, the other into the sheath. The one within the rectum must seek the internal ring; while the other, pursuing the course of the cord on the side affected, is to be pushed up to the external ring; and thus, in the natural state, the opposed fingers may be made nearly to meet, and so estimate the size of the opening. However small the protruded portion of gut, the practitioner will be able to detect, and even to reduce it. *This exploration may be made in the standing posture; but it will be conducted with more facility and certainty if the animal be cast, which is the preferable mode of proceeding.*

Secondly, the *application of means preparatory to the taxis:* these are said to be bleeding, and partially paralysing the parts by administration of chloroform; or lessening the volume of distention by dashing the part with cold water; or, if the horse be already cast, by spreading ice over the belly.

Thirdly, the *manual efforts to return the displaced gut.* To fulfil this indication, we are, with the same hope, at once to proceed thus. The horse is to be thrown upon the opposite side to that disordered; and after one hind leg has been drawn and fixed forward, as for castration, he is to

be turned upon his back, and in that position maintained by trusses of straw, while other trusses are placed under him to raise the croup. With both arms well oiled, or covered with some mucilaginous decoction, the operator will now commence his exploration, taking the precaution of emptying the rectum as he proceeds. As soon as he shall have ascertained that it is a case of hernia; have assured himself the gut protruded through the ring is undergoing neither stricture nor strangulation; he may endeavour to disengage the hernial part, by softly drawing it inward within the cavity, at the same time pushing it in the like direction with the hand within the sheath. Should he experience much difficulty in these attempts, he is to desist; violence being too often the forerunner of strangulation and gangrene. He must bear in mind, also, that although the reduction is effected, unless it be followed by immediate castration, it does not always prove to be a cure: the protrusion recurs after a time, and occasionally even the moment the animal has risen. If the taxis should be fortunate enough to reduce the hernia, and it be not intended to castrate the horse, apply a well-wadded pledget, or folded cloth, to the part; this may be retained with a bandage crossed between the legs from side to side, and fastened by one part under the belly to a girth; and also passing between the legs, it may be again made fast to the back portion of the same girth; the intention of this is, to prevent the protrusion of the gut by the exertion of rising, and consequently it should be removed as soon as that danger is over. If a radical cure were attempted, of course the clams would supersede this, either in the stallion or gelding.

And, concerning the *treatment of strangulated herniæ in geldings*. Inguinal hernia taking the same course, is susceptible of the same terminations, and requires the same treatment, as in stallions. The taxis is to be employed, and will be used with most effect, the operator (the horse lying upon his back) extending the hernial sheath with one hand, while he manipulates with the other; or, should this fail, by instructing his assistant to hold up the hernial mass from the belly, so as to take its pressure off the ring, and thus give him an opportunity to renew his efforts with more effect. In some cases, the introduction of one hand

into the rectum becomes necessary. The reduction of the hernia should be followed up immediately by the application of the clams, if we unite with the reduction an attempt at permanent cure of the hernia; taking care, at the time, to draw out the part of the scrotum to which the vaginal sheath is adherent, and to push up the clams as close as possible to the belly; they are then to be closed, as for castration.

Of *congenital hernia,* our limits allow of little more than the mention; nor need more be detailed, as its consequences are seldom injurious. It appears that inguinal hernia commonly exists in the fœtus in utero. M. Lineguard, V. S., of Normandy, where breeding is very extensively pursued, has ascertained that enterocele is invariably present at birth; even in abortions, and in subjects still born. The *congenital enterocele* is an attendant on birth, increasing up to the third or sixth month, but afterwards diminishing, and ultimately vanishing. Should it continue beyond a year or eighteen months, it is to be regarded as a chronic or permanent hernia. *Chronic* or *permanent hernia,* it may be remarked, our observations being so much limited to geldings, we see little of. Castration, however, with the armed clams, is the evident cure.

STRANGULATION OF THE INTESTINES, OR MORBID DISPLACEMENT OF THE INTESTINES.

The intestines, in consequence of their peristaltic motion, become sometimes entangled together, and a fatal strangulation takes place; this happens, occasionally, from some of the mesenteric folds entwining them; sometimes by their rupturing the mesentery, and becoming strangulated by passing through the opening they have made: but it is much oftener the consequence of *spasmodic* action, and during colic these *inversions, involutions, invaginations,* and *introsusceptions* occur. When thus affected, it is not unusual for the ileum to become reversed in its usual course; in which case a portion, then contracted by spasm, becomes forced into a part less constringed, and an impenetrable obstruction thence is formed. We may draw a practical inference from these cases—that in spasm we should attempt an early relief; and likewise that we should endeavour, in

all cases of failure in bowel affections, invariably to make a *post-mortem examination*: and this we may do on the ground that repeated cases may enable us accurately to interpret symptoms; then, although we cannot relieve, we may offer such an opinion as will convince our employers it is not our ignorance of the signs, but our circumscribed means, which is the cause of our incapability to afford assistance.

CHAPTER VI.

DISEASES OF THE GLANDS.

JAUNDICE.

JAUNDICE, by farriers called *the yellows*, as a distinct affection, is unfrequent in the horse, from his hepatic system being without a gall-bladder. As a symptomatic affection, it is, however, more common; for whenever any great abdominal inflammations occurs, the liver is very liable to participate; bile then passes into the bloodvessels, which thence is thrown on to the skin. Occasionally also a more slow and primary affection of this organ occurs, and the biliary secretion appears either increased in quantity, altered in quality, or obstructed; when the consequence is, that the evacuations are irregular either in quantity or quality. This state is *betokened* by listlessness, dyspepsia, irregular appetite, and early fatigue under exercise: there is some biliary suffusion in the membranes of the eyes, nose, and mouth. Most liver affections in the horse, however, excite no attention until they terminate fatally.

In our *treatment* of such a case, it is perceived, that we must attempt to produce a healthy action in the liver. To promote this intention (as in the greater number of cases costiveness is present), begin by giving the following:—

No. 1.—Calomel	half a drachm.
Aloes	two drachms.
Powdered gentian	two drachms.
Castile soap	two drachms.

Form into a ball, and give night and morning until the bowels are actively purged; then continue only so much of the same, for a week or ten days, as will keep

the bowels lax, not in a purging state. If the symptoms be such as bespeak chronic inflammation, or incipient consolidation, blister the right side. In cases where costiveness is not present, but, on the contrary, a relaxed state of the bowels appears, give the following:—

No. 2.—Calomel	.....	a scruple.
Blue vitriol	.....	half a drachm.
Gentian, in powder	.....	three drachms.
Oak bark, in powder	.....	three drachms.

Make into a ball, and give night and morning, unless the calomel should affect the mouth, in which case give only once a day. Should the looseness increase on this plan, add powdered opium, a drachm to each ball. In all cases of *yellows*, a change of food is proper, and generally necessary. In winter, spear the corn, or give carrots; in summer, soil, or give green grasses; but, in such case, avoid exposure to the night air, making use of moderate clothing so long as the calomel is continued.

THE YELLOWS, OR JAUNDICE, IN OXEN AND SHEEP.

These animals having a gall-bladder and cystic duct, are more liable to biliary *obstructions* than horses; hence this complaint is more frequent among them. It is very common in some of the cold provinces on the Continent, where these animals are stall-fed in winter; from which, numbers of them are attacked with it in the spring. In England, it is less often the consequence of confinement than of a slow inflammation of the liver.

The *symptoms* are standing apart from the herd, looking ragged, with signs of constitutional disturbance, and a peculiar yellowness of the skin, as well as sometimes of the hair also. Cows are more liable than oxen to the disorder; and when cows are attacked, the milk often becomes discoloured, as well as occasionally ropy.

Treatment.—The remedy in this disease depends upon the administration of tonic bitters, purgatives, and alkalies, in order so far as possible to supply the loss of the natural secretion. With these agents are blended, in case any enlargement can be detected upon the right side, a blister over the swollen part, and the exhibition of iodide of potassium night and morning, in half drachm doses.

TRUE RED WATER IN CATTLE.

Red water appears to be a disease of the digestive organs, and is justly attributed to derangement of the liver and stomachs. Unhealthy bile renders the chyme also unhealthy. The chyme, of course, affects the chyle; and the chyle likewise affects the blood, the quantity of which it supports. Thus the consequence of the bile being improperly secreted, is an altered state of the vital fluid; the red particles of which are imperfectly formed, and it then becomes the office of the kidneys to remove them as foreign bodies. Red particles, therefore, are voided with the urine, but not sound or entire. On the contrary, the microscope shows them to be broken down, as though they had been ground up in a mortar; and it is upon the presence of these imperfect foreign bodies, that the colour of the urine depends. The disease is ushered in by diarrhœa, to which constipation succeeds. When it has taken deep hold of the digestive system, the liver is affected, and its secretions are unhealthy, and morbidly stimulate the intestines; the secondary costiveness often complained of gives place to an obstinate diarrhœa.

Causes.—This disease prevails in some parts of England, and is unknown in others. It is associated with feeding on particular pastures, upon which cows can scarcely be allowed to run without their displaying the disorder. It is also connected with the performance of certain natural functions; thus, in some places, red water is common after calving, and in those places dropping after calving is unknown. In other localities, dropping generally happens, and in those places red water is a very rare occurrence.

Symptoms.—Those of general constitutional disturbance in cattle, united with a pulse bounding at the heart, and scarcely to be felt at the jaw. The beat of the heart is even loud; but the symptom peculiar to this disease is the discoloured state of the urine, which assumes all the intermediate tints between the palest ale and the deepest porter.

Treatment.—Those who advocate bleeding say the vein is to be pinned up the instant the pulse falters, or the delay of a few seconds may lose the life of the animal.

Bleeding, however, is not imperative for the perfection of a cure, and being dangerous, it is better, therefore, not attempted. In red water, whether constipation or costiveness exist, administer a strong purge, in which, if the beast is purging at the time, it is usual to mix half a pound of currants; the appearance of the currants in the fæces being supposed to be proof positive that the medicine has had its effect. Such evidence is more than delusive; however farmers insist on seeking it, and the veterinary surgeon must obey. In this disorder, however, give the following drink:—

Epsom salts	a pound.
Flowers of sulphur	half a pound.
Ginger	one ounce.
Powdered gentian	two ounces.
Gruel	one pint.

If the symptoms do not evidence that the virulence of the disorder has abated in six hours, give half the above; and if in eight hours it has no effect, give calomel two drachms, in half a pint of thick gruel, or else shake the powder upon the tongue. This may be repeated; and at the expiration of another eight hours after the two doses of mercury, a pint of oil, with a drachm of chloroform, may be given; for at every risk the bowels must be opened, which in the great majority of cases the first drink will accomplish. After the purgative has acted, administer mild stimulants, as a quart of sound ale twice a day, with tonics, but no astringent medicine.

HÆMATURIA, OR BLOODY URINE IN HORSES.

Farriers term this *passing of blood:* and it arises sometimes from pure topical inflammation of the kidneys, in which case it must be treated as under that head: it may accompany a stone in the pelvis of a kidney, or be caused by an ulceration of any of the urinary passages; but these are unusual origins. Violent exercise, by rupturing the small vessels of the kidneys, produces it most often, and therefore it frequently follows hard riding.

The *cure* must consist in restoring the healthy action of the parts, and promoting a healing of the vessels; more particularly, in avoiding violent exercise and heavy weights. Diuretics are always hurtful. Mild astringents are proper, as bark, catechu, dragon's blood, logwood, &c. Of all

medicine, however, the greatest confidence is to be placed in sugar of lead, or a long course of sulphuric acid, mingled with the water which the animal drinks. Great benefit has been known to be derived from a large strengthening plaister across the loins. In one instance, the following, given twice a day, produced excellent effects, after many other means had failed :—

Acetate of lead	two drachms.
Common mass	a sufficiency.

Make into a ball.

The sulphuric acid is to commence when the administration of the sugar of lead ceases.

PROFUSE STALING.

The above is not an uncommon disease in the horse. In its worst form, it is attended with an immense flow of urine, insatiable thirst, and rapid emaciation ; with an increase of appetite at first, but a sickly one as the disease proceeds. In its usual type it appears as an immoderate flow of the urinary secretion, sometimes limpid, at others turbid, and lastly of a whey-like appearance. It usually originates in some extraordinary stimulus applied to the kidneys, commencing sometimes with the digestive organs ; but more generally the effect appears confined to the kidneys, which become locally affected from powerful diuretics taken into the stomach, either in the form of food, as mow-burnt hay, kiln-dried oats, some vegetable matters browsed from hedges and fields, or otherwise from medicines too active, and ignorantly forced down the horse's throat. Ship-oats when heated, and some particular plants in hay, are also supposed to occasion it : hard brackish water is likewise thought to produce it.

Treatment.—As the cause, in general cases, is not very occult, it would be a prudent precursor to review the circumstances connected with the general management of our patient. Have the whole of the animal's food changed. Order him different water. Caution the groom against the use of diuretics, but place no dependence upon his strongest assertion, that he never gives the horse any physic. If there be merely a superabundance of urine over the liquids taken, moderate doses of catechu, kino, or oak bark, will

be sufficient to check the flow; and the same remedies may be applied in cases where violent diuretics have been the cause. It will also be prudent to apply a warm strengthening charge over the region of the loins; this we have found very serviceable in the urinary fluxes in old horses. If the urine be very turbid, if there is evident wasting of the body and loss of appetite, giving reason to suspect much derangement of the digestive and assimilating powers, try the following drink every day:—

Uva ursi, in powder	four drachms.
Oak bark, in powder	one ounce.
Catechu, in powder	two drachms.
Opium, in powder	half a drachm.

Support liberally on wheat or barley, or ground beans; but more particularly the former given in lieu of oats, or mixed with the corn; feeding with grasses, carrots, or beet, &c. If this, after a sufficient trial, does not benefit, try the following night and morning, clothing the body warmly. Or if the above measures produce no evident change in a day or two, administer the ensuing daily, in the form of a ball:—

Iodide of potassium	one drachm.
Common mass	a sufficiency.

CHAPTER VII.

DISEASED COLLECTIONS OF FLUID WITHIN CIRCUMSCRIBED CAVITIES.

HYDROCEPHALUS, OR DROPSY OF THE HEAD.

Hydrocephalus internus is a rare disease in the adult horse; but it sometimes appears as a congenital affection. It seems, when it does occur, to be the effect of some morbid irritation of the brain or its membranes, terminating in serous effusion within the ventricles, or between the arachnoid membrane. Such irritation may be acute or chronic; it may be sufficiently violent to produce the active symptoms of mad staggers; or it may be the consequence of only a slow pouring out of the interstitial fluid, which shall occasion sleepy staggers, or the megrims; it may, how-

ever, show itself in paralysis, when the fluid penetrates into, or communicates with, the spinal canal. In the examinations made after death, there has been very often found marks of both thoracic and abdominal inflammation: the lateral ventricles have been distended with serosity; the plexus choroides usually pale, sometimes studded with small tubercular spots; occasionally they have been much injected: the medullary matter has been pale, sometimes less cohesive than natural, as though softened by the fluid. All treatment, hitherto adopted, has proved entirely useless to render the horse of any future service to his master.

HYDROTHORAX, OR DROPSY OF THE CHEST.

Hydrothorax consists in a collection of serous fluid within the cavity of one or both pleuræ. It forms a very common termination of pleurisy, and appears to arise in these cases from a peculiar disposition on the part of the arteries of the pleuræ to secrete an inordinate quantity of serous interstitial fluid, towards the close of the disorder. Many gallons of fluid have been found so formed within a very short space of time. In some instances the fluid has been discovered mixed with pus; and in others, coagulable masses are found floating in it.

The *prevailing symptoms* are, breathing difficult, and that in the proportion to the water effused in the chest; the horse is seldom found lying, and if he does recline, it is but for a very short time. A few days of suffering reduces the pulse very much; while swellings, almost universal, are seen over the abdomen, the sheath, the thighs, and legs. Moreover, if during the attack the hair of the tail, or of the mane, be pulled, it will generally come out with ease, and by handfuls.

Treatment.—Mr. Percivall very justly observes, that this is almost an affair of desperation; and therefore we must the earlier attack our enemy, by supporting the horse with every means at our disposal. To detect water of the chest, apply the ear to the sides, beginning at the bottom, and moving it upwards towards the spine. Where no murmur whatever, nor any sound of any kind can be heard, conclude that up to the point where silence prevails, water has been effused. But where a murmur, occasioned by the

atmospheric air rushing into the lungs, can be detected, set it down that the fluid has not reached so high. As soon as the judgment is determined, perform an operation in the manner detailed below.

The operation of paracentesis thoracis, or *of tapping the chest*, consists in first making a slight opening through the integuments; when the skin is to be pulled on one side, and the trochar inserted. The situation for making the opening is near to the anterior edge of the ninth rib, but not too low down, for fear of harming important structures. The skin being drawn aside the canula armed is to be thrust in, and gently pushed forward, till all opposition is mastered; then withdraw the stillet, and push the blunt tube onward. Sometimes the sides of the chest are covered with pus and coagulated fibrine, which prevent the fluid from rushing forth. A probe, therefore, may be introduced, and moved quietly about to remove the obstruction. Fluid is thus drawn off; but supposing it to be present upon both sides, there is some dispute as to how much, or the manner in which it ought to be abstracted. If all be taken at once, nature sinks under the operation; therefore it is best to take a third from each side, using care that the amount drawn from both sides renders them equal as to what remains. Then giving the horse the best of provender, and the animal having perfectly recovered its tranquillity, repeat the operation at the expiration of eight hours; this time inserting the trochar lower down, and in another eight hours draw off the remainder of the water. The trochar, in this last operation, must be inserted very gently, and care be taken that the stillet be withdrawn immediately upon the sides being pierced.

No fear need be entertained about making these numerous holes in the horse's sides. No damage will be done, even though the practitioner should encounter a dry tap, or though no fluid should be found within the chest. The subsequent treatment is to give the most powerful tonic medicines, and the most decidedly nourishing food. Carrots and roots may be allowed, but all grasses must be strictly prohibited. Linseed may be mixed with the food, and ground beans are especially beneficial. Medicine, however, must not be forgotten. All astringent substances

must be denied, and there are simple bitters in the list of tonics. Drugs, likewise, that promote absorption, are to be chosen, and there is one agent which is powerful in this direction :—

Powdered opium	a drachm.
Quassæ, powdered	six drachms.
Iodide of potassium	one drachm.
Carbonate of ammonia	one drachm.

Mix with honey or treacle, and give every night and morning.

If treated in the above fashion, half a diuretic ball being given once every week, and the bowels kept laxative with bran mashes, the horse may, in three months, regain all his powers; but, of course, the animal, as he must be stabled all the time, should be valuable to cover the expenses.

HYDROPS PERICARDII, OR DROPSY OF THE HEART.

Inflammation of the heart is apt to terminate by an inordinate effusion of serum within the membranous sac, called the pericardium. If it admit of a natural cure, or of one founded on promoting absorption, is very doubtful; and an operation in this case requires considerable skill, holding forth small hopes of benefit.

ASCITES, OR DROPSY OF THE BELLY.

Ascites is a morbid increase of the serous fluids which, in small quantity, naturally pervades the cavity of the abdomen. As a sequel of other affections, it is by no means uncommon. The serous membranes of the horse appear very prone to inflammation; and effusion into the cavities, which they render smooth for motion, is the common consequence. Æquine ascites may be brought on by the connexion which the serous membranes have both with the skin and the kidneys, as secreting organs. Whatever, therefore, seriously interferes with the functions of either, may prove a source of serous effusion.

The *symptoms* usually first noticed are œdema of the external parts of the belly, chest, and sometimes of the extremities; which often bring to the recollection some lassitude and disinclination for exertion. The urine is made in smaller quantities than natural, and some costiveness is

present. As the serous accumulation proceeds, the belly becomes more pendulous, and, upon striking, emits a dull sound: the pulse and breathing both now grow somewhat hurried; the former being small and but little developed. The early constipation gives place sometimes to diarrhœa of fœtid stools, and that particularly where the liver is much affected or the disease is much advanced; at which stage the pulse is often found to be hardly perceptible by the artery, but to vibrate with a peculiar thrill at the heart. The appetite now fails; peritoneal irritation frequently produces colicky symptoms; and a few active pangs carry off the poor beast.

The *post-mortem examination*, as may be supposed, very frequently shows the kidneys pale within; the liver sometimes much diseased, occasionally but little so. The mesenteric folds are often thickened, adherent, and show coagulable deposit on them; and the peritoneum is also seen frequently thickened either by original inflammation, or by subsequent irritation and maceration. The fluid thrown out is serous, occasionally (though seldom) muco-purulent; sometimes uniform, but more frequently, like other serous accumulations in the horse, at least like those of the chest, it is mixed with coagulable masses or flocculent portions. The quantity varies, but is very seldom enormous; this may be accounted for by the horse being generally destroyed ere the quantity becomes great.

The *treatment* of ascites promises little; because it is rather a symptom of visceral disorganization than of simple irritation: we are warranted, however, in attempting the removal of the fluid by exciting the absorbents, as detailed in Hydrothorax; and by strengthening the system generally by tonics. We must, however, use no depletion: it may also be observed, that purgatives are not admissible here: on the contrary, they may be expected to occasion much constitutional disturbance. External frictions, frequent and long continued, are best; with gentle, repeated exercise, aided by warm clothing. But as soon as fluctuation is distinctly perceived, at once proceed to the operation of *tapping*, because it will offer the only reasonable chance in the complaint when performed early.

Paracentesis abdominis is a simple operation. The spot

chosen for the opening should be upon the linea alba, midway between the umbilicus and the sheath: in the mare, between the umbilicus and pubes. This point should be chosen for the puncture, which ought to be made directly upwards; and both this and the former operation must be conducted and treated upon similar principles, with the exception, that in ascites the whole of the fluid may be evacuated at once, and allowed further to drain off, by the simple application of a linen bandage. Should any prospect of benefit be derived, endeavour to prevent a recurrence by strengthening the general habit.

CHAPTER VIII.

DISEASED COLLECTIONS OF FLUID WITHIN THE CELLULAR MEMBRANE.

ANASARCA, OR DROPSY OF THE SKIN.

Anasarca, Œdema, and Water Farcy.—We need make no distinction between these terms, particularly the two first. As generally accepted, œdema carries probably rather a more local definition with it; thus we say an œdematous swelling: but anasarca is more frequently used to designate an extensive dropsy of the cellular membrane. Both, however, have the same origin, and are accompanied by the same symptoms. It differs from ascites principally in its external seat, which is sometimes partial and sometimes general. It also appears under different forms, as it has different origins; and its terminations are also under the influence of these circumstances. A debility of the absorbent system is usually observed in the spring and autumn. There is, however, some general atony of the whole system, and the œdema disappears as the constitution establishes itself. At other times anasarca and œdema appear as accompaniments or sequelæ to acute diseases that have disturbed the functions generally, in the which case the absorbents become irritated; or to the œdema is added tumefied lymphatics.

WATER FARCY.

This Protean complaint defies definition. At the close of long febrile affections the œdema is such as not only to tumefy the lymphatics, but sometimes to make its way externally by ulceration or by rupture of the vessels of the skin. The affection, by a very easy transition, can degenerate into cracks or grease. Its *treatment* involves all we have already detailed on hydrothorax and ascites:—internal tonics; but more potent external stimulants, by punctures, by blisters, by friction, and by sustaining bandages; liberal feeding; mild but continued exercise. The free use of green food, however, as being at once diuretic yet laxative, is indicated; or in winter spear the corn, or give carrots, &c. &c.; for succulent vegetable matter is of much consequence.

Water farcy, therefore, has as much to do with anasarca as with either true farcy or glanders. Gibson is not very wide of the mark when he describes it as of two kinds; one resulting from febrile attacks, the other partaking of the nature of dropsy. A limb in these cases is often suddenly seen to be gorged, and sometimes so, as to press out the diseased accumulations, which hang around it like dew drops. One singularity of it, which is noticed by Mr. Percivall, and must have been also observed by others, is, that it often confines its attack to one limb only. It will sometimes break out in a state of grease; and sometimes it will extend itself to the opposite limb also.

The *treatment of water farcy* should be prompt, or true farcy may follow. The limb is hot and tender, and four quarts of blood in this case may be taken from the sephena vein, to increase the absorption; a mild purgative warmed with carminatives may likewise be administered. Should these not produce the effect, mildly blister the limb, and give tonics, mixed with the iodide of potassium, in the form recommended for hydrothorax. If the swelling does not after all return to its healthy size, the appearance of farcy at some distant period may be expected.

SWELLED LEGS.

Partial œdema of the extremities, more often of the *hinder*, is too well known to need much description. What has been said already will apply here: debility, partial or general, is the cause. At the close of long continued diseases, which are weakening, the legs always swell; and it is reasonable to expect they should do so, when we consider how far they are removed from the centre of circulation. The absorbents may also be themselves affected; but it is more than probable they are the least part of the cause, for we find them, in these cases, fully equal to taking up the fluids; as a little exercise often removes the whole swelling. Sudden changes in the temperature of the atmosphere that horses are used to, or in the degree of clothing they wear, or hasty alterations in the nature of their food, may any of them occasion swelled legs. Thus it is, that when horses removed from grass, or from a straw yard, are brought at once into a hot stable, and fed highly, their extremities swell immediately; for the powers of life are unduly pushed before the transporting vessels are able to act on the increased secretion: therefore arises a necessity for the administration of tonics, or medicines, to strengthen the system, which, however, will be found less necessary when the changes are gradually induced. Standing in the stable acts in the same way, by weakening the constitution; and hence exercise is doubly useful; first, by assisting the circulation, secondly, by the increased action it excites in the absorbents, and in reviving the drooping health. On the contrary, turning horses out to a straw yard from full feeding, warm clothing, and a hot stable, may likewise bring on swelled legs, by occasioning a general debility: and when they do suffer from this cause, it is, in general, very acutely. It is thus that standing in snow, or in long-continued wet, produces swelled legs, by weakening the parts, and by being unfavourable to absorption. It is very usual also for horses to have œdematous extremities in autumn, at which period the powers of life are unequal; there being an increased action in the skin to produce new hair rapidly, and those parts most remote from the centre of circulation are consequently unequally supplied with vital energy.

Cure.—This will not be difficult, when we make ourselves master of the cause. In removing horses from grass to the stable, with the precautions mentioned, it may be prevented; but when it has occurred, it must be combated by hand-rubbing, bandages, tonics, and gentle exercise. When swelled legs occur in a horse that is thin and impoverished, the general debility must be counteracted to promote a cure, by feeding somewhat liberally, particularly with a mixture of the edible roots, as carrots, parsneps, mangel-wurzel, &c. &c.; it is aided also by giving tonics, and by the measures already referred to. The weakened vessels having been long distended, will perhaps not readily regain their tone; they may therefore, in this case, be assisted by bandages moistened in astringent solutions. When it occurs among cart horses, haybands may be used for this purpose, dipped in cold water; at twisting which, round the animal's legs, some carters are very expert. In other instances, strong woollen of any kind may be made use of; but flannel forms the best bandage, when evenly and firmly applied, by means of a roller of four yards in length and four inches in breadth. Occasionally we meet with cases wherein the legs appear to become habitually enlarged, or where the recurrence of the swelling is so frequent as to occasion continual trouble: in these cases it is best to study the constitution of the animal, and to endeavour so to adapt the means at your disposal as to restore to the horse that power which its body has lost. If the animal should be very fat, from staying much in the stable, do not all at once order full exercise, or imagine such a horse can bear bloodletting. No creature can endure that which he is unused to, and a fat body has far less blood to spare than a lean one. Begin gently; and by degrees you may do all you wish, only remember the horse is prized because of his strength, and it ill becomes the veterinary surgeon to permanently destroy that, the possession of which is the animal's chief recommendation.

EXTRAVASATION OF BLOOD, OR ECCHYMOSIS.

Ecchymosis is a pouring out of blood into the cellular membrane, either the consequence of spontaneous or of accidental lesion. In the former case, it is usually symp-

tomatic of inflammation, and as such must be attended to in common with its cause. In the latter, it usually results from external violence, and comes under the popular term of a *bruise*, to which the reader is invited to turn. An injury of this kind may so affect the organization as to render it impossible for the extravasated blood to be re-absorbed; in which case both the extravasation and disorganized parts become involved in one common sphacelus, and either a healthy suppuration and granulation closes the wound, or the constitution sinks under the process, and life is destroyed. In lesser injuries, the extravasated fluid is absorbed; or, if it remains, it continues as a fully organized hardened tumour, its aqueous portion disappearing.

EXTRAVASATION OF GAS, OR EMPHYSEMA.

Emphysema is the escape of gas into the cellular membrane, from deep-seated morbid combinations; therefore it is seen in the pestilential epidemics. Emphysema is also brought on by the entrance of the atmospheric air into a wound, from which it makes its way more or less extensively throughout the cellular tissue. When it happens within the cavity of a joint, it often confines itself to that only: but in other, and fortunately very rare, cases, it permeates through the whole cellular surface, from the head to the tail, rendering the unfortunate animal one bloated mass, which soon destroys him by its irritation, unless he be killed by shorter means. It was formerly a custom to make a slight puncture into the integuments of the elbow or arm, and by means of a quill to blow a quantity of air into it until the whole shoulder became distended, as a cure for a shoulder strain. It is also still a custom to make veal *emphysematous*, by blowing air from the mouth of a butcher into any point of the carcass of the dead calf; which plumps up the cellular tissue, and takes off that flaccidity common to the young animal. The most common origin of emphysema, however, arises from lesion of the aërating organs, as wounds of the trachea, bronchia, or substance of the lungs: a broken rib, by being forced inwards and puncturing the pleura, is a common cause. The presence of air within the cellular membrane is always a source of irritation: when, therefore, it is very extensively diffused, it may so irritate

as to affect the powers of life; it does so by producing the symptoms of debilitating disease. Two indications, therefore, present themselves,—to remove the air by small punctures, and to support the constitution by stimulants and tonics. If a re-accumulation takes place, force it out by moderate pressure with gentle frictions; and endeavour then to keep it out by bandages to every part where they can be applied: if possible, cut off the communication also with the inlet by establishing adhesive inflammation in the part.

CHAPTER IX.

CALCULUS, OR STONY CONCRETIONS.

Stony concretions have long been noted in some parts of the body of the horse; and a more intimate acquaintance with æquine anatomy and that of other domestic animals will probably show us that they are almost as universally formed within the various organs of their bodies as in man. *Cerebral calculi* are occasionally detected as well in the horse as most other domestic animals. *Salivary calculi* are more common, and are now and then met with in the ducts, but principally of the parotid, where they occasion tumefaction, and whence these bodies should be dexterously extracted: avoiding as much as possible wounding the larger salivary duct, and uniting the parts as quickly as possible afterwards by establishing a healthy inflammation. *Biliary calculi*, from structural peculiarity in the hepatic system of the horse and his congeners, are not frequent; but in horned cattle they are more often found. *Gastric calculi*, are now and then met with in the horse, but much more frequently in the ruminants.

INTESTINAL CALCULI, OR STONES IN THE INTESTINES.

Stones in the intestines are sufficiently common in the horse, being of enormous size; while they often occasion dangerous colics, by accidentally altering their situations. Whenever, therefore, colics occur frequently without any apparent cause, they may be often proved after death to be referrible to irritation from these displacements.

It is evident that this is an evil we have little power to combat: if a horse by passing a stone with his fæces indicated a constitutional disposition to separate sabulous matter from his food, and afterwards to concrete it by the mucus of his bowels, the removal of a stone actually formed is hopeless. The abdominal calculus generally has a nucleus, or centre, consisting of a nail or stone. It is composed of the triple phosphates, is generally round, and is easily recognised, by its external surface bearing a polish so bright as to seem the creation of art. Others are composed of the fine hairs which cover the substance of the oat, and some, called dung-balls, are formed by the fæces becoming compact. The first is usually found within the small intestines, the two last invariably in the posterior bowels.

STONES IN THE KIDNEYS, OR URINARY CALCULI.

Urinary calculi are rather common in the horse; and as we know these animals are much subject to disturbances in their urinary secretion, we might think it very probable that the silicious matter which is separated from the blood should aggregate within the kidneys, as well as collect in the bladder. We have better evidence than mere supposition, for *urinary calculi* have been found in horses who have died under symptoms which might have been mistaken for very acute enteritis. We may also suppose, that the early accumulation would occasion irregular and diminished secretion of urine; followed, at length, by a bloody purulent mixture with the water, until more active symptoms should arise, and carry off the horse. Concretions within the kidneys might be removed in their early state by remedies tending to decompose them in the urinary pelvis. For this purpose we have the mineral acids, of which the hydrochloric, as holding the silicious matter in solution, is to be preferred. The mineral acids pass through the body unchanged, being emitted with the urine in a state of purity. Their power, therefore, is unimpaired, and they are ready to act upon a calculus encountered within the kidney, with all that energy which they would display were the substance outside the animal. The action of the acid may, likewise, be promoted, by injecting a drachm in a gallon of water into the bladder daily. Two drachms of the hydrochloric

acid may be mingled with every pail of water, and of the mingled fluids the horse will drink with pleasure in a little time, if other diluents be withheld.

STONES IN THE BLADDER, OR VESICAL CALCULI.

The presence of stone in the bladder has long been acknowledged as a disease that has occurred in the horse; but it was always considered as a rare one. Our more extended knowledge has brought many cases to light; it also exists in horned cattle; and swine are not exempt from it. It is by no means improbable that it occurs far more frequently than we are aware of, as would appear when we recollect how many horses are parted with on account of being subject to what is considered habitual strangury, the supposed consequence of a strain. Hereafter, therefore, all cases of this kind which have resisted the ordinary treatment, and are not based on a known cause, should be subjected to examination by the rectum.

The *symptoms* which denote a stone in the bladder are various. Generally speaking, a stone may exist for a length of time, and acquire considerable magnitude, before it is productive of any perceptible disorder. The sedimentous depositions are indicated by the urine gradually becoming thicker and whiter; by frequent desire to stale; by the difficulty and pain with which these desires are executed. Sometimes the urine is bloody, and voided with distressing and painful efforts. The irritation may run so high as to give rise to colic. It is not always easy to distinguish between these fits of colic and common intestinal gripes. So long as the pain is not very acute, the subject of cystic colic paws; makes efforts to strike the sheath with his hind feet; looks back at his flanks, even reaches them with his teeth, and every now and then shakes his head. Should the pains increase, the animal will lie down and roll, experiencing occasional relief, and, in fact, will display the symptoms of common gripes. The sweat the animal breaks into diffuses a strong urinous odour. In this paroxysm of pain, mares have been known to expel the calculus, and thereby obtain instantaneous relief, and from that time to recover.

The *treatment* of stone in the bladder may either be

founded on attempts to dissolve the mass, or to promote its expulsion by pressure, or to extract it by operation. The manner in which solution is to be accomplished, has been described in the previous article. An attempt may be made to *force* it out of the bladder through the urethra, to which we should be more particularly led when we find it already lodged within, or near to, the neck of the organ. The left hand should be introduced into the rectum, and be assisted by the right, in the line of the urethra: if the stone be small, it may be brought forward, until a forceps, introduced from the point of the penis, may reach it. If it can be passed no farther than the curvature, it must be cut down upon. When a larger stone is found within the bladder, and the animal be a male, we must proceed as detailed under *lithotomy*, among the *operations*. In the female, the method of extracting the stone by lithotomy need not be practised. A dilitator is to be purchased of the instrument makers; this being introduced into the short urethra of the mare, and afterwards expanded, enables the calculus to be grasped with the forceps and withdrawn.

CHAPTER X.

ANIMAL, VEGETABLE, AND MINERAL POISONS.

RABIES.

THE *rabid malady*, or *madness*, is never *spontaneous*, but always *acquired* from the application of the virus, by a member of the canine or feline tribe.

The *symptoms* of rabies in the horse are various; it usually, however, commences rather suddenly, by some signs of uneasiness; by sudden falling down, or breaking out into profuse sweats: in a few hours, however, the animal becomes completely unruly: he stamps and paws violently, and attempts to disengage himself from his halter. Within twelve hours from the attack he is commonly frantic: and we have seen one that levelled with the ground the whole of the fittings of a six-stall stable, himself sweating,

snorting, and foaming amidst the ruins. The disease follows the inoculation, at the same periods as in other animals, that is, from five weeks to three months: but its attack is always quickest when the bite is received upon the head. On examination of the morbid appearances after death, there was in two cases great inflammatory marks in the lungs, as well as in all the thoracic viscera; the stomach and bowels also, particularly the latter, participated in the affection. The meninges of the brain were likewise suffused with blood. In another case, to this last symptomatic appearance was added a softening of the spinal cord, while the medullary mass resembled a thin caseous matter. The salivary glands, and particularly the parotids, were exceedingly red and infiltrated with yellow serosity. All the parts of the head would be rendered highly vascular from *exertions*, such as it is impossible that any one can conceive without witnessing them: but no engorgement of the salivary organs, beyond the surrounding parts, existed in the two cases first alluded to, nor have they appeared in those detailed by others. The whole muscular system is discoloured and softened, the cellular texture being studded with ecchymosis. Inflammation at the back part of the mouth, and at the top of the windpipe, has likewise been observed.

Rabies in the ox, sheep, and swine, produces also phrenitic symptoms; the harmless sheep is changed into so ferocious an animal, that he has been known to butt at his own shadow reflected by the sun on a door. In sheep, the general appearances after death also resemble those usually present in the horse: it must, however, be remembered, that in no two cases of any animal whatever are they exactly similar; but in all, marks of violent and almost universal vascular action predominate. However, inflammation of the glottis, epiglottis, and usually of the trachea, are almost constant rabid post-mortem appearances. Inflammation of the stomachs is not always present in the ruminants, though seldom absent in the horse.

Treatment.—Our efforts must be principally directed to a *preventive* plan; for nothing we yet know of will arrest the disease when it has actually appeared. When a bite

has been received, first well wash the parts around the wound with soap and water; next wash the wound itself with the same made strong, and well rubbed in. It would be proper to shave the hair, that any other lesser puncture might be detected. If the wound or wounds be deep or penetrating, dissect it or them wholly out; and if in the neighbourhood of important parts, as the eye, &c., apply afterwards the nitrate of silver. If it be where no danger is to be apprehended, use the actual cautery, which, in one only small puncture, may be found sufficient; taking care to force the cautery to the bottom of the wound in either case. In a lacerated lesion dissect *the whole superficies out, if possible*, and then apply caustic to the whole surface of the excavation. If the complete destruction of the inoculated part be effected, no fear need be entertained for the safety of the animal; but it is very difficult often to decide that no *other* bite has been received. Under such circumstances, any antidote at all, possessing but questionable efficacy, should be also given. The following may be prepared, not in the hope of its effecting a cure, but with the expectation of its acting as a preventative:—

Box leaves (if possible, the tree box)..... eight ounces.
Rue..... eight ounces.

Cut very fine, and boil in three pints of milk in a close vessel for one hour; then remove and strain off. Again boil the ingredients another hour in three pints of water; when again strain off, and mix the liquors. Of this mixture give a third every morning fasting. A *cow* may take the same quantity, and a *sheep* one-sixth of it.

THE BITE OF VENOMOUS REPTILES.

Many of these, in warmer climates, inflict fatal wounds both on man and beast. In the East Indies, the cobra di capello will occasion death in the largest animal in a few minutes: fortunately we know none of the serpent tribe whose bite or sting is poisonous, excepting the adder; which now and then wounds horses and oxen while grazing. This accident is not often attended with fatal consequences; and country persons, as a remedial treatment, merely rub the part with an onion, and force another, mashed, down

the throat. In more serious cases the following will give relief:—

Spirit of hartshorn	one ounce.
Olive oil	a pint.

Mix.

—To a horse, or ox, give the whole; to a sheep a third may be given, and some of the same may be well rubbed into the bitten place.

In case hartshorn cannot be procured, substitute carbonate of soda two ounces, or a double or treble quantity of any of the spirits, as brandy, rum, or gin. The stings of hornets, wasps, and bees, may be successfully washed with ammonia, or rubbed with the blue used by washerwomen, which is often found to be beneficial.

VEGETABLE POISONS.

The stomach of the horse is sensible to the deleterious effects of many narcotic and acrid stimulating vegetable matters. Of some of these, however, it takes an immoderate dose to seriously disturb the functions; of which opium is an instance among others: while a moderate dose of the prussic acid in the form of lauro cerasus kills him in a short time. The *taxus baccata*, or yew tree, is poisonous to horses when they feed upon them, stealing away life speedily, without raising convulsion or commotion. Digitalis purpurea, or foxglove; œnanthe crocata, or dropwort; phellandrium aquaticum, or water parsley; nicotiana, or tobacco, are deadly; while conium maculatum, or hemlock, and cicuta viroso, or water hemlock, are reckoned poisonous by some, and innocuous by others. Vegetable narcotics appear to produce their effect, through the medium of the stomach, on the sensorium: the stomach, however, is found after death to bear small marks of being affected, nor are more to be perceived in the head: the lungs are seen in many cases very highly inflamed. The more acrid vegetables leave very powerful marks of their ravages, by deep inflammatory spots over the villous surfaces of the stomach and intestines. In such cases we cannot hope to effect the removal of the noxious matter by vomits in the horse. We must therefore, in that animal, oppose the

effects of such as are fatal by active purgatives, as the croton nut; and also by a liberal use of stimulants and demulcents, as oil, butter, ammonia, brandy, and any mineral or vegetable acid: but in such cases a caution is necessary with regard to vinegar, which in doses of a pint has destroyed; half a pint may, however, in urgent cases, be safely given, or two drachms of vitriol may be infused in two quarts of water, and poured down the animal's throat.

MINERAL POISONS.

These act usually by their caustic quality on the coats of the stomach and bowels; but the horse is an animal whose power of resisting the effects of the more active mineral agents is remarkable. There must be an inherent structural capability in the alimentary canal of the animal to repel their potency; or how comes it, the mineral acids do not exert their baneful influence, except in quantities which bear no proportion to his general constitutional powers, compared either with man or other animals? *Emetic tartar* to the amount of four ounces, creates no disturbance in the horse; and proportionate doses of *crude antimony* are equally innocuous. The acetate of lead can also be borne by the horse without distress in very large quantities: and although *arsenic*, *corrosive sublimate*, and *verdigris*, cannot be endured in any thing like equal doses, yet amounts large enough to astonish the inexperienced are given every day medicinally.

The *symptoms* which arise from the malicious administration of the more common mineral acids do not materially differ. The horse is first observed to be uneasy and impatient, which ends in his lying down and rolling, or stamping with his feet, as in gripes: he also looks round at his sides in the same manner; so that these cases might be readily mistaken for colic, were it not for an appearance which is almost constant, and is very rarely seen in spasmodic colic. This is the presence of a viscid, ropy, or frothy mucus, which continually escapes from the mouth, which is singularly hot; and the breath becomes fœtid to the smell. In some instances there are frequent attempts to stale and dung: now and then bloody evacuations pass. Profuse cold sweats break out; the weakness becomes extreme; the

pulse is from the first quick and small; then intermits, and the animal sinks to rise no more.

Dissections of these cases do not always present appearances commensurate with the violence of the symptoms. In some, the whole alimentary canal has presented gangrenous appearances of great extent, when the sufferings were not apparently intense, and when even hopes were entertained of amendment. In others, spots of an inflammatory hue have been dispersed over the villous surfaces of the stomach and intestines, at considerable distances from each other; and yet the sufferings during the disease were extreme.

No *treatment* we can offer promises much, for a veil is commonly drawn over the case; and when otherwise, the time usually lost before assistance is sought precludes much hope. If an early application be made, our efforts should be first directed to dilute the poisonous matter, and at the same time to weaken its potency. Alkalies have been supposed the best means to fulfil the second intention; as an ounce of the bicarbonate of potash, mixed with a quart of gruel, frequently repeated; that is, so fast as the animal can be made to swallow it. Orfila, however, recommends in these cases, particularly such as arise from corrosive sublimate, entangling the poisonous matter in the white of eggs. Back-rake, administer clysters, and with whatever is meant for the stomach mingle large quantities of laudanum, one ounce to every quart.

LOCAL INFLAMMATION.

The *principles and doctrine of inflammation* have been so fully treated of at the commencement, under the head of *General Inflammation*, that we shall only now introduce the practical inferences to be drawn therefrom, with such particular observations as immediately connect it with the *surgical* part of our subject. A very attentive consideration of these principles is necessary to a successful practice, as many of the local diseases of the animal have their foundation in inflammation.

Local inflammation is characterized by heat, redness, tension, or swelling, and by tenderness in the part affected. According as such inflammation is considerable or incon-

siderable, the circulating system universally participates, or it is not excited. The general circulation is also increased, according to the circumstances connected with the structure and functions of the injury.

When the general circulation is increased, the horse is said to have *symptomatic fever;* but in every instance the vessels of the inflamed part are in a state of distention. The *tumid* state of the part in inflammation is a well known symptom, and is dependent on the distended state of the vessels themselves; to which is sometimes superadded, an effusion or pouring out of the contents of these vessels; in which, either the serous parts of the blood, or coagulable lymph, are effused into the cellular tissues; and which further increases the tension, and embarrasses the recovery. Thus the effects and terminations of local inflammation are varied according to the nature of the part, the state of the patient, and the violence of the attack. If the inflamed vessels be enabled to reinstate themselves, and of recovering their contractility, *resolution* takes place. But when this does not occur, a more protracted process is usually necessary to the cure. But the effusion, in healthy inflammation, consequent upon incision, is formed of coagulable lymph, which is the cement by whose means the breaches are to be repaired. This joining together is called *adhesion.* If extensive injury has been done to the surrounding parts by laceration, &c., then the same vessels, having organized the layer of coagulable lymph, secrete a homogeneous fluid called *pus,* which process is called *suppuration.* Sometimes, however, the inflammation is torpid, when, instead of pus, a substance like to white of egg is secreted. This may, or may not, have an offensive smell. Absorption likewise ensues; and whereas suppuration repairs the loss of substance, a further diminution of it now takes place. Small holes are formed upon the surface, generally having ragged edges; these holes are termed ulcers, and the process by which they are established ulceration. Occasions will, however, occur, when the inflammatory action is inordinately violent, and the reparative agency very dormant: in which states, the inflammatory congestion may rupture the vessels, and destroy them, and the effused blood putrifying

in and around them, *sphacelus*, or mortification, is said to have come on.

The *treatment of local inflammation* must be varied according as the tendency to these different kinds of termination exists; when it lies in our choice, there are but few instances in which we would not prefer it to adhere. When any injury, attended with inflammation, occurs, the first thing to be done is to quiet the system, and not to imagine the rest of an hour or two, or even of a day or two, can remove the shock which has excited all the animal fear by endangering life. This end is far better accomplished by a cheering and sustaining drink, than by the bleeding, purging, &c. formerly in fashion; which, by further lowering the body, increased or deepened the effect it was desired to remove. In these cases, therefore, give sulphuric ether and laudanum, of each one ounce, cold water one pint, and repeated at intervals of an hour, until the horse is perfectly restored. Bleeding, when imperative, is better performed locally, as we thereby create a greater effect, with less cost to the system. When blood cannot be drawn from the immediate part, still it is often practicable to open a vein in the neighbourhood of it, which does return the blood to the heart, from the individual part involved. *Topical applications* are among our most active agents in dispelling local inflammations. In inflammations, accompanied with much heat, the application of cold promotes resolution. With the coldest water mix spirits of wine, by which means constant evaporation will still lower decrease the temperature; or a more cold application may be formed from the muriate of ammonia with vinegar. As cold proves itself an active agent in some local inflammations, so also heat, or rather warmth, in many other cases, proves no less so. It is in vain to theorize on the seeming incongruity of curing the same disease by two such opposites: the facts are so, and all the theoretic arguments in the world cannot overturn them. In many cases, therefore, we reap the most decided advantages from the use of warmth, in the form of poultices or fomentations; which appear to act by unloading the vessels of the part; but as actual heat increases inflammatory

action, and therefore promotes other termination than resolution, we should be careful to avoid applying either of these means too hot. On the other hand, as in these immediate instances cold would prove injurious, so we should be careful in the use of fomentations, that we do not leave the part afterwards wet and exposed, otherwise cold will be generated by evaporation. For these reasons a moderately warm poultice frequently applied becomes, in many cases, one of the best applications in promoting resolution; and perhaps it is peculiarly eligible when the inflammation is some way removed from the surface, as it tends to unload the vessels near the part. When the inflammation is situated still deeper, we frequently use rubefacients or actual blisters, which create an artificial metastasis. But when, notwithstanding all our efforts, the tension, heat, and tenderness of the part increase, suppuration generally takes place.

When *suppuration* becomes unavoidable, we should promote it. If the inflammation has been confined to a mucous surface, we may expect suppuration to take place without trouble; these surfaces soon throwing out pus, but with great expense to the constitution, as the consequent debility too surely proves. If the inflammation be situated within the cellular membrane, under the integuments, or near the muscles, &c. &c., the symptoms will run higher before pus is emitted, but they will also sooner subside. It must be our care then to avoid depleting the system, when we desire suppuration; on the contrary, we must feed high, and nourish the body by every means in our power; a moderate heat should be constantly applied to the part by means of warm poultices. Should the suppuration be deep seated, or when it becomes prudent to hasten the maturation, turpentine may be added to the poultices, which applications should be frequently renewed; or even blisters may be applied. Almost constant fomentation might possibly be better, as renewing the heat oftener: but in these cases the fomentation is, however, too frequently discontinued, the part being left wet, and suffered to grow cold.

Abscess.—An abscess differs from suppuration, inasmuch as the pus secreted is all poured into a closed sac, and there retained till the bag is either opened with a knife, or bursts

of itself. In some cases, neither of the before-mentioned terminations ensue; and then the pus from being confined, and exposed to the internal heat of the body, becomes inspissated, being more or less hard, varying from the density of a stone to that of cream cheese. When an abscess is forming, it occasions great constitutional disturbance. The pulse throbs; the pain is shooting; the spirits are dejected; the head aches; and the whole appearance is expressive of extreme wretchedness. Give the horse, then, all the corn he will eat, beans, linseed, roots, or any thing he may prefer. Horn down a couple of pots of porter daily; and give every night and morning one of the sulphuric ether drinks previously alluded to. So soon as the abscess comes to the surface, and one part feels softer, or is more prominent than another, open the place with a sharp pointed knife: insert it gently into the soft or prominent part, and when all resistance is overcome, we may be certain the sides of the sac are cut through; then, with a bold sweep of the knife, make a long or short incision from within outwards, as you may have before resolved upon. Occasionally the abscess is deep-seated, and we are asked to look at a tumour, all the active stages of which have subsided. It then requires much consideration, very great nicety of touch, and a sharp eye, to determine whether the swelling contain pus or not. Perhaps an exploring needle is, in these cases, the best; and if this should after being inserted, be drawn forth coated with pus, the operator need no longer hesitate about opening it. Sometimes, when the pus is released from these deep-seated tumours, the stench declares it has been confined so long as to become absolutely putrid.

Sloughing.—This is the process, by means of which nature casts off parts whose vitality, in consequence of bruises, gangrene, &c. is lost. It takes place similar to suppuration. The healthy part inflames, casts out a thin layer of lymph between the living and the dead portions of the body. Vessels penetrate this lymph. They raise its surface into little pimples called granulations; which are very vascular, bleeding on the slightest touch, and highly sensitive, scarcely bearing to be looked at. The granulations secrete pus, and by this means the dead part is cast off; or

the connexion between the body and the substance to be sloughed away is destroyed, through the interposition of a liquid. This process is one of extreme suffering. It is effected at a great expenditure of nervous energy; but the tranquillity which ensues is great, and enables the animal to recover from the exhaustion.

Gangrene.—When debility to a great degree takes place, inflammation falls into gangrene. If the parts near to the seat of inflammation likewise are weak, they usually become gangrenous also; but if they are strong, the edges assume a deep-red appearance, pus is secreted, and by this means a separation of the dead from the living takes place. It is, therefore, our duty to prevent this extension of gangrene to the sound part, and to promote the removal of all dead portions from the living body. To effect this, we must attend to the system generally; for upon a salutary effect on the constitution at large we are to depend upon preventing its extension; particularly if the inflammation be extensive or deep-seated. Constitutional remedies are peculiarly available, because the mortified parts are already dead, and no topical applications can restore them: the *constitutional* means of this nature are such as tend to strengthen arterial action, as it yet remains exhausted or disturbed. These ends are best fulfilled by drinks composed of sulphuric ether and laudanum, an ounce of each, the liquor ammoniæ acetatis six ounces, and cold water one pint, frequently repeated. If the debility be already extreme, we must employ more active tonics, as bark, the chlorides, camphor; in conjunction with the foregoing, and porter, ale, or gruel, as beverages. With regard to medicinal tonics and cordials, they should be frequently administered, that their action may be uniform and permanent. Local applications are to be made use of also; not with a view to restore the parts already dead, but to prevent the spreading of the evil, and to assist the separation of the sound from the unsound. The fermenting poultice, hereafter to be explained, is a useful application; and occasionally the parts may be washed with the chloride of zinc. Scarifications over structures, in a state of gangrene, may be freely made, but they must be circumscribed by the extent of the diseased surface; and they may be more than skin

deep. We shall now proceed to apply these doctrines to a consideration of the several subjects of *wounds*, *ulcers*, *tumours*, inflammatory, indurated, and encysted; and to that inflammation, both healthy and diseased, which affects the bones.

CHAPTER XI.

WOUNDS.

A WOUND is a division of some of the parts of the body; and as wounds frequently occur to all the animals, it becomes a matter of great importance for the veterinarian to be equal to the management of them. A wound in any of the animals subject to our care, should be treated according to the nature of the injury, and the constitution of the creature. When a body is hurt, it undergoes several states before the part is again made whole: hemorrhage first takes place, which if very considerable must be immediately attended to. It is, however, to be remembered, that the vital resources are so much greater in the horse, that the division of an artery which in the human being would require pressure to arrest it, in the horse may be allowed to remain unattended; and that when nothing but taking up a human artery can secure life, moderate pressure will be sufficient in veterinary practice. When, however, a very large artery is divided, a ligature of fine strong silk, or small twine, should be passed around it. The next circumstance to attend to is, the removal of any extraneous matter which may have got into the wound; and if this can be done without washing the cavity, the chances of early union will be increased. But when dirt, dust, &c. render cleansing of the injury absolutely necessary, tepid water is all that is requisite. Powerfully stimulating applications are hurtful, and always prevent an immediate union. We, on the contrary, hope to gain a prompt junction by the medium of the coagulable part of the serum which is poured out in these cases; and which junction is called *union by the first intention*. Modern surgery defines it to be brought about by the vessels of both sides of the wound inosculating with each other: the divided vessels, having first poured

forth their adhesive coagula, prolong themselves through the extravasated matter by their own vitality; the adhesive fluid gluing the surfaces, as the inosculating vessels unite. Some veterinarians deny that this union ever takes place in the horse; which opinion is certainly erroneous. Although the force of the arterial circulation in the horse usually hurries on the suppurative process, yet it is more owing to the difficulty arising from his restlessness, than to any constitutional peculiarity, that primary union does not oftener happen. It is, therefore, the duty of every veterinary practitioner to endeavour to promote the adhesive union by a perfect adaptation of the sides of the wound together, and by a careful retention of them in this situation.

Sutures are stitches made in a wound with needles, armed with either silk, cotton, thread, worsted, fine tape, or zinc wire; the silk, cotton, or thread, are usually many times doubled, that they may not cut the parts, and are also waxed to increase their tenacity. There used to be many kinds of sutures, but modern surgery has reduced the number to three; at least, the interrupted, the twisted, and the continued, are those principally in use. The *interrupted* suture is nothing more than an indefinite number of distinct loops, the ends of the thread being tied, or of the wire twisted, together. For deep wounds, where the substance of the integuments is to be brought into apposition, the needles used are curved, with their bodies somewhat flattened; which form best adapts itself to penetrating the depth of the divided edges in injuries of this kind. The lips of the wound having been cleansed from clots of blood, or any extraneous matter, should be carefully brought together in exact apposition: but unless there be danger of dirt, or other extraneous substance intervening, much washing or wetting the part had better be avoided. The wound, moreover, had better be allowed to remain open until all bleeding has ceased, and the sides have become sticky. The needle properly armed, is now to be carried from without inward, to a sufficient depth to prevent the ligature tearing away the flesh; when having penetrated one lip carry the needle through the other, from within outward. Cut it away and leave it untied; again thread or arm the needle, and if required, repeat the operation in the same manner for

each stitch; the distances of which from one another must be regulated by circumstances, as the depth of the wound, its being exposed to much or little motion, &c. It is, however, seldom advisable to put them nearer than an inch to each other; but oftener an inch and a half or two inches is left between them. Having inserted as many as are requisite to sustain the parts in their just position, begin to tie each ligature, an assistant carefully holding the edges of the wound together; bearing in mind that, if the wound be considerable, it is prudent to fasten the centre stitches first. The disposition that is observed to ulceration in the horse and other quadrupeds, greatly lessens the advantages which are often derived from sutures. It is very seldom that the veterinarian can depend on any suture remaining beyond the third or fourth day, after which time it ulcerates out; more particularly where it has been drawn too tight.

Wherever the uniformity of the part will allow of it a bandage may be applied, and the bandage called the *uniting* is the best; this consists of a long roller having two heads, by which means the central part can be first applied to the portion of the body opposite to the wound; by then drawing each roll forward, the divided edges are brought into contact by the pressure, which will retain them there. The conical form of some parts of the extremities will prevent the permanent application of any bandage, unless retained in its situation by supporting ends passed over the neck in the fore, and over the loins for the hinder legs. The *twisted suture* is not frequently applicable to the horse. It is conceived, however, that in wounds of the eyelids, lips, nostrils, &c., it may be advantageously employed. The *continued suture*, though still used by many older surgeons, is certainly superseded by the interrupted, which is fully equal to producing adhesion in the intestines and other thin membranous cavities. All straight surgical needles are made with triangular cutting edges, which greatly assist their entrance into the substance of a wound, particularly of membranous parts. It still, however, remains a doubt, whether the irritation occasioned by the stitches does not sometimes rather retard than promote the adhesive union: and yet it is principally as a promoter of this union that they are advisable; they being seldom, on account of the

ulcerative process, retained beyond the fifth day; at which time the inosculation of vessels not being firm, the part usually again divides, and must then be filled up by *granulations:* neither is it unusual for the irritation of the wound to occasion the horse to bite them out even before their fair time has expired, unless both horse and wound be very carefully secured. It is also necessary to remark, that where any foreign body has been incautiously allowed to remain within a wound, the irritation becomes so great that it is prudent to divide the stitches, which will sometimes give immediate relief; and the same also takes place when the mere inflammation of the part runs high. Here, therefore, are evils and benefits mixed up, the selection of which must depend on the nature of the case.

The *adhesive inflammation* certainly does in some cases appear to be promoted by the judicious use of sutures: in all wounds it is clearly our duty to attempt the union, by an approximation of the divided parts; we must then be guided by circumstances as to the best method of retaining them so applied. It is, however, proper to remark, that until this union be despaired of, no moist applications should be employed.

Suppurative process.—When the adhesive union cannot be brought about, the injured part tumefies, becomes hard, painful, and tender. Lymph is thrown out; into this lymph vessels shoot; the lymph and the vessels assume the form of nipples, being very minute, and studded all over the surface: these nipples are called granulations; the vessels within them secrete pus; the pus being a bland fluid covers and protects the granulations, which gradually grow until the parts are united, or any cavity the wound may have formed is filled up; the growth of the granulations having reached the surface, cicatrization of the part takes place. *Cicatrization* is the process of joining divided parts. True skin is never reproduced; but after the granulations have united they lose their vascularity, and are converted into cellular tissue. All scars are nothing more than skin united by cellular tissue; and when the skin surrounding a wound is puckered, it is because the cellular tissue contracting draws up the surrounding integuments.

The cicatrix also becomes hard and ligamentous when fully formed, though at first it is thin, very vascular, and highly sensitive. The skin, however, once destroyed, hair is never reproduced; although the scar contracting with time, may draw the separated parts close together, and thus conceal the injury. In the process of forming granulations, the wound should be kept from exposure. Many applications are supposed to promote a formation of granulations; but all of these are quite unnecessary. In other cases luxuriant granulations, as they are termed, shoot up; when these little bodies rise above the surface, they demand the use of some substance which can reduce their exuberant height. The wound will never heal while they remain so high; on the contrary, it frequently enlarges: for the pressure the luxuriant granulations make on the edges produces an absorption of the healthy parts, and thus increases the surface of the sore. This luxuriance must, therefore, be kept down by mild *escharotics*. The firing-iron is often applied. By the constant use, however, of chloride of zinc and water, of the strength of one grain to the ounce, healthy growth is promoted, and all luxuriant granulations effectually checked. The above simple and costless application is all the lotion that every form of wound requires.

It is the practice of many farriers to plug every wound with something of the nature of a *tent*, under an idea of keeping it properly open; by which the healthy processes of nature are frustrated, and simple wounds are rendered complicated and tedious, by this introduction of tow, sponge, candle, &c. &c. In this way pus, being confined, becomes unhealthy, and burrows; sinuses form, and the edges of the wound, by being in constant contact with *foreign* bodies, become hardened, callous, and are rendered incapable of union until they are removed by the knife. The only circumstances that can justify the use of tents are, where a very deep wound exists, with a very small orifice; in which case it is certainly not prudent to permit the external opening to heal until the granulations have filled the cavity from the bottom; likewise when any extraneous body is suspected to be within a wound, as thorns, splinters, gravel, &c.; or when bone has been injured; in which last case exfoliation being

slow, if the muscular parts healed up, the cast-off bone would become a foreign body, and occasion continued irritation, with a succession of abscesses.

WOUNDS OF PARTICULAR PARTS.

Wounds of the head should be treated according to the part they happen in: the first step is to ascertain whether any injury has been done to the bones underneath; which, if found to be broken, must be treated according to the directions given under the head of Fractures. When any part of the *ear* is much lacerated, it may be advisable to draw the divided edges together with fine sutures, and to support the tube internally by means of pasteboard moulded to the shape. When, from accident, either the *parotid* or other *salivary glands* become wounded, every attempt should be made to produce a speedy union, or the continued flow of saliva will occasion a fistulous sore.—(See *Salivary Fistulæ*, chapter XIII.) In wounds of the *eye*, or of the *eyelids*, the parts should be replaced as nicely as possible, so that their motions may not be impeded: in such cases, it is evident no irritating application ought to be used. In divisions of the eyelid, neat small stitches of the interrupted suture may be inserted near together, and the horse secured from rubbing, by placing him in a box or barn, with his head tied to a beam in the ceiling, at the usual height; by which means he cannot rub the wound with his knee or his hind leg, nor will there be any rack or manger to rub against: he should also have a cradle constantly on his neck. We have, in one or two instances of wounded eyelids, used the twisted suture with success. In wounds of the *nose*, care should be taken to remove the bones, if any be broken quite off, or entirely separated from the adjacent structures; to retain the parts in their situations, there may be put any firm substance up the nostril well guarded with soft tow or rag.

Wounds of the neck.—When the ligamentum nuchæ becomes wounded, a depending orifice should be immediately made, and the wound dressed with the lotion of chloride of zinc previously recommended, by which sinuses may be prevented forming. The integuments of the neck are not unfavourably situated for the insertion of interrupted sutures;

but to prevent their being rubbed out, a neck cradle should be worn, and the horse's head should be racked up to the manger day and night. When it is necessary to perform operations on the neck, by dilating an already existing wound, the longitudinal direction of the muscular fibres should direct the section, and due regard should also be paid to the surrounding nerves and bloodvessels.

Wounds of the chest, when they take place in the muscular and integumental parts of the chest, must be treated like other external wounds. When the lungs are punctured, life will, in the majority of instances, be sacrificed; for should the hæmorrhage not destroy, fatal inflammation will follow. These wounds are distinguished by the air rushing out at the orifice, and by the scarlet hue of the hæmorrhage.

Ruptured diaphragm.—A lesion of this important muscular septum is a more frequent termination of the life of many horses than is supposed. Death, of course, is a speedy and inevitable consequence.

Wounds of the abdomen.—These, when external, must be treated after the manner of wounds in general; observing whether the injury be a puncture of the cavity; that none of the viscera are wounded, and no protrusion occurs; when no means are more likely to shut up the opening effectually than the twisted suture. But when the cavity has been more deeply penetrated, and there is reason to fear that some viscus is injured, the treatment must consequently be rendered more complex, and the danger proportionate: when such a wound has happened, the extent of it should be carefully examined, that we may learn what viscera are likely to be injured; in which examination we shall be aided much by a previous knowledge of the different *regions*, and the viscera that occupy them. If any of these be protruded, carefully replace them; unless they should have become mortified, in which case the animal had better be slain. It has been recommended, in case the external wound be large, to stitch the intestine to it, in preference to letting it float loose in the abdomen, which, as will be again noticed, particular circumstances may render eligible. The external wound may be drawn together

by sutures; but if it should be large, more dependence is to be placed on a firm supporting bandage. For forty-eight hours offer neither food nor drink; then only thick gruel in small quantities; and if the wound be in the small intestines, apply wet cloths around the body instead of drink, and nutritious clysters instead of food by the mouth. Sometimes, from very large openings made in the abdomen by staking, or from the gores of oxen, there follows an extensive protrusion of parts, which will often require much force and more dexterity to return. There has been placed close to the wound a very firm bandage already drawn moderately tight; then the parts have been replaced with the fingers under it, gradually drawing the bandage onwards as they were returned: the integuments should, in such case, be carefully and firmly sewn up; an adhesive plaister placed over all, and permanent pressure kept up by means of a strong bandage. It sometimes happens, that with all the efforts we can make, the parts cannot be returned; in which case, what is to be done? If the bowels protrude, and the return is totally impracticable from flatus, is it prudent to minutely puncture them? Many prefer this to any attempts at enlarging a very small abdominal opening, as is too frequently done; but which almost always gives passage to a still larger quantity of intestines, and which no future efforts can replace. The *return* must be attempted by means of the puncture; or by the fingers of one hand gently introducing portions of the intestines within one side of the opening, while the other hand is employed in restraining the parts forced inward; an assistant supporting and gently pressing on the remainder: all this is best done with the animal cast and placed on his back. Having returned it, if the opening be a defined one, it should be stitched up with the continued suture. If omentum has protruded, by all means excise it if discoloured from strangulation; and do the same when it is too tumid to return. In all such cases it is evident that a well-informed practitioner is left greatly to his own resources: but the knowledge that the animal must die without assistance, will embolden his practice; and the recollection that greater liberties may be taken in brute than in human

surgery, will give a wider field to his exertions, and increase his chances of success.

WOUNDS OF ARTICULAR AND BURSAL CAVITIES.

The ruinous effects of these wounds to horses render a due knowledge of the nature of the parts, the consequences that ensue from injuries, and the curative means most likely to obviate their effects, imperative on every veterinarian. Neither, in the whole round of the art, is there a subject that will afford a more striking display between the well-informed practitioner and the ignorant pretender; which has been well exemplified by a comparison between the recovery accomplished by mild treatment, compared with those sad results which often accompany the opposite sort of measures. The anatomical detail is replete with notices of vascular secreting membranes which pour fluids on surfaces, or into sacs, appropriate to receive them. The membranes which line the cavities of joints and of the bursæ mucosæ thus secrete an albuminous liquid or glair, which is admirably formed to resist the effects of friction. To secrete this liquid in constant and due quantities, is the function of these membranes, which are not formed to endure the contact of atmosphere; we cannot, therefore, be surprised at the great irritation which occurs, on so sensitive a vascular surface being exposed to the action of the external air; and when to this we add the effects of attrition between the ends of the bones, or between the sides of the tendons and their sheaths, we recognize in the division sufficient cause for those violent symptoms which are seen to accompany open joints, punctured hocks, or even the accidental or purposed opening of a bursal capsule, or *wind-gall* as it is termed. If the simple effects of attrition, and the exposure of the secreting surface which lines these cavities, is of itself sufficient to create a symptomatic fever that will endanger life, or to engender an irritation sufficient to produce tetanus, how much more are these consequences to be dreaded, when to the effects of the accident are added the injection of the most acrid substances within a cavity already inflamed by exposure; and yet this was the practice formerly, and the event was usually accom-

panied either by a train of fatal consequences, or at best there followed a complete anchylosed joint.

The *articular cavities* most subject to exposure are those of the scapula with the humerus or shoulder joint; of the knee; of the pasterns, before and behind; of the stifle; and of the hock; of all which the knee is the most liable to this injury. Of the *bursæ mucosæ*, poll-evil sometimes opens important ones; the semi-cartilaginous cap of the flexor brachii, which runs over the point of the shoulder, furnishes a bursæ mucosæ, which, when exposed, is apt to be mistaken for an opening into the shoulder joint. The elbow presents others also: a considerable one is situated behind the knee, and lesser ones are found belonging to the various ligaments and tendons which surround the joint; an opening into these is sometimes mistaken for one made into the great articular cavity. The thecal sheaths of the flexor tendons or back sinews are bursal sacs; large ones furnish the pasterns before and behind, whose dilatations are called windgalls. We likewise find bursæ in the stifle: the point of the hock presents one sufficiently known, as being the seat of a dilatation called capped-hock, and around this joint, as around the knee, individual bursal cavities exist, through which the tendons run.

The *symptoms, progress;* and the *consequences* of openings into these cavities as regards all of them are nearly the same; they differ only in degree: the course and the effects are likely to vary according to circumstances. A general view shall be taken of the whole, and then particular cases will be separately noticed. An opening is made into one of these cavities by a fall, by a blow, or stab, or puncture; and the injury appears in the form of an incised or lacerated wound, then inflammation taking place at first increases the synovial secretion. Its presence is detected by the glairy white-of-egg-like fluid, mingled with the exuding moisture. The synovia will continue to flow, until the adhesive inflammation starts up, which will form a lasting plug to the orifice. Or otherwise, the intensity of the inflammatory process will convert the synovial secretion into one, first thinner, next bloody and partly purulent; until the synovial surface is destroyed, or the articular

cartilages are absorbed; the denuded bones inflame, and ossific deposit forms a complete anchylosis; or the horse sinks previously by the symptomatic disturbance in the system generally.

Treatment.—When an accident has laid open an articular or a bursal cavity, the grand indication of cure is *to close the opening made*, which by stopping the synovial discharge, will arrest the *morbid* inflammatory action. We learn, therefore, that in these cases we may regard inflammation as our most dreaded foe; but it is equally certain, that we must view it also in the light of our best friend, and most active agent; and that if it constitutes the disease, it is equally necessary to the cure. It frequently happens that we are not called in until several days after these accidents; and we find the part excessively tumefied, hot, hard, and painful in the extreme; accompanied, probably, with a high degree of sympathetic fever. In such a case we despair of success. If the swelling of the surrounding parts be great, we may at all times decline to undertake the treatment, for such a sign denotes that other neighbouring structures are involved, and we no longer have a simple open joint to deal with.

When open joints occurred, the treatment was to employ the heated iron, various burning substances, or different obstructions, as repeated folds of brown paper, several plaisters, and Indian rubber. The pain occasioned by these measures was such as no man ought to inflict for double the price of any horse; since if his humanity were purchaseable at such an amount only, the poor animal would escape. All these abominations the following recommendations dispense with. Let us suppose a very bad case. A horse falls on a rough road, with a very heavy rider. The animal not only opens the joint, but extremely bruises the knee. This is a very serious injury. What is to be done? Lead the horse to some stable as quickly, but as gently as possible. When he is there, procure a pailful of clean tepid, or warm water, and a soft sponge. With these carefully dab the knees. Do not stroke them down, or try to wipe them dry, but be content to dab a pailful over the knees, and leave the drying to nature. Then take two ounces of

tincture of arnica, and mix it with a quart of water. Order the horse's head to be tied up for the entire time previous to the application of the slings, and a groom to set up all night. The groom is to pour out a portion of the diluted tincture, to soak it up with the sponge, and to squeeze out the sponge above the knee, allowing the liquid by the force of gravity to find its way to the injured surface. This he is to repeat every half hour, night and day. The horse, on the evening of the injury, is to take half a drachm of calomel, shaken upon the tongue, followed by a drink composed of sulphuric ether and laudanum, of each one ounce, with one pint of water. This draught is to be repeated night and morning, so long as the constitution exhibits any disturbance.

About the fourth day the slings are to be applied. The poor horse with open joints will be heartily tired of supporting his body so long upon legs, the knees of which are exposed to the air. He will, therefore, take very kindly to the slings, and throw his weight into them almost so soon as they are securely hung. With the slings, the lotion is to be changed for one composed of chloride of zinc two scruples, water a quart, which is to be applied exactly in the same manner as the diluted tincture of arnica, only there is no longer any necessity for the groom to sit up with the animal.

The bruised parts fall out, or slough out, from the fourth to the sixth day, and the solution of chloride of zinc effectually stays the stench which accompanies that process. As the lotion flows down it mingles with the synovia, which begins to pour out in earnest as the inflammation mounts upward. When the slough is removed, the chloride of zinc causes the albuminous particles of the synovia to coagulate. The coagulum effectually prevents the lotion entering the joint, and excludes the atmospheric air. The coagulated synovia sometimes accumulates to the size of a large apple; but to whatever magnitude it attains, it must not be removed. It must be protected by every means in the power of the surgeon, for the longer it continues to cover the joint the better. Beneath it the healing process actively goes forward, and by the end of a month or six weeks the

wound will be closed. The joint will also be of the natural size, and if no skin has been destroyed the injury will be difficult to detect.

The clothing must be suited to the weather, so as to keep the horse warm, without making the animal hot. The food is to consist of the most supporting or nutritive kind. The water is to be whitened, and to be likewise chilled. The main obstacle, however, consists in getting the lotion applied so often as is directed. It should, nevertheless, be remembered, that every thing depends upon the wound being kept continually wet. The proprietor, or some one on whom he can depend, should look into the stable frequently, to ascertain that the groom does his duty. No inattention to this point can be displayed without the wound itself indicating the circumstance. If the part should remain stationary for two or three days in succession, if luxuriant granulations should at any time sprout, or if the knee should enlarge during treatment, be certain of neglect.

It is as well in these cases to fasten the horse so far away from the manger, that he cannot hurt his knee by knocking the part against the wooden trough. The food can be put in a basket, supported upon a light framework, which can be placed before the horse at feeding time, and withdrawn afterwards. A pail of water can be always ready upon one side, towards which the animal can turn his head, but against which he cannot hit the open joint. The slings may be removed in about a month, but no exercise must be permitted until the wound be perfectly closed.

If the skin be injured, a large scar may show, denuded of hair. However, let it alone. As time progresses, the cicatrix will contract. This will draw the divided edges closer together; and many a bare place upon the knees, which has appeared large when the surgeon left the animal, has, after the expiration of a few weeks, become almost imperceptible.

THE PENETRATED KNEE JOINT PARTICULARLY.

There are some practical remarks connected with this subject which require to be noticed, independently of the

same accident to other articular cavities. The *knee joint* is peculiarly liable to very extensive laceration, from the hard state of our roads, and the exertions we put the horse to; whose tired limbs, making often a feeble effort to recover the effects of a trip, bring him on one or both knees with a violence proportioned to the impetus of the speed he was moving at, the weight of the rider, and the nature of the ground he comes in contact with. Whenever a practitioner is called to a horse with a *broken knee* or *knees*, it is a natural supposition he is applied to for one of two purposes,—either to ascertain the state of the case, or otherwise at once to set about a cure.

If called in soon after the accident, we must commence the treatment by very carefully dabbing away any grit, dirt, or other matter which would occasion future irritation. If no synovia appears on the surface, it is more prudent to avoid *probing*: indeed, in our own opinion, it is better to do this under every circumstance. The *synovia being detected*, no probing can be necessary, as the important fact of a serious injury having happened is ascertained. With regard to curiosity, a surgeon has no business with any such meddling impulse. The welfare of his patient should be his single thought, and experience should tell him the dimensions, depth, or magnitude of the wound, are not at first to be ascertained. Such knowledge is not to be acquired until the slough has taken place. For the present, he sees synovia, and that should be sufficient. The result of his practice ought to have apprised him, that it is of little consequence to the termination, whether the knee, or one of the bursal sheaths, proper to the tendons crossing the joint itself, be opened. The one case is as difficult to cure, and will as probably end in death as the other. The irritation which ensues upon both injuries is the same in these cases. The wound is as like to involve neighbouring structures, and the consequences are in every respect similar. Therefore, save for the gratification of curiosity, it does not matter whence the synovia issues; and all probing can therefore do no good, ascertain no material fact, and often does vast harm, by starting up irritation; also breaking down delicate parts, which, if left to themselves, might still further unite.

With respect to concealing the after blemish, no power of earth can make the hair grow on a scar. It is not skin, and it cannot be covered with the appendage only to be seen upon true skin. But the cicatrix will with time become less. Often the wound, which on first healing appears rather large, in the course of three months will be all but imperceptible. Any application of blisters, be they mild or strong, can but increase the blemish it is their intention to remove. Let the scar alone. If you have thrown down a horse, no veterinary surgeon can assure he shall afterwards stand upon perfect limbs. You must, therefore, take the consequences without complaint, and be grateful that you have, in the effects of time, some hope left, when science has abandoned you.

BROKEN KNEES WITHOUT PENETRATION OF THE ARTICULAR CAVITY.

Occasionally we find that what, in popular language, has been called broken knees, turns out to be a simple contusion; in which case tumefaction, heat, and tenderness ensue, and which inattention, undue exercise, or heating applications, may force into permanent thickening of the part, with blemish and injury to the motion; whereas a little rest, with fomentation, will complete the cure. When *laceration* has taken place without injury to the cavity of the joint, the wound having been washed, bring the edges of the integument as closely together as possible by strips of adhesive plaister, as already directed; or if the wound be extensive, it would be well to sling the horse. A cure by the first intention or adhesive process can only be hoped for in this way. If heat and tumefaction come on, use the lotion composed of arnica and water, of the strength directed in the previous case; and, after applying the arnica and water night and day for forty-eight hours, if the skin be broken, exchange the lotion for one composed of chloride of zinc and water, which will be found in the succeeding paragraph to that which contains the fomentation just referred to; in this way a cure may often be established, without injury to motion or blemish to the animal.

WOUNDS OF THE ARTERIES.

An acquaintance with the course of the large arteries is essentially necessary to every veterinary practitioner, by having which he may avoid them in operations; or, when an accident has occurred, this sort of knowledge will enable him to stop the divided trunk. By the elasticity of the external tunic, the excised ends of moderate arteries, are in the horse attended with no danger; the extremities retract within the cellular tissue, and close their orifices. We make use of this knowledge in our surgery, by treating many hæmorrhages, that have occurred from a partial division of a vessel, by separating the whole, which stops the flow. Hæmorrhages are, therefore, stopped by a complete division of a moderate vessel; by the application of cold; by styptics; by compression; by the firing iron; or by ligature. *Styptics*, in their usual acceptation, are seldom applicable in the horse; they act by mixing with the blood, and with it either form a fine paste, or they coagulate the blood within the vessels. *Compression* is proper when the vessels cannot be easily got at, and may be made with a piece of sponge, or a pledget of any other kind, pressed immediately on the vessel. In docking, nicking, and sometimes in wounds of the legs, compression may be occasionally applied with advantage. *Firing* was once a favourite practice; but is now almost in disuse. The budding iron is only of material service in staying the blood from small vessels, and is principally applied in veterinary practice after docking, and during castration. In deep-seated wounds the hot iron cannot be of any utility; but the vessel must be sought for with a tenaculum or hook-like instrument, which being applied to the end of an artery, draws it out sufficiently to permit a double thread to be passed round it: or when it cannot be got at in this way, some of the surrounding substance should be included within the scoop of a curved needle, and a ligature should then be made to enclose all. In taking up very large arteries, it is prudent to secure both ends, or the anastomosing branches may furnish the end remote from the heart with blood. The ligatures with which bloodvessels are now tied, are not

thick, as formerly, but are found to act best when rather thin.

WOUNDS OF THE VEINS.

When a large vein is divided, it should be secured by a ligature above and below, or the anastomosing branches may continue the bleeding: when smaller veins are divided, the hæmorrhage soon ceases spontaneously.

INFLAMMATION OF VEINS, OR PHLEBITIS.

Inflammation of the veins is often a very serious affection. In the horse, the course of the disease always rises above the opening made into the vessels, thus in the neck it mounts towards the head, in the limbs it extends towards the heart. Previously, however, to entering on the subject, it must be premised that occasionally plebotomy is followed by simple inflammation of the divided integuments and cellular substance; and which is apparently brought on by the mere effusion of blood during the act: or by some escape of it afterwards; or, perhaps, from spontaneous inflammation and serous effusion in the divided integuments and membranes themselves. The swelling thus produced is frequently occasioned by drawing the skin, in pinning up the orifice. It has also been observed to occur when the lancet has been employed by operators not long used to that instrument, which has occasioned the integumental and venous opening to be not exactly opposed to each other. Whenever, therefore, an early extravasation of blood follows bleeding, first having removed the pin, carefully press out the effused blood with the fingers; and, if there appear no likelihood of more hæmorrhage, do not again insert the pin, but tie the horse's head up that day and night. Should the swelling not be observed immediately, or when it happens that inflammation has already taken place within the cellular membrane, first treat by rest, and frequent bathing with a cold solution of muriate of ammonia and vinegar: or apply a mild blister. If the tumour suppurate, as soon as fluctuation is felt, make a depending opening, or introduce a seton through it. We

will now consider something further than the mere integumental inflammation, and come at once to the point we set out at—*the inflammation of the substance of the vein itself*, which is either communicated from the integuments, or originates within the vessel from the puncture, that is supposed to occasion a peculiar inflammation of the inner coat of a wounded vein. It is probable that a predisposition to a certain form of inflammatory action is inherent in the veins so affected, and that this is called forth by some state in the parts themselves; which at one time confines inflammation to the integuments, and at another carries it upward within the interior of the vessel.

The *symptoms* of the injury appear about the third or fourth day usually, when the lips of the cut begin to gape, and a little lymph is thrown out; the next day the edges are more cast back, as well as more red and expanded; a sanious discharge issues, or perhaps hæmorrhage occurs: the tumefied vein now feels corded, hot, and tender; and if the progress of the inflammation be not stopped, the tumefaction extends along the course of the vein: if in the jugular, it proceeds towards the head; and if it occur in any of the other veins of the body, as the saphena and plate vein, it extends towards the heart, hardening the vessel into a cord-like substance; this appears to be the consequence of the inflammatory action, by forming the contained blood of the venous trunk into a firm coagulum, and therefore all attempts to save it afterwards fail. Suppuration of the tumour now often appears; though sometimes the immediate punctured part will present little more than a spongy mass, from which a grumous liquid distils, while abscesses form in various situations around the course of the vessel. As the morbid action extends upwards, it frequently involves the whole neck, and often affects the side of the head, from which results hinderance to motion; and often some difficulty is experienced in eating and drinking likewise. There is commonly constitutional disturbance also: in some cases the symptomatic fever runs very high. The pulse has been above ninety; and the excess of irritability brought on has destroyed even life.

Treatment.—The course to be pursued will much depend on the state of the disease. It is of importance to keep

the horse as quiet as possible, and to restrain the neck from movement; which latter is best effected by tying up the head, and giving him gruel for food. It is also recommended to apply a mild blister, in the course of the tumefied vein, which seems to assist by lessening the general inflammation: this, in fact, is an indication never to be lost sight of.

When, however, we have no hopes of saving the vein from obliteration, but, on the contrary, a disposition manifests itself to form abscesses in various situations, we must proceed to more active measures. The abscesses must be opened freely with a knife, or, if one appears to communicate with another, setons may be passed through the sinuses by which they are joined. The head must be tied up, and blister follow blister; another being reapplied before the action of the first has ceased. In this fashion the life will be saved, although the vein will be lost; the horse subsequently may become equal to the severest service, though immediately after the loss of a jugular he may require some care. He must not be fed from the ground, or ridden hard for twelve months succeeding his recovery. His manger ought to be elevated, and his water even lifted up, so as to prevent him from stooping his head. At first, his food ought to be such as requires little mastication, but in three months he may return gradually to hay and oats. At the termination of a year, he may feed off the ground, or from a common manger; he will by that time be equal to the greatest exertion, and may be sold as sound, though in such instances a guarded warranty is generally demanded, and usually given.

A marked morbid consequence of bloodletting arises from bleeding in the plate or in the thigh vein; in which the phleme often passes through the vein into the fascia that lies between the vessel and the muscles. In these cases the fascia inflames, and a formation of pus takes place within it, which, as it cannot escape, insinuates itself to some depending situation: an opening should, therefore, be made to evacuate the matter, or a seton may be inserted for this purpose, and the part be repeatedly blistered; the animal being taken good care of, and not put to hard work too soon afterwards.

CHAPTER XII.

OF ABSCESS.

By *abscess*, in its most extensive sense, we include every collection of fluid which interposes between parts in a kind of sac: but in its limited sense, as we now propose to employ it, the word represents a collection of pus formed by a quick process of suppuration, and contained within a closed sac. When an abscess forms, the following process takes place:—an injury, generally a bruise, is received: part of the vital body is crushed or dies, and nature is desirous to repair the loss, and to cast off the dead substance. The minute vessels of the part are stimulated to effuse coagulable lymph within the cellular tissue; the consequence of which is distention or swelling, that here, as elsewhere, produces tenderness and heat, and, when the hair allows us to detect it, a reddened blush. The effusion around the immediate part which is dead thickens, grows vascular, and ultimately forms a closed sac. Arrived at this state, the tumour may take on various changes by peculiar processes within it: the suppurative one is supposed to ensue all over the internal sides of the sac, where, by a change in the action of the inflamed vessels, pus begins to be secreted. It then presses against the adjacent muscles, causing these structures to be absorbed: and it is fortunate that, by an apparent conservative law of animal life, such absorption is most active towards the surface of the body, thus aiding the evacuation of its contents, which can be effected without prejudice to the constitution. There are many difficulties to combat in veterinary practice which almost vanish in human pathology: thus, in the formation of human abscess, universal rigors mark almost the commencement of the suppurative process. Neither is fluctuation or direct prominence in the suppurating abscess so clear in our subjects, from the thickness and tenacity of the integuments; though some little pointing, and softening, as well as denudation of hair, may be observed: it therefore becomes us to make our examinations the more closely,

that we may inform ourselves, by less obvious signs, of the actual state of the part.

The treatment of abscess.—In the early stages of such tumours, endeavour to forward them, through the application of warmth and moisture, both of which are gained by a poultice. A blister may likewise be applied to the surface, and a poultice over that, when it is very important to draw the abscess forward. Horse poultices, on account of their magnitude, are generally formed of bran, upon which boiling water is poured, and the whole well stirred together; or a very good poultice may be formed of hay, soaked in hot water, any excess of moisture being squeezed out afterwards. About a gallon of substance is sufficient for one application. Being assured that maturation is completed, the thickness of the integuments, and the fear of the extension of the suppurative process inwards, make it always prudent to form an artificial opening in the more dependent as well as prominent part of the tumour. This may be done by direct section. Incision is effected by the abscess knife: but in every case the opening should be sufficient to give a ready exit to the matter which has formed, and that which may subsequently be secreted. In some situations, as where the natural outlet has appeared on a place we do not desire it should point in, or where the abscess does not point upon the precise spot we could have wished, it may be prudent to make an incision in the natural prominence, and insert a seton through the place we could desire the fulness should have occupied. It is, however, necessary to be careful in making the incision when it dips downwards, that it is made in the course of the muscular fibres, and not in the direction of considerable branches of nerves or bloodvessels.

Nothing further need be done for the eradication of an abscess than the establishment of a free depending orifice. All putting the finger into the opening and stirring it round is unnecessary, to say the least of it. All injections are objectionable, to speak of them in the mildest terms. Should, however, the sac of an abscess display an indisposition to contract after its contents have been evacuated, apply a blister over it, and when the effects have some-

what abated, support the pendant parts by means of bandages.

STRANGLES

Are evidently of febrile origin. The late Mr. Castley thus notices this singular equine affection: "Often when a young horse is looking sickly, delicate, or thriftless, farmers or breeders will say, 'he is breeding the strangles,' or that 'strangles hang about him,' and that he will not get better until he gets over that complaint." There is much truth in this observation, and some breeders are particularly expert at catching the first premonitory symptoms. The affection has been divided into true and bastard strangles. There is, moreover, no reason to suppose the strangles inherently infectious A number of horses having it together is not a proof of its contagious properties; any more than some escaping, and others having, it is a proof it has none. The strangles, in many instances produces so little interruption to the health, particularly in mild weather, and at grass, as to inflame, maturate, and heal, without the affair being hardly noticed by the owner. In some cases, however, it reduces young horses to a state of considerable emaciation; it is said, when very long protracted, to degenerate into glanders; and the transition from the one to the other does occasionally take place. The exciting *causes* appear to be those which are productive of catarrh; thus it is most prevalent in the spring and in damp cold weather.

Symptoms.—The disease usually commences with the common appearance of mild catarrh, or, as popularly expressed, of slight cold and fever. The horse is somewhat dull, has often cough, some soreness of throat, a slight disinclination to food, but still more to water. The under surface of the throat between the jaws swells; it is hot and tender: sometimes the tumefaction extends to the ear of one or of both sides. On the second or third day it is not unfrequent for the nostrils to throw out a muco-purulent discharge; and if the affection be considerable, the mouth is suffused with a mucous secretion also, or the saliva is slabbered out in great quantities. Now and then the lungs become slightly inflamed, and heaving at the

flanks, with oppressed pulse, are present. In most instances the pulse is somewhat hurried.

Treatment.—When the inflammatory symptoms are considerable, treat gently; nurse rather than physic, and on no account be tempted under any circumstances to extract blood. The entire strength is required to cast off the disease, and the animal can ill afford to part with the smallest portion of its vital energy. No matter what the pulse may suggest, in strangles it is a rule never to bleed. Put a hood upon the horse, and fasten a nose-bag on to his head, and in the bottom of it place a scalding hot bran mash, the steam from which he may inhale. Put the animal in a well ventilated loose box, and rub a blister under his jaws; and if the breathing should be bad, carry the blister down the length of the windpipe. Then take an eight-tailed bandage, which is nothing more than a piece of strong canvas, of sufficient length and requisite breadth, with three slits torn a short way at each end, so as to leave four strings at both extremities. The day after the application of the blister place some hot mash in the centre of this bandage, and tie the canvas, by means of the ends, over the horse's poll, so that the mash may rest against the swelling on his throat. Give no physic, neither purgative, sedative, or febrifuge. Let the animal take gentle exercise, but not such as to distress him, daily.

Should nasal gleet remain, after the more urgent symptoms have subsided, feed liberally, and give tonics. If these do not arrest the symptoms in two or three weeks, open one of the frontal sinuses without delay, and inject warm water, for we may then conclude the membrane of the sinuses has taken on the suppurative process, and the sooner this is combated the better for our success.

Bastard strangles are those in which the tumour, after having come partly forward retires, or in which the abscess bursts internally, and the pus becomes absorbed. This is a very bad matter. The glands generally swell, more especially the lymphatic glands of the mesentery. The symptoms are, ragged and unthrifty appearance, with very irregular bowels. The treatment must be tonic, with alkalies, a very small portion of aloes, and simple bitters.

But perhaps it is better to turn the animal over to the knacker, as these cases, which chiefly occur in poor washy colts, are not likely to terminate to the proprietor's satisfaction or our credit.

WARBLES.

These are enlarged bursæ, inflamed by the pressure of the saddle. When they first occur it is best to take a sharp-pointed knife, and thrusting it through them, then to cut outwards, so as to lay the sac open from end to end, by a thrust and cut. The sac, if left in this state, would set up inordinate inflammation, and produce intense irritation to the system. To prevent this, take a piece of lunar caustic, and freely apply it to the surface of the sac, which will effectually destroy it; the wound may be afterwards treated with chloride of zinc and water,—a scruple of the former to a pint of the latter,—and be kept clean, by having a piece of rag wetted with the lotion laid over the incision.

CHAPTER XIII.

OF CHRONIC ABSCESS AND ULCERATION.

The process of healthy inflammation is verified in acute abscess; in chronic abscess it wants life, either from the nature of the constitution generally, or the nature of the part individually. Muscle suppurates most healthily, being most freely supplied with blood. Healthy suppuration is hardly ever witnessed in cartilage or tendinous structures. In such parts the lymph effused is imperfectly formed, and the after changes are naturally slow. After the lymph has been effused, it remains in a state of induration, and when an outlet, natural or artificial, is made, it then happens, that, instead of a healthy granulating process, unhealthy ulceration follows.

Ulceration is a process attended with imperfect granulation. The imperfect granulations secrete an impure pus, which is mixed with a thin irritating liquor. The imperfect granulations, moreover, cannot fulfil their purpose of building up, whereas absorption continues active, and thus a loss, instead of an increase, of substance is the conse-

quence. Granulation builds up regularly. Absorption removes irregularly, carrying away any part that is fit for removal; and an irregular abraded surface, more or less of a hole, sending forth a thin unhealthy pus, is called an ulcer; for the cure of which we must endeavour to remedy the morbid action by exciting one more healthy, so that the part being brought to the condition of a simple wound, will heal. When ulcers have continued for a long time, it is often necessary to employ constitutional remedies to establish a cure. In the generality of cases the ulcer occasions great irritability of system, which must be combated by opium; tonics likewise must be given, together with a liberal diet. In some cases, stable soiling, a course of carrots, or other total change of food, assists the healing and restorative process greatly. The general treatment of an ulcer is first to cleanse it by means of a poultice, and then to stimulate it by all the means in our power, keeping up the system by a very liberal, nutritious diet.

Ulcers are often found of a greater extent internally than externally; when the fluid which is secreted by them absorbs in different directions, forming narrow pipes, the sides of which are scirrhous, from which issues a glairy discharge. These pipes are called *sinuses* by the surgeon. In general cases, the longer an ulcer has lasted, the more difficulty there will be to bring it back to a healthy state. The external means employed for this purpose are usually stimulating injections, or incision. Ulcers are apt to be treated by farriers erroneously, by plugging up the sinuses; when the caustic penetrates farther than was intended, sloughing away the diseased, and the healthy parts. The true remedy is equally simple and effective, namely, to slit them up, and then to lay within the divided pipe a piece of tow, saturated with some caustic solution. By this means the scirrhous lining will be cast forth, and that which was a sinus will be converted into a simple wound.

POLL EVIL.

This is the consequence of an abscess forming within the bursæ mucosæ of the poll, and extending downwards: sometimes these may run underneath the cellular attachments of the cervical ligament. In either case they usually, unless

they are early checked, extend to the ligamentous articulations which connect the neck with the head. It is most common in large coarse horses. It is sometimes occasioned by hanging back in the stall, and thus forcibly pinching the poll between the collar rein, or halter, and the bones of the neck: blows, also act in the same manner, given either by the horse himself in rising, or received by knocking his head against a low door-way, when leaving the stable, or inflicted by brutal chastisement with the butt-end of the carter's whip. Inflammation results, in a degree proportioned to the extent of the injury: if moderate, resolution may occur; but if it has been great, and the ligamentous parts have become injured, resolution never takes place: on the contrary, from the living powers of these parts being comparatively small, an unhealthy inflammation follows; from which circumstance it is that we never meet with healthy pus from poll evil; but, rather its opposite—a thin sanious discharge, or sometimes a more glairy one.

Treatment of poll evil.—This regards its *nature* and its *extent*. If it be the early state of abscess, whether it is *deep* or *superficial*, we must first open it freely, and then endeavour to promote the healing process. Should the abscess not be fully formed, we should use our best endeavours to make it maturate; which end will be best attained by a mild blister rubbed in as often as required, till the fluctuation is felt either on one side or the other; when the next indication is to procure a speedy evacuation to the contents, and a depending orifice for its future passage, that no sinuses may form; this may be done by the introduction of a seton, first inserting the needle in the middle of the tumour, and passing it out at the most depending part. In case the tumour is a central one, and its limits extend equally over the neck, do exactly the same by the other side. But when, from improper management, matter has not only formed, but has been suffered to remain; or has only evacuated itself by a superficial opening, either natural or artificial, and not from one in a depending situation; in such cases, the healthy secretion of pus always ceases, and instead of it, a thin ichorous or a glairy discharge succeeds; the ulceration also extends still further; sinuses form in every direction; and

not unfrequently the cervical vertebræ become absorbed. The ravages which this disease makes are sometimes extreme; it has been known to disease the occipital and parietal bones, burrowing around the ear, and has insinuated pus into the parotid gland, as well as into the spinal canal, or the brain itself. Under any appearance, a very strict examination must be made, which is best done when the horse is cast, having his head elevated by a bundle of straw, and turned towards the light. Enlarge the lateral opening so as to admit of a free examination, by means of a finger, of every part liable to be injured. Carious bones must be laid bare, scraped, and then exposed to the escharotic effect of a strong solution of chloride of zinc. Hardened callous edges must be removed, and the smaller sinuses laid open, so as to form one continuous cavity. If all this be not thoroughly done, it will happen, that, when the whole seems on the point of healing, a new tumour will suddenly appear, and frustrate all our hopes. In this way the expert operator, well acquainted with the anatomy of the parts, will combat the worst cases. We must, however, avoid an injudicious use of the knife, by which much mischief has been done. We have seen a direct incision at the summit of the neck which divided the cervical ligament, and allowed the skin and muscles to recede beyond the power of surgery to unite them: and although it has been said that this may be done with perfect safety, for its principal attachment being to the dentata or second vertebra, so the head can be supported without it. Such, however, is a dangerous doctrine, and the division can only be warranted as a last resource; for a close examination of the head will show, that this ligament does most directly extend itself to the occipital bone also, where it evidently acts as a suspending agent, and cannot therefore be cut away without some injury to the mobility and support: we would, therefore, recommend the practitioner particularly to avoid so wide a range, and first to try two moderate counter-openings, created by means of setons. The injection of the internal cavity should be made, if possible, twice a day. One full examination and operation ought to be sufficient for all ordinary cases, but desperate diseases require extraordinary measures. A very mild case is often sufficiently stimulated into healthy action by fully

injecting into it the lotion composed of chloride of zinc and water. A more active escharotic than this will be found in the following:—

Chloride of zinc	a scruple.
Water	four ounces.

When the slough, which the above mixture will occasion, has been cast off, dress with the milder lotion, formed of the same ingredients; and if, after this, healthy matter shows itself, and granulations arise, the cure will progress. If the discharge again becomes ichorous, and the sore looks unhealthy, at the end of a week or ten days from the first, repeat the operation as before.

FISTULOUS WITHERS.

When a saddle has continued to press on the withers, either by its ill fitting, or the improper management of an incautious rider for a whole day, and the evil has, perhaps, been repeated the next, the consequence is frequently an inflamed tumour, which is produced by the enlargement of one of the bursæ in connexion with the dorsal spines. This should be immediately laid open, and subsequently treated after the manner explained under the head of Warbles. When this is not done, the whole hardens. Suppuration generally takes place within the part. The strong fascia on the back prevents the pus escaping. It becomes unhealthy, being confined: it absorbs, thus creating numerous pipes, and a case of fistulous withers is established. Should the attention be called to a case that has proceeded to a fistulous state, treat exactly in the same manner as with poll evil. Instances have occurred where the matter has penetrated under the scapula, and made its way to the point of the elbow or the front of the breast: in these cases a depending orifice should be made, and a seton introduced through the whole extent of the sinus; for which purpose seton-needles of sufficient length, with their points guarded to prevent them injuring important vessels, are manufactured. Occasionally the disease extends and involves the dorsal spines. The stench will speak aloud when the bones are affected. When the bones are diseased, slit up the fistula, and scrape them, until a healthy surface is exposed; after which, the milder lotion of chloride of

zinc and water may be used. But when the cartilage that tops the spines is affected, without delay saw it off, leaving a healthy surface of bone. When the sinuses, likewise, are slit open, to cut from within outwards produces less pain, which in surgery is a consideration. After the incision has been made, lay into the opened sinus some tow, saturated in the strong solution of chloride of zinc, the which after twenty-four hours may be removed, and the wound subsequently dressed with the milder lotion.

Fistulous sternum.—Occasionally the point of the sternum also becomes so much tumefied by blows or pressure, as to proceed to suppuration; when here, likewise, a fistulous state of the wound is not uncommon. The *treatment* of this must be regulated by circumstances, but, on surgical principles, must follow the rules laid down for sinuses in general.

FISTULOUS PAROTID DUCT.

A fistulous parotid duct presents an unnatural salivary outlet in some parts of its passage. A recent wound of the duct itself will show little more, at first, than the mere opening bedewed with limpid moisture, excepting the saliva, which during feeding will *pour* from the aperture like blood from an artery: the appearance of the opening soon changes, first to ulcerous edges, and at length into the true fistulous ulcer: an old orifice attains an almost cartilaginous hardness. The salivary fistula may always be distinguished from any other by the nature and circumstances of the discharge, which is particularly plentiful after fasting, and will then be forced out in a jetting stream; at other times it runs down the face. The fluid itself is semi-transparent; but, not unfrequently, from ulceration in the gland, it becomes tinged with pus, and occasionally stained by a little blood. These cases are usually the consequence of either accidental injury, or of abscesses resulting from strangles. The *cure* was formerly attempted by means of the budding-iron, which fearful agent became a favourite with veterinarians, under the fallacious teaching of Mr. Coleman. The iron was applied at a dull heat, and was tried over and over again, with increased severity. The iron was thought to create an eschar, which acted as a

plug to the orifice, while the heat started up reparative inflammation beneath it, which was to effectually close the opening by the time the roasted living flesh was cast off. Did it always succeed? No! Then, did it never occur to those who used it, that its application was painful, and that the operation of sloughing was likewise painful? Moreover, the iron necessitated a destruction of the immediate part, and any loss of substance in a duct is certain to be followed by stricture. All ways, then, this boasted remedy was bad. It was bad surgery to speculate with suffering, nay, especially so, when success could only efface an evil by the establishment of another and a worse injury; and especially is it the worst of surgery, to repeat so faulty a process an indefinite number of times.

There are, likewise, other modes of pretended cure, all equally barbarous, all derived from the same school. We shall with indignation pass by each of these, to notice a plan of proceeding adopted by Mr. Gowing, of Camden Town. A firm, agglutinating liquid is formed, by dissolving gun cotton in sulphuric ether, which is called collodiun. Upon applying this liquid to the surface of the body, the vital warmth occasions the ether rapidly to evaporate, leaving the cotton in an altered form, sticking firmly to the part.

Mr. Gowing first applied some mild caustic to the wound, till the orifice presented the reddened appearance he desired it should assume. He then placed above the opening a bulky pledget, sufficiently large to thoroughly close the wound, and sufficiently solid to resist the solvent powers of the saliva. A piece of cork, cut to the required shape, answers the purpose admirably. Over this, to bind it to the part he wished it should close, he passed some cotton thread, the ends of which he fixed to the hair of either side, by a liberal allowance of the liquid we before alluded to. This he repeated several times, till the plug was held firmly to the place by the cross bands of cotton. He repaired this dressing from day to day as it was necessary, having the horse's head tied up, and supporting the animal entirely by fluids. After a few days had elapsed the horse was allowed to lie down, and a short time subsequently the bandage was removed, when the orifice was effec-

tually stopped. This is a far better, and a far more effectual plan than any of the old measures once fashionable, but now, we trust, on account of their barbarity, discarded. Treated after the above method, should the first trial not succeed, a second can be made; and even this plan be repeated an indefinite number of times, without inflicting suffering amounting to positive torture.

CHAPTER XIV.

SPRAINS, OR STRAINS.

Unless we were allowed to destroy a vast number of horses with sprains in every stage, we could never define this injury so accurately as to defy criticism. It is said to be not an unnatural distention of parts, but a rupture or division of the cellular membrane which connects these parts: it is at the same time held by some that the injury which tears through this, does not put these tendinous and ligamentous parts on the stretch, because we are told that they are not capable of either distention or contractility. Wood, iron, stone, and even glass, are capable of contraction and distention, yet ligament and tendon are incapable of it; so we are told at least. But, with great submission, we do firmly believe that these organs can and do suffer extension; and that, during the violence committed in putting their structure on the stretch, both the internal cellular tissue, and that which connects them with other parts, is ruptured; and, with it, an infinity of minute vascular, nervous and absorbent vessels are likewise torn asunder; whence we are at no loss to account for the distention which follows this kind of injury; the pain and exquisite tenderness consequent upon the lesion; nor the difficulty of promoting immediate absorption, when the absorbents have suffered in common with the other parts. Such we believe to be the rationale of ordinary sprains or strains; but there are extraordinary, or rather more severe effects which follow sudden exertions; as violent efforts of the muscles to restore the equilibrium endangered by a slip. Here it is supposed that the tendinous structure itself, thecas, and all surrounding parts, may be unnaturally distended, and their minute connexions broken through.

We shall now proceed to trace the *symptoms* and *treatment*, under these kinds of injury. It is probable that the slightest sprain produces some lesion, however minute: and this, of necessity, causes inflammation to repair the hurt; we therefore always find heat, tenderness, and lameness as accompaniments of the slightest affection of this sort, but which a few days, or even a few hours, of rest is often sufficient to repair: rest is the remedy, and Nature has then time to work her own cure; but work the animal, and much more time, with artificial aids, will be required. If greater violence has been committed, greater re-action will take place; the effusion will be considerable, consequently the tumefaction great; the heat, pain, and tenderness excessive; and the animal will lose his appetite, fall away, and present every indication of symptomatic fever. If judicious means are, however, adopted, these symptoms gradually disappear, and, after a considerable interval, the parts are reinstated in their original integrity by absorption of the extravasation. If injudicious means are adopted, the engorgement remains, and becomes organized into a permanent induration, rendering the future action of the horse imperfect and painful. When laceration has extended itself into the sheaths, all these evils will, of course, be aggravated.

The *treatment* of sprain or strain, in whatever part it occurs, must be essentially the same, and the differences required are rather mechanical than medical. There are two indications that present themselves; these are, to overcome the inflammation; and, to restore the disintegration which may remain. A mere muscular extension will be followed by considerable inflammation, the removal of which will often leave the limb sound. But it is otherwise when the ligamentous structures are the principal sufferers: the vascular excitement will less easily give way; and when it does, will leave much enlargement and much weakness. There is one rule in surgery which cannot be too deeply impressed. After every injury the vital fluid is required for reparation, and therefore never bleed when an option upon the subject is left to you; and, in the great majority of cases, it is not whether the animal really requires bloodletting, but whether the veterinary surgeon shall perform

an act which will put money in his pocket. Absolute rest, however, is indispensable; and constitutional adjuncts, as cooling diet, and pure cool air, will assist the other means adopted. If the injury be recent, bathe the part with the coldest water that can be procured; but if the sprain has been done some time, apply fomentations and warm poultices. Should the tumefaction be great, puncture the part all over, and encourage bleeding with hot water. If it is a flexor muscle that has suffered, put on a high-heeled shoe. These first measures being over, apply pressure to the part, and keep it constantly there, unless the aggravation of the symptoms suggest its removal. This is now readily done by means of the vulcanized india rubber, beneath which, and over the place of injury, may be put a piece of spongeo-piline that has been soaked in warm water. Frequent blisters have sometimes done good, but not nearly so often as is generally imagined. It is a common practice to fire the horse that has a chronic induration springing from an old sprain; but there must be magic in the iron which is to remove an already organized substance. That end, however, is sometimes the consequence of continued pressure, which can produce absorption of bone or muscle; and that is best attained through one of the vulcanized india rubber bandages before alluded to.

SHOULDER SPRAIN.

What is now generally known by the term *shoulder sprain*, appears to consist in an unnatural extension of the muscular or ligamentous parts which connect the scapula and humerus to the trunk; and which parts, it must be evident, are very liable to this kind of injury, from the great extent of motion the shoulder-blade enjoys. A *shoulder strain* is, therefore, the consequence of a side wrench, which, by separating the fore legs too widely, puts these parts suddenly upon the stretch. The adductor muscles are frequently the sufferers: sometimes, however, the ligaments of the articulations, both scapular and humeral, are affected. As Mr. Percivall, however, justly observes, in the last part of his Hippo-pathology, which is the best and most compendious work upon the diseases of the horse that has hitherto appeared in the English language,

there are no known symptoms by which we can be informed, whether the muscular or fibrous texture is affected. Shoulder sprains are, however, not of such frequent occurrence as they were once supposed to be; and when, on viewing a horse in front, the muscles of one or of both shoulders appear wasted, it requires more than usual exertion to make people believe that the evil did not originate where its effects are evident. Such appearance, however, is no decisive proof; for in all affections of the feet, where there is much pain, the animal indulges in rest, and not only the external, but the internal muscles of the shoulders waste: this draws the fore legs closer together, and the whole substance seems lessened. It is very necessary, therefore, to be able accurately to distinguish a *sprain of the shoulder* from the numerous affections with which it may be confounded. Every case of true shoulder sprain, however, appears to occasion extreme pain to the horse when extending or advancing the leg; for which reason he drags the toe along the ground, and having rested the limb, drops considerably, and again catches the foot up quickly. These cases are especially characterized by the extreme difficulty with which a horse moves down the slightest declivity, from the weight being thrown on the shoulders; and also by the strange kind of movement with which he accomplishes the rotation of the body, in which the horse swings the leg round in a remarkable manner: in fact, he evidently attempts to move the limb in any direction but that in which elevation of the shoulder must take place. When the injury is principally in the shoulder, if pressure be made between the fore leg and chest, in the direction of the serratus muscle, the horse will flinch; and as a further mode of distinguishing this affection, if the foot be elevated, and the whole limb at the same time brought in a straight line, it will give intense pain should the shoulder be the seat of lameness. The immediate seat of the affection itself is in recent cases sufficiently well marked by the heat and tenderness of the immediate part; there is, however, not always much tumefaction present.

Treatment.—When by the heat, tenderness, and lameness, there is reason to consider the inflammation great, bathe frequently and copiously with a lotion composed of

half a pint of tincture of arnica to a gallon of water; under the supposition that the violence of the symptoms spring from the muscular structure being hurt. Should the case be recent, and the inflammation or external symptom less, bathe with cold water alone; and, in either case, so soon as the inflammation has abated, change the cold water for hot. In this manner, keep the shoulder wet for a week or longer, when every sign of active disease having departed, a blister may be applied. With regard to the manner of applying the blisters in these cases, the late Mr. Blaine speaks very confidently, and he says; "I would recommend the following practice, which I have long pursued in these cases with invariable success. As soon as the more active inflammatory symptoms are abated, I proceed to raise an artificial inflammation by the free use of stimulants, generally of the liquid blister, in the following manner: Mix six ounces of common oil with two or three ounces of liquid blister (see *Mat. Med.*), and with this rub the whole affected part twice a day, until the swelling and inflammation it will bring on prevent the use of more. In two or three days these will subside, when it should be repeated, until the same effects again prevent the application. In this way keep up a mild inflammation for a week or ten days, according to the original violence of the affection: in general cases, the subsiding of the second swelling will leave the horse sound. This will be found a much more efficacious mode of practice than the common blister; but it must be particularly remembered, that I know of no affection so liable to return as this; consequently, although the horse may appear sound, it will be very dangerous to put him to immediate work."

Blows on the point of the shoulder.—These injuries occur more frequently than strains; they are often productive of more present lameness, and eventually of consequences more serious. Turning suddenly in a narrow stall, running against a hard body, or being kicked, or violently struck, may occasion this injury. There will be great tenderness and heat at the point of the shoulder; some swelling, and the lameness will be extreme. In such cases the treatment will be the same as in sprain of the shoulder.

SPRAIN OF THE FLEXOR TENDONS, THEIR SHEATHS, AND LIGAMENTOUS CONNEXIONS.

A *sprain* or *strain* of the flexor tendons is a very grave and serious evil. It is probably often accompanied by laceration of some of the ligamentous fibres; there is, however, no doubt but that it may be occasioned by a simple distention of the synovial sheaths, and even of the tendons themselves. It is more frequent in the fore than the hind legs; but it may and does occur in both. It is the result of some violence which acts suddenly on the limbs, as downward leaps, attempts to recover a false step, &c. It is also occasioned sometimes by lowering the heels too much and too suddenly; by which they are put unnaturally on the stretch. The injury received brings on inflammation, with an incapability of extending the limb. If the inflammation continue, or exercise or improper applications be made use of, the effusion then not being readily absorbed, may eventually form adhesions between the tendons and their sheaths. It is these effects of adhesive inflammation which form the permanent callosities around the back sinews; and which, by obstructing the freedom of motion, occasion a lameness much felt after very hard work, as well as at first starting to exercise; but this decreases as the journey proceeds. It being therefore observed that he is not only less lame when exerted, but also less swollen, an opinion is very general that horses with old strains may be *worked sound*. It would be as reasonable to drive the soldier with one leg until the other grew.

The *treatment of thecal and ligamentous distention* or sprain should follow the general rules already laid down. Put the horse where he may be quiet, and have a high-heeled shoe placed on the foot of the affected leg. Cold applications, in the very early stages, particularly when the tumefaction is considerable, will much tend to unload the vessels; and the same indications will be followed by immersing the whole limb in spring water. In two or three days, change this plan for fomentations or embrocations. Any treatment more stimulating than this in the early stages tends to increase the deposit of lymph, and to organize it into a permanent tumour. But when the active stage of

the inflammation has subsided, then mildly stimulating applications are proper; and they should be accompanied here with due friction and bandaging. The recovery from a severe case is usually very slow: the parts being ligamentous, do not readily reinstate themselves; the after-treatment must, therefore, fully accord with this view, which is that of giving *sufficient time;* and in most cases it ought to be some weeks after the horse may seem sound before he is put to full work. Excepting in trivial cases, it is not often that the parts are really so reinstated as to be equal to continued exertion. Therefore it is better, in the most favourable lesion, to give a few weeks' rest, using a vulcanized india rubber bandage, having underneath it a piece of spongeo-piline, saturated with water. Where the induration remains obstinate, repeated blisters, applied after the method recommended by Mr. Blaine, in shoulder lameness, are the best means of promoting a removal of it; but firing is a disfigurement, without the slightest benefit.

OVERREACH

Is a *blow* inflicted on some part of the fore leg by the hind foot; frequently it strikes the flexor tendon, and produces inflammation and tumour. The treatment must be similar to that just described: to prevent a repetition of the accident, have the toe of the hind shoe shortened, and the shoe itself put upon the foot so far back as may be convenient.

RUPTURE OF THE SUSPENSORY LIGAMENTS.

Breaking down is the name given by farriers to this accident, the which now and then happens to young horses while being broken in, or in training. It occasionally happens to older animals, while undergoing violent exertion of any kind. It has been often mistaken for a rupture of the flexor tendons themselves; but it is hardly ever or never that this injury takes place in the horse: the immense strength of these organs very seldom indeed admits of their rupture from the efforts of the animal; but their connecting and suspending ligaments, being weaker, are occasionally broken through. The limb, in these cases, betrays its loss of support by the fetlock being brought almost to the

ground; but the horse can flex his foot after he has raised it, which is not the case when the flexor tendons or back sinews themselves are torn through. A perfect cure is very seldom obtained, but, as the horse may be made sufficiently useful for some purposes, so it should always be attempted, first by reducing the inflammation by the means already indicated; and this beginning to abate, the toe should be somewhat flexed by the application of a high-heeled shoe, to prevent the laceration of that intermediate substance which will be thrown out to unite the ruptured ligaments. A vulcanized india rubber bandage should also be kept on afterwards, until all is firm and some strength be gained. In other respects, the treatment is such as is suited for sprains generally, which will be found fully detailed under the head of Shoulder Sprain, &c.

RUPTURE OF THE FLEXOR TENDON, OR BACK SINEW.

This, as observed, is a very rare occurrence: it has, however, happened from great violences committed: the general *treatment* will be that which has been already detailed, excepting that here it would be essential to flex the whole limb from the stifle downward, and to keep it constantly in that state for some long period; which could alone be effected by the use of proper splint apparatus. To effect this harmlessly, the animal should have the splints put on at the commencement of the injury, before pain and inflammation has time to set it. The head should then be tied up, until the horse is quite tired, when he will generally allow slings to be placed under him. In these he must remain till the treatment is concluded.

Crooked limb from this rupture, and sometimes also from the former injuries, has taken place. To prevent this, in a month, if all goes on well, the apparatus mentioned may be removed, and a straight piece of iron gradually brought forward from the toe; this should be by degrees increased, and worn till the cure is as perfect as the nature of the case permits it to be made.

SPRAIN OF THE FETLOCK JOINT.

A Sprain of the Fetlock Joint arises from some injury done to the ligamentous and tendinous connexion of this

part, either from long-continued exertion or from violent efforts. The effect immediately produced is, heat and swelling of the part, accompanied with great lameness in the injured leg. When it occurs behind, it is often mistaken for common enlargement arising from œdema, particularly when the accompanying lameness be not considerable. Such cases have happened, where horses have continued to be more actively exercised to take down the enlargement, until the increased inflammation thus occasioned has forced the vessels to deposit coagulable lymph, which, becoming organized, could never be removed. The *remedial treatment* must be the same as that of other sprains.

STRAIN OF THE LIGAMENTS OF THE FEMUR, WHIRL, OR ROUND BONE.

As chestfounder covered all the defects of the fore limbs, so lamenesses behind are all referred, by the older farriers, to either a strain of the round bone, or of the stifle. Violence may, however, and certainly does, occasionally injure the ligaments of the articulation of the thigh. Here the *treatment*, from the deep situation of the part, must necessarily be attended with some difficulty. It will be proper to use cold applications to the part, if the pain and tenderness are considerable; then resort to stimulants, and after a brief time lay on a blister, which should be frequently repeated. As a last resource, fire over the joint.

SPRAIN OF THE LIGAMENTS OF THE PATELLA, OR STIFLE JOINT.

The ligaments of the patella, or of the *stifle*, may be injured by over-exertions, or by accidental violence, as blows, &c. This may be known by the *circular direction* in which the leg is carried, during motion, purposely to avoid flexing the joint. The heat and tenderness are, however, of themselves sufficient to guide the judgment. Sometimes the muscles of the thigh, and not those of the joint, are the seat of the injury; in which case, the tenderness will be found within, towards the groin, and not around the patella or stifle. In *treatment*, however, this affection in no wise differs from the former. Repeated blisterings and absolute rest in both cases are the best remedies.

CURB, OR EXTENSION OF THE LIGAMENTS OF THE HOCK.

This is usually brought on by some violence offered to the sheath of the perforans tendon, passing downwards at the back of the hock. It is often the effect of leaping, rearing, kicking, &c., and as such is usually sudden in its appearance. A kind of predisposition to curbs from conformation is apparent in horses with *sickle hocks*. For the confirmation of this fact the public are indebted to the dissections and observations of Mr. W. Percivall, a writer whose various works cannot be too highly commended. The lameness arising from curbs is not, in general, severe: occasionally, however, it may and does prove considerable. The *treatment* must accord with the general rules established for the cure of other ligamentary extensions or strains; by first allaying the inflammatory symptoms, and then by counter-irritants, as blisters, &c., promoting an absorption of the deposit; using iodine ointment and ung. cantharides, mixed in equal parts, with a high-heeled shoe.

BRUISES.

These are tumours formed by some injury, when a rupture of the smaller vessels occasions an extravasation of blood within. If the lesion be moderate, the parts will reinstate themselves; the effused blood will either become absorbed and the tumour removed, or otherwise it will become organized, and, with some increase of dimension, will form an integral portion of the surrounding mass: but when the injury is violent, the parts may be unequal to either of these processes, when the extravasated blood will become a source of irritation, and suppuration will follow. Should a still higher degree of injury have been sustained, the entire tone of the substances around becomes destroyed, and sloughing must take place; when the living parts will make an effort to remove the dead, and an extensive sore will be formed.

The *treatment* of bruises will therefore vary according to these several circumstances. We should always endeavour to fully reinstate the part, by promoting absorption of the effusion; which may be done by giving local strength by

external stimulating applications, as warm fomentations, diluted tincture of arnica, spirits of wine and camphor, soap liniment, &c. If the blood remain fluid, promote its escape by making a small depending orifice: if it suppurate, treat as a common abscess. When sloughing occurs, treat as directed under the head of gangrene. Should the tumour remain indurated, stimulate with iodine ointment, mixed with that of Spanish flies, and by friction.

RHEUMATISM

In the horse is doubted by some, who nevertheless cannot account for many anomalous symptoms on any other pathological view. It is acknowledged in cattle; and no one conversant with dogs but is aware rheumatism is one of the most prevalent diseases with those animals. The horse, then, is the subject of a disease essentially rheumatic; that is, he is liable to an attack on the membranous and tendinous aponeuroses of the muscles, more particularly of the fore extremities. It appears also to be occasioned by cold and moisture, though it may also spring from high feeding; and it is seen both in an acute and a chronic form.

Of *acute rheumatism* well-marked cases are occasionally encountered, which were traceable to the effects of cold or moisture. The leading characters were alike in all; the attack being ushered in by universal stiffness, but more particularly of the fore extremities. Sometimes the case is attended with considerable tumefaction in front of the breast. The treatment consists in first decreasing the food to so much only as will support life and diminish fat. Then give the following ball night and morning, until the bowels are freely opened, when it is to be withheld till purgation has ceased, and then recommenced:—

Powdered colchicum	two drachms.
Calomel	one scruple.
Opium	one drachm.
Aloes	one drachm.
Powdered capsicums	half a drachm.

In the mean time the swollen parts may be freely fomented with very hot water, and afterwards well rubbed with soap liniment, to every pint of which a quarter of a pint of liquor ammonia fort. has been added.

Should the above ball not succeed, try the following drink, which, in some cases, is even more effective:—

Iodide of potassium	one drachm.
Sulphuric ether	one ounce.
Cream of tartar	four drachms.

Give night and morning in a pint of gruel.

Chronic rheumatism may be the sequel of the acute; in some cases it appears as the immediate consequence of exposure to cutting winds, humid atmosphere, &c.; and is betokened by stiffness and tenderness of the parts it attacks. When the extremities suffer, it is not unusual to observe some tumefaction, but always great disinclination to move. It occasionally visits the loins, but is most common in the fore quarters. Sometimes one fore extremity and occasionally both are affected: when sudden, metastasis will often remove it to the other parts; which cases were well characterized by the old term of *flying lamenesses*.

The treatment of chronic rheumatism does not materially differ from that recommended to be followed in cases of the acute description, excepting that strychnia, in doses of a grain, gradually increased to three grains, has occasionally been attended with benefit.

RHEUMATISM IN CATTLE.

This disease is even more common among cattle than among horses. It is often observed by the graziers and breeders, who call it a *chill*. If it affects the extremities, there is heat, tenderness, and enlargement; when the loins are the seat, the whole vertebral column is stiffened. Encysted tumours are apt to appear between the gastrocnemii tendons and the tarsus when general inflammation passes into a chronic form. The causes are attributed to the variable state of the atmosphere, and to the low and ill-ventilated stables in which stall-fed cattle are immured. The treatment is, restricted diet, and the soap liniment, as before directed, only further strengthened by the addition of four ounces of the tincture of cantharides, and the like amount of the tincture of capsicums. The encysted tumours are to be freely opened, and afterwards to be dressed with the

solution of chloride of zinc, two scruples to the pint of water.

EXTERNAL TUMOURS.

Sitfast is a thickening of the cuticle, produced by the friction of the saddle. It is best removed by the application of blistering ointment, rubbed in upon the excrescence, and an inch all round it. This is to be repeated daily till the sitfast falls off, which it will do after a few applications. The sore left is to be dabbed thrice daily with the weaker solution of chloride of zinc.

Induration of the elbow is sometimes observed, and of cartilaginous hardness, occasioned by the horse lying with his fore legs doubled under him, so that his elbow rests on the heel of the shoe, particularly when worn long or with calkens. It would be useless to attempt a cure without removing the cause: that removed, by taking down the calkens and shortening the heels, the enlargement might be dissected out.

CHAPTER XV.

OF ENCYSTED SWELLINGS.

VARIX, OR BLOOD SPAVIN.

A DISEASED enlargement of the coats of the veins is termed *varix*, but which is not a common affection of the horse, as his superficial order is comparatively small, and not subjected to such artificial pressure as our own. The only instance usual in veterinary surgery is that termed *blood spavin;* which presents certainly something like a varicosed enlargement of the superficial vein passing over the hock; this is the consequence of the pressure of a distended capsule, which is called *bog spavin*. The dilatation, being situated immediately below the bog spavin, is caused by obstruction to the passage of the blood, and a consequent extension of the coats of the vein. Usually, therefore, the dilated capsule is the part to be attended to; but when the vein itself becomes so much enlarged as, by its own pressure,

to occasion mischief, it can only be remedied effectually by removal. This may be effected by carefully including the *vein*, and the vein alone, above and below the enlargement, within ligatures, by means of curved needles. The operation is performed without dividing the skin, and the ligatures are left to slough out. After which the tumefied vein may be opened, and the contents evacuated. But it should be remarked that, in five hundred cases of what is called *blood spavin*, it would not, perhaps, be actually necessary to take up the vein in but one of them.

DISEASED ENLARGEMENT OF THE BURSÆ MUCOSÆ, OR WINDGALLS.

The tendons of those muscles connected with or passing over joints are furnished with membranous bags, called *bursæ mucosæ*. These *capsules* are distributed about all the joints; but, in a *practical* point of view, some are more important than others. The morbid enlargement of these constitutes *windgalls*. Violent and long-continued exertions determine more blood to the extremities, and, from its greater supply, the synovial secretion is augmented; thus it is that *windgalls* are almost the invariable attendant on hard work. While the swellings remain small, they can do little mischief, and had much better be let alone: but when they become enormously enlarged, they may produce injurious effects from the unequal pressure they occasion; and, also, by a sympathetic effect on themselves, their contents become not only increased, but diseased, proving frequently inspissated or thick.

In the *treatment of windgalls* we must attend to three particulars; the removal of any diseased alteration they may have occasioned in the neighbouring parts; the removal of their own distention; and the prevention of its recurrence. Stimulating applications are the most likely to produce a removal of any coagulating deposit; these are likewise still more proper, as they will tend to effect a removal of the contents of the windgall itself. The *liquid blister* will be very proper for this purpose. But simply to promote absorption of the contents of the windgall, continued pressure will be found the most convenient and efficacious remedy. A calico or a flannel roller may be prepared, of

two, three, or four yards long, according to the part affected: four inches is a proper width, and, from its superior elasticity, flannel is preferable to calico or linen. In addition to this, be furnished with one or two pads, stuffed with horse-hair or other elastic matter. Begin to apply the roller, and after having made a turn or two below the swelling, place the pad exactly upon the windgall; if in the pasterns, one should of course be placed over each side: continue the roller firmly and evenly over all, and fasten off. It however must not be forgotten, that but little benefit can be expected unless this be continued as a constant application for a considerable time, during day and night, when not in exercise; also, it must be remembered, that upon a repetition of the original cause (*hard work*), they are apt to return; the dilated capsule seldom regaining, with its original size, its original strength. It may be necessary here to warn the practitioner never to puncture a windgall. Most of those of great bulk and long continuance actually communicate with the cavity of the joints they surround; and the others of themselves excite similar effects with open joints, when they are laid open; and even if no mischief followed, no good could result; the cyst would be only momentarily emptied; for its capacity would commonly remain the same, and would almost immediately fill it up again. Such an operation is, therefore, not only useless, but usually produces such inflammation as either destroys the horse, or ends in anchylosis of the joint.

BOG SPAVIN.

Blood spavin cannot exist without bog spavin, for it is the swelling of bog spavin that causes the passage of blood within the vein to be stopped; but bog spavin can, and most frequently does, exist alone. This disease is synovitis, or inflammation of the great synovial capsule of the hock, i.e. that between the astragalus and tibia. The only measure which can benefit this disease is an india rubber bandage, so formed as to allow the top of the calcis to protrude, which will aid the elasticity; besides, the bandage would answer no further purpose so far as bog spavin is concerned, if the point of the hock were included.

THOROUGH-PIN

Is the farriers' term for the bursal enlargement situated in the upper and back part of the hock, beneath the tendons of the great flexors of the foot; and, as after some time it necessarily shows itself on each side, so it is a *thorough-pin*. From the peculiarity of situation it seldom occasions lameness, unless it be very large. Continued pressure is the only remedy.

CAPPED HOCK.

This arises from a swelling of the bursa mucosa, that assists the motions of the point of the calcis under the skin. It is very unsightly, and sometimes becomes of a great size, particularly when it is occasioned by the practice of kicking; in which case not only is there an immense increase of the secretion, but the integuments also thicken, and accumulations take place about the capsule, which become of semi-cartilaginous consistency. It has been punctured occasionally with partial success, and the contents have been drawn off by setons, but the inflammation raised has endangered life; it has also been opened, and its contents, which in the enlarged state are partly fluid and partly semi-solid, evacuated, but after-irritation has endangered life; and no great advantage has been gained, for the incision made has united, and the sac has filled again. Hand-rubbing, almost continuously applied, has done more good with regard to diminishing the size, than all the puncturing, blistering, and firing put together. The hand is also assisted by an india rubber bandage made to fit the part, and worn at such times as the friction is stayed. When, however, opening the sac is insisted upon, it is best to dissect away the lining membrane, or to destroy it by the application of caustic.

CHAPTER XVI.

FRACTURES AND DISLOCATIONS.

When any important bone is fractured in the horse, from the trouble of managing him, the expenses attending his

keep, and the risk of his future usefulness, attempts are seldom made to reunite it. We destroy, however, many horses with fractured bones that might be saved; and it was formerly much more the custom than at present to attempt their cure. An old writer, of the name of Blount, has given a very good figure, with directions for the treatment of fractures of the extremities. If this were then practicable, under the present improved state of the art, probably broken bones might again be perfectly consolidated. Even in fractures of the large and important bones, if the horse was either carefully slung, or partly slung and partly supported, a cure would often follow. When a bone is broken, and there is no external wound, it is called *a simple fracture*, to distinguish it from that producing a wound externally, which is termed *a compound fracture*. In simple fracture the divided bone after a time inflames; coagulable lymph is thrown out from the ends of the broken portions; within this lymph vessels first form; the lymph then becomes cartilage, and then the arteries deposit ossific matter, which consolidates, and the bone is united. In addition to this, there is another formation which occurs, called callus. When a bone is fractured the surrounding soft parts are injured, and they effuse lymph, which accumulates about or around the ends of the bone. This effusion is blended with that of the bones, and forms a temporary bandage about the parts. It undergoes similar changes with the other lymph, and thus it becomes firm, binding the parts together, and filling up any space that may be left between them. This callus diminishes with time, but always to a greater or less extent exists. When a fracture is compound, in addition to the union of the bone, the lacerated soft structures have to be brought together by the suppurative process, which, of course, will generally delay the cure. Fractures are sometimes accompanied with dislocation also; in which case it is evident all attempts at a cure will utterly fail. In the *treatment* of fractures, it is necessary that our aim be directed to assist nature: first, by replacing the divided ends as nearly as possible in their original situation; and, next, by proper applications, to retain them there, until union be effected. In addition to the foregoing fractures, there is another in which the bone

is fractured, or rather smashed into several little pieces. Such a case is obviously hopeless with our patients. We shall therefore proceed to notice the fractures individually; premising, however, that it would not be prudent in the medical attendant to give too early a favourable opinion in these cases. The impatience of the animal, and his great powers of resistance, all act against a successful issue. But if it is determined to attempt the union of the bony portions, commence by replacing the fractured parts of bone as nearly as possible in their original position; and next apply such aids as will so retain them until the union is consolidated. Carefully, however, watch your patient, that his own irritability do not frustrate your attempts. A steady attendant should remain with him night and day, alternating, however, his watch with some other equally trustworthy stable-man. If the fracture is in the bones of the extremities, then suspension of the animal may be resorted to, which will, in a great measure, prevent the necessity of a constant watch.

Fractured Skull.—This is quite unfit for treatment, the result generally being phrenitis of the most acute kind. The horse with a fractured skull should be immediately destroyed.

Fractured Face.—Horses have had all the fore part of the head smashed in, and yet have survived; and even done good service in the hunting field afterwards. The skin, if not sufficiently divided, should be separated; each perfectly detached piece of bone removed, and the other portions supported by every means in our power. Pasteboard, or thin leather, should be passed up the nostrils if necessary. The skin should then be brought together, and the horse fed on slops, if imperative. His head should be tied up, to prevent his rubbing the wound against any thing, and the animal placed, as soon as he will bear them, in the slings. If, after all, any opening into the nostrils, or elsewhere, should remain, it may be covered with leather. One eye has, in a case treated by Mr. W. Percivall, been forced out upon the cheek. But this gentleman cleansed and restored the part. The horse subsequently perfectly recovered the use of the organ. This is the only comminuted fracture which, in the horse, can be treated with success.

Fracture of the Lower Jaw-bone.—It is fortunate if one branch only be broken; should, however, the injury happen to both, there is still no need to despair. Make a strong leathern case to support the broken bone, and nourish the horse with thick gruel. This is one of the easiest remedied cases of fracture that can be encountered. It generally does well, sufficient time being allowed.

Fractured Ribs.—Blacksmiths are apt, from the effect of passion, to strike a horse with the shoeing hammer. We have more than once seen a fractured rib from this cruelty. In other ways, also, the ribs may become fractured. If the fractured portion of the rib penetrate the cavity of the chest and wound the lungs, the case is hopeless. Should it, however, be a simple fracture, apply a bandage round the body, and bring the divided ends of the rib together.

Fractured vertebræ or *pelvis* are both hopeless.

FRACTURED BONES OF THE EXTREMITIES.

In *fractures* of the larger bones of the limbs, the horse is almost always killed, as being supposed incurable, or that, if cured, he would be utterly useless: but not only are many of these cases curable, as has been occasionally proved, but a horse frequently becomes very useful afterwards; and it is evident that the breed of such an animal, at all events, provided it be a mare or stallion, may be made subservient to our purposes.

Fractured Scapula, or *Shoulder-blade*, is rare, but does occasionally occur. In fractured scapula the toe trails along the ground; but as it does the same whether the arm or fore arm be broken, so we must look for other evidences; and these are gained by attempts at elevating the foot, which not only give excessive pain, but usually produce a *crepitus* sufficiently distinct; particularly if the hand is placed on the part. A *cure* may be effected by suspending or supporting the animal, united with the application of some adhesive matter, which can give solidity to the limb without excoriating it; further strengthened by bandages judiciously applied, so as to have an equal and extensive bearing.

The *Humerus* is not often fractured. It is very short and thick, and so strong as to be little in danger; but when

it does happen, the plan recommended for the cure of the scapula would be here also proper.

The *Arm-bone* is rather more frequently broken, and may be successfully treated as follows:—Having first slung the horse, reduce the fracture; that is, replace the divided ends of the bone in correct apposition to each other. The animal might be partially slung, so that the feet might rest on the ground, while they supported little of the weight of the body. When all is safe, encase the fractured limb accurately, by making a bandage embrace every part, and strengthen the whole with proper splints.

The *Femur* is likewise occasionally fractured: when this accident has happened to a valuable stallion or brood mare, whose future usefulness in propagation would not be materially affected by the shortening of the bone, we might apply sustaining bandages and solidifying applications, after the same manner as directed for the scapula, with the addition of *suspension*, which here could probably not be dispensed with.

Fracture of the Tibia is more common than that of the femur, to which it is mostly exposed at its inferior part, where the resistance of the muscles, and its obliquity, render efforts at reduction generally unavailable. Union, however, will take place between the bones, and the deformity will be lessened, as well as a more favourable position of the callus around the bone will be gained by bandaging and by splints; and also by support to the body from the ceiling, either wholly or partially. By these means the animal may be rendered useful for slow draught-work, or for breeding.

The *Olecranon*, or *Elbow*, has been fractured by violent efforts of the muscles; but the tendinous attachments render it extremely difficult to apply means to retain it in its situation. It is only by preserving a state of absolute relaxation of the limb that any attempt can have a chance of succeeding.

Fractured Cannon.—The muscular action which resists the reduction in the former cases, serves here to keep the bones steadily applied; and we have seen such a case treated successfully without slinging, by a stiff frame of leather, resembling splints for human fractures, only more exten-

sively applied. In Blount's Farriery there is a plate representing some ingenious machinery for the cure of these lesions. Mr. Bass, near Barnet, is said to have had several of such cases, which have terminated successfully, by the application of proper splints with bandages; of which instances are now so common, that no practitioner would be warranted in condemning a horse with a simple fracture of one of these bones.

Fractures of the large and lesser Pastern and Coffin Bones.—These bones have never been successfully united. The animal may afterwards, however, be fit for breeding, but never again, or so rarely that the exception proves the rule, can be fit for fast work. When it is determined to try chances, it is better to sling the horse, and allow nature to do the rest.

Fractured Navicular Bone.—This accident, though rare, never happens unless the bone be much absorbed, and very hollow, in consequence of pre-existing naviculartbritis. It is impossible to suggest any remedy, or if any measure likely to benefit the part could be thought of, we do not see in what way it is to be applied.

A Fracture of the prominent portion of the *Ilium*, or *Haunch Bone*, sometimes occurs; when it is of the simple kind, the adhesive inflammation which follows readily unites the parts; but from the action of the muscular fibres implanted into the disunited portion, it is drawn aside, and no surgical efforts can retain it in just opposition with its fellow portion. These cases are called *hipped*, or *let down on the hip*.

The *Patella* is likewise occasionally fractured by violent kicks; when the action of the tendons inserted into its surfaces disunites the fractured portions, beyond the power of veterinary surgery to bring them together; the limb is useless, having lost the antagonism to undue flexion: it will be therefore of no avail to attempt a fruitless course of hopeless treatment.

DISLOCATION OF BONES.

The articular surfaces of bones are sometimes displaced from their proper situation, when they are said to be *dislocated* or *luxated*. In human surgery this forms a very

important branch of practice, but is less so in the horse: not that these separations do not sometimes occur, but the immensity of the muscular resistance is such, and our surgical machinery at present is so little calculated to make any resistance to the power thus exerted, that few reductions have been attempted.

Dislocated Patella.—This accident is of rather common occurrence. The bone, however, is always dislocated outwards; the form of the lower end of the femur, the strength of the ligaments, and the power of the muscles on the outward side, all prevent the bone from being dislocated inwards. It sometimes happens from weakness, when mere motion will be sufficient to reduce it. Nevertheless, in other instances, surgical aid is needed. In such cases proceed as follows:—in the first place, have the leg drawn forward, if necessary, by means of a rope passed over a beam or rafter, and around the fetlock; then push violently against the dislocated bone, the position of which will be accurately told by the swelling it produces. It will generally fly back with some noise; and having got it in its proper situation, partially release the drawn-up leg, and have an assistant to hold the bone justly, by pushing against it for several hours; afterwards blister the part, to render the animal averse to using it.

The Signs of a Dislocated Patella are the rigid determination of the limb backwards; exactly as might be expected from the loss of the moving pulley into which the extensor muscles of the thigh are implanted. The flexor muscles, moreover, having no antagonists, the limb is drawn downwards, and remains firmly flexed, the toe dragging on the ground. The displacement of the patella itself is less a guide than might be imagined; but the complete determination of the limb backwards, and the flexion of the pasterns and foot, will serve to distinguish it; it can at once be detected by grasping the condyles of the femur. An examination of both limbs will make clear the loss of the protuberant patella in its natural situation, and enable us to see the bone towards the outer edge of the thigh; but sometimes so deeply imbedded within the muscles of the part, particularly in coarse fleshy horses, as to almost escape cursory observation. This occurs from the powerful

actions of the extensor tendons implanted within it; to which cause we must also attribute the pain that is sometimes observed in these cases.

CHAPTER XVII.

DISEASES OF THE BONES.

CARIES.

Bones are subject to chronic inflammation, which terminates, as in soft structures, in resolution, suppuration, or in mortification. The living powers of parts being generally proportioned to their vascularity, bones, as having less blood than other structures, are weaker, and their diseased actions are slower: consequently they do not readily inflame, but, having so done, the process frequently produces death of them. Thus bone will die: it is however necessary to observe that the restorative powers here, as in other instances, are more active than in man.

Exfoliation.—When death has taken place in a bone, the process of its removal is called *exfoliation*, and such process is conducted by the absorbents. This is effected partly by the suppurative and partly by the ulcerative actions; or by sloughing, though in a very slow mode, which removes so much of the living as forms the union with the dead; by which means the decayed portion, losing its attachment, comes away. In *caries*, therefore, it must be our endeavour to assist this exfoliation. Sometimes, from an actual want of power to accomplish this, the caries spreads; in which case we must rouse the living bone into greater action by liberal diet, and a free allowance of ale or stout, or even spirits; while chloride of zinc, from its disinfecting power, is freely injected, to destroy the fœtor that accompanies the sloughing of bone.

EXOSTOSIS.

Bones being organized like the soft parts of the body, we might therefore suppose that they were also susceptible of disease; the most prominent instance of which is *exostosis* or bony tumour. This is the consequence of a morbid

increase of the secretion of bony matter. It is to the periosteal exostosis, or *cartilaginous exostosis* of the *periosteum*, that those bony swellings we call splints, spavins, &c., owe their origin. Yet these exostoses are not limited to any individual parts, but can be as numerous as the bones themselves: the spine exhibits them throughout; the extremities have them from the semi-ossified cartilage of the senile scapula to that of the lateral cartilages of the coffin bone. The *causes* of æquine exostosis may be characterized as predisposing and proximate. *Pressure* is the predisposing cause, and *inflammation* the proximate. If the exertions are pushed greatly beyond an ordinate degree, the neighbouring muscles press unduly against the bone, irritation springs up; commencing occasionally within the periosteal covering, but oftener within the ligamentous connexions around. After a time, and with repetitions of the original cause, inflammation sets in, and communicates itself to the periosteum, which is in contact with the bone. But there are, as already hinted at, injuries productive of exostosis where the stimulus is one violent effort of over *straining* the bodily machine: here we have reason to suppose that the foundations of the most ruinous exostoses are laid within the ligaments, which inflaming, extend the affection to the periosteum, and from thence to the bone under it: the result is, that osseous union takes place between the ligaments and the contiguous bone, of which spavin is an instance. The articular cartilages are particularly exposed to the effects of pressure; as those of the spinous processes of the vertebræ also are; those of the lateral parts of the feet, and some others are likewise the centres for osseous deposits: during which the cartilage may become absorbed, leaving the bony matter. A morbid disposition to ossific deposit likewise appears to pervade other parts than those immediately connected with the bony base; as within the coats of the large arteries, the cartilaginous parts of the larynx and the internal portions of some glands. In horses the order of science is so far destroyed, that it is not unusual to see ulceration and deposition going forward side by side, on the same part of the same bone; as in the articular surfaces, where disease generally ends in anchylosis. The *cure* of exostosis must consist in whatever stops the

disposition to farther deposit, and removes what has been already produced. These effects have been attempted by constitutional means, intended to act on the absorbents generally; such, however, have not been found to answer any end: local means only are therefore resorted to, and are principally of a stimulating nature, variously modified, as will be seen under individual cases of exostoses.

SPLINT.

Splint, or as some call it *splent*, is the name given to a very common exostosis situated upon the cannon bones, usually commencing in the fibro-cartilaginous substance. In the fore limb it generally occurs upon the inner, and in the hind upon the outer side of the leg. This species of exostosis most commonly lames the young horse, from the greater plasticity of his frame, and from his organization being not yet inured to continued exertion. It is usual to consider the consequences of a splint as principally dependent on its situation, and this is generally correct; but a splint may prove painful, and otherwise injurious, although it should not interfere with any tendon or ligament; for the periosteum becomes exquisitely sensitive under inflammation and distention. This inflammation, fortunately for the animal, is seldom very acute; and the increase is generally slow, which enables the periosteum to accommodate itself to the distention: generally, therefore, when a splint is not situated immediately under a tendon, or contiguous to ligamentary matter, it occasions no lameness. The veterinary practitioner should, therefore, in his consideration of the *consequences* in these cases, be guided, in a great measure, by the *situation* of the splint. If placed anteriorly, it is productive of much less injury than when placed posteriorly; for, as already pointed out, in this latter case, the swelling may press on the ligaments, or interfere with the flexor tendons. For the same reason also, a splint placed at the lower end of the cannon is still more prejudicial than when situated higher up the leg. It is not uncommon to attribute that lameness to a splint which is dependent on other causes. A fully developed splint never lames, unless it interferes with a tendon or ligament. A splint, in the course of formation, however, may produce

the most acute lameness; and it does so generally in young horses. But a splint may, by its situation, excite also inflammation in the ligaments and tendons themselves; it then loses its harmless character, and becomes a source of great evil. As the general nature of splint is that of a conversion of what was fibro-cartilage into bone, so it is evident, in this point of view, that a splint once formed can never be removed: but from the absorption going forward during the later periods of life, it happens that the bulk of the splint is diminished, or, as grooms express it, they 'wear away.'

Treatment of Splints.—Although, as before stated, we cannot restore the fibro-cartilaginous union, yet we can endeavour to promote an absorption of the hurtful and prominent portion of the exostosis; or, rather, we can hasten the consolidation, when tenderness and pain will cease, and all further increase be prevented. The appearance of splints, as much as their hurtful consequences, has occasioned such varied attempts to remove them. In the olden time very rough means were used for this purpose, which sometimes succeeded, but oftener left matters much worse than before. Such were thumping the swelling with a hammer; rubbing it violently with a stick; piercing it with a gimlet, &c. An attempt at removal was also made, and is still occasionally practised, by dissecting away the coverings, when, with a sharp knife, the bony or cartilaginous swelling was removed. There is no doubt that, when a splint is very prominent, it may be laid bare and extirpated by this means. Pressure, by means of lead, &c. &c., is an invention also of ancient date. Blistering and firing are also very old remedies; while 'sweating' with oil of origanum, and other essential oils, is of patriarchal extraction, and, if not superseded by mechanical removal, will probably last to the end of time. It has lately been the practice to substitute setons for blisters; but these do but half the work of blisters in twice the time, and are apt to leave a blemish into the bargain: it does, however, appear, that this last method has succeeded in some cases, and after other means had failed. At the Veterinary College, it has likewise been common to divide the periosteum over the splint, by which much relief has been obtained. It has

also been treated by applying escharotics to the denuded bone after the periosteum had been divided: the budding-iron has even been applied; occasionally much inflammation has succeeded; and in one instance it extended itself among the tendons, and did irreparable mischief: in all, the blemish is very considerable. It is, however, seldom necessary to have recourse to other means than vesication, which, if persisted in by first actively blistering, and then keeping up an irritation by means of the oil of cantharides, diluted with three additional parts of oil, for four or even more weeks, will generally complete *all that can be effected*. Or one active blister may be followed up by another, with intervals of a week between.

SPAVIN.

Spavin is a very serious æquine affection: its destructive attack on the utility of the most valuable of our domestic animals has made it a subject of much importance. There is some peculiarity in the degree the fore and hind legs are disposed to take on disease. In the fore leg, for instance, splint occurs upon the inner side of the limb; in the hind leg, it is seen upon the outer side of the shank-bone. Why is this difference beheld in the same disease? In the fore leg, we attribute splint to the weight cast upon one of the bones of the knee being entirely transferred to the inner small metacarpal. In the hock something of this sort occurs also upon the outer side, yet the small metacarpal bone there is not nearly so often affected; while the outer splint-bone, which takes little more than its share of weight, is the actual seat of the affection. Why is this distinction? Does not its existence show us we have not yet hit upon the right cause. The artery, nevertheless, passes along the inner side of the fore leg, close to the seat of splint; and it likewise does the same upon the outer side of the hind leg, near to the place where splint in that member begins. Splint originates in inflammation. Inflammation is a disease of excessive vascularity. Can, therefore, the neighbourhood of the artery have any thing to do with its production? It is not for us to answer the question.

All this, however, is foreign, it may be said, to our pre-

sent subject—which is spavin. Coleman was possessed of far more cunning than wisdom; and he used to teach his pupils, when a lameness occurred in the fore leg, to swear it was in the foot; and when in the hind, to vow it was in the hock. So far as the mere fact of liability of the parts to be affected is concerned, the late professor was in the right. But whence spring this disposition in different parts to assume disease? Let us illustrate this by a kind of every-day example. A gentleman has two walking sticks; the one is straight, the other is bent at an angle in the middle. He uses this one day, and the other the next. They both consequently get the same wear. The straight one will become useless, because of its being battered at the point; and so the foot of the fore leg generally gives way in the limb which is straight. The other will yield at the part where the two lines meet, or at which the stick is bent; and so in the hind leg, the hock most feels and sustains the shock of motion. The artery crosses from the inside of the hock to the outer side of the hind leg, close to the inner and lower part of the joint, which Mr. W. Percivall defines accurately enough to be the seat of spavin. May not vascularity be the predisposing, and jar the exciting cause? In the formation of the fore leg can also be discovered a reason, for attributing to the foot greater vascularity than that of the hind limb. In the fore leg, the blood has only to pursue its natural course, or to fall from a height downwards, to make no mention of its being nearer to the heart. In the hind limb, the stream is impeded by making several bends in its course to the foot, placing entirely on one side the circumstance of its being further removed from the centre of supply. Can any inference be drawn from the foregoing statements? The reader is left to reply.

Spavin may be characterized as exostosis of some one or more of the tarsal bones, or ossific inflammation of the ligaments which connect them with each other. It may also be considered, *that it has no determinate seat*, but is much more often found on the inner, than the outer side of the hock. It is also true, that its effects are not to be measured by the dimensions of the exostosis, as these are sometimes great without corresponding lameness; and that

it is a character of the affection founded on the lessened irritability and increased deposition which warmth, friction, and mental excitement occasion, to render the horse less lame as he progresses; which symptom will assist to distinguish it from other affections. A spavin of the cuneiform bones usually lames more than that which is lower down and joins them to the metatarsals. Neither do spavins, when arrived at a certain state, usually increase; consequently spavined horses for some purposes may prove useful. In moderate and slow work they are even frequently amended; but in bad cases the fear of lying down prevents their thriving. Thus post-masters and stage-coach drivers were not often willing to purchase badly spavined horses, or any others with permanent lamenesses behind, although they did not reject the foundered or groggy horse. Lamenesses before force the horse to lie down; those behind often hinder him doing so, owing to an instinctive dread, that when once down he cannot rise again; and the persons alluded to were well aware that the horse who lies most can work best.

Treatment of Bone Spavin.—This does not differ from that of splint, except that it is much oftener a cause of serious lameness; occurring, however, as it commonly does in older horses, it also proves more obstinate; and the treatment required, therefore, should be more active. Among the older farriers, who, like some of the moderns, thought nothing too strong for a horse, violent mechanical operations were resorted to; as the mallet and chisel to chip it off, boring the exostosis with a gimlet, punching it with a hot iron, or applying caustics; the first removing it mechanically, and the three latter methods destroying its vitality promoted its exfoliation. As might be expected, for one case which succeeded (and in some it certainly did succeed), in many it increased the lameness, or ended in anchylosis, and sometimes in death. It is not improbable that instruments may yet be devised which will operate on these bony enlargements without risk; though the chances are fewer in the hock, from its connexion with capsular and bursal ligaments, than in other parts. The *treatment* pursued by veterinarians of the present day varies somewhat; those bordering on the old school still rub them with some violence, and then stimulate them with ol: origanum, ol:

terebinth: &c. &c. Those of later date blister and fire. At the Veterinary College setons are used, by nipping up the integument and pushing a needle armed with tape through it, so that the seton within the skin exactly opposes itself to the spavin. If the skin be tender or tumefied, it is more proper to make an opening above and below the exostosis, and to push a *blunt* seton-needle, or eyed probe, from one opening to the other, armed with a tape, smeared with mild blistering ointment, or common turpentine. In this way, report says, the College practice has proved very successful. Blistering we have, however, found, when repeated over and over, commonly proved equal to all the benefit these obstinate cases can receive; for when the bony deposit is fully formed, it is in vain to expect its entire absorption: even its partial absorption is often frustrated; the removal of acute lameness is generally the only benefit that can be anticipated. Our principal hope lies in preventing the increase of the bony deposit, and likewise in removing that inflammation which is the existing cause of much of the pain, stiffness, and tumefaction in the surrounding ligaments. Our hopes of success must also greatly depend on the time the evil has existed. When it is early attended to, that is, before the bony deposit has gained its full solidity, stimulants act more favourably, and lessen it more materially. It remains to add, that, when repeated blistering fails, the firing-iron generally concludes the business, but commonly answers no further purpose than being a publication of the animal's infirmity, and a warning to practitioners as regards the previous treatment.

RING-BONE.

This is an exostosis surrounding the whole, or part, of the circle of the coronet, or involving the junction of the large and small pastern bones. But, although the situation is no further varied than this in the different cases which occur, yet the parts affected are very dissimilar, and the degree of lameness greater in the lower disease. In upright pasterns, either formed thus originally, or having grown thus from ligamentary contractions, the articulary surfaces of the bones become so opposed, that great jar is sustained during

motion, inflammation is excited, and an osseous deposit ensues. *Ring-bones* are, however, not uncommon among colts at the time of being backed, from the ruinous weight of a heavy rider over rough or ploughed ground; or from their being thrown on their haunches during their training, which effort is, perhaps, the chief reason that they are more common to the hind than to the fore feet. This disease is likewise to be met with among yearlings that have never been backed.

The *treatment* of a ring-bone resolves itself into attempts to reduce any considerable inflammation which may exist; poulticing around the foot, until it be abated. After this, blister the coronet, and keep up the action of the blister for a month. If the ring-bone be still in the same state after this period, again blister it.

Exostoses of the Coffin Bone is still more common; indeed the coffin bones of old horses are seldom seen without them: it is equally common to see the lateral cartilages more or less absorbed, and their place supplied by bone. It is curious to observe the vast varieties in these deposits; in some, the coffin is increased to a grotesque form, totally distinct from the original. In a few, the absorption is greater than the deposit, but this is not frequent. Can we, therefore, wonder at the stiffness and disinclination to unusual exertion in old horses? or can we be surprised that these affections are so irremediable in them?

ANCHYLOSIS.

When ossific matter is deposited within or upon the cartilaginous extremities of bones, or upon the capsular and investing ligaments, so as totally to destroy the motion of a joint, it is called *anchylosis*. This tendency is manifested in a very great degree in the horse. Few of the joints of the animal escape anchylosis, as none of his bones are out of the ordinary reach of exostosis. The joints of the spinal column, particularly of the dorsal and lumbar vertebræ, are very frequently the seat of this affection, which seems to be occasioned by heavy weights. It is anchylosis which renders old horses stiff, and in some instances unwilling to lie down, or when down averse to rising up again.

Anchylosis of the Knee and Hock are not frequent; but when seen, they usually have their source in punctures of the cavities of the joints.

From what has already been said, it will be evident that no *treatment* will effect a perfect cure in any instance; we can only palliate the symptoms by the means before detailed at length; such as adapting the shoe to the peculiarity of the tread, and soothing the irritation natural to a part in such a state by wet bandages.

CHAPTER XVIII.

DISEASES OF THE EYE.

SIMPLE INFLAMMATION OF THE CORNEA.

This common or accidental inflammation must be distinguished from that known as the specific or periodical ophthalmia: this usually yields readily to medical treatment: in most instances it would be cured by nature. The diseases of the eye have a consequence on the horse unknown to man, who, having one affected, is still able to perceive objects distinctly with the other: the horse, on the contrary, has his axis of vision so directed that he sees different objects with each eye; consequently, when blind of one eye, all things on that side are shut out from his sight. It is said to be a fact, that a blind horse has a smooth coat in winter and a rough one in summer. Nimrod says it happens to nine out of ten. We relate it as we have received it. There is also another evil connected with an inflammatory affection of the eye in the horse; which is, the animal is rendered startlish and timid by objects presenting themselves indistinctly upon the diseased side: when both eyes are affected, he is made more so. It is but seldom that this inflammation has other than a mechanical origin: blows, lesion of the conjunctival coat from the lash of the whip, hay-seeds, or other matters falling within the eyelids, and not being removed by the action of the nictitating membrane, are among the common causes. It now and then, in a mild degree, is an accompaniment of influenza; likewise it occasionally appears as the consequence

of a direct attack of cold; such cases, however, are rare, and should always be looked on with extreme suspicion.

The *appearances of simple inflammation of the eye* are principally to be distinguished by the circumstance, that, except in cases of unusual intensity, they are such as characterise an affection of the conjunctiva only; whereas, in an attack of specific ophthalmia, the internal parts of the globe are always involved, and it is probable they are the parts primarily attacked. Another assistant guide in distinguishing between the two is, that, in specific ophthalmia, there is always constitutional disturbance, as symptomatic fever, impaired appetite, and harsh, dry skin. There is, generally, in both cases, the same impatience of light denoted by closed eyelids; the same distention of the vessels, reddened hue of the conjunctival coat, and there may be an inflamed and protruded haw: moreover, in the generality of cases arising from simple ophthalmia, the cornea is opaque. From that sympathy which is found to exist between double organs, even when the affection has been entirely brought on by violence done to one eye, the other will by sympathy become affected also, but in a minor degree. Of such liability the practitioner should be aware, as a mistake in this particular might lead him into several important errors.

The *treatment* must commence by a careful eversion of the eyelids, in case the cause is not otherwise apparent, and due examination to detect any extraneous substance which may have intruded itself; if any such be found it should immediately be removed, when the animal, if not very bad, will get well. If the evil has existed for some days foment the eye with an ounce of laudanum, mixed in a gallon of warm water, or a drachm to a pint. Lay a piece of wetted cloth also over the eye. If the inflammation, from delay or wrong treatment, runs high, take blood from the eye branch of the angular vein, and give the horse some food of which he is fond upon the floor. The pendant head, and motion of the jaw, will cause the blood to flow freely; and, should any application be further required, use some of those recommended in the next article.

SPECIFIC OR PERIODICAL OPHTHALMIA.

This ruinous affection of the eyes is distinguished from the simple disease by the constitutional disturbance which accompanies it; it is also characterised by affecting the more deeply-seated humours. The attack is made on the inner structures of the eye, the external covering being only sympathetically involved.

The *appearances* which accompany the affection are not always the same: those more commonly present are swelled eyelids, which appear nearly closed, and when separated exhibit a sunken retracted eyeball, giving the eye the appearance of being diminished. This arises from the retractor muscles acting to withdraw the eye from the stimulus of light, and the horse resists every effort to force open the lids, if the attempt be made in front of a strong light; but turn the head away, and the animal will unclose the eye. This retraction of the eye at the same time forces the haw over a portion of its globe, where it is seen swelled and preternaturally red, from its participation in the disease. The inner lining membrane of the lids will be found highly vascular and hot, pouring forth, in most instances, a flood of tears, which continually trickle down the face; and the whole conjunctiva will present a network of turgid red vessels over its opaque white surface. If the cornea be not too opaque or too much inflamed, we shall discover the aqueous humour thick and muddy also; the iris and choroid will likewise be found altered from their natural colour. From this state it follows sometimes, that a central yellow patch is discovered at the bottom of the eye; in which case matter has formed, from the usual suppurative inflammation, but it most commonly becomes absorbed again, and sometimes very speedily. In very acute cases, however, there is a large deposit of fluid, which disorganizes the eye. The rapidity of the changes in the state of the eye is a very marked feature of specific ophthalmia; and the transition from a most opaque to almost a clear state of the cornea, and from a simple dimness in the appearance to a perfect opacity, sometimes occurs in a remarkable short space of time. We have seen an eye opaque within and without, which was merely dim the night before; and perhaps, within

twelve hours, it would again have almost become transparent, without any apparent medical agency.

In the above detail of symptoms, it is the *active* inflammatory state which has been described, and is frequently so sudden in its attack as to gain almost its "topmost height" in a few hours. It is not, however, in every instance, thus violent, nor thus sudden; on the contrary, it sometimes approaches more slowly, when the impatience of light is not remarkable, and amounts only to a winking of the lids, and moisture from tears, when brought into the full glare: the globe of the eye looks rather yellow than red, and within, it is only slightly disturbed by a discoloured muddiness. The haw is then hardly apparent, the eyelids are less swollen or gorged, and the tears pass in their natural channel; the eye or eyes remain without much variation many days, and sometimes even weeks. This apparent mildness of symptoms is not, however, a prognostic of a less formidable disease, for this proves usually an obstinate case, and may be eventually fatal to vision.

Specific ophthalmia commonly attacks only one eye in the horse, leaving the other totally unaffected, or at most only sympathetically involved. Worthy of remark, is the complete and sudden metastasis which often takes place in this disease. From being in a very aggravated state of inflammation in one eye, it will suddenly shift its seat to the other, leaving the original much amended or nearly well; and it will not only thus change about from eye to eye, but may likewise either spring from, or be transferred to, other organs.

The *periodical* nature of the complaint is such, that, having once made its appearance, there is almost a certainty of a recurrence of its attacks; its appearance, however, cannot be anticipated: it may be absent for months, or it may return in a week or two. It is always observed, that the first of these inflammatory attacks, however violent, having arrived at its height, usually gives way to medical treatment; or the disease leaves the horse of its own accord, and the eyes recover *nearly* their former appearance: upon a narrow inspection, there may be observed either some small opaque spots within the lens, or the general cornea will not be so distinctly clear as it was before the appearance of the disease; or even should the centre of the cornea be

perfectly transparent, yet there will commonly remain some cloudy lines around its circumference. This latter appearance should always be particularly attended to, for this is the very last part the opacity quits; and, we believe, *this* hardly ever wholly leaves the edges of an eye once affected. The eye or eyes, however, *thus far* recovered, seldom remain very long sound; but often are again subject to the diseased action, and the complaint recurs with all its pristine violence. As these attacks are repeated, they leave the eye less and less transparent. The remaining opacity forms a nucleus for future and rapid accretion: sometimes, however, it will remain stationary for a long time, and now and then it never enlarges. But, usually, repeated inflammatory attacks succeed each other; and the whole crystalline lens at last becomes opaque, when the disease takes the name of *cataract*, in which almost all these inflammations terminate. It is remarkable, likewise, when the process of forming cataract has become fixed and regular within the crystalline lens, active inflammation usually leaves the eye, and seldom again returns. Occasionally it terminates more destructively; the crystalline lens may be pushed from its capsule against the membrane of the aqueous humour; sometimes the pupil is torn, and the iris hangs ragged, or adheres to neighbouring structures; and more rarely the eye is thoroughly disorganized.

Causes.—It has been conjectured, that the *remote* cause of this disease arises from the plethora which takes place in horses at the adult period; that is, when they have just attained their growth, at which time it is observed they are more frequently attacked by it; for until this age the blood has not only to nourish the body, but to increase it also by the addition of parts; but after maturity, having only to support the organs it has already formed, there must be a *superabundant quantity* thrown on the system: at this period, therefore, the vascular action is strong, and much subject to distention. This theory, however ingenious, is by no means sufficient to account for the constitutional predisposition so evident to this disease; it is by no means confined to the adult period; it has been witnessed in colts far from the adult state; and even barring this objection to its correctness, it yet remains to be accounted for, why the eye should be, of all the organs, the

only one attacked; and why also the complaint should be confined to the horse, and not equally take place in the mule and ass. It is, however, in the native countries of the last mentioned animals, more frequent than in our colder clime. We have, moreover, by a source of extensive observations, pretty clearly established its hereditary nature: the constitutional disposition does descend from the parents of both sexes to the offspring; and this knowledge may be hereafter turned to account by our breeding only from such horses as have not a tendency towards specific ophthalmia. The wall-eyed horse, by general consent, is said to be exempt; yet Mr. Castley met with two cases of this kind in one regiment. Size of body is thought to have some connexion with it, seeing that blindness is much more rare among ponies than among larger horses; and it is the general opinion, that small retracted eyes, particularly in the heads of coarse fleshy horses, are more predisposed to disease than others.

The *occasional* causes are probably various. A determination to the head must be the consequence of the exertion which a horse is exposed to when he is first put to active and laborious exercise, particularly that of drawing; and this, as he is unused to it, must act considerably in *distending* the vessels of these organs. Hurtrel d'Arboval lays much stress on *dentition* as an occasional cause; and in this process it is certain much blood must centre about the eyes. Early breaking horses into harness by collar pressure must also hinder the free return of blood from the head, and produce congestion. There is great reason to think, that disturbances in the digestive functions are predisponents. The acrimonious fumes of a hot foul stable, to a young animal that has been only used to a barn and paddock, may call it into action. Of all causes, foul stables, and improper food, serve to keep alive the disorder. Formerly, when animals were little cared for, specific ophthalmia was a frequent disease. Now, when horses are better understood, and more carefully tended, a man may be in practice ten years without encountering a single instance of its ravages. Cart-horses are most subject, because they are of all animals worst stabled. Ponies are all but exempt; these diminutive creatures being suffered to go at large.

In England, where stabling and fodder are much studied, the disease is rare. In Ireland, where horses are thought to be well housed, so they can stand and feed on what they can get, specific ophthalmia, and its effects, are still an every-day occurrence.

Treatment.—It is not in general found difficult to remove the immediate attack; but from the specific nature of, and the connexion the disease has with the constitution at large, as before insisted on, it proves extremely difficult to prevent the recurrence. In this particular it resembles scrofula in the human being; and it is only a proof of the fatal blindness of practitioners, that after all their endeavours have rather aggravated than ameliorated the disorder, a total change of practice never occurred to them. Many recommend four large blood-lettings, purgatives, diuretics, sedatives, setons, and blisters; and have even not scrupled to propose the putting out of an eye, to stay the ravage which they had no art to stop. When the animal is first attacked, fasten a piece of tape to the head stall, that it may slant across the face; but above the eye, and on this line, hang a portion of soft rag several times doubled, so that it may fall over the affected organ, which it ought entirely to cover. Have the rag kept wet with hot or cold applications, according as either seems to be agreeable to the animal. If hot, break up some poppy heads, and boil one dozen in two quarts of water for four hours, repeatedly filling up the saucepan as the liquor is reduced. Afterwards, press and strain. Then add water to make up the quantity, if any be deficient. Let it stand till the sediment has settled, when decant with care, and warm as required. Should cold be preferred, add one ounce of laudanum to a quart of spring water, and keep the rag wet with the mixture.

The food should all be boiled, and of the most supporting kind. Roots of all kinds, malt, oats, ground beans, clover hay, linseed, &c. &c. This will probably sufficiently open the bowels, but should it not, avoid giving more than one drachm of aloes night and morning; and even continue this quantity no further than is imperative to render the bowels soft, yet by no means to induce watery stools.

With regard to physic, any thing administered must be

of a soothing and supporting description, therefore give night and morning, during the violence of the attack, the following drink :—

Sulphuric ether	one ounce.
Laudanum	one ounce.
Powdered colchicum	half an ounce.
Stout	one quart.

Should the inflammation run very high, the superior branch of the angular or facial, called the eye vein, may be opened, and the horse have some food, to which he is partial, given him to eat off the ground. If the animal refuses to feed, the opening made with the lancet may be bathed with warm water ; and even by this last process, no inconsiderable quantity of blood may be abstracted, yet occasionally the blood refuses to flow. In that case, open the opposite vein ; and after this last has lost a small quantity, the original will generally pour forth freely.

This is every thing that should be done ; and when the horse recovers he will be fit for service, without a long rest, and an expensive course of tonics. To perfect the cure, however, and to prevent a recurrence of the disorder, mind and have your stable's drains overlooked: do this, even though your nose can detect nothing. The most unhealthy gases are not always those which smell the worst. This being accomplished, next attend to the ventilation. See that the roof of the stable be, at least, nine feet high. That the air may be sweet it should never exceed 52° degrees of warmth in winter, and 65° in summer. Should the temperature of the atmosphere be higher than the figures recorded, throw every door and window in the place wide open, and let them remain thus till the heat declines to the required standard.

Place a pail of water in the horse's manger, so that he may drink when he pleases. Observe that the water be repeatedly changed, and not the quantity merely filled up, a portion of the stagnant fluid remaining each time. Good water is as necessary for horses as for Christians. It is true, these animals will generally endeavour to drink at every dirty puddle they cross ; but this does not prove that dirty water is good for horses, any more than it is established that green gooseberries are good for children, because little boys and girls are fond of eating them. Man,

with all his reason, has partaken of very injurious drinks; and it is hardly fair for him to insist his dumb servant should be over choice in the matter of fluids.

No matter in what condition the eye, which has lately suffered from ophthalmia, may be in, do nothing to it. Trust entirely to nature, and shut your ears to the quacks about you, though each should swear he has in his possession an infallible remedy. Formerly all kinds of stuffs were put into the sore and sensitive eye of the sick horse; but if you are determined to do something, the following probably may do as little harm as any thing else, though they are far more appropriate to the former disease:—

No. 1.—Sugar of lead ..... half a drachm.
Sulphate of zinc ..... one scruple.
Distilled water ..... one pint.

Mix. When the sediment has settled, decant gently, then filter through blotting paper, and bottle for use.

No. 2.—Crude sal ammoniac ..... one drachm.
Infusion of red rose leaves ..... one pint.

No. 3.—Laudanum ..... half an ounce.
Rose water ..... one pint.

CATARACT.

The specific ophthalmia just described has too common a tendency to end in total *cataract;* the lens, in the majority of cases that have terminated, is fully involved, and quite white. In other cases that have happily stopped short in their career, spots only of an uncertain size are visible on the lens or upon its capsule; for a white opaque spot on either is called a cataract. Cataracts, however, can and do exist in eyes that have never been subjected to ophthalmia; and as they make their appearance without any apparent cause, so they occasionally will depart without any treatment. Blows sometimes produce them, and when caused in this manner, they are for the most part stationary. However, in cataract following ophthalmia, there is generally much derangement of the other internal parts of the eye; particularly of the iris, which sometimes adheres to the lens, at others to the cornea; and in some cases its pupillary opening is so reduced by contraction as to render the cataract hardly perceptible. This internal derangement

greatly prevents any benefit being derived from the operation of *couching;* added to which, a horse so operated upon, to have perfect vision, would require to wear spectacles. It has, however, been suggested that, even without glasses, so much benefit might be gained from it as to prevent accidents, like running against posts, falling in pits, &c. This, nevertheless, would be greatly overbalanced by the imperfect vision, which would render the horse so operated on very dangerous from his liability to shy.

Treatment.—Cataracts of all sizes and shapes are best let alone. Should they cause the horse to shy, blind the eye or eyes in which they may exist. The measures generally pursued, with very doubtful success indeed, are the blowing of mercurial preparations into the eye, the application of caustics, either in powerful solutions, or in substance, to the organ; and, in short, all kinds of cruelties, more likely to favour the formation, than to cause the dispersion of cataract.

GLASS EYES, AMAUROSIS, OR GUTTA SERENA.

This disease, known by the term *glass eyes*, from the peculiar *glassy* appearance the organs assume, is generally considered as dependent on a paralytic state of the optic nerves, or of their expansions, the retinæ. By others it is, however, thought to arise from the effects of inflammation, by which coagulable lymph is placed over the optic nerve, rendering the retina inaccessible to the stimulus of light; this can hardly be an occasional, and is certainly not the usual cause. The disease, however, is likely to arise from any irritation of the brain; thus it is found to follow staggers and the loss of large quantities of blood; which last mentioned cause specially affects the nervous system. The veterinarian should make himself familiar with the appearances of this complaint, otherwise he may lie open to serious imposition. In amaurosis, a horse presents indications of blindness in his *manner*, though but little in his *eyes;* he seems cautious in stepping; lifts his legs high, and moves his ears quickly, as though endeavouring to make up by sound the intelligence lost by the deprivation of sight: but, above all, a hand moved close to the eye occasions no winking, unless held near enough for the

motion to influence the air around, which an artful person might manage with ease. When this kind of eye is examined closely, the pupil will be found of one *invariable size* and unvarying hue; it will not enlarge and diminish as in a healthy horse, when removed farther from, or nearer to, the light; for the retina, ceasing to be influenced by the luminous ray, no longer controls the movements of the iris. It is, therefore, from the peculiarities in the manner of the horse, the invariable size of the pupil, and a *greenish glassy cast* in such eyes, that these cases may be distinguished. As it has hitherto proved incurable, we shall waste no time on its treatment.

EXCRESCENCES, &C. ON THE EYES.

It remains to observe, that small polypous excrescences sometimes form on the globe of the eye, or on the eyelids. Fungoid projections on the transparent cornea likewise sometimes follow accidental abrasions, or may be they are spontaneous productions. When they are of the nature of polypi, cut them off. When of the fungoid kind, the chloride of zinc in solution, or a minute quantity of the ung: precip: rub: softened with oil and painted over it every day, or second day, will effect a removal.

CHAPTER XIX.

DISEASES OF THE SKIN.

GREASE.

THIS disease appears to be dependent on a morbid alteration in the quantity and quality of the sebaceous matter secreted by the glands of the extremities. The inflammation which first brings about this effect exhibits some singularities not observable in the inflammations of other parts; and had the assertion of Jenner been true, that matter from it was capable of raising a disease again communicable, its character as a specific disease would stand on equal grounds with syphilis or small-pox. But that capability is now questionable, although not decidedly proved to be erroneous; and as on this it rests its main support to the

character of a specific disease, the assertion must be left undecided. The secretion of the sebaceous glands varies according to the necessities of the part within which they are situated. It cannot be denied, therefore, as probable, that their diseases may exhibit corresponding peculiarities, which we find to be the case in grease. Mr. Percivall notices in this disease its simple form, its ulcerative, and its grapy form. In the *simple* form there is merely swelling of the skin of the hind legs, which becomes hot, inflamed, and tumefied; greasy in appearance, moist with exudation, and offensive to smell. It soon assumes the *ulcerative* character, and cracks, raw, deep, and excessively tender, mark the next stage of the affection. Unless the further progress of the disease can be arrested, these wide and deep ulcerated cracks throw up loathsome excrescences called *grapes:* renewed fungoid deposits continue to be added, and the heels become enormously swollen.

The inflammation productive of grease appears to originate in *debility*, general or local. It originates in general debility, when the system at large is weakened by long-continued disease; or from want of proper nutriment; or from long-continued exertion: in which cases these parts being farther removed from the source of circulation, which itself labours under *additional* languor, they are thought to suffer proportionally in a greater degree than those nearer to the action of the heart; hence it is said accumulations take place, which, if not removed, terminate in an inflammation, and in an increase of the secretions peculiar to the leg. This species of general debility appears in spring and autumn, from the efforts nature employs to generate a new clothing of hair.

Grease may be said to have local weakness for a cause. As fluids press, not in proportion to their diameter, but to the height of their column, the venous blood must find some difficulty to its ascent. Debility is therefore more felt in the distended vessels remote from the influence of the heart, under which circumstance the effects productive of grease necessarily ensue.

Over-feeding is one of the causes of grease; and if to this plethoric state the want of exercise be added, the legs will be the parts most likely to suffer. An inflammatory re-

action will follow the distention, and the sebaceous glands will be stimulated both to an increased and an unhealthy deposit: and they being here very numerous and large, and requiring to secrete in proportion, it follows that instead of the natural unctuous secretion of the skin of the heels, they will now pour forth a serous fluid through ulcerated *cracks*, or a general purulent one under the real term of *grease*. Cold is unfavourable to absorption; it likewise weakens the general energy of the parts, and it often suspends the circulation; and, when this has happened, on the return of warmth the impetus of the blood is always preternaturally increased; and the distended vessels, being previously weakened, are rendered incapable of contracting on their contents; and it is perhaps principally to the presence of cold, and its effects on the constitution, that swelled legs, cracks, and grease, are so much more common in winter. Grease has even been called a winter disease, and the *chilblain* of horses. Moisture is likewise favourable to the complaint, for it first produces a determination to the parts, and then, as a parent of cold, it weakens the already distended vessels. It is stated by an officer of a dragoon regiment, that, when stationed in America, another officer being favourable to the custom of washing the heels of horses, was permitted to exercise it on his own troop; the result was, that this individual troop in three months furnished more than twenty horses with grease, the remainder of the regiment not more than two or three. The *acclivity* of the *stalls* in our stables has been considered as aiding the other causes of grease, and with some apparent propriety; for it tends to throw considerable weight on the hinder extremities; this, by the unnatural position of the heels, puts the parts on the stretch, and hence weakens them. Grease will often follow injuries; as halter casting, or indeed any accidental abrasion, may bring it on. The disease may become serious when it occurs under other circumstances favourable to its production, as in moist, cold, and particularly frosty or snowy weather; or when, from previous illness, a horse has been thrown out of condition; and, more than all, when such a case has been maltreated by the idleness or ignorance of those around, who, finding a swelled heel, immediately fly to urine balls, or purging balls, whereas

a little local attention would cure the injured surfaces at once. Vast numbers of horses are greased by want of attention: it is too much to say, under good grooming, horses would never have swelled legs or even cracked heels; but perhaps few, if any, would ever run into that stage of ulceration, distinguished from milder abrasions by the term grease, as expressive of its oily discharge. It is to extreme cleanliness, to free ventilation, to hand-rubbing the legs when wet until they are perfectly dry; and to immediate local attention to any accidental abrasion, or to any slight swelling of the heels, that grease is now banished from among our cavalry, and so seldom met with in any well-regulated stable. Grease is, in ninety-nine cases out of a hundred, the consequence of improper treatment of some kind. The attendant is apt to slight the hind legs, because they are less clean from soil and moisture; from fear also the hinder extremities get neglected, as many grooms dare not trust themselves on their knees, or even employ both hands at once to the heels of the hind legs; and we need not say, that, from one hand being a resisting point to the other, friction can only be thus obtained. Colour, likewise, as it marks debility, so it influences grease; thus, it has been remarked that white-legged and light-coloured horses generally are more liable to cracks, to grease, and to diseases of the feet, than others which are darker, or whose legs are black. In the foregoing summary of the causes of grease, which in the present edition is greatly compressed, every possible reason is assigned for the origin of the disease, save the right one, upon which the author is rather forced, than reaches by his own efforts. The truth is, grease arises from bad stable management. No matter of what breed, or how old the horse may be, the groom is to blame if the animal becomes greasy. In all well-regulated stables, the appearance of this loathsome disorder is a signal for a change of attendants therein; for as the affection is now banished from the army, what earthly reason can be urged why it should be found in private stables?

TREATMENT OF GREASE.

This complaint takes on different states or stages, which being known by different terms, as swelled legs, cracks,

grease, graped heels, &c., are apt to be considered as distinct diseases: but the causes producing any one of them may produce the others, and the treatment of all must be grounded on the same principles: nevertheless, for simplicity of reference we shall consider these several states separately, still blending the character of the specific affection and the treatment. Swelled legs without discharge have been already fully considered.

Of Cracks.—At first there will be simply heat and itching in the part; the horse will be observed to rub one leg against the other, and sometimes to stamp with his foot, the whole surface appearing more red than before. If this state be not attended to, there succeeds an oozing out of an ichorous discharge from a kind of crack, of which there are sometimes several. Occasionally the suppurative process follows the inflammatory action, so that purulent matter appears to flow from the first; but, if suffered to proceed, pus always makes its appearance. In this early state of tumid, itching, scurfy heels, frequently little more is necessary than the application of the chloride of zinc lotion, a scruple to the pint of liquid; having first well cleansed the legs with soap and water, and well dried them afterwards, removing as much of the cuticular eruption as possible. When the case has proceeded to form cracks, it will be advisable to attempt the stoppage of the discharge by frequent washings of the same solutions before recommended; however, taking care that all the hair be clipped from the heels, so that the lotion may reach the skin. If with an inflammatory state there is an ichorous discharge, and an ulcerative process fully established, the part showing much virulence and tenderness, the cracks must be carefully washed with warm water, and thoroughly dried, whenever the horse returns from exercise; after which, bathe with any mild astringent lotion, as the following:—

Chloride of zinc	two scruples.
Laudanum	two ounces.
Water	a pint.

This should be well applied, at least three times daily, at most six times in twenty-four hours.

Sometimes the irritability of the parts requires the application of a poultice previously to the use of the wash.

One formed of the following ingredients will be found to act admirably in cleansing, and at the same time soothing the parts:—

Powdered charcoal	two pounds.
Fresh ale yeast	one pint.
Bran	one quart.
Barley-meal	one quart.

Add a sufficiency of blood-warm water, then sprinkle the surface with powdered opium, and over that strew pulverized camphor. Apply it at night, and remove in the morning.

Swelled Legs, with Discharge.—In some instances with a general want of condition, the result of disease, there is a great tumefaction of all the extremities, which is apt to be followed by serous discharge from several outlets. The curative plan in this case is more complicated; for we have to combat the general debility by generous diet in the form of speared corn, malt mashes, with carrots, &c. in winter; and also to lessen the watery deposit by very mild remedies. Mild tonics may be administered, but every thing of a draining or depletive description strictly withheld. No matter what shall be urged to recommend diuretics or purgatives, let the proprietor firmly resist all such poison. The following is a mild tonic drink:—

Sound ale	one pint.
Carbonate of ammonia	half a drachm.
Extract of gentian	half an ounce.
Tincture of capsicums	half a drachm.

Rub down the extract and the carbonate in some of the ale, and give night and morning. It was before hinted that cases occur of discharge from the heels, where astringents, immediately applied, only irritate: every practitioner must have met with such instances, as they are sufficiently common. Without cavilling about the term, we know that in this form of the complaint it must be patiently soothed, before the parts will suffer themselves to be even gently stimulated by the mildest astringent applications. In these cases the heels, in addition to the tumefaction, and the pouring out of ichorous or semi-purulent discharge in considerable quantities, are stiff, tender, and painful in the extreme; the horse evinces the greatest reluctance to have any thing done to them, and when he is moved snatches up

his leg convulsively, while the extent of vascular action is such that the heels smoke when exposed. This highly irritable state can only be reduced by poultices. In these cases apply the poultice before recommended, only the bran may be changed for linseed, or for carrots or turnips, boiled and mashed. By these means the heat, tenderness, swelling, and redness, will abate: the discharge also from a thin ichorous one will become white, bland, and truly purulent. Now there may be mingled with the mild tonic drink, which is to be given at the times before stated, one ounce of the liquor arsenicalis; and, instead of the former lotion, either of the following prescriptions may be used for once or twice:—

Powder:—

Chloride of lime	one ounce.
Chalk	a quarter of a pound.
Powdered gall nuts	two ounces.

Or the subjoined lotion:—

Chloride of zinc	three drachms.
Laudanum	four ounces.
Oak bark (solution of)	four ounces.
Water	one quart.

Neither of the foregoing are to be used, unless the state of the case imperatively demands them, as they are at all times far better withheld than exhibited. When, also, much tumefaction takes place, a linen bandage is often beneficial; beginning at the coronet, and rolling it more than half way up the leg; being careful that it is only done with a very moderate degree of tightness at first, and that the same bandage is never used twice without being well washed. As amendment proceeds, great care is requisite to prevent relapse, by avoiding the original exciting causes. The general disposition to swelling will be best counteracted by long-continued walking exercise, with moderate but nutritive feeding, particularly by the use of green meat in summer, and of carrots in winter. Bran mashes, as tending to open the body, should not be lost sight of; and when it can be conveniently managed, place the horse in a loose box. But if the complaint occurs in an emaciated animal the plan already detailed should be pursued with more moderation as regards exercise, or with such only as a loose box may afford. We have, in all those cases, where

green meat could not be got, experienced great benefit from spearing the corn, particularly where the horse was low in flesh or poor in condition. Any *change* of food, almost, is proper; at least, any not manifestly injudicious. The best effects have been known to follow the substituting of beans for oats, and this in a horse not particularly emaciated. Before we quit the subject it may not be improper again to remark, that this species of grease is frequently the result of blisters injudiciously applied when the legs are in a state of swelling and debility.

Confirmed Grease.—This is to be considered only as a more aggravated stage or state of the former; in which the matter issuing has the fœtid peculiar smell, that strongly characterises the disease; so powerful is this, a person can at once recognise whether a greasy horse be in a stable or not. The inflammation, that was before principally confined to the sebaceous glandular structure, now affects the integuments generally, producing extensive ulceration, with intermediate dry hardened scabs: the hair stands erect; the whole surface becomes exquisitely sensible and vascular, bleeding on the slightest touch; and the vessels of the heels not only secrete a peculiar fluid, but some of them take on a singular action, and form a semi-corneous substance; so that, in the advanced stages and violent degrees of this complaint, hardened horny knobs form over the fetlock, intermixed with others more vascular, uniting the properties of pus, mucus, and oil: these protuberant portions are called *grapes*, from their figure. The constitution usually sympathises much with this extreme state of grease, and the horse, unless very well fed, becomes weak, lean, and irritable.

Treatment.—It becomes a question, whether, in a case of confirmed grease, even if it were in our power, it would be prudent to stop the discharge at once; for when secreting vessels have been long habituated to any action, they can seldom be suddenly checked with impunity. But it is to be first remembered, that the diseased exudation cannot be a natural one; therefore, the heels should be subjected to a treatment that may produce a more healthy secretion. The best means for effecting this is the poultice composed of charcoal, yeast, bran, and barley meal. This should be

applied every day and night, as soon as mixed, it being suffered to perform its fermentative process upon the leg; and, by the action of the carbonic acid gas, it is remarkable what a change is produced on the part, generating a mild, bland, pus-like fluid, with a decrease of irritability. Should the expense be objected to, a carrot or turnip poultice may be tried instead, though no vast saving is effected, as these last are much longer and more uncertain in their action. It is, moreover, essentially necessary to the cure, that all sprouting luxurious granulations should be reduced to the level of the surrounding integuments. Caustics only render these *grapes*, as they are termed, of greater size; but the mode best adapted for their removal is by the knife; having a flat piece of heated iron also ready to pass over the surfaces, in case the hæmorrhage is profuse; as the horse having grease can but ill afford the loss of blood. The operations being finished, apply the poultice as directed. In two or three days leave off the poultice, and employ the strongest lotion into which chloride of zinc enters, and sprinkle the legs with either of the powders before mentioned, only rendering each weaker as the symptoms abate. In this manner a cure may be accomplished. The disease, however, is apt to return. Should it display this disposition, discharge the groom, and procure one that is less sparing of his labour. Do not have the horse's heels washed when he comes in dirty from work. Make the groom take a hay-band, and go upon both knees, to rub them with both hands, until they are thoroughly dry. Wash them the following morning, and be careful to dry them well afterwards. The thin linen bandage may also be dried; and the way to the stable, and the straw under the animal inspected, to see they are all free from dirt. A Liverpool dealer, when he has a horse that displays a disposition for grease, claps a blister upon the heels, and gives the horse a few old beans, with a quart of ale daily. This treatment has so highly pleased the dealer, that he expressed a determination to pursue it for the future.

SMALL POX IN SHEEP.

When this disorder first appeared in England, the editor then declared his opinion, that it was but as a fugitive

visitation; that it would obtain no hold of the native flocks, and however virulent it might be abroad, it would be unable to establish a footing at home. This conclusion was based upon the intimate communication, which had long existed between this country and foreign parts; upon the known contagiousness of the disorder; and upon something very like to it, having from time to time broken out in this country, but always having ultimately disappeared. These facts enabled an encouraging opinion to be published, at a time when all was terror and dismay; and it is just ground for self-gratulation, that subsequent events have proved the opinion then declared to be well founded. Nevertheless, as sheep-pox may, in consequence of the now frequent importation of live stock, break out at any moment, it will be proper to include a description of its symptoms and treatment, in the new edition of the present compendious treatise. The first stage of this affection is imperceptible, but during it nothing is to be foretold. The sheep appear perfectly healthy. They feed well, and are as lively as any members of the flock; but, during all this time, the taint has been received, and the animals are breeding the disorder. The period, from the reception of the contagion to the development of the complaint is, during the summer months, from six to twelve days; but, during the colder half of the year, from twelve to twenty-four days.

At the expiration of one or the other of these periods, the disease exhibits its characteristic symptoms. The animal becomes dull; is off its feed; stands apart from the rest; and ceases to ruminate. The head and ears are pendant; the membrane, lining the eyes and nostrils, inflamed; the pulse increases; the attitude is unnatural; while a watery secretion overflows the eyes, and a thick mucus is discharged from the nose. If the animal be now caught, and thrown upon its back, there will, upon the hindmost part of the belly, and inner side of the thighs, where the wool is very thin, or altogether wanting, be seen a reddish blush, the colour of which will disappear upon pressure. Upon passing the palm of the hand over the skin, a number of inequalities, like to pimples beneath the integument, will be plainly felt. In from two to four days, these pimples pierce the skin, and the fever increases. The

lumps may be in large or small patches; they may run together, or be at a distance from each other: there is no limit to the eruption, or bounds to its ravages. At the first appearance of the swellings, however, they are of a weak red hue. The animal's sufferings increase. A light clear liquid, in a very small bladder, next appears on the top of each swelling, in from two to four days. After this last symptom is fairly exhibited, the sheep becomes more lively; but in three days, or in six, he becomes worse than ever. There then appears an inflamed circle round each head of the pimples. The bladder no longer contains a clear liquid, but pus now occupies the place of the original fluid. The fever is then at its height, and many a sheep who has past the first virulence of the disorder, sinks beneath this second aggravation. After a while, the pustules burst, and scabs are formed, which, when they are cast off, leave behind them small pits or ulcers, that are very difficult to eradicate, because of the weakness attending the complaint.

The attack generally lasts a month. The after consequences are hardly less fearful than the disease. In some cases, when the patches run together, the symptoms are very fearful; the breath quickens; the lips and tongue ulcerate; the head swells; the breath stinks; thick saliva runs from the mouth; the wool tumbles off in flakes; large sloughs occur, and the animal sinks under the violence of the disorder, diarrhœa generally concluding every thing. The signs by which the disease is recognised are redness of the skin; the felling of a rash underneath it. Also the appearance of the pimples; their getting white and clear heads; a ring showing itself round each swelling, when the transparency becomes opaque. The pimples burst; the dried matter accumulates about the orifice. Black scabs are formed; these last drop off, and leave ulcers behind. There are several forms of this disorder, or, rather, the same disease can assume various degrees of violence.

Treatment.—When sheep-pox is abroad, the master's eye ought to be daily cast upon the flock. The food should be nutritive, the pens open, and sufficient space allowed, as all crowding is injurious. It is better to give the animals a little shelter, than force them together to keep one another warm. Any sheep that seems dull should be carried home,

and put by itself. The following mild laxative ought to be given :—

Epsom salts	half an ounce.
Sulphuric ether	two drachms.
Nitre	half a drachm.

Dissolve the salts and the nitre in a pint of cold water, and having added the ether, give the drink to the animal.

This may be repeated the next day, if costiveness be still present; but must not be continued after the bowels are relieved, however gently. When the disease declares itself, we must give further medicine; and the following drink is as good as any :—

Belladonna	a scruple.
Liquor ammonia acetatis	one ounce.

Rub the belladonna in a little thin gruel, and give in half a pint quite cold.

While this is administered, all solid food must be withdrawn; the appetite is almost or quite lost, but the desire for drink is great; advantage may be taken of this last circumstance to throw some support into the body if water be denied, but plenty of sweet thin gruel (constantly renewed) kept before the animal. Cleanliness must, in every particular, be scrupulously attended to. Thus the measures recommended must be pursued, the drink last proposed being given night and morning. When the pimples have heads, boiled roots or malt mashes may be allowed; and, after the scabs are turned black, discontinue the last drink, and give the subjoined :—

Extract of gentian	one drachm.
Sulphate of copper	ten grains.
Sound ale	half a pint.

Dissolve the copper in a little ale; rub down the extract in a little more, and give daily. All should after this go well; but occasionally the disease assumes a typhoid character, when the drink above must then be persevered in, and in addition, a quart of gruel be horned down three times each twenty-four hours.

When the scabs fall off, bathe the ulcers with a solution composed of a drachm of the chloride of zinc to a quart of water; keep the parts perfectly clean, and apply the liquid mentioned night and day.

The after consequences of this disorder are, by continental writers, recorded as loss of sight, lameness, affections of the lungs, colic, weak intestines, emaciation, abortion, loss of the fleece; any one of which is hardly less fearful than the disease itself. Wherefore it is better for the farmer to have such animals slaughtered as do not speedily recover, rather than nurse them upon a chance of restoration. Foreign authors speak of inoculation as a certain preventative, or at most, the loss is but one in a thousand lambs, when it is done properly; but people in this country, where the disease is rare, are not advised to have resort to this last measure.

MALLENDERS AND SALLENDERS.

When a scurfy or scabby eruption at the posterior part of the bending of the knee appears, it is termed *mallenders:* and when a similar one appears at the bend of the hock, it is called *sallenders.* Neither of them lame or do much harm; but sometimes, when neglected, they degenerate into a foul ichorous discharge, a little more troublesome, and always unsightly. Both of them are very easily removed by washing with soap and water, and by applying the following:—

Camphor	one drachm.
Subacetate of lead (*sugar of lead*)	half a drachm.
Mercurial ointment	one ounce.

Mix.

WARTS

Are best removed by tying a ligature round them; or, with scarcely any pain, by applying every day, with a camel's hair pencil, a small portion of strong acetic acid; or they may be cut off with a knife or scissors, and the root touched with any caustic body. There is sometimes seen a sprouting luxurious species, whose roots are larger than their heads, so that a ligature is not easily passed around them; these are best removed by touching their surface daily with the following paste. The following application will seldom fail to remove such as cannot be conveniently got at by the knife or ligature, dressing with it once a day:—

Sulphuric acid Sulphur	a sufficiency of each.

Make into a paste, and apply a little to the wart.

MANGE.

This is sufficiently known as an eruptive affection of the skin, very highly contagious, and accompanied with almost incessant itching. It is found in all our domestic quadrupeds. In the various animals it presents some distinctive marks. Our principal difficulty was, to account for the readiness with which mange was taken or propagated. This difficulty is now surmounted, since Mr. Erasmus Wilson has shown the veterinary profession the disease is caused by the presence of minute insects of the spider tribe, called *acari*. Mange often commences at the roots of the hair of the mane and tail; where a scurfy state of the skin appears, and which it gives the horse pleasure to have examined. A few days will extend this beyond the simple line of the mane and tail: spots denuded of hair will appear, and will eventually make their way over the body to the face. A close examination will detect under the branny scurf small vesicular eminences, watery above and red beneath; distinct in the moderate state, but running into continuous scabby patches in inveterate mange. Mr. Percivall has, with his characteristic accuracy, remarked on the stubborn adherence of some few hairs in the very middle of the otherwise bare mangy patches. If the observer is inclined to examine these individual hairs, he will find that it requires a very powerful pull with a pair of tweezers to dislodge one of them from its cell within the cutis; and when done, he will find not only that the hair itself is enlarged, but that its bulb is singularly tumid and vascular. As the disease advances, it thickens and puckers the skin, particularly that of the neck, withers, and loins; and it is throughout marked by its incessant and intolerable irritation, which forces the horse often to rub himself raw.

The cure of mange.—The disease is more often to be considered as a local affection; but there are cases also where it may have a constitutional connexion; as when brought on by emaciation, close confinement, and habitual filth. In cases either generated or caught, where emaciation is present, feed liberally with malt mashes and green food of the most nutritive kind. If in winter, allow carrots, beet, potatoes, &c.; and if these are not to be had, *spear* the corn, and give with bran: for, although not generally taken

into the account, a change of food will materially assist and expedite the cure.

The *external applications* resorted to for the cure are various; but *sulphur* is, of all other remedies uncombined, the article most to be relied on. The first three of the following receipts are *washes*, and are calculated for very mild cases, and where the filth of rubbing with unguents is wished to be avoided; but they should be abandoned if they do not benefit in a week. They may be applied with a sponge, carefully wetting every affected part. The two latter are *ointments*, sufficiently efficacious, particularly No. 4; but of course are not so cleanly as the former: these are also to be applied every morning, accurately rubbing all affected places.

No. 1.—White hellebore ..... two ounces.
Lime water, fresh made ..... one pint.
Water ..... three pints.

Boil the hellebore in the three pints of water till reduced to a quart; when cold, add the lime water. Put the whole into a bottle, and cork it well, pouring it out as wanted.

No. 2.—Corrosive sublimate ..... one drachm.
Spirit of wine, or brandy ..... one ounce.
Tobacco ..... quarter of an ounce.
Water ..... a pint and a half.

Dissolve the sublimated mercury in the spirit, by rubbing in a mortar, after which boil the tobacco and mix.

No. 3.—Sulphur ..... two ounces.
White hellebore ..... five drachms.
Water ..... one pint.

Either of these, though more cleanly, are not so safe as the following ointments, which, besides being safer, will likewise be more efficacious:—

No. 4.—Sulphur ..... one pound.
Oil of juniper ..... quarter of a pound.
Yellow basilicon ..... one pound.

Where a stronger remedy is desired the following may be used:—

No. 5.—Mercurial ointment ..... half a pound.
Soft soap ..... two pounds.
Corrosive sublimate ..... half an ounce.

At the Veterinary College a liniment is in general use—

Oil of nuts }
Oil of tar } of each equal parts.
Oil of turpentine }

Previously to the application of any unguent, all excrementitious matter should be removed from the skin, as scurf or scab, by scraping, brushing, rubbing, or washing, which will enable the ointment to reach the parts more effectually. The method of applying the ointment may be left to the discretion of the rubber. We used to direct it to be done by means of a thick pair of leathern gloves; which will enable the operator to work it into the skin, or to spread it well over every part, and to the bottom of any sinuosities. The rubbing for the exposed parts should be repeated every day, and a general dressing should be made every other day. Where the skin is very stubborn, apply the ointment by means of a hard brush.

HIDEBOUND.

It is very seldom that hidebound exists as a *primary* disease of the skin, but as a *symptomatic* affection it is sufficiently common. It is unnecessary to enlarge farther on it; the introduction of it here is merely intended to keep the systematic order of diseases complete. Liberal food and proper grooming will generally cure this imaginary disorder.

CHAPTER XX.

DISEASES OF THE FEET.

LAMINITIS, OR FOUNDER, OR INFLAMMATION OF THE FEET.

ACUTE LAMINITIS, OR FOUNDER.

This may be characterized as an acute inflammatory attack on the vascular parts of the foot generally, but on the sensitive laminæ more particularly; when we consider the extent of secreting surface engaged in the formation of horn, we cannot be surprised that these organs should become the subjects of extensive inflammation. Primary inflammation takes place in them from different causes, as from the alternation of heat with cold, exactly in the same manner as it occasions other great inflammations; but more particularly here, when extraordinary exertions have already distended the vessels. It is, therefore, not unfrequently seen consequent upon any great exertion, as hard driving or

riding for many hours in succession; and it is found still more likely to occur in snowy weather, particularly where the removal into a hot stable has immediately followed. Another cause of primary inflammation may be regarded as dependent on the unceasing strain of the laminæ which the erect position occasions; particularly in sea voyages, where it is united with very great stress alternately laid on one or other of the feet in attempting to preserve the perpendicular position during the rolling of the ship. Acute founder is sometimes not a primary affection, but is too frequently the effect of metastasis. We have seen the feet receive this morbid state from a translation of inflammation from many of the organs, but it is most frequent in pneumonia and enteritis: there is no acute attack but what may be translated to the feet. Founder may be confined to one foot, to two, or it may attack the whole four; but it is most common to the fore feet.

Symptoms of Acute Founder.—When a horse labours under this complaint, the attendants are usually unconscious of the real nature of the disease; and it is not unfrequent that even the medical practitioner, when called in, does not immediately detect it, unless much used to these cases: for he finds the horse heaving at his flanks, with a quick, labouring pulse; and, on inquiry, he hears that the attack commenced with a rigor or shivering fit; that the suffering animal has been lying down and getting up frequently; groaning with excess of pain, and occasionally breaking out into cold and profuse sweats. In such a case, unless he be informed that the horse has been ridden or driven with violence, and afterwards exposed to cold; or, unless his eye catches the particular disinclination to remain on the feet, or his hand detects their extreme heat, he is at a loss, frequently, whether to consider it an attack on the bowels, kidneys, or lungs, or an inflammatory or rheumatic fever. An experienced practitioner will, however, even when called in at first, observe, that though the horse appears to suffer much pain, and to lie down and rise frequently, yet that he neither attempts to roll or paw with his feet, nor look at his flanks, or kick his belly; and that even early in the complaint he betrays a peculiar manner of shifting and lifting up his legs, or of placing them so as to re-

lieve the superincumbent pressure; either drawing his hinder much under him to ease the *fore* feet, or placing the front under the chest to relieve the *hind*, according as one or the other are the principal seat of inflammation; or, by a marked disinclination to remain long up, when the *whole* of them are affected. When the inflammation exists in all four of them, the horse usually lies almost wholly on the ground; this disposition is, however, not quite invariable. We need hardly give any signs to prevent it from being considered as an affection of the loins, rheumatic or accidental; for as soon as the complaint has fully seized on the feet, they will become intensely hot, and the plantar arteries will be found pulsating very strongly. There is sometimes some little tumefaction around the fetlocks, and, when one foot is held up for examination, it gives so much pain to the other, that the horse is in danger of falling; at which times the slightest tap on the feet with any thing hard gives evidently extreme pain, and is flinched from most sensitively. If the horse be attempted to be taken out of the stable, his disinclination for motion at once shows the feet to be the seat of evil: in his taking each limb up and setting it down, there is something so truly characteristic of the intensity of the anguish felt in them as will not easily be forgotten. He appears to walk as it were upon his heels, and to allow no other part of the foot to touch the ground. The course of the disease is various: it may end in *resolution*, in which case the symptoms all relax, the remains of the congestion become absorbed, and the parts reinstate themselves perfectly. In other cases, the laminæ, throwing out an impure pus, the coffin-bone parts from its attachments, and by the weight is forced down; the pressure of the fallen coffin-bone partly destroys the concavity of the sole, which becomes partially convex; or is forced outward, and leaves a large space, between the coffin-bone and the horny toe, filled with a semi-cartilaginous mass. When the inflammation proceeds to copious *suppuration*, the symptoms having raged with much intensity for six or fewer days, a slight separation of the hoof from the soft parts may be observed commencing around the coronet: the purulent secretion soon becomes established, and, totally dissolving the union between the soft masses of the feet and the hoofs,

they fall off, when, of course, the animal is of necessity destroyed, as a perfect hoof will never be renewed.

Treatment.—As soon as the disease is discovered, if you are able so to do, proceed to remove the shoes; and, while the horse can yet stand, thin the sole and crust around, allowing him a momentary respite, or he may fall on the operator. If his state utterly precludes his standing up so long, support him by every means at hand; for thinning the hoof is so necessary to relieve the internal pressure, that it cannot be dispensed with. The next point is, by arteriotomy, to abstract blood from the toe of each affected foot to the amount of two quarts from each, if the founder extends to all four of the feet; but take three quarts from each, if the disease is confined to the fore feet only, as is most common. To encourage the bleeding when it does not flow sufficiently free, the hoofs may be immersed in warm water, or surrounded with cloths, and warm water poured on them. As soon as the disposition to suppuration has commenced, which is usually about the fourth or fifth day in very acute cases, then topical bleeding might be productive of mortification. The next indication is the continued application of moisture to the feet, either by wet cloths, or by cold poultices; or by the cold bath, if the horse can be made to stand. In a horse that lies almost incessantly, coarse cloths are wrapped around the feet, these being moistened with the coldest water, and covered with thin gutta percha. Although the inflammation runs so high as totally to prevent the horse rising, and his pulse be at 90°, he nevertheless may recover. We should also, in all very acute cases where there was much plethora, prefer cold applications; and a shallow bath, in which the horse if he will stand may be allowed to remain night and day, is an excellent addition to a veterinary establishment. Where the bath is absent, the horse ought to be placed in a loose box, the flooring of which should be strewn with wet tan, that ought to be further watered every second hour.

The *Constitutional Treatment* should be that prescribed for diffused inflammation; except that, while we unload the bowels by back-raking, clysters, and laxatives by the mouth, we should avoid active purgation, which would distress the horse, and might increase the fever; besides, in this dis-

case, we should always guard against a transfer of inflammation to the bowels: but mild nauseants, diaphoretics, or other febrifuges may be usefully employed, as the following, four times a day, in a pint of warm water:—

Tincture of aconite	half an ounce, of the strength of a drachm to an ounce.
Infusion of Indian tobacco	four drachms.
Nitre	two drachms.

Allow plenty of tepid water to drink, feed very sparingly indeed, and never force the horse to rise: the recumbent position is the best, as that which favours the return of blood from the feet; and, to encourage it, bed him up well, and have his body comfortably clothed. There is much difference of opinion with regard to the propriety of blistering in this affection, and it is most prudent to avoid it in the early stage; but it is beneficial when the active symptoms have decidedly abated, avoiding, however, the coronet. Apply a cradle, and also wrap tow around the blistered part in sufficient quantities to prevent injury to other parts; and should amendment occur, give a caution as to the liability of recurrence on extraordinary exertions for some months. Horses with acute founder have had frog setons inserted, and these animals are said to have done well.

CHRONIC FOUNDER.

There are several states which might pass by this name; one is, when the coffin bone drops, as alluded to in the previous disease; it then rests with its toe, or point upon the sole, which is soon cut through. Horses in this condition are forced to work, but they never can recover the use of their limbs. Every step is taken in agony. They are lame for life, and no art which man possesses can render them otherwise. Another is, when a horse has survived, but imperfectly recovered from an acute attack. In this case, also, the animal's existence is rendered miserable. His affection is subject to increase by fits, and again to abate. He is usually comparatively happy during very wet weather. The last and best form of this lamentable disorder is, when it comes on gradually, never entirely vanishing, but never assuming the acute type. Many such horses are now at fast work; they, however, perform slow motion with comparative ease. The last two cases alone admit of

treatment, and that, in the great majority of such cases, is perfectly useless, leaving the horse in a worse state than he was before. The measures commonly resorted to, consist in violent purgatives, and setons through the frogs. A cure is not to be expected from these. The most that can be anticipated, is a temporary relief; but the question arises, whether such relief be not dearly bought, both by the horse and his master?

SHOEING.

A great fuss was formerly made about this process. All the evils resulting from the custom were attributed to the mal-practice of the smith. A very great deal was said about his prejudices, his barbarity, and his ignorance. Every lameness was thought to be traceable to one or the other of these causes. Smiths were changed, and veterinary surgeons employed, but nevertheless lameness was as frequent as ever. Then it was discovered, that the evil arose from the smith's having no knowledge of the internal structure of the foot. How, it was confidently asked, could men presume to touch feet, who were thoroughly ignorant of the various parts which composed them—their anatomy, their physiology, and their pathology? Upon this some few, and very few smiths, learnt anatomy, and became very knowing about the horse's foot. But the men thus accomplished were, upon trial, found to be none the better workmen. Horses became lame while under their hands, as frequently as before. It should have been asked, Why should not a person, who knows only the thickness of a piece of horn, be able to drive a nail through it? Many men apparently rude, and entirely ignorant, will, upon taking up a horse's foot, pronounce the thickness of the horn with surprising accuracy. Constant practice gives them a facility of thus judging, by external signs, of the probable depth of a secretion.

And that is all the men require to know. Had they all the knowledge of the schools, this would be of no use to those who have exclusively to deal with horn. It is of no service to cast needless blame upon a laborious class; the fact being, that with regard to horse-flesh, the proprietor has a choice of evils; either to ride the horse unshod over

our hard roads, or to protect the foot by means of a circular piece of iron. This truth was ultimately suspected by the owners of horses, and some persons began to turn their attention to the form of a shoe. Certain people took out patents for particular shoes, which were to cure all diseases; but which in the end were found to aggravate the evils they were designed to remedy. The little piece of iron was beat and battered into an endless variety of shapes: it was pierced in this place, and punched in that, hoping to make it change its nature. But, nevertheless, it was found to remain iron; and so long as it is esteemed imperative to have horses shod, we must put up with the evils attendant upon the metal, for the sake of enjoying those advantages which it can bestow.

Among those evils inseparable from every kind of metallic shoe, is the severe battering upon hard roads, rendered yet more severe, by the interposition of an unyielding substance, like to iron. Every step the horse now takes is made upon iron, and the wonder should be, not that a foot occasionally gives way, but that any part of a living frame should be able to withstand such treatment. Then, not only are the roads hard, and the pace at which the horse is driven along killing, but we have also to weigh properly the treatment the horse receives within the stable. Here he stands often for days together, crimped up in a stall where he can only stand, frequently he cannot turn round, and very seldom can he lie upon his side and stretch out his limbs. It is infinitely worse than a sentry-box is comparatively with a man. He stands here generally for twenty hours out of the four-and-twenty. Here he stands with iron upon his feet, resting upon wet stones or damp bricks. No wonder if the feet should become cold; and those who are accustomed to bleed horses from the foot, can tell how unnaturally cold the first drop or two of blood flows from the part.

Nor is this all. Blood for its circulation requires muscular action. It ascends with difficulty against gravity. But what assistance can the circulation receive, when the wretched animal must stand motionless throughout the day. If the creature hangs back a little to relieve its flexor tendons, the groom sits behind to bid him "come up."

By thus placing the animal alone in a stall, we not only compel him to remain inactive, but do violence to the nature of the beast. Horses when free always roam in herds. They are naturally fond of one another's society. But if a horse within a stable endeavours to put his nose over the division, just to have a nibble, a lick, or a smell at his next door neighbour, he commits an egregious fault in the eyes of the groom, and receives the whip accordingly. Thus he must stand alone in utter solitude, and remain thus standing, perhaps, days together; for when the owner does not always ride out, the groom is not invariably regular with regard to the hours of exercise. The poor animal stands upon metal, which rests upon wet stones or bricks. It is denied to him to look to the right or the left. To go much forward is impossible, and to hang back the length of his halter is visited as an offence against decency. He must not, to break the monotony of his existence, even raise his eye to look at, or to invite the acquaintance of his neighbour. In the stall he must be content to breathe and feed, but in all other respects, the nearer he approaches to the inanimate the better. And all this must be done, despite the teaching of physiology, which instructs us that the horse was intended for constant motion. Beneath the horny box which covers the foot, is a mesh-work of veins which, unlike the majority of vessels in the living frame, have no valves. The blood within these veins has to ascend against gravity, but it has no machinery to assist it in its course.

Now, if the horse were free, he would walk about; or if he stood still beneath the shadow of some wide-spreading tree, he would select uneven ground, upon the highest part of which he could place his hind feet. Yet he would seldom be quite tranquil: he must walk to nip the grass upon which he existed. His feet in this state would be alternately lifted from the earth, and then placed again upon the ground. By this simple motion a kind of pumping action would be established, which would effectually empty the external vessels beneath the horn of the foot. When the hoof was raised, the blood would gush into the veins beneath it; but when it was again placed down, and the immense weight of the horse's body rested upon the foot,

the blood would be driven from the vessels under the hoof into those above it, with a force which, of itself, would render assistance needless; and it is these alternate states, leading to this result, which proves to us that the horse was designed to be in constant motion. If further argument be wanting, surely it might be found in the frolics and gambols of these animals. When they are happiest, then they are most active, for there is not a surer symptom of disease than inactivity. The horse that is very ill will stand quiet enough; but the animal that is in health requires space to run about in and to enjoy himself.

After knowing this, and also perceiving the manner in which man treats his servant, can it be wondered at that the foot gives way, when thrown out of use and totally perverted? Does it require we should blame the smith, or reproach the shoe, as the primary or even the exciting cause of the injury? In the country, horses are treated less systematically, and there, although they may be roughly shod, they rarely become lame. It is in the stables of the gentleman, of him who has education to teach him better, and wealth to enable him to build proper lodgings for his beast, that the great majority of horses are injured.

The shoes we do not pretend to say are no evil; but they are one which cannot be got rid of, and for which all has probably been done that the necessary shape admits of. The iron which composes a shoe may be twisted this way, and turned that. It may be puffed as a new invention, and recommended as a patent, but after all it will be a semicircular piece of iron nailed to the bottom of a horse's foot; there it will continue, and man can make nothing more of it. As to all newfangled shapes, or additions, or abstractions, he who cares for his horse had better have nothing whatever to do with them. They are generally expensive, and though meant to do good, they mostly do harm. Let the man who values the animals Providence has entrusted to his care, know the shoe is, and must be under any possible form, an injury. Let him accept it as a necessary evil, and seek not to improve what appears to have reached very near to perfection; but let him yield a slight portion of his notions with regard to propriety. Let him cast off some of his prejudices concerning a glossy coat. Let him

free his mind from a portion of his predilection for a neat turn-out, and have the creatures under his charge kept in greater accordance with the fixed rules of nature.

GENERAL REMARKS.

Our advice to all persons not intimately acquainted with the process of shoeing, is not to dictate, but to clearly point out what defect they wish remedied, and leave the choice of the shoe to the smith: nor must we blame the man if the first shoe does not altogether succeed. There appears to be much of chance in these matters. Two horses shall cut; the defect here is obvious, and it would be thought the remedy was certain; but there are five different shoes for this defect, and no man can tell the precise one which will suit a particular case. One horse will go well in one, another in the second, and so on; but all must be tried, to know that which will exactly answer any special horse: this is even the case, although the first veterinarian that ever lived stands at the horse's heels; and the proprietor need not complain, if he is no worse off in the hands of a smith. Therefore, do not blame the man if he should not hit upon the precise shoe which is to make your nag faultless: he will ultimately stumble against it if you do but give him time; and no doctor can do more, only people yield more willingly to a little outward respectability, joined to the most delicate assertion of superior judgment.

Then, with regard to a horse being pricked. Do not, when this accident happens—and that it does not more frequently occur is a subject for legitimate wonder—do not fly into a passion, and abuse the unlucky smith. It, ten to one, was no fault of the man's; but let the subject be fairly investigated, and your horse will probably be found the sinner. The best smith may prick any horse at any time; but the worst or the best is seriously culpable if he attempt to conceal the occurrence, and the horse be laid up in consequence of his silence. Then let loose upon him the vengeance of the law, and you will be sure of a verdict, for no one can defend the culprit.

If your horse has a thick wall, a high hard sole, and a small inelastic frog, affected with a running thrush which never dries up, have the soles pared out till they are quite

springy under the pressure of your thumb. Try it yourself, for the hard thumb of the smith is no certain test. The sole should be pared out till a gentleman's child can make it yield; and never mind although a little blood do ooze through, and hang upon the surface like drops of sweat upon a reaper's brow. Then have the frog cut away till it is smooth, and all the exposed horn be perfectly healthy: cut away, even until all the horn is removed, so long as any whitish powder remains. Do not have the wall touched, farther than to lower the margin of the crust that rested upon the shoe. With regard to the bars, give no directions about such folly. Allow the shoeing smith to use his will, whether they shall be left prominent or cut away: then have a stopping of tow and tar applied; over this see there be placed a leathern sole, which is nothing more than a piece of thick leather fixed between the foot and the shoe; but mind the leather is sound and new, as smiths are apt to buy old stuff, which they assure us answers very well for this purpose: however, where the horse's huge weight has to be sustained, we imagine the leather cannot well be either too new or too strong. Then have the shoe applied, and mind it is made after the fashion recommended by Mr. Turner, of Regent-street; that is, let it have the full number of holes upon the outer quarter, but only one, or at most two, upon the inner quarter. This freedom allowed to the inner quarter does not prevent the horn from expanding, but it permits a certain amount of play which keeps the internal parts healthy, and hinders their secretion (the horn) from diminishing.

Into the space left at the heels, between the frog and bars and the leather, at least once a week, have poured in a mixture of tar, and whale, seal, nut, or rape oil, in equal proportions; and when the tow is saturated, enough has been used for one occasion. Most nag horses, not much worked, will require their shoes removed every third week, and to be reshod every sixth week. But with regard to those whose work is both fast, heavy, and constant, notwithstanding the smith may load on the iron, and tip with steel, they will only endure from four days to three weeks; when either at the longer or the shorter period a change will be demanded. Such is the difference of tread in

some horses, that a shoe which will serve one horse more than three weeks, shall not last his companion that runs beside him longer than seven days; consequently no rule can be laid down where there are such evident variations.

Let no man be seduced into patronising any new invented shoe, under the pretence that they will prevent the horn from contracting. Horn is unorganized; it has within itself no power of dilatation, of contraction or of reparation or of union: it is without arteries, veins, nerves, or absorbents; it is wholly devoid of life or sensibility. Then how can such a substance contract? It is to talk evident nonsense, to mention horn as having any such capacity. It is secreted like to human nail; it can be cut away, but the horse does not flinch; it can be even burnt, and the animal remain unconscious; it is purely a secretion; it is shaped by the fleshy parts within, which secrete the substance. The chest and cranium are formed of hard and resisting bone; but if even this unyielding substance is bent, swelled out, drawn in, formed and regulated by so compressible a part as the lungs, and by so pulpy a part as the brain, how much more is a pliable material, like to horn, capable of being moulded by a fleshy membrane, backed by a stubborn bone. The gradual dilatation of the horn may give room for the vascular current of the internal parts; and this is exactly that which Mr. Turner's one-sided nailing accomplishes. Therefore, where diminution has to be remedied, Mr. Turner's shoe is to be adopted, and it will be some years before this admirable invention is superseded. Besides, Mr. Turner has taken out no patent. This novel shoe is as cheap as any other, and with the addition of leathern soles, especially to the fore feet of light horses, is the very best for general use which we can point out to the reader.

There is another prejudice shoeing smiths are apt to appeal to; this is the dislike which horsemen have taken to wood pavement. Every man who shoes a horse has some particular form of iron, which costs only a trifle more, but which will effectually prevent all slipping. If it does not perform every thing which is prophesied of its virtues, another is produced which never fails. This is put on, but by this time the horse has gained experience in consequence

of two falls, and the driver or rider grown somewhat timid by twice being cast upon the earth. The one treads more carefully, and the other is content to pass the dangerous locality at a slower rate. The new shoe, therefore, this time perfectly succeeds; and so the old one would have done had it been permitted to remain upon the foot. The amendment in the manner of going arises from other causes than the shoe; but the dupe attributes the change to the last addition, and, in his prejudice, cannot be induced to sit behind a horse wearing any other.

There is another prejudice the forge is apt to appeal to, and this is avarice. A shoe is recommended, because it will wear so much longer. Many horses could go in their shoes perhaps a fortnight longer; but then a remove, that is, taking off the shoe and paring out the foot, would be necessary. Even, however, with the remove, some hazard would be incurred; and with a horse under the best of circumstances there is alway sufficient risk. This, therefore, is a subterfuge to push off an inferior article, under the pretence of its possessing extraordinary qualities. This trick can only be practised upon certain owners; for some horses, shoe them how you may, and put what amount of iron and steel you will, wear through the metal far more quickly than the horn is reproduced, so as to afford hold for the nails. But upon gentlemen who have horses that do not work much, the fraud is very frequent, and it is really astonishing how many persons it imposes on. When a smith tells you he has a better article in reserve, refuse to listen to him. You pay him for the best his shop contains; and the fellow would not confess he was cheating you, unless he thought to gain by the admission: repel all such appeals. Shut your mind against all such advances. Close your ears against all suggestions intended to tickle your avarice; and you will in the end be a gainer in pocket, for you may be very certain no tradesman has so very honest a spirit that he abhors to finger your money, or can afford to be candid in business at his own expense.

If your horse has weak spreading feet, the smith then cannot remove too little horn. Tell the man to draw a heated iron over the sole at each shoeing. When the first effects of the fire have subsided, the secretion will be hard-

ened, and the secreting parts stimulated towards a new production. These kind of feet, however, mostly have large prominent frogs, and at them the smith usually cuts at freely; but the sole and frog should have nothing but the ragged portions removed; and the wall only be pared away to the extent which the old horn has been pushed downward. This, however, is pretty well understood, and you may trust the horse within any respectable forge without fear; only these kind of feet, more than any others, require to be shod with leathern soles, which protects them against those injuries from stones, &c., to which they are too much exposed.

Another prejudice you must be careful from indulging, is that of insisting that your horses be sent home looking smart about the feet. This is usually accomplished by the rasp, and where this instrument is much used, the best judge cannot tell at a glance whether the shoe be fitted to the foot, or the foot has been rasped away to make it fit the shoe. Rather forbid the use of the rasp, save to remove the projecting ends of the clenches; and have the feet sent home moderately in the rough, rather than they should be too much reduced, and polished up with a coating of lamp-black, tar, and train oil. In conclusion, when your groom or coachman makes any remarks prejudicial to the smith, listen with patience to all that is said. Should the man be moved by malice, or a desire to remove the shoeing (from which the servant mostly has a consideration), he will betray it if left to himself. If you detect any such lurking bad feeling, rather change your servant than your smith; as it is better for your interest that you should be moderately treated by a stranger, than that those who are in your confidence, and immediately about your person, should plunder you. Besides, a man who would play tricks with the horses' shoes, is not a person to be trusted with their corn; and he who would cheat you to the horses' injury, would not mind profiting by putting your animals upon a full allowance of hay.

The various kinds of shoes required for particular cases will be hereafter specified; and we have preferred penning these few pages of advice, rather than repeating that which has been often said.

THE PUMICED FOOT.

Pumiced feet are produced by a slow chronic inflammation: the front of the hoof always enlarges, and the sole therefore becomes more than flat; the horse begins to falter, and is sometimes very lame; at others he can move moderately well. The foot, when shod, presents no acquisition of horn; on the contrary, the sole becomes thinner and thinner, and at last bulges out into a surface more or less convex as the internal derangement is greater or less. The large wide feet of the native horses of moist counties are most prone to this evil; not being able to resist the weakening and irritating effect of battering on stony roads, and least of all on the paved streets of London and other cities.

The *treatment* of these feet can be only *palliative*, as a removal of the deformity has never taken place. Some benefit has been experienced from blistering the coronets in early cases; this has stimulated the part to an increased secretion of horn. Every means must be taken to avoid pressure on the sole, which is not only painful, but actually aggravates the disease. Pumiced feet should not be kept too moist, nor can they ever be cured by turning out without shoes; but they may be very properly dressed every day, both sole and walls, with a mixture of tar and oil, which proves extremely beneficial to them. The *shoe* in use for these feet is sufficiently known; being formed with a very wide web, and being made so thick as to allow of being bevelled away on the inner surface, to receive the convexity of the sole without pressing on it; this is called a dish shoe. From the outer crust of the foot being thin and brittle, no rule can be laid down as to the particular part through which the nails should be driven, but the smith, in these cases, must get a hold where he can. This is often a very trying matter. It requires no little judgment and patience to shoe a pumiced foot. The sole, however, should, every time the shoe is taken off, have a red-hot iron passed over it, which stimulates the growth of horn, and hardens the part. There is no cure for a foot so diseased; neither can any one palliate the disorder except the shoeing smith. Standing upon a level pavement, when the shoes are off, has been recommended; but this invention of a mechanical mind

has done more harm than good. The measure which has been attended with the greatest advantage is shoeing with a wide-webbed dish shoe, having a leathern sole, for the purpose of protecting the seat of the disease, and being rather higher at the toe than at the heel; because a prominent healthy frog is found an accompaniment to a pumiced foot, and the horse can bear upon the frog when he dreads to let the sole touch the ground. Formerly a different mode was practised by some persons, which was to apply a shoe so narrow in the web as to cover the crust only, but of sufficient thickness to elevate the sole above the chance of pressure from the ground. This invention is said to obviate the effects of stones, gravel, &c., getting under the wide webbed shoe, which sometimes lamed the horse; and it is said that pumiced horses even go best in these kind of shoes. In some cases, however, no shoe answers so well as a strong bar shoe.

DISEASE OF THE NAVICULAR JOINT, OR NAVICULARTHRITIS.

Groggy lameness is the term by which this affection has been principally known to horsemen, and which, like many other names, served to characterize many of its evils. It is but due to Mr. J. Turner to state, that, by his ample and scientific investigations, the navicular joint disease is now ranked among the recognized afflictions of the horse: and if, unfortunately, we have little hope of finding an efficient remedy for it, we at least do not grope in the dark, and torment sound parts, to the anguish of the animal, and the demonstration of our own ignorance.

The *causes* of the affection may be strictly called hereditary or predisposing: the tendency may exist from birth. Pressure and concussion are, in general, the remote causes; the proximate is found in inflammation, leading to ulceration, or some ossific deposit. Mr. Turner lays much stress on contraction with the hollowed arch of the sole as a cause, which acts by drawing the frog upwards: other writers, without denying that some displacement is occasionally found, are not willing to acknowledge this as a cause. The perforans tendon is inserted into the most backward portion of the sole belonging to the coffin bone. To gain this point it has to pass underneath the navicular

bone. In progression no inconsiderable portion of the weight is cast upon the navicular bone, and by it transferred to the perforans tendon; which, however, is protected, and in some measure supported, by the frog beneath. However, when we consider the immense weight of the horse, increased by motion as well as by the burden of a rider, it cannot be wondered at if the protection and support sometimes prove weaker than is required. The tendon receives, in all cases, the first injury. Often the occasion is marked by instantaneous lameness; at other times it is slow in coming on, and often repeated before the disease is confirmed. Between the bone and the tendon is situated a synovial capsule, which facilitates the independent motions of each upon the other. The first consequence of injury is inflammation. Inflammation of the tendon is readily communicated to the synovial capsule; the secretion of the lubricating fluid is thereupon stopped; friction takes place as a consequence; the navicular bone is denuded of its articular cartilage; ulceration is ultimately established; this may end in the absorption of the synovial sac, and the junction of the bone to the tendon; it may terminate in the fracture of the bone, and it may also conclude with the rupture of the tendon. In case of the first termination the horse is groggy ever after, and when either of the two last terminations occur it is better to order the animal to be immediately destroyed, for his service in this world is at an end.

The *symptoms* are various, according to the progress made by the disease. At first the horse is lame, and the cause can be discovered in no other part than the foot. If the animal be now narrowly observed, when at rest, and within the stable, he will be seen to favour one foot, and to have the diseased one slightly in advance of the other; should the animal now be taken out and ridden he goes forth lame and returns home sound, for the warmth of exertion forces back the absent synovia. Should the disease progress to the ulcerative stage, the lameness has, like toothache, moments of uncertain ease, but more or less it keeps on. The foot is now generally advanced or pointed; the frog narrows, hardens, becomes elevated, and is continually emitting a loathsome thrush; the sole likewise grows more thick and more high, the quarters become considera-

bly heightened, and of much greater substance; while the horse either cannot put a foot to the ground, or he patters along with peculiarly short steps, going up hill far better than he descends from an acclivity.

The *treatment*, unfortunately, must begin very early, and be followed by a very long rest, to be successful; and it is seldom that the practitioner is called in until disorganization has proceeded too far for permanent benefit. If contraction is apparent, thin the sole and outer crust; provided inflammation of an active kind be present, as may be known by the heat of the part and the shifting of position, bleed by the toe, and put the foot into poultices; otherwise blister the pastern and coronet. Insert a frog seton through the elastic, or, as it is called, the "fatty frog." Neurotomy, or division of the nerve, as a last resort, will somewhat stay the ulcerative process, and always ease the suffering animal during progress, as well as give liberty in action. The operation, however, should not be attempted while any active symptoms of inflammation remain, or when the crust or horn of the foot is scanty and weak.

CORNS.

Corns, both in man and horse, certainly arise from pressure, but farther than this the analogy fails: in ourselves, the cuticle is usually increased. A corn however in the horse is mostly the consequence of pressure applied to that part of the horny sole which is between the inner quarter and the bars. When violent pressure is endured, even for a short time, it produces inflammation and extravasation from the vascular secreting sole, whose vessels becoming ruptured, make a fresh corn present a bloody spot. This vascular secreting portion of sensitive sole, when once injured in this way, unless immediately relieved and not again subjected to any pressure whatever, until it be perfectly reinstated, takes on a permanently diseased state; ever after, instead of perfect horn, a morbid secretion is deposited, and in some cases a semi-purulent matter, or pure pus, fills up the place, the inflamed vessels retaining an exquisite sensibility. It is to this that the incurable nature and the great tenderness of corns when pressed on is owing. We can imagine why corns are

usually found upon the inside of the foot, when we learn that the inner wall and heel are weaker, and also as they bear a greater portion of superincumbent weight than the outer parts endure. The coffin bone, not reaching to the heels, is the reason why these structures are the seats of corn, for the coffin bone is the active agent in its production. This bone is moved upwards and downwards at either end, as the weight rests upon one extremity or the other of its articular surface. It is the wings of the coffin bone which causes corns. The descent of its wings squeezes the vascular sensitive sole between it and the shoe in open feet, the shoe in this case being the passive agent; but in the contracted foot, the high, thick, hard and unyielding sole becomes the passive agent, and between that and the wing of the coffin bone the sensitive sole is bruised. These corns may occur in the stable, in the field, or on the road, in short, on any spot where the slightest motion is possible. Too little horn also subjects the feet to corns, because a slight pressure will indent weak feet, which are notoriously subject to them. The best shoe, suffered to remain on a foot too long, will produce a corn or corns. Neglecting to prepare the foot for the shoe is also a fruitful source of corns; for in preparing a foot, this angular portion should be so pared as to remove it from contact with the iron, without weakening the horny covering of the sensible sole. Another common cause is the neglect of removing or renewing the shoes at proper intervals: when a shoe has been long worn, the growth of the hoof carries it forwards, by which the parts originally opposed to the heels are carried beyond them, and now press on the sole, often becoming indented within the line of the crust, and producing a most injurious pressure. Sometimes, also, either from the original form of the shoes, or by long wear, they become loose or '*springy*' at the heels, as smiths call it; in which cases gravel is apt to make its way between the shoe and foot, which, by the pressure of the heels during action, is indented into the substance of the horn; other gravel becomes received in the same manner, which presses still onward, until at last it harms the sensitive part of the sole: extravasation of pure blood ensues, and forms a corn, or it may proceed to suppuration.

Corns when new are deeply seated, and of a bright crimson colour, requiring much digging with the drawing knife to be found. When old they are black and near to the lower surface of the sole, which has then only to be scraped clean to perceive them. A corn, however, should be followed with the paring knife to its source in the sensitive part; for horses with old corns only go well when fresh shod and newly pared; and as soon as the portion of sole between the bars grows to a level with the surrounding horn, the sensible sole receives a fresh bruise, and lameness again appears.

Treatment of Corns.—When a corn of moderate extent first appears, it is not difficult by proper means to remove it completely: but when it has existed some time, the injured part becomes weakened, and the diseased action established. As soon, therefore, as it is discovered, the cure should be immediately attempted; first, by removing the shoe, then with a fine drawing-knife cutting away every portion of *horn* around; avoiding, however, wounding the sensitive sole underneath. If any contraction of the heels be present, the sole should be thinned till it yields to the pressure of the thumb, and the blood appears like dew upon the surface. A unilateral shoe should be then applied, chambered opposite the weak part. Every third week remove the shoes, and pare the horn away from the seat of corn. In this way corns may be *cured* at their outset. But having become habitual and permanent, a *palliative* treatment only can be pursued. In the first place, the pressure of the horn must be guarded against by a regular and frequent paring out of the sole; and if the hoof be very strong, and at all disposed to contract, the quarters also should be attended to, and not allowed to become too thick. We have also in very strong feet found the short shoe or tips sometimes of the greatest possible service: to a weak foot, a chambered shoe is preferable: when the weakness is very considerable, or the corn a very bad one, a bar shoe, with plenty of bearing upon the frog, is the most proper support; more particularly remembering, in these very aggravated cases, to remove occasionally all the surrounding horn likely to press on the injured part. Animals that could not wear tips or bear a bar shoe upon the foot, have gone

well when shod with leather, and with a shoe shortened at the quarter, which is the seat of corn. By regularly attending to this, horses, before useless, have been able to perform work with comfort to themselves and satisfaction to their owner. In slight cases of corn, the shoe proper to be used is one of rather more substance than common, with the web a little wider than usual, and its width equal throughout, that is, as wide at the heels as the toe; it should also extend rather farther back than it generally does, and present a perfectly level surface to the sole. This affords ease and protection: future pressure must be avoided by keeping the seat of corns clear from offending horn.

THRUSH.

This complaint consists in a diseased action of the sebaceous follicles of the sensitive frog, whereby they produce a thin fœtid discharge, which escapes out between the cleft of the horny frog. It is very improperly considered by many as a matter of trifling import; but a little experience only in the diseases of the feet will show that it is by no means so harmless as supposed. Still more erroneous is it to assert that in all cases thrushes do good by cooling the feet. On the contrary, there probably never was a perfectly *harmless* thrush, or one that could exist long without doing some injury. Various causes produce thrush; the immediate one is always inflammation of the sensitive frog. In very many instances their origin is to be traced to the application of moisture, particularly of *acrid* moisture, as that of dung, urine, &c.; which, soaking the horny frog, at last penetrates it, and then becomes a source of irritation to the sensitive frog underneath. This effect of moisture accounts for the increased tendency of thrushes to affect the hinder feet, while the fore feet remain perfectly free from them. Naviculartbritis is notoriously a common cause of thrushes; when the disease has terminated the thrush ends, but the narrow small hardened frog remains. While naviculartbritis exists, however, thrush is constantly present, though in the latter stages it may send forth so slight a discharge as almost to escape detection.

As naviculartbritis is a very common cause of thrush, so

it is equally certain that a long continued thrush is apt to end in naviculartheritis, by lessening the horny frog which acts as the chief defence of the perforans tendon. Neither can any horse be considered *safe* that has a thrush, for there is always some degree of tenderness felt; and in these cases, if the point of a sharp stone at any time should penetrate the cleft, or any of the sinuses occasioned by the complaint, the animal will come to the ground from excess of pain: but it is not often that this complaint produces any lameness in the general gait. The appearances of thrush are sufficiently known: at first a moist exudation only appears from the natural cleft of the frog; when it has existed some time the frog scales away, and is but partially renewed: the ulceration extends to the sensitive sole throughout its whole surface; the horny frog now produces a dark coloured discharge of a peculiar fœtid smell; and such cases, if unattended to, particularly in the hinder feet, may degenerate into canker. A horse with one thrush, especially if it be in a fore foot, should on no account be purchased; but a horse with three or four thrushes may be safely bought; because in the first case, it denotes internal disease, and is surely the symptom of something more fearful going forward within; and because in the last instance, there is every reason to believe they arise from standing in dirt, and will yield to a little mild treatment.

Treatment.—Thrushes in the hind feet, caused by dirt, ought to be immediately stopped; but when a thrush appears in one fore foot, do not meddle with it, as it is an outlet to the inflammation raging within. In that kind of thrush we notice, sometimes taking place in the open feet of young horses, it will remove all danger, if the treatment should be at once applied to the affection. When thrushes are connected with a diminished state of the feet, it is evident that the frog cannot afford to lose much horn. All however that is diseased, rugged, or detached, should be cut away; however small the frog may be made, the smith should be told to pare until he comes to healthy horn, or reaches the flesh beneath. When moisture has been the exciting cause, it should, of course, be carefully removed, and its occurrence again prevented; particularly that produced by decomposing

dung and litter. In cases of thrush, never have the foot permanently stopped, but leave the frog free, so that it may be readily dressed. The latest and by far the most effective dressing for the disease is, two drachms of chloride of zinc, added to a quart of water. Friars' balsam, tincture of myrrh, solution of vitriol, alum, lead, &c., all have their advocates. Tar and salt mixed is a favourite application, or tar and bole armenian blended: a solution of nitrate of silver is also recommended; but perhaps the following, should all the foregoing fail, may deserve a trial:—

Prepared calamine	half an ounce.
Verdigris	half an ounce.
White vitriol	one drachm.
Tar	three ounces.

Mix.

Before the introduction of the dressing, the frog should be inspected, so that the introduction of the remedy may be facilitated, and the disposition to harbour filth and moisture prevented. The whole frog may then very properly be well rubbed over with the application; but, more particularly, a small piece of tow should be charged with it, and by means of a skewer, or other similar instrument, pressed to the bottom of the cleft. Care should be taken, when introducing the tow, to do it neatly, so that no part hangs out; by which means the dressing will remain secure two or three days; but no application simply poured in, without the aid of some other substance, as tow, soft sponge, wool, or rag, which retains the agent and guards against moisture, generally answers so well. In bad cases the dressing should be repeated every day, in others every second day, or twice a week.

SANDCRACK.

This is a solution of continuity between some of the horny fibres of the hoof, generally in the direction of their growth; that is, from above downwards. Now and then, though but very seldom, the cracks exist in an horizontal position. This affection is called *sandcrack*, because it was formerly supposed peculiar to hot *sandy* districts, the heat of which, applied to the feet, gave them a disposition to *crack*. This opinion has however been proved correct. English horses when in Egypt had fearful sandcracks, and frequently more than one or two upon the same foot.

These fissures are more common to the fore than to the hind feet; not but the latter are sometimes affected, particularly of cart and other heavy draught horses; in which last animals they are generally observed in front of the hoof, and arise from the violent strain put on this part in drawing loads: in the fore feet they are more usually situated upon the inner side of the foot: here, also, the weakness of the quarter, and the increased weight thrown on it, acts peculiarly disadvantageously: sandcracks are, however, seen occasionally in the front of the fore feet. In every instance, where it is not occasioned by some outward injury to the hoof, it is, we believe, brought on by a brittle state of the horny fibres; sometimes it is constitutional. When the hoof is completely penetrated, it becomes a most painful affection, and productive of extreme lameness; for the divided edges of the horn are apt, during exercise, to admit the protrusion of the soft parts underneath; which becoming suddenly pressed on by the approximation of the horny edges, exquisite momentary pain is produced. From the injury done to the sensitive laminated expansion, there is often a sprouting of fungus between the divided edges, which greatly aggravates the symptoms.

Treatment.—A very different curative plan is proper to be pursued, according to the state in which the complaint may be found. The grand object must be, to interrupt the communication between the crack and the sound horn. Much difference of opinion has arisen as to the best mode of destroying the connexion between the divided and the entire hoof. Some prefer the firing-iron, others the rasp, and others the drawing-knife. In the usual cases of sandcrack, the state of the opening must be first carefully attended to. When, either from pressure, or from dirt getting into the wound, suppuration has taken place, were an attempt made at once to close and bind up the opening, very extensive mischief would be the consequence. Instead of this, the hard edges of the horn should be first removed with a very sharp knife, and the surrounding portions thinned considerably; after which, the opening should be dressed with any mild stimulant likely to encourage the adhesive inflammation, as a pledget of tow, saturated with the mild solution of chloride of zinc; and over this another

thick pledget, spread with tar, may be placed; and if the irritation and inflammation are considerable, apply a poultice over all. In case of underrunnings and detachments of horn, the separated portions must be removed; but as this will seldom happen, the levelling of more than the horny edges is not often necessary. In a few days, by repeating a similar mode of dressing, the dirt will be evacuated, and the parts will heal, harden, and become dry; when the process about to be recommended for common cases, without suppuration, may be proceeded with.

When a sandcrack has occurred, which shows no signs of active suppuration, although it have completely penetrated the horn, and a little blood or serous moisture shows itself at the edges, but only under the effects of motion, proceed to pare away the horn around it; and next, by means of a camel's-hair pencil, introduce within the edges a small quantity of the solution of chloride of zinc, recommended for thrush. Bandage the hoof up moderately tight for two days, then again examine the fissure; when, if the oozing be altogether stopped, and no inflammation appear, proceed to draw lines of a moderate depth with a sharp firing-iron; one very little above the upper limit of the crack, another just beyond the lower limit also, and afterwards bandage as directed below. If preferred, these lines of separation may be made with a rasp, or fine drawing-knife; but we have commonly chosen the iron, as we think the seared line of distinction stronger or more perfect, while the melted horn binds the edges together. But in case no moisture at all has appeared at the crack, then the insertion of any caustic matter is unnecessary, and the treatment for this kind of fissure is very simple. The measures necessary for such an injury will be as follows:—

The horse being shod with a bar shoe, and the hoof either pared away in a line with the crack; or otherwise the shoe chambered, so that the horn immediately under the fissure may not be pressed on: proceed to bandage up the foot, so as to fulfil the following intentions:—bring the divided edges of the fissure together, and completely retain them there, in such a manner as totally to exclude moisture from entering the opening. Whatever mode will

answer these purposes best should be adopted; perhaps the following, though a common one, is equal to any:—melt some shoemakers' wax, and smear all over the hoof; and, before it is quite cold, bind upon the wax firmly about three yards of tape, so as to include as much of the hoof as may be within the turns; fasten off with a hard knot, and again over the whole smear more wax; and, lastly, smooth it into an even surface. This done, rub over a little lard or other greasy substance, to prevent the pitchy matter from sticking. In all cases of simple fissure, not very long or deep, pare away the divided edges so as to cut out the crack, and then with a hot iron draw a line above and below the place where the division had been.

PUNCTURED FOOT, OR PRICK.

The foot is unavoidably exposed to numberless injuries from sharp bodies penetrating its substance: this may happen in various ways, from nails, pointed flints, glass, &c. The shoe being partly torn off, and then stepped upon, may produce it; but the accidental puncture by a nail during shoeing is one of the most frequent causes of these accidents. Injuries of this kind are proportioned in their effects according to the parts punctured, and not entirely to the depth of the wound: a knowledge, therefore, of the anatomical structure of the foot is necessary to enable us to form an opinion of the extent of the harm done. A puncture through the fleshy frog, even to the vascular portion, is not productive usually of such serious consequences as an apparently more superficial opening made through the centre of the sole; both may penetrate the capsular ligament of the perforans tendon and navicular bone, and either produce anchylosis or destroy the animal. Whenever a puncture takes place of sufficient depth to produce the above-mentioned injury, and synovia escapes, the *external* opening should be enlarged; but it should be attempted to close the *internal* opening, by the continual application of a pledget of tow, soaked in the weaker solution of the chloride of zinc, not to the immediate surface of the capsular ligament, but to the flesh directly over it. This should be renewed three times a day, and the horse should wear a boot, having the foot slightly stopped by means of an old

shoe tacked on. No matter whether suppuration has commenced or not, the above solution should be employed till the opening has healed. A very deep posterior puncture may extend itself into the flexor tendon, and is always productive of very great irritation and inflammation. In such cases enlarge the opening, and treat in a similar way with the boot and the weaker solution of chloride of zinc; observing, that if prior to suppuration the inflammation run very high, or the pain be excessive, a little blood may be taken from the toe and the foot, without removing the previous dressing placed in a poultice: examine the wound to see it contains no foreign body, and enlarge the opening whether it does or not. A puncture of the sensitive sole may be treated by cutting away the horn below and immediately near to the injury, and then dressing the wound with a pledget of tow smeared with tar, and kept close by means of splints and stopping. Should, however, suppuration start up, remove the above, put the foot in a poultice, and afterwards dress with the solution of chloride of zinc in the previous mentioned manner; when, there being a depending orifice, the wound will do well.

But the most usual cases of punctures are those which arise from a wrong direction of a nail in shoeing, and which either presses on, or actually wounds, the sensitive laminæ. This is commonly known to the workman at the time by a peculiar sensation arising from the different resistance occasioned, or by the flinching of the horse. The best smith that ever lived may meet with this accident; the slightest movement of the horse may occasion it. The wonder is, the men perform a hazardous and delicate office so frequently with so few mishaps. Many horse proprietors, however, think differently, and by venting their ignorance and bad temper, make the smith unwilling to acknowledge when a nail is driven the wrong way. Concealment, in this case, is all that is to be feared. Hide the fact the puncture may suppurate, and the most fearful destruction to the foot ensue: make it known, and with proper treatment there is an end of the affair. Nineteen horses out of twenty that are pricked do well; but the smith, rather than face the bad temper or abuse of the owner, conceals the circumstance, and runs the chance of ultimate discovery. To prevent the worst, and

spare the animal, say to the men labouring at the forge where the horse is shod, you know no man can help pricking an animal, and you shall think nothing of it provided you are told; but you will put the law in force should the circumstance occur and be concealed. Were the nail immediately redrawn, the opening enlarged, and a small quantity of tow with tar put upon the wound, it would commonly heal; and even should it proceed to suppuration, still a depending orifice would exist for the evacuation of the matter, and the extensive detachment of horn be prevented. When a smith, in shoeing, drives the nail into the inner horny wall, or too fine, he is apt, from fear or shame, to let it remain; but he ought to be aware a slight bulge takes place during progression: pressure on the vascular parts ensues, and inflammation surely follows if it is not withdrawn. It happens, even when he is aware that the nail has penetrated the inner surface of the horn, and wounded the vascular parts, he is often then hopeful to conceal that which not avowed becomes his fault. The offending nail being allowed to remain, the inflammation is considerable the same night, or perhaps not till one or two days afterwards. In such cases, as suppuration proceeds, the confined matter spreads around, detaching a portion of the fleshy from the horny sole, more or less considerable; at last extending upward, it finds itself an exit by an opening at the coronet, and a quittor is established. In proceeding, the inflammation does not always confine itself to the punctured portion of the sensitive laminæ; but often, when not assisted by an artificial opening, it extends to parts less vascular; sinuses form inwardly. Fortunately, however, the vital action of the sensitive sole and laminæ being extreme, the matter usually proceeds outward, and finds an exit at the coronet.

It may, therefore, in pursuing this subject, be stated, that at any time when a horse becomes lame within a week after he has been shod, if the origin of it be hid in any obscurity, the shoe should be always removed, and the foot gently struck all over with the hammer. If the lameness springs from this source, and any part be injured by one nail in particular, at that part the stroke will occasion the horse to

flinch. If this fail to detect the evil, pinch the sole and the wall round with the pincers; which, if the mischief arise from a prick, will readily point out the affected part by the pain felt there; and under this spot matter will have surely formed. Proceed in such case immediately to pare away the horny sole, if necessary, till the blood be upon the point of starting; when on inspection a dark-coloured fluid may ooze from one of the nail holes, yet, if a longer period has elapsed, a purulent one will appear. But should considerable time have passed, and there be an appearance of extensive suppuration, we must carefully examine the extent of the injury, to ascertain how far the horny sole has become separated from the fleshy one; for to this extent must the horn be removed; ever keeping in mind, that, as the fleshy sole will never form over the dead or detached sole, so, to gain a new horny secretion, every portion of loose horn must be removed. No greasy matter should be applied to the fleshy sole, but a pledget of tow or lint moistened with tar may be laid on. If the case has been a neglected one, and there has been extensive separation of horn, with considerable suppurative process, take away at once every portion of the separated horn. There must here be an immediate exposure of the entire underrun fleshy surface; and a mild stimulant application, such as tar, made to the sensitive sole, to change the purulent into a horny secretion. If on the next day the secretion of new horn, though very thin, is yet moderately complete, continue to dress it as before; but if fungus appears to be forming, touch such part with the butyr of antimony: and after the luxuriant granulation have disappeared, change the dressing to the solution of chloride of zinc, two grains to the ounce of water. Apply such cover as will defend the part as well from moisture as unequal pressure; but general and healthy pressure, in a moderate degree, will be salutary: tack on a shoe lightly over all, and fasten on the dressing with splints. When matter has proceeded to evacuate itself by the coronet, treat as for a quittor. And in all these cases, when the symptomatic fever rages high, give physic. Perfect quiet is absolutely necessary in every instance of puncture; the slightest exercise irritates, and should be avoided. The

hoof should either be cut away, or a shoe should be made to '*lie off*' the injured parts, and be very lightly tacked on with three or four nails, not fully clenched up; this will allow of a ready removal and re-application.

TREAD, OR OVERREACH.

A wound about the coronet or heels is a very common accident to horses, from one foot being set on the other; when the outer quarter, or toe of the shoe upon the hind foot, will wound the integuments, together with the vascular coronary rim of the fore foot. Or it may occur from a blow inflicted by the heel of the fore shoe upon the front of the coronet, in consequence of the hinder one overreaching it. In the first instance, all these cases are to be considered as simple wounds, or rather as bruises, which, if extensive, have produced death in the surface and adjacent parts of the hurt; in which some inflammation must occur and be followed by slough of the edges thus injured. And sometimes the injury is so great as to cause sloughing of the extensor pedis tendon and opening of the coffin joint. In no instance, therefore, should an early application of irritating or caustic matters be made, by which more extensive inflammation and an increase of sloughing are produced. On the contrary, wash with water to remove dirt, &c., and if the wound be considerable, wrap up the foot in a poultice; if not, apply over it simply the mild lotion of chloride of zinc. Should the injury be slight, it may heal at once; but if not, sloughing and suppuration will occur. Under some circumstances, however, more extensive mischief will follow, when the case must be considered as *quittor*, or open joint.

QUITTOR.

The various accidental lesions just described sometimes suppurate; and in consequence of the thick covering of horn, cannot follow the usual course of inflammation by proceeding outward, but directs its confined secretion inward, attacking all the internal parts of the foot: this state is called quittor, which is a diseased state supplementary to many other lesions of the foot. Now when it is considered of what different materials this organ is composed; some vascular and sensitive; some in which the

powers of life are very feeble, and their organization low; while other parts exist which are varied in their shades between the two; when this is considered, we need not wonder that any morbid action of the foot, having a predisposition to extend inward, should in its course present different symptoms, arising from the different structures which it attacks.

Symptoms.—The probability of a quittor is shown by an enlargement of the coronet. This may be followed by an exudation between hair and hoof, or the tumour on the coronet may burst in its centre. Let whichever may take place, an open sore is speedily set up from which does not issue healthy pus; but a mixture of pus and a fluid resembling white of egg, in which white particles are often seen to float, and which often has a most offensive smell. On searching the wound, it is found to proceed by little narrow channels various ways. The channels are often so small and tortuous as to defy the entrance of more than the point of a probe; and it is from these that the liquid resembling white of egg issues. To find out their extent, cut a small twig of a broom, and, having rounded its point, use it as a flexible probe. It will bend with the winding of the sinus, and will enter where the silver wire would not penetrate. It must be used for some time and with some force upon the first occasion, and its application should be repeated upon the three following dressings. It should be made to enter wherever any glairy exudation is perceived; for often several large sinuses will communicate with a very small opening.

A quittor seems to occasion intense pain, producing acute lameness. The horse having a quittor fears to put the diseased foot to the ground; wherefore it is better to turn him into a loose box, and to dress him with as little disturbance as may be possible. Nevertheless as he suffers from an injury which demands the reparative process to be established before it can be healed, feed him fully with as much liberality as may be compatible with a life of idleness. Attention paid to this last direction will materially shorten the duration of the cure.

Treatment of Quittor.—This, like most matters of opinion, has varied with the theories and the customs of the day. Formerly all quittors were attempted to be cured either by

caustics or by the actual cautery, or by both together. La Fosse, the elder, who was rather fond of novelty, in some measure overturned this practice in France, and introduced a new method, founded on an idea that the obstinacy and derangement that accompanied the complaint originated in the lateral *cartilages* becoming carious; these he affirmed were capable of being thus affected, but incapable either of exfoliating like bone, or sloughing like ligament; and therefore, to promote a cure, the whole cartilage must be removed. This practice became universal in France, and extended itself here also, particularly after M. St. Bel assumed the professorship of our Veterinary College. Here it reigned a little time only; but in France it continued until the writings of M. Girard on the subject checked its career, and brought its practice into some disrepute. This celebrated professor showed the superiority of the old method of employing corrosives; and the success of the practice at the Alfort School, over which he presided, tended further to bring these into use. Perhaps also our own success with them might have hastened the re-adoption.

The *practical part of the treatment of quittor* should be commenced by acquainting ourselves with the actual state of the parts; and this is the more necessary, as it will often prevent us from being involved in a fruitless attempt, which will probably bring disgrace on our practice, torture on an innocent beast, and ensure trouble and useless expense on our employer. When, by the use of a pliable probe, we meet with a firm hard body, a bone, the case cannot be said to be a favourable one: but unless the cartilages be also carious, such horses frequently become sound, therefore our opinion should be to that effect. If, in addition to caries of the bone and cartilages, we observe a flow of synovia also, a perfect cure is hardly to be expected; although even here the powers of the constitution have occasionally restored the foot to a degree of utility; and as these cases happen principally to the hind feet, and very frequently to our large and valuable draught-horses, the attempted cure might be worth the trial. When we detect caries of the anterior or lower parts of the lateral cartilages, we must then be aware that the process of exfoliation is a very difficult one to promote, in consequence of the small

powers of life in the parts: if our efforts succeed, the process will probably be a lengthened one; but as these cartilages extend themselves posteriorly, they become more and more of a cartilago-fibrous texture; this as being more highly organized, is more capable of the sloughing and reproductive processes; so, when caries of the cartilage is detected, if it have a backward direction, and not burrowing deep towards the articulation, we are warranted in expecting to succeed. In no part of the treatment is judgment more displayed than this: we must spare, and yet spare not; we must expose every particle of the internal part of the foot, be it walls, heels, or sole, that obstruct our proceeding; but we must most carefully avoid removing one particle unnecessarily: and it must be kept in mind, that, unless dictated by the circumstances we have pointed out, we must content ourselves with keeping the hoof well thinned, and pliant by moisture, &c. And, notwithstanding the prejudices against firing in quittor, we would, whenever a circumscribed spot of carious bone could be got at, without endangering articular or bursal cavities, apply a pointed cautery; neither should we be deterred from touching such a spot in the centre of the lateral cartilages; but we would lightly apply it only, and not at all when it was carious towards the base of the cartilage. This will often save much time, even in the worst cases, and equally in those which are destined to an after treatment: occasionally it will do more; for it sometimes happens that this alone will bring about a new action, when the cartilages and ligaments do not very extensively participate, as frequently happens if a nail have penetrated the anterior part of the sole, and wounded the bone. The general end we have in view is to promote a removal of the dead parts; our further attempts must therefore be directed to alter the diseased ravage going on. Our surgical principles now teach us to make use of so much stimulus, and only so much, as shall alter the diseased action. If it can be done by mild means, it is by far the most humane and eligible method. But if the sinuses are extensive, and the disorganization has extended to the cartilages and ligaments, we must proceed further: indeed, it is seldom that we can stop short from '*coring out the quittor*' by a forcible slough-

ing, brought about by the introduction of some caustic substance, after this fashion. When the opening is very small, and the sinuses deep, but contracted, make a paste with equal parts of resin and corrosive sublimate, softened and held together with tar. Impregnate small pieces of wool or tow fully with this paste, which place around the end of a probe, and introduce one by one to the bottom of each sinus, filling also each up to the orifice with the same, but not jamming them in with force. When, on the contrary, the orifice of the wound is sufficiently large, and one or two straight sinuses only exist, a bougie may be made with paper, dipped in the paste, and introduced; or in case the diseased action be extreme, and the quittor is very *foul*, the powder may be rolled within thin paper, so as to make also a bougie, which being greased or rubbed with tar to render it slippery, should be introduced to the bottom of the sinuses; but it must be remembered, that, when these are numerous and irregular in their direction, the first is by far the best mode. The hoof should, as soon as the caustic is introduced, be put into a poultice. In two or three days after the introduction of the caustic, there will follow great heat and tumefaction of the foot; and, at last, the orifice will burst out, expelling the slough, together with the application that occasioned it; after which it may be expected that the wound will go on healthily to heal. If, however, unfortunately, this should not be the case, recourse must be again had to another introduction of escharotics, and in every case remove so much of the horny sole as may be beneath the pipes. The foregoing is severe treatment, necessitated by long standing cases. However, when the quittor is recent, and the sinuses are superficial, have the horn thinned over the seat of the disease, but not to that extent which lets forth blood. Then have the horse cast. Next take a small director and insert it into a sinus. A sharp knife may then be slid along the director, and a cut made outward, slitting the sinus open. This is to be repeated as often as shall be necessary. Some tow saturated with solution of blue vitriol is then introduced into each sinus, and the horse allowed to rise, when he frequently gets up sound. The wounds are to be treated in the ordinary manner. Even when the severe treatment is imperative, it simplifies the case if all super-

ficial sinuses be got rid of at once, in the manner just proposed; so that the caustic, whose action we cannot watch or control, may be inserted into as few places as may be possible; besides, while the horse is down, the practitioner has an excellent opportunity of making a perfect examination of the quittor.

CANKER.

This affection has some peculiarities of character; spreading over the surface of the soft parts, particularly of the sensitive frog and sole, and having a fungoid excrescence, somewhat of a hardened texture, and exuding a thin and an offensive discharge; which inoculates the soft parts within its reach, particularly the sensitive frog and sole, and destroys their connexions with the horny covering. Canker can be safely said to have much constitutional origin; it is frequently local; seldom if ever spontaneous; but either constitutional, or secondary to some affection, as grease, thrush, &c. It appears oftener in hot weather than in cold, and is more frequently seen in crowded and filthy stables than in well-regulated ones. It is now unknown in the army, and, were the same preventive means applied, would be equally unknown elsewhere. The disease originates in various ways: one source, as supposed, but supposed only, is the high heels or calkins of the heavy draught-horse, which remove the frog from that pressure that seems so necessary to its healthy state. The state of wet and filth these horses stand in is a more likely source: moisture applied to the frogs is a most active agent; it disorganizes the frog itself, and increases the growth of the horn on the heels, which aggravates the evil. Another common origin is neglected thrush, which extending beyond the sensitive frog, inflames the vascular sole, and extensive ulceration succeeds. Virulent and neglected grease will often occasion it, and it is no uncommon circumstance for quittor to degenerate into canker. When a canker is the consequence of a wound of the sole which extends to the flexor tendon, it is commonly of the worst kind. Treads, bruises, suppurating corns, or whatever produces inflammation, may occasion canker.

Treatment of Canker.—The principal indications appear to be, first, to reduce the inordinate increase of parts to

a level with the surrounding surface; and, next, to restore the healthy secretions. To lessen the disposition to produce an inordinate quantity of the wall at the expense of a sufficient development of the sole, the plantar arteries were taken up by Mr. Coleman, but without benefit. When, however, he divided the immediate branches furnishing the coronary ring which cut off the secreting supplies from the wall of the foot, the horn of the sole began to form in larger quantities; and the experiment has been repeated by others with the same result. The division of the plantar nerves has been employed for the same purpose, but with equivocal benefit; yet it has acted beneficially in another way, by removing much pain, and enabling the animal to bear on the foot, which, by the pressure thus obtained, is improved. When neurotomy is performed in canker, it is principally confined to those cases where the disease has its seat in the sole, bars, and frog: it would never be prudent to do more than simply divide the nerve, because the object here is to destroy sensation temporarily only. When the fungus extends itself considerably beyond the edges of the horn, it is prudent at once to remove it to a level with the horny covering by the knife. This will occasion a considerable hæmorrhage, which may be checked by touching it lightly with muriate of antimony; after this, the edges of the horny sole that surround the opening whence the fungus arises may be better got at. Proceed carefully and accurately to examine what extent of sensitive sole is separated from the horn, or, how much is '*underrun*.' Exactly to this extent must the sole of the hoof be removed with a drawing-knife; for it must never be lost sight of, that the horn once separated never again reunites; but becomes a foreign body, and as such, occasions the same effects that occur from the presence of other substances in all parts. Not only must this be done in the first instance, but at every future dressing the same attention should be paid to examine if any further separation has occurred, that this last portion may also be removed.

Having thus fulfilled the first indication, by reducing the diseased fungus, and having lessened the irritation that occasioned it, the next process is to promote a more healthy

action in the diseased surface: two plans tend to this end —the first by *stimulants* applied to the surface; the second, by *pressure*, which strengthens the parts generally. As long as there is a profuse secretion of a curd-like matter; and as long as the fungus grows beyond the surrounding parts, so long the *cankered* action is going on; and, during this time, no secretion of firm horn will take place. An unhealthy formation of thin half-solid horn may be observed over many portions of the surface; but this will prove an imperfect secretion, and must not be allowed to remain; on the contrary, it must be carefully removed at each dressing, until, by the application of stimulants, and the benefit of pressure, a healthy granulating surface appears, that will produce only an ordinate and proper quantity of good pus, and finally end in the formation of sound horn. After the exposure of the whole cankered surface, therefore, and of its treatment as before directed, let it be sprinkled with either of the following powders:—

Chloride of zinc	one drachm.
Resin	four ounces.
Chloride of lime	one ounce.
Alum	one ounce.
Resin	two ounces.

Mix.

Make only sufficient for one dressing, as neither of the above powders will keep, in consequence of the great attraction for water. The cankered surface being lightly sprinkled with either of these, or any other stimulant judged proper, let it be covered as dry as possible; first by a layer of lint, over which place pledgets of tow thickly upon the bottom of the foot; this should be done very judiciously, so as to fulfil the remainder of the indication, that is, to keep up a firm and equal pressure; and to insure a prolongation of it, introduce over the whole thin strips of iron or steel, slid under the shoe and crossing each other, which will retain the dressing and keep a continual compression. This being done, keep the foot perfectly dry, which is of the utmost importance: nor does any thing so strongly prevent its future increase, and restore the healthy action as dryness, united with pressure. A very great fault is

often committed by dressing cankered feet too often. We would, however, except the first dressing, where it has been severe: here it is usual to let it remain two or three days, until sloughing may be supposed to have commenced and matter to be formed; but afterwards, no bad case ought to be dressed more frequently than every fourth day. From a feverish impatience, this is often overdone, and a cure that might be quickly performed is needlessly protracted; also, in the end, proves less complete than it might otherwise have been: for when the dressing is too frequent, every thing done is rendered nearly useless by the diseased action extending itself under other portions of the sole, and the growth of fungus increasing. The destruction of the fungus, when very high and luxuriant, may be effected, as before mentioned, most conveniently by the knife; but, when not so prominent, it may be done by the application of any of the caustic matter in general use. Muriate of antimony is very commonly applied for this purpose; as it can be laid on every part by means of a small paint-brush. It has also another advantage, which is, that, by turning the surface immediately white it shows what parts it has been applied to, and what are left undone. The lapis infernalis, or caustic potash, from its quick action, is also a convenient application. We have likewise used a solution of lunar caustic, but the application of the same in substance is not sufficiently quick to be useful. The caustic dressing, be it what it may, should be continued no longer than there is a diseased surface remaining; nor should the escharotic process ever be pushed to the extent of corroding deeply into the substance of the vascular parts. Such conduct betrays the grossest ignorance, and therefore can hardly be expected in the veterinarian; but it has happened in the practice of smiths and farriers, to the utter destruction of the foot. Yet, on the other hand, until the cankered matter, from being profuse, thin, and clotted with white masses, change to a thicker, less fetid, and more healthy discharge, as well as lessens in quantity, the sore is still a *cankered* one; also until the cauliflowered white fungus change to a healthy red granulated appearance, the unhealthy discharge must continue: and, in all such cases, a due degree of pressure, united with the application of

some escharotic, milder or stronger, according to circumstances, may be considered requisite. But so soon as the fungus is completely reduced, the discharge is lessened in quantity, and improved in quality, accompanied with a secretion of healthy horn; then nothing more is necessa y than to watch the parts, to dress dry, and not too often; still keeping up a moderate degree of pressure till the sore be completely hoofed over. Horses are often turned out during the cure of inveterate canker; as the foot becomes unavoidably exposed to moisture, it is an improper course to pursue; but mill-work under cover offers an excellent method of combining pressure with benefit to the general health; observing, if the horse has been subjected to neurotomy, that his insensibility does not cause him to injure his foot.

FALSE QUARTER.

This can hardly be considered as a distinct complaint, but, more properly, as a consequence resulting from some one of the former diseases; in which, from the injury done to the coronary vascular ligament, it can never afterwards secrete horn; but the break or interruption produced by the interposition of a portion of non-secreting substance, causes a part of the outer crust of the wall to be absent. Such a blemish is called a *false quarter;* and it is evident that it must greatly tend to weaken the hoof. It likewise sometimes produces the same unpleasant effects as a sand-crack, by the separation of the under layer of the wall admitting the vascular laminæ between the opening. The *treatment* can be only palliative. Keep the neighbouring horn always thin: use a bar shoe, and '*lay off*" (as a smith calls it) the deficient quarter. This may be done either by paring the crust, or by an indentation in the shoe; the choice of which is left to the prudence of the operator, with this exception, that, in a weak thin foot, the alteration should always be made in the shoe, and in a strong one in the crust.

OF SURGICAL OPERATIONS,

AND THE VARIOUS RESTRAINTS IT IS SOMETIMES NECESSARY TO PLACE THE HORSE UNDER FOR THEIR PERFORMANCE.

When it is necessary to perform any painful operation on so powerful an animal as the horse, it is of consequence to subject him to a *restraint* equal to the occasion. Horses are very dissimilar in their tempers, and bear pain very differently; but it is always prudent to prepare for the worst, and few important operations should be attempted without casting. Humanity should be the fundamental principle of every proceeding, and we ought always to subject this noble animal to pain with reluctance; but when circumstances absolutely call for it, we should joyfully close our hearts to all necessary suffering. The resistance of the horse is terrible, and it is but common prudence to guard against the effects of it. The *lesser restraints* are various: among them may be first noticed the *twitch*. The *twitch* is a very necessary instrument in a stable, though, when frequently and officiously used, it may have the ill effect of rendering some horses violent to resist its application. In many instances blindfolding will do more than the twitch; and some horses may be quieted, when the pain is not excessive, by holding the ear in one hand, and rubbing the point of the nose with the other. A soothing manner will often engage the attention and prevent violence; but it is seldom that either threats or punishment render an unruly horse more calm. Inexperienced persons guard themselves only against the hind legs; but they should be aware that some horses strike terribly with their fore feet: it is prudent, therefore, in all operations, to blindfold the animal, as by this he becomes particularly intimidated, and if he strikes he cannot aim. When one of the fore extremities requires a very minute examination, it is prudent to have the opposite leg held up; it may, in some cases, be tied: and when one of the hinder feet is the object of attention, the fore one of the same side should be held up, as by this means the animal is commonly prevented from striking. If this precaution be not taken, still

observe to keep one hand on the hock, while the other is employed in what is necessary; by which means, if the foot become elevated to kick, sufficient warning is given, and the very action of the horse throws the operator away from the stroke. Without the use of these arts the practitioner will expose himself to much risk. The *trevis* is the very utmost limit of restraint, and is seldom used save by smiths, to shoe very violent and powerful horses: whenever recourse is had to it, the greatest caution is necessary to bed and bolster all the parts that are likely to come in contact with the body. On the Continent we have seen horses shod in this machine, and apparently put into it from no necessity greater, than to prevent the clothes of the smith from being dirtied. Horses have been destroyed by the trevis, as well as by casting; or their aversion to the restraint has been such, they have died from the consequences of their own resistance. The *side-line* is now very generally used, not only in minor operations, but also in those more important. Many veterinarians do not use any other restraint than this, in which they consider there is safety both to the horse and to the operator. It is applicable to such horses as are disposed to strike behind; and consists in placing a hobble strap around the pastern of one hind leg, and then carrying from a web collar passed over the head the end of a rope through the D of the hobble, and back again under the webbing round the neck. A man is then set to pull at the free end of the rope, by which the hinder leg is drawn forward without elevating it from the ground. By this displacement of one leg the horse is effectually secured from kicking with either. Occasionally it is thus applied:—hobbles are put on both hind legs, and the rope is passed through each of the rings. According to this last method, the horse is actually cast, as he must fall when the ropes are pulled. Take a long rope, and tie a loop in the middle, which is to be of such a size as it may serve for a collar; pass the loop over the head, letting the knot rest upon the withers; then take the free ends, pass them through the hobbles, and bring it under the loop. Let two men pull at the ropes, and the hind legs will be drawn forward.

Casting.—The objections to this practice arise from the

dangers incurred by forcing the horse to the ground. Mr. Bracy Clark simplified casting, by inventing some patent hobbles, having a running chain instead of rope, and which, by a shifting D, made the loosening of all the hobbles, for the purpose of getting at a particular leg, unnecessary. These were still further improved by Mr. Budd, so as to render a release from all the hobbles at once practicable. Hobble leathers and ropes should be kept supple and pliant with oil, and ought to be always examined previous to using; nor should the D or ring of the strap be of any other metal than iron. Brass, however thick, is brittle, and not to be depended on. To the D or ring of one pastern hobble, a chain of about four feet long is attached; to this a strong rope is well fastened, and, according to the way the horse is to be thrown, this hobble is to be fixed on the fore foot of the contrary side: the rope is then passed from the hobble on the fore foot to the D of the hind foot of that side, then to the other hind foot, and, lastly, through the D of the other fore foot. After this, much of the ease and safety of the *throw* depend on bringing the legs as near together as possible. This should be done by gradually moving them nearer to each other, without alarming the horse; which will very much facilitate the business, and is really of more moment than is generally imagined. A space sufficiently large should be chosen for the purpose of casting, as some horses struggle much, and throw themselves with great violence a considerable way to one side or the other; and *they are able to do this if the feet have not been brought near together previous to attempting the cast.* The place should be also very well littered down. The legs having been brought together, the assistants must act in concert; one particularly should be placed at the head, which must be carefully held throughout by means of a strong snaffle bridle; another should be at the hind part to direct the fall, and to force the body of the horse to the side which is requisite. Pursuing these instructions, the animal may be at once rather *let* down than *thrown*, by a dexterous and quick drawing of the rope; the whole assistants acting in concert. The moment the horse is down, the person at the head must throw himself upon that member, and keep it secure; for all the efforts of

the animal to disengage himself are begun by elevating the head and fore parts. The rope is tightened. The chain is fixed by inserting a hook through one of the links, of sufficient size not to pass the hobbles. When the operation is over, the screw which fastens to chain to the hobble, first put upon one fore leg, is withdrawn. The chain then flies through the D's of the other hobbles, and all the legs are free, save the fore leg first alluded to; the strap of this has to be afterwards unbuckled. There are also other apparatus used in casting, as a strong leathern case to pass over the head, serving as a blind when the animal is being thrown; and as a protection against his rubbing the skin off his eyes when down. Then a circingle is also used. This is fastened round the horse's body, and from the back hangs a broad strap and a rope: the strap is fastened to the fore leg of that side which it is desired should be uppermost; the line is given to a man who stands on the opposite side to the generality of the pullers. On the signal being given, the men having hold of the hobble rope pull the legs one way, while he who has hold of the rope attached to the circingle pulls the back in a contrary direction, and the horse is immediately cast.

Slinging is a restraint which horses did submit to with great impatience, and not without much inconvenience, from the violent excoriations occasioned by the friction and pressure of the bandaging around his body. Graver evils are also brought about by the abdominal pressure: some horses stale and dung with difficulty when suspended; and inflammation of the bowels has not unfrequently come on during slinging. The slings are, however, forced on us in some cases, as in fractured bones, the treatment of open joints, and some other wounds where motion would be most unfavourable to the curative treatment. *Suspension* may be partial or complete. Suspension of any kind will require the application of pulleys and ropes affixed to the beams, that the whole body of the horse may be supported. A sling may be formed of a piece of strong sacking, which is to pass under the belly, the two ends being fastened firmly to pieces of wood; each of about three feet long, and which are to reach a little higher than the horse's back: to the pieces of wood cords and pulleys are to be firmly attached,

by which means the sacking can be lowered or raised at pleasure. To the sacking, also, are to be sewn strong straps, both before and behind, to prevent the horse sliding in either direction, without carrying the sacking with him. Upon this so formed cradle he is to recline. If horses when they are fresh should be placed in this machine, most of them would either injure themselves, or break through all restraint. However, by tying up their heads for three or four nights, their spirit is destroyed. The slings may then be applied without the fear of resistance: it is the best method not to pull the canvas firm up, but to leave about an inch between the horse's belly and the cloth, so that the animal may stand free, or throw his weight into the slings when he pleases. In this fashion a horse may remain for months in the slings, and at the end of the time display none of the wear and tear so feelingly described by old authors.

VETERINARY OBSTETRICS.

Protracted and difficult parturition does occur in the mare, when it becomes the veterinary practitioner to be *au fait* at rendering assistance, or he will be completely under the lash of the farriers around him. The principal cases that occur arise either from weakness in the mare, or from a disproportion between the fœtus and mother. False presentations are also to be witnessed, but chiefly of the back and croup: that of the back requires much labour, but the foal is to be delivered, the hind legs being presented, without turning in the womb being necessary. When either from debility of the mare, or disproportion in the size of the foal, a natural birth is despaired of, the practitioner having introduced his arm, and having ascertained that the presentation is a natural one, should draw the feet gently forward, and then endeavour to place the head between them. If the head only is met with, seize it by the muzzle and draw it gently onward, searching for the feet, and drawing them one after the other in the line of the head; which manipulations are, of course, only to be attempted during the throes of the mother. So soon as the head and legs are got near the external orifice, enclose each foot within the loop of a rope; then holding both the ends so attached,

endeavour to liberate the foal, which must be done by steady, but not brutal, pulling at the time of each throe; unless by protracted labour or excess of debility they have altogether ceased; when strive to revive them by the administration of stimulants, especially the infusion of the ergot of rye, in two drachm doses every twenty minutes. Should this not succeed in one hour, proceed to extract without: to delay it, would be to lose both mother and offspring. The blunt hook is sometimes used on those occasions, when the hand cannot be introduced; it is a powerful aid with those that can direct it. When the obstruction arises from an unnatural presentation of parts, that is, of other parts than the head and fore feet, as of the loins, the croup, and one single extremity, the other being doubled backward; it is evident here our endeavours must be directed to change the position to the natural one, if practicable; if not, to bring the hinder extremities forwards, and endeavour to make the extraction by this method. Lastly, if all these means fail, we must proceed to lessen the fœtal mass by embryotomy.

EMBRYOTOMY.

When, from weakness, a very narrow pelvic opening on the part of the mother, or monstrosity on the part of the foal, no efforts can bring the fœtal mass away entire, it must be dismembered. A knife made for the purpose, having the blade concealed, with the haft lying within the hollow of the hand, is to be taken up into the vagina. We are told that, occasionally, hydrocephalus in the colt prevents the head from passing. Such a case will detect itself by the volume that will be felt on examination, and which will be easily lessened by plunging the point of the knife in the forehead, and evacuating the contents by pressing the skull in; when, laying hold of the muzzle, the head may be brought through the pelvic opening. But it is usually the natural size of the head which forms the obstruction; in which case the head itself must be removed. When the head has been dissected off and brought away, it will be necessary probably to contract the volume of the chest; which will not be difficult, by cutting the cartilaginous portions of the ribs; detaching the thoracic viscera, and then

crushing, or rather moulding, the empty thorax together; after which the rest of the body will offer little obstruction. When the head cannot be got at, the limbs must, one by one, be detached: after which the body, and at last the head, may be drawn out either entire, or lessened considerably.

CASTRATION.

This practice is of very ancient origin; and is as extensive as ancient. It is founded on the superior placidity of temper it gives. The castrated horse no longer evinces the superiorities of his masculine character, but approaches the softer form and milder character of the mare. Losing his ungovernable desires, he submits to discipline and confinement without resistance; and if he be less worthy of the painter's delineation and the poet's song, he is valuable to his possessor in a tenfold degree. In England, where length in the arms and of the wide-spread angles of the limbs is absolutely necessary in the horse to accomplish the rapid travelling so much in vogue among us, the exchange of the lofty carriage and high action of the stallion is absolutely necessary; and when we have added the lessened tendency of the gelding to some diseases, as hernia, founder, cutaneous affections, &c., we may be content to leave the sexual type with the racer for his breed; also with the drayhorse for his weight, and the fancy of his owner. Supposing it, therefore, eligible to castrate our horses, what is the proper age for the operation? What are the relative advantages and disadvantages of the different methods of performing it? The proper age to castrate the young horse must depend on circumstances; as on his present appearance, his growth, and the future purposes we intend him for; observing, generally, that the more early it is done, the safer is the operation: for until these organs begin to secrete, they are purely structural parts, and as such are not so intimately connected with the sympathies of the constitution. It is otherwise when they take on their functional office; their vascularity and volume is then greatly increased, and the system largely sympathises with them. On the other hand, a removal before the adult age has so much effect on the external

form, that it has occasioned, in some countries, a legal enactment to prevent it.

A reference to our anatomical detail will show that a partial descent of the spermatic glands takes place soon after birth; and that in most cases, therefore, they may be found *without* the external abdominal ring, until the fourth, fifth, or sixth month; but occasionally even later. After this they are drawn up within the interior of the inguinal canal: here they remain until the tenth or eleventh month. Colts, therefore, can be castrated any time between the first and fourth month; and this period is preferred by some persons, from the little disturbance it occasions to the constitution. Some breeders of horses castrate at twelve months; others object to this period, because they think the animal has not sufficiently recovered the check experienced from weaning, before this new shock to the system occurs. In the more common sort of horses used for agricultural purposes, it is probably indifferent at what time the operation is performed; this consideration being kept in view, that the earlier it is done the lighter will the horse be in his fore-hand; and the longer it is protracted the heavier will be his crest, and the greater his weight before, which in heavy draught work is desirable. For carriage horses it would be less so, and the period of two years is not a bad one for their castration. The better sort of saddle horses should be well examined every three or four months; particularly at the ages of twelve, eighteen, and twenty-four months; at either of which times, according to circumstances or to fancy, provided the fore-hand be sufficiently developed, it may be proceeded with. Waiting longer may make the horse heavy: but if his neck appear too long and thin, and his shoulders spare, he will assuredly be improved by being allowed to remain entire for six or eight months later. Many of the Yorkshire breeders never *cut* till two years, and think their horses stronger and handsomer for it: some wait even longer, but the fear in this case is, that the stallion form will be too predominant, and a heavy crest and weighty fore-hand be the consequence; perhaps also the temper may suffer. Young colts require little preparation, provided they are healthy and not too

full from high living; if so, they must be kept somewhat short for a few days; and in all, the choice of a mild season and moderate temperature is proper. When a full-grown horse is operated on, some further preparation is necessary. He should not be in a state of debility, and certainly not in one of plethora: in the latter case, lower his diet, and it would be prudent to give him a purgative. It is also advisable that it be done when no influenza or strangles rage, as we have found the effects of castration render a horse very obnoxious to any prevalent disease. The advanced spring season, previous however to the flies becoming troublesome, is the proper time for the performance of the operation upon all valuable horses; and be careful that it be not done until *after* the winter coat has been shed, which will have a favourable effect on the future *coating* of the horse, independent of the circumstance, that at a period of change the constitution is not favourable to any unusual excitement.

Castration is performed in various ways, but in all it expresses the removal of the testicles: there are methods of rendering the animal impotent without the actual destruction of these organs; for if by any other method the secretion of the spermatic glands is prevented, our end is answered.

Castration by cauterization is the method which has been principally practised among us. But this by no means proves it the best; on the contrary, many of our most expert veterinarians do not castrate by this method. Mr. Goodwin, and many other practitioners of eminence, never castrate by cautery.

A preliminary observation should be made previously to casting, to see that the horse is not suffering from a rupture: such cases have happened; and as in our method we open a direct communication with the abdomen, when the horse rises it is not improbable that his bowels protrude until they trail on the ground. Hernia as a consequence of castration may easily occur by the *uncovered* operation, for, as already observed, it makes the scrotal sac and abdominal cavity one continuous opening. It is not to be wondered at, therefore, if the violent struggles of the animal should force a quantity of intestine through the rings into the

scrotal bag. Should we be called on to operate on a horse which already had hernia, it is evident we ought not to proceed with it, unless the owner be apprised of the risk, and willing to abide by it. In such case we would recommend that the method of Girard be practised, *i. e.* to inclose the tunica vaginalis within the clams (sufficiently tight to retain them, but not to produce death in the part) pushed high up against the abdominal ring, and then to remove the testicle, being very careful to avoid injuring any portion of intestine in the operation. When a discovery is made of the existence of hernia *after an opening has been already made* for the *common* purpose of castration, should the operator continue his process, and castrate? We should say, by no means; but on the contrary, we would greatly prefer the method recommended by Mr. Percivall; firmly to unite the lips of the external wound by suture, allowing the testicle itself to assist in blocking up the passage; with a hope also that the inflammation caused by the excision might altogether stop up the scrotal communication with the abdomen. But in the appalling case of immense protrusion of intestine, what is to be done? Mr. Coleman, in such a case, proposes to make an opening near the umbilicus, large enough to introduce the hand, and thus draw in the bowels. Mr. Percivall would prefer dilating the external ring: but the testicle must be very firmly retained, and even permanently fixed against the dilated ring, or the bowels would again descend. The intestines probably would become inflated in any such case.

As unbroken young horses are the most usual subjects of this operation, and as such often have not yet been bridled, if a colt cannot be enticed with oats, &c., he must be driven into a corner between two steady horses; where, if a halter cannot be put on, at least a running hempen noose can be got round his neck; but whichever is used, it should be flat, or the struggles, which are often long and violent, may bruise the neck, and produce abscess or injury. When his exertions have tired him, he may be then led to the operating spot: here his attention should be engaged while the hobbles are put on, if possible; if not, a long and strong cart-rope, having its middle portion formed into a noose sufficiently large to take in the head and neck, is to be slipped

on, with the knotted part applied to the counter or breast; the long pendant ends are passed backwards between the fore legs, then, carried round the hind fetlocks; brought forward again on the outside, run under the collar-rope; a second time carried backward on the outer side of all, and extended to the full length in a direct line behind the animal. Thus fettered, Mr. Percivall says his hind feet may be drawn under him towards the elbows; it has been, however, often found that, at the moment the rope touches the legs, the colt either kicks and displaces the rope, or altogether displaces himself; but his attention can generally be engaged by one fore leg being held up, or by having his ear or muzzle rubbed, or even by the twitch: if not, the rope may be carried actually round each fetlock, which then acts like a hobble; and this rope may be gradually tightened: this last however is a very questionable method, and the others therefore ought to be long tried before it is resorted to; in this way people have succeeded with very refractory colts; but it requires very able assistants, and, if possible, the man who has been used to the individual colt should be present. In either way, as soon as the rope is fixed, with a man to each end of it behind the colt, let them, by a sudden and forcible effort in concert, approximate his hind legs to his fore, and thus throw him. Before the colt is cast, however, it should be endeavoured to ascertain that he is free from strangles and hernia.

Being satisfied that no hernia exists on either side, proceed to cast the colt, turning him, not directly on the left side, but principally inclining that way; and if possible let the croup be very slightly elevated: it is usual to place him directly flat on the left side, but the above is more convenient. Next secure the near hind leg with a piece of hempen tackle, having a running noose; or, in default of this not being at hand, make use of the flat part of a hempen halter, which should for safety be put on before the hobble of that leg is removed; as may be readily done if the hobbles having shifting or screw D's, as described in casting, are made use of. Every requisite being at hand, the operator, having his scalpel ready, should place himself behind the horse, as the most convenient way to perform his manipulations; and firmly grasping the left testicle with his left

hand, and drawing it out so as to render the scrotum tense, he should make an incision lengthways, from the anterior to the posterior part of the bag. The resistance of the cremaster muscle has to be overcome before the testicle can be forced to the bottom of the scrotum; and this is the more readily accomplished if the animal's attention be engaged. The incision may be carried at once through the integuments, the thin dartos expansion, and the vaginal coat of the testicles, with a sweep of the scalpel: but with one less dexterous at the operation, it will be more prudent to make the first incision through the scrotum and dartus only, to the required extent; and then to do the same by the vaginal coat, thus avoiding to wound the testicle, which would produce violent resistance, and give unnecessary pain. We however take this opportunity of noting, that cases have occurred, when the tunica vaginalis was divided no testicle followed; firm adhesions between this tunic and the tunica albuginea having retained it fast. In such cases the scalpel must be employed to free the testicle, by dissecting it away from the vaginal sac. When no such obstruction occurs, the testicle, if the opening be sufficiently large, will slip out; but the operator must be prepared at the moment of so doing to expect some violent struggles, more particularly if he attempt to restrain the contractions of the cremaster, and by main force to draw out the testicle. Preparatory to this, therefore, the twitch should be tightened; the attendants, especially the man at the head, must be on the alert; and the testicle itself, at the time of this violent retraction of the cremaster, should be merely held but not dragged in opposition to the contraction. If the clams have been put on over the whole, according to Mr. Percivall's method, they will assist in retaining the retracting parts; but they must not be used with too much pressure. The resistance having subsided, the clams must now be removed; or, if they have not been previously in use, they must now be taken in hand, and having been prepared by some tow being wound round them, should be placed easily on the cord, while time is found to free from the grip of the pincers the *vas deferens*, or spermatic tube, which is seen continued from the epididymis. The Russians, Mr. Goodwin informs us, cut it through when they operate. Humanity is

much concerned in its removal from pressure, because of the excess of pain felt when it is included. It is necessary, before the final fixing of the clams, to determine on the part where the division of the cord is to take place. To use Mr. Percivall's words, 'If it be left too long, it is apt to hang out of the wound afterwards, and retard the process of union;' on the other hand, if it be cut very short, and the arteries happen to bleed afresh after it has been released from the clams, the operator will find it no easy task to recover it. The natural length of the cord, which will mainly depend on the degree of the descent of the gland, will be our best guide in this particular. The place of section determined on and marked, close the clams sufficiently tight to retain firm hold of the cord, and to effectually stop the circulation within it. There are now two modes of making the division: the one is to sever it with a scalpel, and then to sufficiently sear the end of it as to prevent a flow of blood. The other, and in some respects the preferable method, is to employ a blunt-edged iron, which is to divide by little crucial sawings, so that, when the cord is separated, it shall not present a uniform surface, but ragged edges, which will perfectly close the mouths of the vessels. This done, loosen the clams sufficiently to observe whether there be any flow of blood; gently wipe the end of the cord also with the finger, as sometimes an accidental small plug gets within the vessel; this had better be removed at the time. Retain a hold on the clams a few minutes longer; and while loosening them gradually, observing to have an iron in readiness again to touch the end of the cord, if any blood makes its appearance. Satisfied on this point, sponge the parts with cold water; no sort of external application is necessary, still less any resin seared on the end of the cord, which can only irritate and will never adhere. On the after-treatment much difference of opinion has existed, and even yet exists. The powerful evidence of accumulated facts has now convinced us of the necessity and propriety of some motion for the newly castrated horse, as a preventive of local congestion; such practice is common in most countries, and seems salutary in all. Hurtrel d'Arboval, thus impressed, recommends the horse, immediately after the operation, to be led out to walk for an hour; and it is

a general plan in France to walk such horses in hand an hour night and morning. Mr. Goodwin, in proof of its not being hurtful, informs us that whole studs of horses brought to St. Petersburgh to be operated on, are immediately travelled back a certain portion of the distance, night and morning, until they arrive at home. We have, therefore, no hesitation in recommending a moderate degree of motion in preference to absolute rest.

The French method of castration is advocated by Mr. Goodwin; and it is sufficient that it receives his recommendation to entitle it to attention; it is rendered the more so, as he observes on the method in general use among us, "that the operation performed by the actual cautery always induces, more or less, symptoms that often become alarming; and that it cannot be performed on the adult without incurring more swelling and severer consequences than attend other methods of operation. If I ever use the actual cautery, it is for the sake of expedition, and then only on a yearling, or a two-year old; but I am resolved never to employ it again on an adult." These observations, as emanating from such a source, must be deemed important. Mr. Goodwin then offers the description of the French method of operating from Hurtrel d'Arboval. 'Castration by means of the clams is the method in general use, if not the only one now employed; it is the most ancient, since it was recommended by Hieroclius among the Greeks. It is performed in two ways, the testicle being *covered* or *uncovered*. In the former, the exterior of the scrotum, formed by the skin and dartos muscle, is cut through, and the testicle is brought out by dissecting away the laminated tissue, the gland being covered by the tunica vaginalis; the clam is then placed above the epididymis, *outside* the external peritoneal covering, of the cord. In the uncovered operation, the incision is made through the serous capsule of the testicle; the tunica vaginalis being divided, the testicle presents itself, and the clam is placed well above the epididymis, on the cord. The operation, performed in either way, requires us to provide ourselves with a scalpel, a pair of clams, a pair of long pincers, made purposely to bring the ends of the clams together, and some waxed string. The clams may be formed of different kinds of wood; but the elder is considered the

best, and generally made use of. To make a clam, we procure a branch of old and dry elder, whose diameter should be about an inch, and whose length should be from five to six inches: of course, the dimensions must at all times be proportioned to the size of the cord we have to operate on. At the distance of half an inch from each end, a small niche, sufficiently deep to hold the string, must be made, and then the wood should be sawed through the middle lengthways. Each divided surface should be planed, so as to facilitate the opening of the clams, either when about to place them on or take them off. The pith of the wood is then to be taken out, and the hollow should be filled with corrosive sublimate and flour, mixed with sufficient water to form it into a paste. Some persons are not in the habit of using any caustic whatever; then, of course, scooping out of the inside of the clam is not necessary: notwithstanding, the caustic, inasmuch as it produces a speedier dissolution of the parts, must be useful, and ought not to be neglected.' The addition of the caustic, however, Mr. Goodwin objects to with great reason, remarking, that unless it be a very strong one, and therefore dangerous to employ, it cannot be of any use to parts compressed and deprived of circulation and life. He further informs us that he has operated in six cases in succession with the same effect, without any escharotic matter whatever. An experimental case of Mr. Percivall's terminated fatally: by the use of caustic the cord was greatly inflamed, as high as the ring, and which unquestionably produced the unfortunate result. 'The covered operation,' continues Mr. Goodwin, 'is the one that I am about to advocate, and which differs only inasmuch, that the scrotum and dartos muscle must be cautiously cut through, without dividing the tunica vaginalis. It was Monsieur Berger who was accidentally at my house when I was about to castrate a horse, and who, on my saying that I should probably do it with the cautery, expressed his surprise that I should perform the operation in any other way than on the plan generally approved of in France. Being a stranger to it, he kindly consented to preside at the operation, and, after seeing him perform on the near testicle, I did the same on the right, but of course not with the same facility. After opening the scrotum, and dissecting through

the dartos, which is very readily done by passing the knife lightly over its fibres; the testicle, and its covering, the tunica vaginalis, must be taken in the right hand, while the left should be employed in pushing back the scrotum from its attachments; and, having your assistant ready, as before, with the clam, it must be placed well above the epididymis, and greater pressure is, of course, necessary, as the vaginal covering is included in the clam.

Mr. Goodwin further observes, that in Russia he has seen hundreds of horses operated on, even after the human fashion, with safety; and he remarks it certainly produces less pain, the animal loses less flesh and condition, and is sooner recovered than when operated on by the actual cautery.

Castration by ligature is a painful, barbarous, and very dangerous practice: and consists in enclosing the testicles and scrotum within ligatures until mortification occurs and they drop off. It is practised by some breeders on their young colts, but it is always hazardous, and disgracefully cruel. The substance of the testicle in some countries is also broken down either by rubbing, or otherwise by pressure between two hard bodies: this is practised in Algiers instead of excision, and tetanus is a frequent consequence of it. In Portugal they twist round the testicle, and thus stop the circulation of the gland. Division of the *vas deferens* has been performed, it is said, with success on many animals; and is proposed as a safe and less painful process than the emasculation of the horse. It consists in a longitudinal section through the scrotum, dartos, and vaginal sheath, so as to expose the cord, from which the vas deferens is to be separated and severed from the artery vein. There is a certain consent of parts by which the sympathy of an organ remains after its functional offices are *apparently* destroyed. There can be little doubt but the nervous excitement would continue, the vein and artery remaining entire. There are certain nice conditions of the organ necessary for propagation; thus the horse who retains his testicles within his abdomen, possesses all the riggish qualities of him with one perfectly evolved: he is lustful, and can cover, but is seldom fruitful. Of the morbid consequences of castration we have little to say: by early evacua-

tions, green food, a loose box, a cool air, moderate clothing, but particularly by walking exercise, swellings of the parts may be prevented: if not, bleed and foment; should suppuration follow, and sinuses form, treat as directed under those heads; and if tetanic symptoms start up, refer to that article. There has been lately practised in India a novel mode of castration, which is said to be the invention of a Boer settled at the Cape of Good Hope. The cord is exposed in the usual manner; from the cord the artery is singled out; this vessel is scraped through with a coarse-edged blunt knife, when the other constituents of the cord are cut away, and the operation is finished. This method is much praised by those who have adopted it, and is said to be always attended with success.

LITHOTOMY.

Hurtrel d'Arboval's account of the progress of lithotomy in veterinary practice commences in 1774. The second case was successfully operated on in 1794; and at later periods other veterinary surgeons have also performed it. 'In monodactyles there are two methods of operating for the stone; one through the rectum, the other through the bladder. The first, which consists in laying open the bladder by a longitudinal incision made through the parietes of the part of the rectum adherent to it, by means of a straight bistoury, is easily practised; but in its consequences is dangerous in the extreme: in fact, it is an operation never to be adopted but in a case where the magnitude of the stone precludes its extraction through the neck of the bladder. In all other cases, lithotomy by the urethra is to be pursued. For its performance are required, a straight probe-pointed bistoury, a whalebone fluted staff, and a pair of forceps curved at the extremities. The animal should, if practicable, be maintained in the *erect* posture. The tail plaited and carried round on the right quarter, the operator feels for the end of the staff introduced up the urethra, and makes an incision directly upon it, from above downwards, an inch and a half or two inches in length. Next, he introduces the sound, and passes it onward into the bladder. Now, placing the back of the bistoury within the groove of the sound, by gliding the knife forwards, the pelvic portion

of the urethra, and also the neck of the bladder, become slit open; the latter in two places, in consequence of a second cut being made in withdrawing the bistoury. The opening made being considered of sufficient dimensions, the operator introduces the forceps into the bladder, and seizes the calculus, one hand being up the rectum, to aid him in so doing. The forceps clasping the stone are now to be withdrawn, but with gentleness; and with a vacillating sort of movement of the hand from side to side, in order more easily to surmount any difficulties in the passage, and the more effectually to avoid contusion or laceration. M. Girard tells us, 'That the cut through the pelvic portion of the urethra ought always to be made obliquely to one side; the operator should hold his bistoury in such a direction, that its cutting edge be turned towards the angle of the thigh. By this procedure we shall gain easier access to the bladder; and not only avoid wounding the rectum, but also the artery of the bulb, as well as the bulb itself, and suspensory ligaments of the penis.' The parts cut through in the operation are, 1st, the fine thin *skin* of the perineum, smooth externally, and marked with a raphe; densely cellular internally: 2ndly, adhering to the tissue, the *faschial covering*, derived from the faschia superficialis abdominis, which has here become fibrous: it forms the common envelope to the parts underneath, and is closely connected with the corpus musculosum urethræ: 3rdly, *the corpus musculosum urethræ*, that penniform band of fleshy fibres which springs by two branches from the ischiatic tuberosities embracing the sphincter ani, and concealing the arteries of the bulb; whence they unite, and proceed to envelope the urethra: 4thly, *the corpus spongiosum urethræ*, the part immediately covered by the muscular envelope, and which here is bulbous. It is more particularly worthy our remark, from two arteries penetrating the bulb, which come from without the pelvis, ascending obliquely outward to reach the part: 5thly, *the suspensory ligaments* of the penis, pursuing the course of, and adhering to, the tendinous union of the erectores. An attention to the relative position of these parts will demonstrate the advantages of the lateral oblique incision over one made directly along the raphe: by pursuing the latter, we necessarily cut through the sus-

pensory ligaments and into the bulb, wounding thereby the arteries; whereas, by the former, all this danger is avoided, besides that it renders the operation more simple and facile.

TRACHEOTOMY.

Cases occur when this operation is required; as in strangles, when the tumours threaten suffocation, or when any substance has remained unswallowed in the œsophagus, the pressure of which obstructs respiration. In a distressing case of gunpowder bursting immediately under a horse's nose, the effects of which tumefied his mouth and nostrils, so as to prevent free inspiration, the animal owed his life entirely to our excising a portion from the tracheal rings, about ten inches below the angle of the throat. The operation is a very simple one, and may consist either in a longitudinal section made through two or three of the rings, or a portion, occupying about an inch round, may be excised from the anterior cartilaginous substance. The proper mode, when it can be done, however, is to make a circular opening with a very narrow knife, removing a portion of two cartilages, or taking a semicircular piece from each; and this last, although it is seldom performed, is by far the best method: the integuments should be first divided in the exact centre of the neck, three or four inches below the obstruction; then the skin and tissues should be sufficiently separated to allow a tube adapted to the size of the trachea to be introduced; the tube having an acute turn and a rim, which must be furnished with holes for the adaptation of tapes to secure it around the neck. There are several instruments of this sort in use, of which that adopted by the French, or the one invented by Mr. Gowing of Camden Town, is to be preferred. The operation has been also performed in cases of roaring, under an idea of dividing the stricture which impeded respiration; but unless the exact situation of this were discovered, it would be but an experimental attempt.

ESOPHAGOTOMY.

It was long thought that a wound in the œsophagus must be necessarily fatal, but we have now sufficient proofs to the

contrary on record; so that we are not deterred from cutting into the esophageal tube when it is necessary; but it is an operation requiring skill and anatomical knowledge; and its future results are sometimes very serious. The cases that call for esophagotomy are the lodgement of accidental substances within the tube. An apple once so lodged was removed by incision by a veterinary surgeon at Windsor. Carrots, parsneps, beet, &c., are liable to produce such obstruction when not sliced. Too large a medicinal mass also has lodged there; and a voracious eater has, by attempting to swallow too large a quantity of not salivated bran or chaff, produced an obstruction which pressed on the trachea and threatened suffocation. In all cases of obstruction of this kind we will suppose that a probang well oiled has been previously attempted to be passed, and has completely failed. The probang for the horse, however, differs materially from that used for the cow. It is formed after the fashion of the one adopted by the human practitioner, consisting of a pliable piece of whalebone, having a sponge tied to one end. The operation being determined on may be practised standing; if the swelling be large no fear need be entertained about cutting important organs, as the enlargement will push them on one side. Cut down, therefore, directly upon the centre of the impacted substance. If the horse be cast, which is quite unnecessary, have him of course thrown with his left side uppermost. It will also be necessary to command a good light. The part of the neck chosen for the opening must of course be governed by the obstructing mass. A section should be made through the integuments and cellular tissue beneath them, right into the œsophagus, if possible with one cut, and into the centre of the pipe. If this be not done at once, and it requires some dexterity so to effect it, mind to make all future incisions in a line with the first opening; as it is important that the cellular tissue should be little interfered with. The œsophagus, fairly cut into the impactment, should jump forth; should it not do so, do not manipulate, or attempt to force it out, but enlarge the opening, and the substance will come through when that is long enough; but no fingering could compel its exit while the opening is too small. The end gained for which the incision was made in

the œsophagus, the wound may be then closed by the interrupted sutures, each holding a small piece of tow above the orifice, and having their ends hanging out of the external opening, which should also be brought together by sutures. The after-treatment should be, to interdict all dry food; the animal ought to subsist on very thick gruel for three, four, or five days. If the condition appears to suffer much, allow malt mashes, and when so doing watch the wound; and if the matters taken in are seen to ooze out, wash them away frequently with warm water, to prevent lodgement, which might encourage sinuses to form; and after each washing syringe with some very mild stimulant, as a very weak solution of sulphate of zinc (*white vitriol*), &c. &c.

NEUROTOMY.

DIVISION OF THE SENTIENT NERVES OF THE FOOT.

Neurotomy has now stood the test of very extensive application: our writers offer innumerable proofs of its restoring almost useless animals to a state of much utility. And if there are chances that it may occasion such injury as to hasten the end of some horses, it is usually in such as the disease would have done the same for at no distant period. Having stated thus much in its favour, it must not be supposed that we recommend it as an unqualified benefit, even where it succeeds best. No neurotomized horse ever after goes with the same freedom, nor with equal safety, as he did before the operation was performed: indifference to the nature of the ground gone over, is said to have fractured legs; it is quite common to batter the feet to pieces; and although horses have hunted afterwards, and hacknies have carried their riders long distances, yet it is more calculated to prove beneficial to carriage than to saddle horses. This we believe to be a just statement of its merits; but there are benefits which it offers to the animal of a more extensive and constitutional kind. Those gained by the bodily system generally have been in some cases very marked: thus, an aged and crippled stallion, from the irritation constantly kept up, became so emaciated as to be unable to fecundate; but

being relieved from a constant state of suffering by neurotomy, improved in health and condition, and was again used to cover. It happened, also, that a mare similarly circumstanced ceased to feel œstrum ; but after neurotomy it again returned, and she resumed her character of a brood mare. It appears to act with most certainty when a *portion* of the irritated nerve is *excised.* One case has actually occurred where the tetanus, occasioned by a wound in the foot, was arrested and removed by neurotomy. It also promises much in the painful state of some cankers, where the irritation has rendered the application of dressings almost impossible: here, by depriving the foot of sensibility, we deprive the horse of that which is injurious to him: the sore itself is often amended by it; but in every instance the dressings can be effectively applied, and the healthy processes cannot be at all suspended.

With respect to whether the lower or upper incision ought to have the preference, the decision should be guided by the circumstances, as regards the intensity and the seat of the disease. The operation commonly leaves, for a considerable time, some enlargement around the spot, the effects of the adhesive matter interposed between the severed portions of nerve; and which can be remedied by no application of bandages. This bulging remains so long as life continues; and, however cunningly the incision be concealed, this can be felt with ease, and tells the truth ever after the operation has been performed. Such a circumstance has, however, led some practitioners, when it has been wished to make the upper section, and yet to avoid the chance of detection, to operate on the metacarpal nerve on the *outside,* and on the pastern or plantar nerve on the inside.

MODE OF PERFORMING THE OPERATION.

The situation of the section through the skin being determined on, a guide to which may be gained from the perforatus tendon, and having firmly secured the leg to be first operated on, cut the hair from the part. This being done, and the exact course of the artery being ascertained by its pulsation, make a section close to the edge of the flexor tendon. Let the cut be near, but rather behind, the artery,

if below the fetlock joint. The cellular substance being cleared away will bring the vessels into view, and the nerve will be readily distinguished from them by its whiteness. Elevating it from the vessels, and its membranous attachments, by means of a crooked needle armed with thread, pass a bistoury under it, as near to the upper angle of the section as possible. The violent spasm the division of the nerve produces may be somewhat lessened by pressing the nerve between the finger and the thumb; when an opportunity may be taken, either with the scalpel or scissors, of dividing it; then, taking hold of the lowermost portion between a pair of forceps, excise about three-fourths of an inch of its trunk. Having finished, if both feet are affected, proceed to operate upon the contrary side of the other leg; after which turn the horse, and repeat the operations on the like parts of each leg as they come in succession. The integuments may be now drawn neatly together, and secured by a twisted suture, the whole being properly covered by a light compress. Tie up the head for a day or two, after which put on a cradle; keep the horse very quiet and low: give mashes to open the bowels; but we should avoid *physicking*, from the fear that griping might occur, which would make him restless, or probably require exercise.

PERIOSTEOTOMY.

This operation consists in having the horse thrown upon his side, and the leg to be operated upon released from the hobble, and extended upon a sack filled with refuse hay or straw: this is done by means of a piece of webbing passed round the hoof, and the end given to a man to hold, who pulls rather violently at the member. The operator then kneels down and feels for the exostosis he intends to perform periosteotomy upon. This may be a splint or a node, and commonly exists upon the metacarpal portion of the fore limb. The operator having found the excrescence, snips just below it with a pair of rowelling scissors. He then takes a blunt seton needle and drives it through the cellular tissue, and immediately over the enlargement. Next, another slit in the skin, above the exostosis, is made with the rowelling scissors, and through this last opening the

point of the seton needle is forced and then withdrawn. Into the free space thus made a curved knife is introduced: the point of this knife is blunt, and the blade curves upward, the cutting part being below. Some persons use a very diminutive blade, but the editor prefers rather a large instrument, as being more under the command of the hand. Having introduced this knife, he turns the cutting edge downwards, and with it incises the enlargement, sending the blade right through the periosteum, and also through the substance of the exostosis, if it be not too solid for the knife to penetrate. This latter fact is only to be ascertained by actual experience, and no opinion formed after an external examination can be of any value; such being much more the guess of a pretender than the judgment of a surgeon. The age of the animal may be some guide, but even this it is better not to depend upon too entirely. It is true that young horses freely cast forth exostoses, which aged animals mostly absorb; but this rule, though very general, has exceptions, and by no means is to be absolutely depended upon.

The enlargement being cut through, next take a seton needle armed with a tape, and draw it through the channel already made: tie a knot at either end of the tape, large enough to prevent its being pulled through the opening at either end, and the business is over. The affair is very simple, and the horse may be at once let up. It is, however, in some cases, and only in some, of so much benefit, that the horse being thrown "dead lame," gets up and trots off quite sound. However, ere you adopt the operation, apprise the owner of the risk incurred, and that it is by no means a certain cure. Leave the choice with him, but be sure and tell him the openings made for the entrance and exit of the seton commonly leave a blemish behind them; and where the seton travelled, often there remains a thickening, which it may require months to obliterate.

The after part of the treatment consists in merely having the seton daily moved to and fro: though some persons apply an active blister all over the parts immediately in the neighbourhood of the seton; under the idea that the vesicatory renders the operation of greater efficacy, which how-

ever is very questionable. When periosteotomy acts at all, it mostly does so at once; and when its benefits are not immediate, it is better to withdraw the seton to prevent after blemish, rather than hazard further and useless treatment by the application of a stimulant to skin already deprived of any connexion with the deeper-seated structures.

DIVISION OF THE FLEXOR TENDON.

There are so many accidents and diseases that may produce contraction of the flexor tendons, that we only wonder we do not more often meet with them; which we should certainly do, but that the attendants, despairing of being able to afford relief, advise their destruction. The operation consists in making a longitudinal incision of about three inches in length along the inner lateral edge of the tendon; dissecting each portion from its cellular attachments, so as to expose the nerve, artery, and tendons. This opening will allow the perforans to be freed from the perforatus, when a division should be made by a scalpel applied to its surface. It is evident that this should take place below any thickening, or adhesions which may have permanently connected the tendon with the neighbouring parts: any lesser attachments will be broken through, by forcing back the foot to the just position. By Mr. Dick this was done 'by placing his knee against the front or projecting part of the pastern, at the same time laying hold of the foot with one hand and the upper part of the leg with the other, and using considerable force: and this appears to be necessary, in order to break any adhesions that may have formed.' The limb should now be placed in a poultice; and if any fear of future contraction should arise during the cure, lengthen the toe of the shoe proper to the foot operated on. Some slow exercise after the first week may be allowed, but previously to that the horse should be confined to a stall, during which the bowels must be kept open with mashes.

AMPUTATIONS.

These have been hitherto confined principally to the tail, the ears, and other parts of minor importance in the animal

frame; but veterinary surgery now takes a wider field, and the extremities are amputated with a certainty of making horned cattle still serviceable for the purposes of yielding milk; and without doubt the same might be done with the brood mare, or stallion, particularly in fractures of the fore extremities. Professor Dick, of the Edinburgh Veterinary College, furnishes a case sent to him by one of his pupils to the following effect: 'I performed amputation upon the cow on the 7th of July; after having properly secured the animal, and applied a tourniquet above the carpus, I made a circular incision through the integuments round the leg, a little below the carpus; and having separated the skin so as to allow of its being pushed up a little, I cut through the sinews, and lastly sawed off the stump: the parts are now completely whole, although she has been going at grass all the time; and, now that she has got the advantage of a cork stump, makes a wonderful shift for herself, and yields a good supply of milk to her owner.' Mr. Dick also notices another case of amputation of the fore leg of a two-year old heifer; and of a third, where the hind leg was removed above the tarsus. Such operations have occasionally occurred from time immemorial, with a few enterprising characters. We have heard of them, but they were mostly regarded as mere matters of curiosity or wonder; and therefore were not imitated. We shall, however, probably ere long have them more common, in cows at least; for, occurring below the carpus and tarsus, they are as easily performed as nicking or docking: and there is no doubt but were a hollow padded stump applied, such low operations might be prudent in many cases. Fractures, with great comminution of bone, considerable ravages of disease within the foot, or extensive gangrene, are the cases which might call for amputation. Of the method of amputation little need be added to the above. The principal practical points are, the fixing of a tourniquet of sufficient force, which should be padded to make its principal pressure on the leading arterial trunks, while its general circumference will act on the smaller vessels: a ring should be cut lightly below the intended place of operation; only through the integuments; which, when separated from their cellular adhesions for about six inches, should be turned back; and a

circular incision may then be made through the muscles, &c., taking up by ligature such vessels, both venous and arterial, as display a disposition for much hæmorrhage. The section thus made, free the bone from the soft parts by the scalpel, where the adherences are very intimate; and having by means of a crucial bandage retracted the soft parts altogether above the bone, saw it through. Finally, effectually secure the principal vessels, when, bringing the soft parts and skin over the bone, retain them there by proper bandaging, which suffer to remain without disturbance until the third or fourth day.

AMPUTATION OF THE PENIS.

Amputation of the penis is not unknown among us: it has been performed several times, and it is found that no canula is necessary to keep open the urethra; the force of the urinary flow breaking down any incipient cicatrization of its orifice. The sheath is first forced back, and the penis brought forward to its greatest possible extent: whatever portion it is intended to remove is now cut through by means of an amputating knife; when the remainder is retracted within the sheath, and little hæmorrhage has afterwards occurred, except at the time of passing the urine; but there appears to have been no alarming quantity of blood lost.

AMPUTATION OF THE TAIL, OR DOCKING.

We are most happy to state this filthy and unnecessary operation is now discarded. It never consisted of more than the cutting off a portion of the stump with brute force, and the cruel application afterwards of a hot iron to the small artery of the tail.

NICKING.

We should be grateful that this barbarous and dangerous process is no longer numbered among the necessary operations. It is so beset with accidents which no skill or prudence can prevent, that no one who has a free will ought to mutilate a horse by nicking.

FIRING.

The practice of firing was not always confined to quadrupeds; on the contrary, it probably was first used on man; and to this day in many countries it is a very popular remedy among human surgeons. In India it is applied over the abdomen for the cure of scirrhosity of the liver. Firing in veterinary practice has, by Mr. Coleman's pupils, been justified as only men will justify a favourite operation, the virtues of which have been impressed upon their minds by an eloquent teacher. When Coleman was the chief of the veterinary profession, firing under his rule was used for any and every occasion. It was ridiculously supposed to act as a permanent bandage; as if a few strokes with a heated iron could destroy the elastic property inherent in the skin. It was the favourite styptic of these practitioners, and was applied to arteries (as of the tail), as though it possessed within itself some medicinal virtue. It was used to promote absorption, as in callus; and was likewise resorted to to check absorption, as in ulceration. It was called into action to promote granulation, in broken knees; and was also a favourite agent to check granulations, when they were too luxuriant. In short, there was no folly which a hot iron did not cover. It has now happily fallen into disuse. Most modern practitioners will now confess that their chief reason for exercising the iron is to satisfy the proprietor, not to benefit the animal. After such an acknowledgment, who would submit to have his patient servant's skin scored and burnt with red hot metal?

The *mode of cauterization* differs according to circumstances. As a general rule it ought, of course, to be applied in the direction of the hair, by which the blemish is lessened; but this rule cannot be arbitrarily followed, although it ought to do away with all the false pride of displaying the taste in the figures scored upon a prostrate beast. The Veterinary College recommends that the limbs be *always* fired in perpendicular lines; others advocate all manner of fanciful marks. Some cast the horse; many surgeons perform standing. The irons used are of various shapes and dimensions. Some recommend the firing of all things to be very

light; others persist there is no virtue in hot iron unless it burns very deep. The operation consists in having irons of some substance made red hot, and then drawing them mechanically along, or twisting them about upon the skin. The figures are various, so is the depth of the incision. Both must be decided by the taste, judgment, or heartlessness of the operator.

BLISTERING.

This is an operation of very great utility, and is, perhaps, compared with its benefits and importance, the safest that is performed. When a *vesicatory* becomes absorbed through the pores of the skin, it inflames the sensible cutis underneath; the consequence of which is an effusion of serum through the part, which, in the human, elevates the cuticle into a bladder equal to the surface inflamed; but in the horse, from the greater tenacity of the cuticular connexions, it becomes separated in the form of small distinct vesicles only. If the irritating cause be quickly removed, the serum may be reabsorbed, and the surface restored by a slight effort of adhesive inflammation. If the irritant act in a still minor degree, it simply irritates the vessels of the cutis to an infiltration of fluid through the sensible pores, but produces no desquamation of cuticle: such has been called, a *sweating blister*. But when by continued irritation, the cutis is exposed, suppuration succeeds, and the part is fully blistered. The salutary action of blisters is exerted in several ways; in promoting absorption; in combating deep-seated inflammations, and in aiding others. As a stimulus to the absorbents, they act beneficially in the removal of injurious deposits, as the coagula remaining after inflammatory lesions. But it is to be remarked, that when any existing deposit is of long continuance, or is osseous, it requires that the action of the vesicatory be kept up. Mercurial blisters have been thought to have a superior influence in accelerating absorption. Mercurials, *rubbed in* some weeks or days previously to blistering, are certainly great assistants, and should always be employed in the treatment of obstinate osseous or ligamentary enlargements. Blisters are very important aids, in inflammatory affections, as counter-irritants, derived from a law in the animal economy,

that two inflammations seldom exist in the vicinity of each other; therefore, when such an affection has taken place in any part, and we wish to remove it, we attempt to raise an artificial inflammation in the neighbourhood by means of blisters; which, if persevered in, destroy, or at least lessen, the original one. Occasionally also we blister the immediate inflamed part, with an intention to hasten the suppurative process by increasing the activity of the vessels; as in deep-seated abscesses, and also in those which attack glandular parts. We, therefore, employ blisters to hasten the maturation of the tumours in strangles. When the flagging powers vacillate between resolution and suppuration; as they often do in the phlegmonous inflammations of glandular or of deep-seated parts; blisters may either hasten the resolution, or they may add their influence to the attempted suppuration, and thus bring it to maturity. But we carefully avoid, in other cases, applying a vesicant to a part immediately in a state of active inflammation: particularly we should avoid what is too often done, that of blistering over the tendons, ligaments, and articulatory surfaces of a tumid limb, labouring under a congested state of the parts from excess of vascular action. Here we should do great injury were we to blister, by causing a greater deposit of lymph, and by hastening its organization into an injurious bond of union between the inflamed parts. The *vesicatory* or *blister*, for general use in veterinary medicine, as a simple stimulant, should be principally composed of Spanish flies. Cheaper substitutes are used, but they irritate violently: in extensive inflammatory affections, they are on this account perfectly inadmissible; and wherever a case requires any thing more it will be noted. *The mode of blistering* with the Spanish fly, is sufficiently known. The hair should be cut or shorn as close as possible from around the part; the blistering matter should then be well rubbed in for ten or fifteen minutes. If the pasterns and fetlocks are the parts to be blistered, previous to rubbing in the ointment, smear some lard, tallow, or melted suet, over the heels, and within the hollow at the back of the small pastern. This will often prevent some troublesome sores forming, from the blistering ointment falling on these sensitive parts. While a blister is

acting, the litter should be removed from under the feet, or it will tickle the legs, and irritate; but, above all, the head ought to be most carefully secured, for two days and nights, to oppose lying down, more especially to prevent the horse biting the blistered part. On the third evening he may be permitted to repose; but a prevention should even then be continued, by means of what is called a cradle. This apparatus may be bought at every turning shop; or may be made of eight or ten pieces of round wood, an inch and a half in diameter, and two feet long: these are strung at each end on a rope, and fastened around the neck. When it is intended to blister repeatedly, the effects of the first should have subsided before the second is applied; the scurf and scabs also be cleared away, and the part well washed with soap and water. In all cases, the third or fourth day after the application the part should be thoroughly painted over by means of a long haired brush (such as are in use with pastry cooks to glaze their crusts) with lead liniment, which should be repeated every day; and when it is proposed to turn a horse out, it should never be done until the whole blistered surface be quite healed; otherwise dirt, flies, &c. may prove hurtful. It remains to observe, that, instead of repeated active blistering, it is in some cases preferable to keep up a continual slight irritation on the original blister by means of stimulants, as iodine ointment, mild blistering applications, &c.: caution is however necessary to avoid forming an eschar, and thereby a permanent blemish; but when a blemish is not of consequence, this plan will be found often more efficacious than firing, as in splints, spavins, &c. Some practitioners blister mildly one day, and on the next wash off the blistering matter, thereby saving loss of hair. But there is more of apparent than real good in this plan. If a blister be necessary, it requires all its activity.

Ammoniacal blister.—Spanish flies are only efficacious when the animal can afford to wait their action, which is rather slow. In most of the acute diseases the horse would perish before the blister began to rise, wherefore resort has been had to boiling water and red hot iron. The action of these last coarse and brutal measures, was alone controlled by the violence of the internal inflammation; and if the practi-

tioner was mistaken in his estimate of the immediate danger, extensive and lasting blemish was the consequence. We have in the liquor ammonia an agent quite as formidable as boiling water or heated iron, but it is rather longer in displaying its force; wherefore it allows time for watching its action, and of checking it the instant it has sufficiently blistered the skin. It is true the liquor ammonia upon the skin cannot be removed, neither need it be counteracted. Ammonia is like steam, only powerful when confined. The ordinary soap liniment if covered over, would, because of the ammonia it contains, produce a lasting blemish; but every veterinary surgeon knows how very harmless a preparation that is when simply rubbed upon the surface. So when we desire the active effects of liquor ammonia, we double a blanket or rug four or five times and hold it over the liquid. It takes from ten to twenty minutes to raise a blister, and it consequently can from time to time be observed; and when its action has reached the wished-for point, all we have to do effectually to stop it is, to take away the rug or blanket. That removed, the free surface and the heat of the body occasions the ammoniacal vapour to be dispersed, and the animal is safe.

ROWELLING.

Rowels act as foreign substances within the body; they cause irritation and suppuration, whereby more deep-seated inflammations are supposed to be removed: they are, however, often very convenient, because they stand as signboards to show the proprietor that something has been done. The common mode of making a rowel is after the following manner. A slit is first made by means of the rowel scissors, on any part of the integuments held between the finger and thumb; with the handle of the scissors separate from its cellular connexions a circle of two or three inches in diameter, into which introduce something to prevent the reunion of the skin. A piece of circular leather, tolerably stiff, with a central hole, is a very common substance used; but is objected to by some, on account of the difficulty of changing it without injuring the skin: tow, as more pliant, is frequently introduced into this cavity. If the rowel runs freely, it should be dressed every day, by

changing the plug, if of tow; and by cleansing it, if of leather: no rowel should go undressed beyond the second day, for the comfort of the horse. They are very favourite applications with farriers, and therefore are frequently abused, by being employed in all cases indiscriminately; they are now, however, falling into disuse, setons having almost superseded them.

SETONS

In their action resemble a very mild form of rowel, but are more convenient in their application. There is hardly a part of the body where a seton may not be conveniently placed: they have been put around the eye. They have also been entered at the withers, and brought out between the humerus and the sternum; so extensive or so diminutive can they be made. In sinuous ulcers of the withers and of the neck, they may be placed; through the heels in foot diseases, they have been inserted. In cavernous sores they are entered at the superior part, and are brought out at an inferior, so as to form a depending orifice. The formation of a seton is very simple: a skein of thread, or a piece of tape of a convenient size, may be used: at the one end place a large knot: arm the eye of a corresponding-sized seton needle with the free end of the tape; introduce this into any proposed part; and, bringing it out at some other, either make a second knot, or tie the two ends of the tape together; which last method of fastening is, however, often objected to, from the danger of its catching in something, and being torn out, to the disfigurement of the horse. When a seton is placed in a sinuous track for the purpose of inflaming, it is moved twice a day frequently, and moistened each time with some stimulant, as oil of turpentine, tincture of aloes and of benjamin. All setons require daily cleaning and moving. When they are required to act more quickly, the tape is infused in terebinthinate of cantharides, or small pieces of black hellebore are sewn within it. An old material composed of woollen, flax, or cotton, and hair, is also used instead of tape. Setons, however, are of small service in acute cases. They are chiefly in use for disturbances of a chronic description.

ABSTRACTION OF BLOOD, OR BLEEDING.

Arteriotomy.—Blood is abstracted by opening the conducting vessels, arterial and venous. When taken from arteries, the process is called *arteriotomy;* when by the latter, *phlebotomy.* Some bleedings include both these operations; as general scarifications of the soft parts; bleeding at the toe point; divisions of the vessels of the cornea, &c. &c. Blood-letting is called *local* when it is practised on or very near the affected part; and it is supposed to act more immediately than general bleeding, because it produces more effect with the loss of less blood. Local bleeding is therefore usually practised on the minor branches of the arteries and veins, as on the temporal artery, the plate vein, the vena saphena, &c.—*Leeches* are a means of local bleeding not often used by us in veterinary practice; but there is no reason whatever why they should not be employed; when applied to the eye, and occasionally to other parts also, they adhere readily, abstracting blood rapidly; and therefore might be valuable aids in violent local inflammation.—*Cupping* is also practised in France and other parts of the Continent with very large glasses, and it is there supposed to act remedially in many local inflammations. By *general bleeding* we understand the depletion of the system at large; and this we practise in extensive inflammations.

Division of the temporal artery.—The proper spot for either its puncture or division is directly where the vessel leaves the parotid gland, to curve upwards and forwards around the jaw, a little below its condyle. When it is *punctured* it usually affords much blood, and in such case, enough having been obtained, *divide* the trunk; when the receding portions becoming pressed by the integuments, and lessening by their own contractility, the hæmorrhage is stopped. It should be punctured by a lancet; a fleam may fix itself in the bone: its division can be readily made also either by a lancet or scalpel.

Bleeding by the palate is also a species of arterio-phlebotomy; and is a very favourite spot for abstracting blood with most ignorant persons, who vehemently recommend it in spasmodic colic or gripes, and in megrims. In such cases, however, a want of knowledge of the anatomy of the

parts has occasioned a serious hæmorrhage to occur: it may prove a fatal one if the artery proper to the part be divided incompletely. The palatine artery and nerve run near each other, on each side of the roof of the mouth, so as to divide the inner surface of the hard palate into three nearly equal portions. No other than a direct division of the vein should ever be made; therefore, when bleeding is determined on at this place, do it by plunging a lancet or even a penknife in a *direct* line *across* the rugæ, *one inch within the mouth, exactly between the middle and second nippers;* there these vessels form a curve, which curve will then be divided, and will then yield three or four pints of blood. If the instrument enter too much on one side, as about the middle of the second nipper, then a *partial* and *longitudinal* division of the artery may be made, and an alarming hæmorrhage may follow. In this case the section must be enlarged and deepened inwardly, that is, away from the teeth; which *completely severs* the vessel, and its retraction will stop the hæmorrhage. A moderate or slight flow of blood from the palate may be obtained by light scarifications of the rugæ: but all bleedings here, except under circumstances of the most urgent necessity, had better be avoided.

Bleeding by the toe is also arterio-phlebotomy. By no means cut out a portion of the sole at the point of the frog, which frequently occasions abscess; but with a very fine drawing-knife cut down exactly in the line of union between the crust and the sole; then, by puncturing the part with a lancet, a vast flow of blood may be obtained, the benefits of which in some cases are very marked, particularly in acute founder. If the blood should not flow with sufficient freedom, place the foot in warm water: the bleeding finished, cover the puncture with some tow and a little tar, and lightly tack on the shoe. There are, however, other methods of bleeding from the toe. Mr. Maver uses a drawing-knife with a long curve, so that one sweep of the blade may cut a piece out of the foot. This appears to us bad practice, as it leaves nature a space to fill up, instead of a simple incised wound to heal. Others take away none of the horn, but merely make a slit through the outer covering on to the vascular portion of the foot. The flap of horn

they hold up so long as they desire blood, by the insertion of a piece of wood; and when they have obtained blood enough, they take out the wood so as to let the horny flap down. This last method, of all others, appears to us the easiest and the best.

Sometimes the *plantar vein* is opened as a substitute.—*Scarifications* are also occasionally practised, which, of course, divide both venous and arterial branches. In France extensive scarifications used to be made into indurations before the suppurative process had commenced, which in some cases prevented that from going on; and the *remedial wounds* made were healed by adhesive inflammation, or by healthy granulation: the same method has also been occasionally practised here, but it is not now often attempted.

Phlebotomy, or the puncture of a venous branch, is the most usual mode of drawing blood in veterinary practice, and may be employed on any point of the body; but some vessels are much more frequently opened than others, and most of all the jugular.—*Bleeding by the thigh vein.* The *saphena* is a prominent vein, continued from the inner part of the hock, and may be opened by the fleam; but with much greater safety and propriety by a lancet. The opposite leg being held up, the operator placing himself in front of the thigh, and steadying himself and the horse by placing one hand on the hock, may fix the vein with the little finger of the other; while the lancet held between the thumb and fore finger punctures it. This vein should never be opened, save upon absolute necessity, as it is often troublesome to pin up. A horse has been cast for the trivial matter of stopping the hæmorrhage.—*Bleeding from the plate vein.* This vein is frequently opened to abstract blood after injuries of the fore extremities.—*The superficial brachial vein* is a continuation of the superficial division of the metacarpal veins, and in the passage upwards receives more than one branch; its principal trunk ascends along the inner side of the radius. It may also be well to remark, that, when taking blood from the superficial veins of the arm or fore-arm, if any difficulty is experienced in obtaining a sufficient flow, the lifting up of the other leg, by throwing the muscles of the punctured one into action, will

force the blood from the inner to the outer set; and an increased quantity may be obtained. The plate vein, or external thoracic, is often opened, as it emerges from behind the arm, and is pinned up without any difficulty.

BLEEDING BY THE JUGULAR VEIN.

The situation of this important vessel is well known, but its internal connexions are not so familiar, though such knowledge is essential to the *uniform safety* of the operation. The horse has only external jugular veins, a right and a left one: as each emerges from the chest, it is found deep-seated, and approaching the trachea; it then passes forwards in company with the external carotid artery: towards the middle of the neck it becomes more superficial, and is now distinctly seen progressing rather *above* and *without* the carotid artery and trachea, or windpipe. The carotid, therefore, in the future course of the jugular, is situated a little *below* and more deep-seated than the vein. The jugular is also separated from the carotid by a slight muscular band, derived from the levator humeri. Its further track is marked in the hollow formed by the inferior edge of the levator humeri, where it is covered by the panniculus carnosus and integuments only; when, having nearly reached the jaw, it makes its well-known *division* into two portions. Bleeding by the jugular is usually practised with a lancet, or with a fleam. The proper spot for the puncture may be found any where between two inches and six from the division of the vein: this latitude is here mentioned, because it is prudent to avoid puncturing directly over a former bleeding place, known by the scar and enlargement: it should also be avoided where a little knot in the course of the vein will sometimes denote the existence of one of the venous valves. But in all ordinary cases, where these hinderances do not appear, operate at two or three inches from the division of the vein; which will be sufficiently evident when it is pressed on below the place punctured. Avoid operating low down in the neck, as there the vessel is deeper seated, and near to important parts.

First moisten the hair and smooth it down; then, steadying and enlarging the vessel with one hand, with the other plunge the point of the lancet into the integuments, so as

just to puncture them and the vein; then, by a slight turn of the wrist, carry the instrument obliquely forward to finish the cut. For opening the smaller veins, the *lancet* should always be used. In all but the practised hand, the *fleam* is the safest for bleeding from the jugular; it is always prudent to have the eye of the horse covered: unless the eye be covered, the horse will be likely to flinch at the moment of the stroke, and the puncture may be made in any place but where we wish. The hair being first wetted and smoothed, and the fleam being retained in the left hand, the unemployed fingers pressing on the vein so as to fix and swell the vessel; let the point rest exactly in the middle of the swelling; strike the fleam sufficiently hard to penetrate the skin and vein. A blood-stick is preferable for the purpose of striking the fleam: there is a vibration between two hard bodies when they meet, which, in this instance, is favourable to a quick and moderate puncture of the vein. After the vein has been opened, moderate pressure with the edge of the can which catches the blood is sufficient to keep up the flow: it may also be encouraged by putting a finger within the horse's mouth. The requisite quantity of blood being drawn, remove the can. The remaining process of securing the vessel is of equal importance. The sides of the orifice are first to be brought in apposition, without pinching them, and without drawing them from the vein: the same cautions should also be observed when the pin is introduced: let it be small, with an irregular point, and when inserted wrap round it a few hairs or a little tow.

Common, however, as this operation is, and qualified as every one thinks himself to perform it, yet there are very serious accidents which do arise occasionally. It has occurred that the carotid artery has become penetrated. When the puncture has been made through the vein, the accident is known immediately by the forcible and pulsatory gush of florid arterial and dark venous blood together. In one instance of this kind, which occurred to a French practitioner, he immediately thrust his finger into the opening through the vein, and thus plugged up the artery, intending to wait for assistance. In this state he remained, we believe, an hour or more; when, removing his finger, to

his surprise, he found the hæmorrhage had ceased, and did not again return. In another case, where an English practitioner accidentally opened the carotid, he placed a compress on the orifice, and had relays of men to hold it there for eight-and-forty hours; when it was found the bleeding had stopped. The admission of air is also another serious accident that now and then attends bleeding: it sometimes happens from the sudden removal of the fingers or blood-can, or whatever was used to distend the vessel by obstructing the return of the blood: this being suddenly taken away, allows the escape of the blood towards the heart, and occasions a momentary vacuum, the air being heard to rush with a gurgling noise into the vein through the orifice; it then mixes with the blood, and occasions, in some instances, almost immediate death. The animal begins to tremble; he next staggers, and finally falls in a state of convulsion: if the quantity of air taken in has been considerable, death ensues. The remedy must, therefore, be instantaneous, and consists in again opening the orifice, or, making a new one, to gain an immediate renewed flow of blood, which will, in most cases, renovate the horse, who has been found afterwards to be tormented with an intolerable itching.

OF PURGATIVES, AND PHYSICKING OF HORSES.

Theory and effects of purgation.—The principles of purgation are the same in man and the horse; but the products vary: thus it commonly requires twenty-four hours to produce complete catharsis in the horse, whereas two or three hours, and often less, will effect it in man. Speciality of structure produces this difference. The alimentary track is of immense length in the horse, and the surface to be stimulated into action is consequently of great extent; add to which, that the erect position of man is favourable to a gravitation, particularly of the liquid abdominal contents, which the horizontal posture of the horse tends to retain. Cathartics act by stimulating the intestines to a more frequent evacuation, and they also increase the quantity of the matter expelled: under some circumstances they alter the quality of it also. A simple increase of the peristaltic motion of the bowels will hasten the expulsion of the excre-

mentitious parts of the aliments. A farther stimulus will not only so hasten them, that the fluid contents of the bowels cease to be absorbed, but the secreting surface of the intestines themselves will furnish fluid matter. Stimulate them still more, the biliary and pancreatic fluids are poured forth in greater quantities. This being the simple operation of purging, it is evident how many erroneous notions are entertained relative to it.

The abuse and dangers of purgatives.—In *most* inflammatory affections of the stomach and bowels, cathartics require to be judiciously administered. They are almost equal to poison in inflammation of the lungs; and in all great visceral inflammations active purges should be admitted with caution. In farcy and glanders, purgatives never do other than harm; and in no chronic affections attended with great debility are they admissible. Physic is rendered yet more hurtful, from the frequency of its administration, and quantities which are sometimes given. Grooms suppose that every ordinary case requires three doses of physic, the reasons for which Mr. Peall has humorously given, 'The first being intended to stir up the humours,' 'the second to set them afloat,' and 'the third to carry them off.' To very young horses, and to delicate feeders, the exhibition of three strong doses of physic must be attended with most injurious consequences, and such as they cannot recover from for months. It is an unfortunate prejudice, engendered by ignorance and kept alive by obstinacy, that to do much good with physic it should be very strong. We were once told by a groom, that the dose dispensed was not strong enough, for it had not purged the horse more than fourteen or fifteen times; and we have also heard that two ounces of aloes was but a moderate dose. In many cases, however, these sapient grooms are not satisfied unless a horse have twenty or thirty evacuations. Super-purgation has destroyed hundreds of horses, and it has irreparably injured thousands: it certainly very much debilitates the horse. It is hardly possible to conceive a more deplorable object than a horse under the action of an enormous purgative: the liquid aliments escaping almost involuntarily, the adjacent parts being excoriated, with the violence and frequency of the dejections; the belly is drawn to the flank; cold sweats bedew the frame; appetite

is totally lost, and the strength so lessened as to leave the animal hardly power of tottering from one stall to another; and yet to this state does obstinacy and ignorance condemn horses to be reduced. The number and strength of the purgative doses are not the only evils also to which the horse is liable, from improper purgation; the articles used are likewise often of an injurious nature. Frequently the coarsest aloes are a component part of the favourite prescription, and other drastics are added to increase the strength. No horse should have a *strong* dose of physic put into him without two or three days previous mashing; and if this be done, a mild dose will be sufficient. When good physic has been properly given, still it is often rendered injurious, and even destructive, by carelessness or ignorance. Even cold water at these times will injure; a sudden chill from a door left carelessly open may bring on enteritis; and active exercise, to promote a 'stirring up of the humours,' has destroyed many a valuable animal.

Of the articles used in purging horses.—There are numerous articles which simply *relax* the bowels, i.e. slightly increase their peristaltic motion; but very few which produce active purgation. Of the former, bran, calomel, and neutral salts, are the common instances; but it must be confessed that, with the exception of bran, all the others occasionally fail. Rhubarb, jalap, colocynth, and elaterium, are inert; except in such doses as derange the bowels dangerously, and, therefore, it is evident how uselessly these enter into the purgative physic for horses. Gamboge, which is occasionally added to a horse purge, is a still more dangerous addition; for it sometimes proves a most drastic purgative. The purgative of the horse, therefore, in almost every instance, is aloes blended with gentian. Opinions differ with regard to the various kinds of aloes imported; nor can we ever arrive at a just conclusion on this head, until we unite a conclave of *honest* druggists, both wholesale and retail, from whom alone might be procured something like a knowledge of the various sorts in an *unadulterated* state; for they are all said to be mixed and remixed to suit the convenience of the dealer; and are named and renamed, to supply the wants of the purchaser; to which circumstances we are indebted for the contradictory accounts we read rela-

tive to them. Of the aloe varieties two are principally in use; the Barbadoes and the Cape. The Barbadoes are somewhat quicker and stronger in their action, and consequently rather more drastic in their operation than the Cape; therefore in some cases they are not to be preferred. But they are in general more certain in their action than the Cape. Cape aloes are commonly thought to be milder and weaker; it is usual, therefore, to consider, that a dose of physic, which requires six drachms of Barbadoes, should necessitate seven drachms of Cape aloes. The quantity requisite to produce purging is dependent on so many circumstances, that it is no wonder it should be so often mismanaged. Horses do certainly vary greatly in their intrinsic capability of being acted on by purgatives, but much more in the circumstances under which they are given. Mr. Coleman, in his lectures, mentions a horse of his own that would purge by taking three drachms only of Cape aloes: while Mr. Percivall quotes a horse which belonged to Mr. O'Conner, which at three years old required fourteen drachms to purge its bowels. These facts serve to show the propriety of prescribing a very moderate quantity only as the first dose for a horse with whose constitutional peculiarities we are unacquainted. The requisite quantity is also greatly dependent on various other circumstances; old horses, and such as are constantly fed on hard meat, require more than others; while horses eating green meat purge with a very mild dose; and in all, by mashing three times a day for several days, we may make four drachms do the work of eight. This, we repeat, shows the extreme importance of *previous* preparation for all horses; but more particularly for weakly horses, and also such as have been previously accustomed to much home diet. Form also influences the quantity requisite; a thin, narrow-chested horse, will purge more readily than a circular deep-carcassed one. It may be considered, therefore, that the quantities required to purge horses range between four and eight drachms; the extent of which range will serve to show that something more is requisite than a blind acquiescence in any invariable form.

The croton tiglium is a purgative of new discovery. In its action it is certain only in producing motions much more

liquid than those produced by aloes, consequently we suppose it is also much more weakening. The capsule of the croton seed, we believe, has been found, if our information be correct, unworthy of much dependence. Mr. Youatt tried it with variable effect; but altogether he did not appear prepossessed in its favour. Several others, we know, have also tried it, without being able to come to a direct conclusion relative to its properties. Mr. Field has however found, that two drachms of the capsule have produced the same effects as forty grains of the farina; which last is the remains of the kernel of the seed, after it has had the croton oil expressed from it. This farina, when genuine, appears to possess more certainty of action. Mr. Field estimates that thirty grains of it are equivalent to six drachms of Barbadoes aloes. The croton oil is equally certain in its action with the farina. Mr. Percivall suggests, that from twenty drops to half a drachm might be found the quantity necessary to fully purge. There is, however, one objection to the use of croton nut or oil. It has the property of sadly blistering the mouth, unless made into a ball. The nut, divested of its envelope, may be given in doses from ten to twenty grains. The oil, in doses from eight to sixteen drops; and the farina, which is sold in cakes, may be administered in doses of from sixteen to thirty grains. Therefore when we read of such or such doses being recommended, it is necessary to learn which of the preparations the writer refers to. It appears consequently, at present, aloes is likely to remain the base of the purgative; and we proceed by offering the formulæ of the several strengths formed of Barbadoes aloes.

No. 1.—Barbadoes aloes (finely powdered) ..... two drachms.
Oil of caraways..... one scruple.
Extract of gentian..... a sufficiency.

No. 2.—Barbadoes aloes (finely powdered) ..... three drachms.
Oil of caraways..... a scruple.
Extract of gentian..... a sufficiency.

No. 3.—Barbadoes aloes ..... four drachms, with extract of gentian, a sufficiency.

Mix.

No. 4.—Barbadoes aloes ..... five drachms, with extract of gentian, a sufficiency.

Mix.

When it is thought proper to give mercurial physic, one

drachm of calomel may be given the evening previous, by sprinkling the powder on the tongue. This, by lying all night in the horse, may, perhaps, assist the efficacy, if the aloetic ball be given the next morning; keeping in mind it should be less strong on account of the calomel administered. However calomel is best exhibited blended with the aloes, when for every scruple of the first it will be necessary to abstract a drachm of the last.

Treatment connected with physicking.—The intestines should always be prepared for this operation by bran mashes, and which should be given the three previous days. The first dose given to every horse, with which we are not well acquainted, should be a very mild one; for some horses are much more easily purged than others, and if the dose does not operate, it can do no harm. Exercise is of particular importance in physicking; but we would earnestly caution the attendants against active trotting or galloping: brisk and continued walking is all that ought to be allowed. Cold water should never be allowed, but, if the horse will not drink it warm, it may be given cool, but never cold: on this particular it is also necessary to observe, that ample dilution of the bowels is of the utmost consequence to insure physic working freely. During the working of the physic the horse should be kept warm within the stable, and by the clothing; and he must be exercised (if in winter) in clothes proportioned to the cold. *When a purge is to be given*, proceed as follows:—the horse having fasted an hour or two in the morning, give him the ball, after which he should be offered some warm water; or it will not be improper to let him have his ball a quarter of an hour after he has had about half his usual quantity of water; for it sometimes happens that the ball disgusts, and then he will not drink for some hours. After it is taken, he should fast another hour, when a bran mash may be given, with a very few oats sprinkled on it, to make it palatable: he should, at noon, be walked for an hour, with mash feeding afterwards; and exercised again an hour in the evening, being allowed warm or tepid water at intervals during the day, with hay and a bran mash again towards night. Early on the following morning the physic will probably begin to work, which, if it does freely, no more exercise need be

given; but if not, half an hour's walking should be allowed, when the horse may have a mash and warm water. After this, another half hour's exercise should be given (walking only), and which is to be repeated every other hour or two, till the physic acts; allowing mashes and a little clean hay occasionally, and warm water as often as he will take it. Should the horse appear griped and uneasy, a warm clyster may be given, which will generally relieve; and in the event of its still continuing, then the following drink may be given, hand-rubbing the belly well at the same time.

Sulphuric ether	one ounce.
Laudanum	one ounce.
Peppermint water	one pint.

Mix, and give quite cold.

It occasionally happens that, notwithstanding every attention, physic will not work on the second day; in which case let nothing tempt the practitioner to give another dose immediately; for it sometimes happens that purgatives will not act until the third day. But when a case occurs of non-purgation, always wait until the third day; when, if no symptoms of purging appear, either let the horse rest altogether for two days longer, and then give him another dose; or commence by giving him a quarter of the original dose every six hours till it purge, mashing, giving exercise and warm water as before. Let it also be remembered, that it is erroneous to encourage liquid purging to twenty, thirty, or more dejections. No good attends this practice. In the usual course of physic, on the day after the operation of the purgative, the fæces will resume nearly their former consistency and shape, when the physic is said to be *set*. If it, however, continue to operate with nearly the same violence as on the day before, it must be regarded as a case of *super-purgation*, and recourse must be immediately had to the following drink, which is to be administered every second hour.

Powdered chalk	two ounces.
Laudanum	two ounces.
Tincture of catechu	one ounce.
Tincture of gulls	half an ounce.
Nitrous ether	three ounces.
Mild ale	one pint.

Mix.

DIURETICS.

As we have but little power over the skin of the horse, so we have correspondently a greater one over the kidneys. Diuretics in the horse appear to stimulate the kidneys, whereby they separate a larger quantity of water from the blood. The blood, losing an unusual proportion of its watery part, must be supplied from other sources: this is done by the absorbing vessels, which take up any superfluous fluids; the heightened vascularity of the kidneys detracting, like a blister, from the force of the circulation. Like purgatives, they however are much abused, and irreparable injury is done to horses by their too frequent administration. In all accumulations connected with debility, it is evident that diuretics may do harm: we may, it is true, remove some extravasation and swelling to-day, but still more will return to-morrow. In these cases we must, on the contrary, strengthen the system by tonics, proper feeding, and mild exercise: the local debility we must treat by friction and bandages.

The *principal strong diuretic substances* in general use for the horse are juniper, nitre, turpentine, and potash. The milder ones are cream of tartar, neutral salts, resin, &c. Many other substances act on the kidneys of the horse, but in a less degree. *Resin* is, perhaps, the least active diuretic in veterinary practice, and a dose of three to six drachms is not certain in its operation. *Nitre*, in similar doses, is perfectly certain, likewise more active. In inflammatory diseases, and in urinary obstructions from gravel, *nitre* is much to be preferred to resin. *Turpentine*, both liquid and solid, is a certain diuretic; as also is *potash*, half an ounce or an ounce being diluted in two or three quarts of water, and given fasting. *Cream of tartar* must be given in doses of four to six ounces. All the *neutral salts*, in similar doses, act in the same way; but not always with uniform certainty. When they prove aperient, the flow of urine is in general inconsiderable, but it lasts some time. The unobservant are but little aware how very seriously too powerful and too often repeated diuretics injure the horse; for great debility and emaciation usually follow upon their abuse. Whenever a diuretic is given, the same cautions should be

observed as with a purgative: to keep warm, but not hot; sweating would impede the process of the diuretic; to avoid over-exertion; but, above all, to allow a large quantity of tepid water, which greatly increases the effect, and renders the action less hurtful: indeed, a large quantity of water will of itself prove a diuretic, particularly if the horse have previously abstained from drinking. When a horse has long fasted from water, his other secretions must have lessened the watery parts of the blood so much that it would seem to occasion an imperative call for dilution; and in such case it would be supposed, that whatever fluid aliment was taken, however large the quantity, would be received into the system to repair the waste. But it is not so; on the contrary, whatever may be the wants of the constitution by long deprivation from liquid aliments, a full dilution, instead of being at once taken up to repair the waste, greatly increases the urinary flow by constitutional sympathy not absorption. It is, therefore, clear, that whenever we deprive horses of water during the action of diuretics, under a supposition that we thereby increase the absorption of the extravasated fluids, we err greatly. Diuretics are given in the form of *balls* or of *powders*, a formula of each of which is added:—

DIURETIC BALLS.

Resin, yellow	four pounds.
Nitre, in powder	two pounds.
Horse turpentine	two pounds.
Yellow soap	one pound.

Melt the resin, soap, and turpentine over a slow fire; and when cooling add the nitre. Strong dose, one ounce to ten drachms. Mild dose, five or six drachms.

DIURETIC POWDERS.

Yellow resin, powdered	two pounds.
Nitre, powdered	four pounds.
Cream of tartar, powdered	two pounds.

Dose, six to eight or ten drachms.

THE

VETERINARY MATERIA MEDICA;

OR,

AN ALPHABETICAL AND DESCRIPTIVE LIST

OF THE VARIOUS

MEDICINAL ARTICLES AT PRESENT EMPLOYED

IN VETERINARY PRACTICE.

THE

VETERINARY MATERIA MEDICA, &c.

A WELL-GROUNDED knowledge of chemistry is necessary to the proper construction of the formulæ used among veterinary surgeons; and without it we are apt, by injudicious combinations to destroy the effect of our remedies, or otherwise to beget new compounds of totally different qualities to those intended. An intimate acquaintance with chemical affinities of substances enables a practitioner, from articles apparently dissonant in properties and action, to form a new compound with particular influences suited to his purpose.

The veterinarian should have a neat and well-regulated dispensary: except that the matters need not be quite so numerous, it should be a fac-simile of a well-arranged apothecary's shop. The various articles should be inclosed in drawers, pots, or bottles, according to their forms or natures: each should be separate, and each should be distinctly marked. Above all, it behoves him, if he wish either to satisfy himself, or to do justice to the cases under his care, to be most particular as to the *quality* of the *simples* and *compounds* he uses. The prudent veterinarian will find it his interest to deal with a druggist of established reputation, and to order only high-priced drugs, and of the best quality. The only means to avoid deception is to compound for himself; and to do it with genuine drugs. In the *formulæ*, and *doses*, the apothecaries' weights and measures are always meant.

A TABLE OF THE WEIGHTS AND MEASURES GENERALLY USED IN THE COMPOUNDING OF MEDICINES.

WEIGHTS:

The Pound	contains	Twelve ounces.
— Ounce		Eight drachms.
— Drachm		Three scruples.
— Scruple		Twenty grains.
— Grain		

MEASURE OF FLUIDS:

The Gallon	contains	Eight pints.
— Pint		Sixteen fluid ounces.
— Fluid ounce		Eight fluid drachms.
— Fluid drachm		Sixty minims or drops.

ABBREVIATIONS:

Gut. or Min.	for	Drop.
Gr.		Grain.
℈		Scruple.
ʒ		Drachm.
℥		Ounce.
℔		Pound.

Absorbents.—The efficacy of this class of remedies consists in their tendency to correct a diseased acidity in the stomach. In horned cattle, complaints apparently originating from this course are rather common; hence cows, calves, and sheep, are sometimes benefited by chalk.

Acetated Liquor of Ammonia.—This has been long known by the popular term of Mindererus's spirit, and is made by pouring any quantity of acetic acid, diluted with seven times its amount of water, upon carbonate of ammonia, until all fermentation ceases, or until a neutral solution has been formed. It is useful in horse practice; it gently invigorates, is diaphoretic, and sometimes it proves mildly diuretic. It principally shows its salutary effects on the commencement of the debile stage, or at the close of lingering febrile diseases, particularly of influenza. In the more early stages of epidemic catarrh, it may also be exhibited: the dose is from four ounces to an almost unlimited quantity.

Acetate of Copper, or Verdigris.—See Copper.

Acids.—Such as are in use in veterinary medicine are described under their proper names throughout the *Materia Medica*.

Acetic Acid.—Made from the destructive distillation of wood. A good application to warts. Diluted with seven

times its amount of water it forms vinegar, and a good lotion for several forms of prurigo.

ÆRUGO.—See COPPER.

ÆTHER, SULPHURIC.—A valuable medicine, and the best anti-spasmodic we possess. Blended with its own amount of laudanum, and more than ten times its amount of cold water, sulphuric ether forms one of the best and safest drinks we know of The *nitrous spirit of æther*, or sweet spirit of nitre, as it is called, is a more general remedy, only because of its greater cheapness. As a febrifuge, it is at once, though in a less degree than the sulphuric æther, refrigerating without being lowering.

ÆTHIOPS MINERAL.—See MERCURY, BLACK SULPHURET OF.

ALOES.—These form a very important article in the veterinarian's list of medicines, and therefore too much care cannot be taken to procure them genuine. Every practitioner, however, should purchase them in the gross; and have them reduced to powder under his own inspection, as the surest preventive against adulteration. The aloes in use among veterinarians are principally of two kinds; Barbadoes and Cape. Barbadoes are in most request, as being the most certain in their action; because they are less adulterated. Barbadoes aloes are of a deep tint, slightly brittle, fragrant, and intensely bitter. Cape aloes are altogether an inferior drug. The action of each kind as a *purgative* is detailed under the head *Purgatives*. As an alterative, aloes are sometimes given in doses of one drachm to two daily; they are also sometimes used in similar doses as a nauseant in inflammations, but are not uniform in their action, and are apt to irritate. As an external stimulant, they are used in the compound tinctures of myrrh and of benjamin. Aloes form a remarkable instance of the different properties of the same article over different animals. A horse requires less than an ounce, an ox two ounces or more, to purge him; it will make a dog vomit rather than purge the animal; a man can bear only a small quantity; and the largest hog not even so much: while, according to the experiments of M. Gilbert, a sheep which took two ounces was not purged, although it died seventeen days afterwards. Aloes, particularly the Barbadoes, will

not pulverise readily except in frosty weather; at which time a sufficient quantity should be powdered to last the year through; and as they are apt again to unite into a solid mass, so, soon as powdered, they should be mingled with half their weight of lard or palm oil: mixed in this manner they keep well, and form a uniform mass of a proper consistence to make balls; which dissolve readily in the stomach, never harden, and are less apt to gripe than any other form; particularly if half drachms of powdered ginger be added.—Aloes are now boiled by some practitioners, to render them more mild. The great difficulty of keeping aloes in an equal state of consistence, as a purging mass, induced Mr. B. Clark to adopt the following method, by which, he informs us, these inconveniences are obviated. He places one vessel within another, exactly as carpenters melt glue, having water in the outer vessel, and aloes with one-fifth of their weight of treacle in the inner one, which is carefully covered with a lid. The apparatus being put on the fire, is suffered to remain, the aloes and treacle being now and then, but not too often, stirred to combine them, for an hour or more, or until perfectly melted. The inner vessel being now taken from the outer, the contents are expeditiously cast in paper moulds or tubes, of the usual diameter of a horse ball. When cold, Mr. C. finds these balls flexible, yet solid, and says they remain so. He gives an ounce to a saddle or carriage horse, and six drachms to a cart horse: but there is reason to fear that they do not prove so soluble in the stomach as when their particles are divided by oil, lard, or even syrup; but the last is a more objectionable ingredient than either of the others.

A watery solution of aloes should be kept by every veterinarian, and which will be found, in many instances, a very convenient form, on account of its quicker action.

A spirituous tincture of aloes, made by digesting four ounces of the powder in a quart of proof spirit, forms a common stimulating application to recent wounds, &c. Half an ounce of powdered myrrh is a good addition to this vulnerary.

ALTERATIVES are articles that are supposed to act medicinally on the body, in a slow and nearly imperceptible manner. The usual alteratives among farriers are nitre, antimony, sulphur, resin, and spices; but a better acquaintance with the art teaches us to add to the list every drug in the Pharmacy. It is easy to make a ball, and call it an alterative. But a good medicine of this description should be adapted to some particular case. It should change something into something else; wherefore it requires more skill to manage properly this class of medicines than any other.

ALUM (*Alumen*).—This compound body is in very general use in veterinary practice, both externally and internally. In doses of one or two drachms, it is employed as an astringent in diarrhœa, diabetes, and other fluxes. Externally it is by some used as a styptic to stop hæmorrhage, by sprinkling it on the bleeding orifice, when its coagulating properties plug up the mouth of the vessel. It is also esteemed to be a useful escharotic to destroy fungus, and a valuable detergent for foul ulcers.

AMMONIA CRUDE (*Ammonia murias*).—It is called crude, to distinguish it from the volatile or prepared ammonia which follows. It is, in general opinion, when diluted, one of our very best discutients; and, when in mixture with acetic acid or vinegar, to which camphor is added, it forms the favourite discutient lotion of general practitioners. From it are prepared

Ammonia volatile (ammonia subcarbonas). The gaseous ammonia, fixed into a solid form by combination with carbonic acid, forms the volatile ammoniacal salt of the druggists. It is a good stimulant in the latter stages of fever: united with vinegar, it forms the spirit of Mindererus, an excellent preparation.

Ammonia acetatis, see *acetated liquor of ammonia*.

Carbonate of Ammonia is called salt of hartshorn; carbonated water of ammonia is the spirit of hartshorn of the shops. It is convenient in veterinary practice, from its peculiar property of uniting oil and water. Internally, it is an antispasmodic, in doses of six to eight drachms. Externally it is a very quick blistering agent.

AMMONIACUM.—This *gum* is sometimes given in old obstinate coughs, and in farcy.

ANISE SEED.—The powder of these seeds was formerly much used by farriers; and the druggists who make *horse powders* find it a profitable article; for it is adulterated to one-third only of the genuine powder. It may be very properly united with other warm aromatics when cordials are admissible. It is also thought to possess some pectoral properties; but they are very trifling. The essential oil is the most active preparation of it; which see.

ANODYNES.—These are medicines that quiet pain. In the human, they procure sleep also; but no article with which we are acquainted is absolutely capable of producing this effect on the horse. As mitigators of pain, opium and hyoscyamus must be tried. Camphor and æther will also act as antispasmodics; but in all painful affections, where relief is essential, opium in doses of one or two ounces, is chiefly to be depended on; and if pain be mitigated, sleep follows of course, from the fatigue of irritation.

ANTIHELMINTICS.—See VERMIFUGES.

ANTIMONY.—There are several medicinal preparations made from the crude metal, as

Black sulphuret of antimony (Sulphuretum antimonii); the metal itself, being ground and levigated, in this state is always compounded with sulphur; but when it is to be given as an alterative, more sulphur is often added to it, with nitre or other articles, according to the pleasure of the compounder: in doses of two, three, or as far as four drachms, it is a good and safe alterative, daily administered. It should be bought and powdered by the practitioner, or he may purchase manganese and forge-dust as a part of the mass. It holds within itself often a portion of arsenic, to which we attribute its occasional violence of action, particularly when given to dogs: the presence of arsenic may be tried by burning a little on a red-hot iron plate, when a smell of garlic detects the arsenic.

Tartarized antimony (Antimonium tartarizatum).

Emetic tartar, or the tartrate of potash and antimony, is a very valuable medicine in veterinary practice, although its merits are not allowed by some practitioners: but whoever will try it without prejudice, will have reason to be satisfied that it is both a febrifuge and expectorant; and, as most of the fevers of horses are connected with some pneumonic affection, so a remedy that combines the properties of diminishing action of the lungs and increasing expectoration, is invaluable. In inflammation of the lungs it is commonly exhibited. In other cases, it may be given with nitre and supertartrate of potash (*cream of tartar*) in similar doses, once a day, in a mash. It is also an excellent alterative. In full doses it occasions determination to the skin, and ultimately lessens the action of the heart and arteries: sometimes it increases the flow of urine. In our opinion it certainly lessens the febrile action of the vascular system more effectually than any other medicament. It is also in use as a vermifuge, and highly praised.

Antimonial powder (Pulvis antimonialis). This well-known preparation, supposed to be the same with Dr. James's powder, is a compound of oxide of antimony with phosphate of lime. It has some febrifuge qualities; but it is not so efficacious in the horse as the tartarized antimony. As an alterative it is useful in doses of one to two drachms; and as a promoter of condition it is often preferable to tartarized antimony.

Antimony, chloride of (Murias antimonii), or *butter* or *butyr of antimony*, is a very useful escharotic.

Antiseptics are remedies supposed to possess a power of resisting a putrefactive process in the body; but this influence is questioned, and all medicines of this class are now considered as acting only by their stimulating qualities.

Antispasmodics.—The horse is subject to many spasmodic affections, and the class of remedies that applies to those he is troubled with is small. Ethers stand first on the list. Opium holds the second place. Camphor, hyoscyamus, belladonna, oil of turpentine, and asafœtida, have all of them likewise proved useful. Cold

also, in an intense degree, is a powerful antispasmodic, for which reason it is applied in tetanus.

APERIENTS.—See LAXATIVES.

ARSENIC, OXIDE (*Arsenicum oxydum*). This powerful mineral is somewhat uncertain in its action, and not always safe: were it not for this, it might be called a good tonic, in doses of five to ten grains daily, in a very fine powder: more has been given; but it sometimes appears to remain innocuous until the constitution is fully saturated with it; and then commences its noxious effects suddenly and irreparably: this destroys much of its usefulness, and makes it necessary to exhibit it with great caution: nor should it ever be given on an empty stomach. The best form in which it can be administered is, as the liquor arsenicalis, made by boiling its own weight of potash with arsenic and water (one ounce of water to every four grains of arsenic), in some glass vessel. It has the power of staying the progress of glanders; and it ultimately cures farcy when watched and continued: it also appears to have some vermifuge properties; and it certainly retards the march of the rabid disease, but is not ultimately successful.

ASTRINGENTS.—These are supposed to act on the living fibres by producing increased contraction in them, in which point of view they form a very numerous and important class; but in a more limited sense, they are considered as substances that restrain immoderate fluxes, as of the intestines and kidneys. Those that act by constringing the divided ends of bloodvessels are called styptics. Opium, chalk, alum, starch, and catechu, act favourably in restraining intestinal fluxes. Catechu, alum, and acetate of lead, operate as astringents on the urinary passages.

BALLS.—There are some circumstances, in the preparation of this form of medicines, not in general sufficiently attended to by veterinarians. Substances that are volatile do not keep well in balls, and therefore should only be made when used. The same caution is also requisite with such as liquefy by the absorption of air. All hard substances entering into balls should be finely powdered,

and the moist matter that is to form them into an adhesive mass should be of a nature that will neither ferment nor become mouldy. A mass for balls not intended for immediate use should be pressed down into a jar, and tied over with a bladder. As the *giving of a ball* is a forcible operation, when it is requisite to exhibit medicines more than once a day, it is more prudent to give them in the form of drinks. A horse ball should not be so large as a pullet's egg; nor should it be too hard: the weight between an ounce and an ounce and a half, in form resembling a short sausage. A very ingenious instrument is now made for giving balls, which may be used in many cases, but is particularly applicable to colts, ponies, or horses with small mouths. *The most convenient mode of 'delivering a ball'* is, to back the horse in his stall, when the operator should gently draw the tongue out of the mouth; but it should not be held apart or by itself, as in that case the struggles of the horse may injure it; it should be retained firmly by the fingers of the left hand pressed against the jaw. The ball must now be taken between the tips of the fingers of the right hand, lengthwise, when it should be passed up the mouth close to the roof: having placed the ball on the root of the tongue, the hand may be withdrawn, and the tongue liberated, when, unless the horse should cough, the ball will be swallowed. The head should, during the whole, not be elevated: when it is held up, there is some danger of choking the horse.

Balsams are a kind of resinous juice, united with some of the extractive matter of the various plants they are obtained from, in combination with an essential oil. All the balsams are occasionally in use in veterinary medicine, and were formerly in very high estimation, for their supposed salutary action in chronic diseases. They were also considered as a sovereign vulnerary for abraded urinary passages. It is the modern doctrine to think their efficacy overrated, and which is probably in some respects true, particularly as regards their expectorant qualities: nevertheless they are far from being inert; they appear to act very favourably in some instances, as

a warm terebinthinated stimulant. There are balsams of Canada; of Copaiva; of Gilead; of Peru; and of Tolu. What is called balsam of sulphur is merely a compound preparation of sulphur in oil.

BARBADOES TAR.—See TAR.

BARK.—Several of the *barks* enter into the veterinarian's list of medicaments, and all act by an astringent property on the animal fibre. Peruvian bark stands foremost in reputation; but as horses are little subject to intermittent fevers, we can therefore dispense with it. The elm and the oak barks, particularly the last, may be used in cases of debility, with advantage. Cascarilla bark proves also a valuable stomachic tonic.

BARYTES (*Murias Barytæ*) has been tried with some benefit in glanders. It is, however, a very powerful medicament, and few glandered horses are able to bear the quantity requisite for the cure.

BASILICON (*Ceratum resinæ*). A useful digestive ointment.

BEANS, in a medical point of view, are sometimes used as a tonic, and the flour of them as an astringent.

BELLADONNA (*nightshade*). An excellent sedative. Its specific action, however, appears to be expended upon the throat. It is largely used in affections of the lungs, and in all diseases where sore throat is a prominent symptom. Its full effect is shown by loss of appetite.

BLISTERS.—The *action* of blisters, and the cases in which they are properly applied, are detailed under operations. The *substances* used for this purpose are various; the most important is the cantharides, or Spanish fly, whose action is so certain and mild, that, as a simple vesicatory, every other article is very inferior. In acute inflammatory disease it is, however, too slow in its effects to be of any benefit; wherefore the application of liquor ammonia is recommended. Euphorbium, which is the general substance introduced as a substitute for a portion of these flies, is sufficiently active; but it irritates, and therefore ought never to be employed in these cases. However, in common blistering for strains, &c., where the expense of cantharides is objected to, auxiliary vesicatories may be admitted, among which the tincture of croton is now used.

No. 1.—*Blister for general Use.*

Powdered cantharides	one pound.
Lard	eight pounds.

The liquid blister is made by substituting eight pints of oil for the eight pounds of lard, and allowing the flies to digest for a fortnight, or boiling them in a water bath. A pound of camphor is a good addition; it does not lessen the action of the blister, but diminishes its irritation.

No. 2.—*A powerful Blister.*

Spanish flies	one pound.
Lard	three pounds.
Resin	two pounds.
Oil of turpentine	one pound.

Melt the resin with the lard, after which add the turpentine. When beginning to cool, throw in the powdered flies.

No. 3.—*A Mercurial Blister for Splints, Spavins, and Ringbones, which may be used where dependence is placed on the action of Mercurials and Blisters, but which there is reason to think are of but little assistance in the reduction of these exostoses, particularly if of long standing.*

Of either of the former	four ounces.
Corrosive sublimate, powdered finely	a scruple.

No. 4.—*Liquid Blister, weak; sometimes called* Sweating Blister.

Spanish flies, in gross powder	half a pound.
Olive oil	three quarts.

Steep the flies in the oil three weeks; strain off, and bottle for use.

No. 5.—*Liquid Blister, very mild.*

Of the above	one pint.
Olive oil	a pint and a half.

The farriers' *sweating blister* is only a strong stimulant: it occasions heat and swelling, without excoriation or loss of hair; consequently it is a very convenient application, when it is an object to avoid a temporary blemish, and when the case is not of a very desperate description. But there are also instances in which it is to be preferred to an actual blister, as in strains, where some remains of heat and inflammation are present, but without activity: in such cases the sweating blister is very often efficacious. The mode of application is to rub it in of sufficient strength to irritate in a mild degree only; repeating it every day, until considerable swelling is occasioned, when

the application should be desisted from, and the enlargement suffered to subside.

Blue Vitriol (*Cupri sulphas*). See Sulphate of Copper.

Bole Armenian (*Bolus Armeniæ*), vulgarly called bole armenic, is an argillaceous earth impregnated with iron; and was formerly extolled for its astringent, strengthening qualities, both externally and internally; but, although it has some claim to attention, it is seldom now used.

Borax.—See Soda.

Bran.—Independently of the use of this as an article of food, it may be here introduced as a medicine also, being without nourishment, but mechanically aperient. In the latter point of view, it is perhaps the most certain laxative with which we are acquainted, and at the same time the most mild also.

Burgundy Pitch differs so little from resin in its qualities, as to need no particular comment.

Butter or Butyr of Antimony (*Antimonium Muriatum*). See Escharotics.

Calamine, prepared (*Lapis calaminaris*), is an ore of zinc, which, when reduced to a fine powder, may be very usefully sprinkled on excoriations, and on cracks of the heels, to dry them. It is, however, most frequently used in the form of the unguent called calamine cerate, and formerly Turner's cerate, and is an excellent application.

Calomel (see *Submuriate of Quicksilver*). This is a very useful medicine in horse practice, but is liable to some uncertainty in its action: therefore it should never be continued by veterinarians, unless united to twice its weight of opium; even then, the moment the gums look red, the mouth feels hot, and a tenderness is observed in chewing, it should be discontinued. Calomel has not much effect as a vermifuge beyond its purgative properties; but it is an excellent alterative in skin affections, as hidebound, surfeits, &c. It has proved useful also in farcy, grease, and œdema. It is often united with purges, but is not to be depended on alone as a purgative: it acts well when shaken upon the tongue or strewed upon a mash, the evening preceding the morning the purge is to be given. A scruple to two drachms

is a proper quantity; but it must not be forgotten to subtract something from the strength of the purge. During the use of calomel as an alterative, the horse should not be exposed to wet or cold, nor should its use be persisted in more than a week without a pause. It remains to add, that, unless this article be purchased from a druggist of reputation, it is very apt to be adulterated.

CAMPHOR is an Indian produce, chiefly extracted from the *laurus camphora*. It is a substance whose action it is very difficult to define; but as it is active in its properties on the horse, it well deserves a full trial. In large doses it produces convulsions and delirium: half an ounce has done this. In moderate doses, as a drachm, it proves sedative and antispasmodic, and therefore may be usefully employed in flatulent colic, in conjunction with other remedies. United with opium, it has acted beneficially in spasmodic constrictions of the neck of the bladder not dependent on inflammation. It has also been highly spoken of as a powerful remedy in locked jaw: on very respectable authority it has been also warmly praised for its virtues in fever; and as in small repeated doses it is at once a gentle stimulant and soother of irritation, so in the latter stages of febrile complaints, where the irritability is considerable, it may be very properly given. But in the more early stages its beneficial action is questionable: nor are its powers as a permanent stimulant sufficient to be depended on at any time without other auxiliaries. Externally it proves a mild discutient in indurations and rheumatic affections; and it is with advantage blended with the ordinary blister.

CANTHARIDES, or SPANISH FLIES.—These are, or ought to be, the principal stimulating ingredient in the making of ordinary blisters; and every veterinarian should purchase them whole and powder them himself, otherwise he will be very apt to buy them adulterated. Previously to being powdered, they should be moderately dried, and then leisurely pounded, or rather ground into a powder; the operator guarding his face with a close muslin handkerchief, so as not to receive the fine particles into his nose and throat, otherwise an unpleasant soreness will

arise. If they are very dry, and the powder flies much, add a few drops of sweet oil, which will prevent this. Of all the vesicating articles in use, none equal cantharides. They likewise make a very useful stimulating tincture for injecting into sinuous sores. Cantharides are found also to have a very salutary effect in those relaxations of mucous membranes which produce a morbid purulent secretion; and which is apparently done by stimulating the system generally, and these parts particularly, into a new and healthy action. It is thus they have been applied to the treatment of glanders: in nasal gleets they have been extremely beneficial.

CAPSICUM.—In Indian horse practice, an infusion of Cayenne pepper is often given as a cure of flatulent colic, and as a vermifuge also; it is likewise used externally as a stimulant. We have ourselves tried it in colic with some advantage, but not with sufficient benefit to prefer it to the more established means. As a stomachic, it is decidedly more potent than most other peppers.

CARAWAYS.—Both the seeds and essential oil are used as warm stomachic cordials.—See CORDIALS.

CARBON.—The chemical name of charcoal: it is useful in stopping the ulcerative process.—See POULTICES.

CARBONATE OF AMMONIA, or SALT OF HARTSHORN of the shops.—See AMMONIA.

CARBONATED WATER OF AMMONIA, or SPIRIT OF HARTSHORN.—See AMMONIA.

CARBONATE OF IRON.—See IRON.

CARROTS.—These become, under many circumstances, a medicine, as well as an article of diet. Even for the latter purpose they are not sufficiently known; for they fatten without heating; but, on the contrary, they keep the body cool by keeping it open, and greatly promote a healthy coat. As a *medicine* they often remove cough, cure incipient grease, are good in farcy, and beneficial in surfeits and mange; but in these latter cases they must be wholly substituted for corn. A *poultice* formed of the scraped root is an excellent application in cases of ichorous discharge from the heels.—See POULTICES.

CASTOR OIL (*Oleum Ricini*).—See OILS.

CATAPLASMS.—See POULTICES.

CATHARTICS.—Whatever excites the intestines to a more early, a more frequent, and a more copious discharge of their contents, may be termed a *cathartic*, or purge. If this effect be intended to be produced in a slight degree only, the article effecting it is termed a *laxative;* which see. The principal cathartic in veterinary practice is aloes. Linseed oil, calomel, and neutral salts may be considered as laxatives.

CATECHU.—By universal suffrage this has long been called *japan earth;* although it is an extract from a species of Indian acacia. It is a very mild but tolerably certain astringent; and its effects are even more obvious on brutes than on the human subject. It acts favourably in relaxations of the urinary passages, and also in alvine fluxes or diarrhœa; in which latter cases it should be given with chalk and opium, in doses of an ounce of each. It ought not to be united with any metallic salt, particularly in a diluted form; to avoid the affinity which its tannin or gallic acid has for all metals, which such blending reduces to almost inertness. Even the chalk with which it is so commonly given, being an alkali, Mr. Youatt thought weakened its action; but the loss is compensated by the chalk's antacid properties. By Indian practice, it would appear catechu is a sedative; for in that country it is given in daily doses of two ounces, to tame vicious horses. It is an astringent in the diarrhœa of cattle, and appears in these animals to be more active than in the horse.

CAUSTICS.—See ESCHAROTICS.

CERATES are ointments of a drying, healing nature; the principal of which is calamine, or Turner's cerate.

CHALK (*Creta*).—This is a carbonate of lime, commonly used in a prepared state under the name of *prepared chalk*. It is an excellent antacid and astringent, in diarrhœa; it also proves beneficial in the scouring of calves. The dose is from half an ounce to two ounces. It is occasionally sprinkled over cracks also.

CHAMOMILE.—This vegetable is supposed to unite in an admirable degree the qualities of a stomachic and febrifuge. In debility of the stomach and bowels it is a tonic,

in doses of an ounce and half an ounce twice a day, particularly in conjunction with carbonate of iron. In fevers, but more especially in the debile stage of influenza, when the purulent discharge has appeared, it is assistant to the other medicines, though inferior to good stout.

CHARCOAL (*Charbo ligni*) has a peculiar property of amending the ichorous discharge from ill-conditioned ulcers, either sprinkled over them in powder or mixed with a poultice.

CHARGES are not much used by modern veterinarians; for a more extensive acquaintance with the animal economy teaches us that there is but little activity in what are considered as external bracers. Nevertheless, there are some other points of view in which we may place this matter, to prove that *charges* may be of very much service in some cases, if it is merely to act as a bandage, or to protect from cold. In this way a *charge* becomes a useful application to the loins in rheumatism; not only as it protects the affected part from cold, but also because of the resin proving a useful stimulant. Any strong adhesive, as resin, pitch, &c., melted with wax or oil sufficient to keep it from being too brittle, may be formed into a *charge*, and applied warm on the part; and as it cools, it should be covered with flocks of wool or short tow. Another favourite, and, if we are to believe the accounts given, a very effective *charge* in ligamentary lamenesses, consists of common salt with the white of egg.

CHLORIDE OF ZINC is valuable as a disinfectant, and also as promoting healing in suppurating or sloughing wounds. It has the peculiar property of suppressing all luxuriant granulations. It acts admirably also in the closing of open joints: preventing all fetor, coagulating the synovia, and at the same time promoting the healing beneath or the stopping of the orifice. It is beneficial in thrush and canker. It is used as a solution of various strengths, a scruple to the pint, and a drachm to a pint and a half of water, in grease, in thrushes or cracked heels with exudation.

CHLOROFORM is an excellent medicine if administered internally. In spasmodic colic it may be administered in doses of one drachm, or two drachms blended with a pint of oil. It is serviceable also in guarding oil wherever a

laxative effect is desired without the possibility of the physic griping.

CLYSTERS.—These often form very important medicaments in veterinary practice, and have the valuable properties of being always safe to the animal, and commonly easy to give. From the length of time it requires to open the bowels by purgatives given by the mouth, clysters are often our principal dependence; and when aperients cannot be used they are our only real means of dependence. Nutriment may be administered in this way, when circumstances prevent its being received in the usual manner. When clysters are given to remove costiveness, it is always proper to back-rake first (see RAKING), as it removes any hardened dung that might obstruct the passage of the liquid. The apparatus for administering a clyster may be a large hog's or ox's bladder, capable of holding five or six quarts, attached to a smooth wooden pipe an inch in diameter, and fourteen or sixteen inches long; but a much more efficient apparatus is *Reid's patent syringe*, by which almost any quantity may be forced up to the required distance in the intestines. The liquor should not be too warm; but the pipe oiled, the process must be conducted gently, so that the horse may not be surprised, by the clyster being suddenly thrown up. This is a better instrument for giving injections than the pewter syringe sold for this purpose by the instrument-makers.

A laxative Clyster.

No. 1.—Thin gruel, or broth ..... five quarts.
Epsom or common salt ..... one pound and a half.

A Clyster for Gripes.

No. 2.—Oil of turpentine ..... half a pint.
Thin gruel ..... four quarts.

Mr. Gowing once relieved a lingering case of spasmodic colic by administering a pint of turpentine in two quarts of soap and water, as an injection.

A nourishing Clyster.

No. 3.—Thick gruel ..... three quarts.
Strong ale ..... one quart.

Mix.—Or,

Strong ale ..... one quart.
Thick milk ..... two quarts.

Mix.

Astringent Clysters.

No. 4.—Boiled milk	three pints.
Thin starch	two pints.
Laudanum	an ounce.
No. 5.—Alum whey	one quart.
Boiled starch	one quart.

COLCHICUM (*Meadow saffron root*) is a diuretic medicine to the horse. It also acts upon the liver, and can be administered in cases where the exhibition of calomel is inadvisable. In very large and dangerous doses it is a purgative. It is a favourite agent for the cure of rheumatism, as likewise for circumscribed affections of a painful nature as periodic ophthalmia. The powder or tincture are the two preparations in use among veterinarians. The extract is too expensive.

COLLYRIUMS are washes commonly in use for the eyes.—See WASHES.

CONSERVES.—The conserve of red roses is a most convenient medium for forming balls, as it is adhesive, and, when properly made, keeps well.

CORDIALS are matters that invigorate by their stimulating property, usually through the medium of the stomach. Cordials have been so long the very strong hold of the ignorant and presuming, that the very term sounds ill in the ear of the well-informed veterinarian. The groom requires a cordial, because his daily and perhaps hourly habits tend to derange his stomach, which can only be brought to feel appetite when *re-stimulated* by the *cordials* that are fast hastening him to his end. But his horse indulging in no such habits, does not require a cordial ball twice a week; or on every evening after hunting; or on every morning his coat stares with the altered temperature: to the animal, a cordial, as being unnatural, must be hurtful, unless required by some very extraordinary exertion; which, by calling forth too much of the constitutional powers, has expended the vital resources whence the stomach draws its tone. Thus after a very hard run with hounds; after thirty, forty, or fifty miles' rapid carrying, this may happen; and then a gentle stimulant may excite the digestive sympathy artificially. Here a *cordial* may be *proper* and even *necessary:* but a very good one can under such circumstances

be administered; it is not a ball, but a drink, being composed of an ounce each of sulphuric ether and of laudanum, in a pint of cold water. It is given so soon as it is thoroughly mixed.

COPPER (*Cuprum*) yields two articles used in veterinary practice.

Verdigris (Ærugo). This subacetate of copper has been given internally in daily doses of two or three drachms, and sometimes with success; but it does not appear to merit the exclusion of other remedies. It has however some power as a tonic, and, in this point of view, may be properly administered. Externally, its benefits are more apparent, as it proves one of the best detergents and mild escharotics with which we are acquainted. Mixed with honey, it forms ægyptiacum, and is used in ulcers of the mouth, and likewise as a paste to other ulcerated parts. Mixed with tar, it forms a good application for thrushes, grease, and cracks.

Blue Vitriol (Cupri sulphas).—This has been at one time lauded to the skies; at another abused to the shades; and, like most of the matters thus treated, its merits lie between the two. It is, unfortunately, not a cure for glanders; but it certainly does, in some cases, flatter much. It has been justly observed of it, that in lingering chronic cases, the result of influenza, it proves a most excellent tonic; and here often it exerts its best influence, and puts a stop to the discharge. It is also a good detergent application in the proportion of half an ounce to a pint of water; or when injected into sinuous sores in dilution, or sprinkled dry on unhealthy surfaces, as canker, &c., its action is mild but effective.

CORIANDER.—The seeds of the coriander are a warm aromatic stimulant.

CORROSIVE SUBLIMATE (*Hydrargyri oxymurias*).—See MERCURY.

COWHAGE.—This has been described as a valuable vermifuge in doses of half a drachm to a drachm; but it does not appear to possess much medicinal activity on the horse.

CREAM OF TARTAR (*Potassæ supertartras*).—See POTASH.

CROTON TIGLII.—In India this has long been used both as a human and brute purgative, and lately it has entered

into the veterinary practice of this country: the expressed oil is of extraordinary power as a cathartic. In veterinary pharmacy the meal which possesses similar properties is often used; but, unfortunately, by the arts of the druggist, it is often so adulterated as to deceive the expectations of the practitioner. When it is pure, it may be given in doses from a scruple to half a drachm, with linseed meal, in the form of a ball, to shield its acrid nature. It is equally, indeed somewhat more, drastic than aloes, producing profuse liquid watery stools, often much griping, and it occasionally takes as much time to excite purgation. It is also somewhat uncertain in its action, but, under a favourable operation, it is quicker than aloes, although our first accounts of it denied this. It may, therefore, when immediate purgation is necessary, be very properly applied to; and also in tetanus its diminished bulk and great activity make it valuable. Dissolved in turpentine, it forms a blister, only inferior to cantharides. For cattle, Mr. Morton observes, that its union with the sulphate of magnesia in doses of from twenty to thirty grains is now commonly had recourse to; and that it has been found effectual in overcoming obstinate constipations, as well as in those cases which require the bowels to be quickly acted upon.

Demulcents are medicines that act mechanically, by surrounding acrid matter, and thus sheathing it from hurting sensitive and irritable parts. In this way oily preparations act; likewise, honey, gums, mucilages, &c. Diluents, as warm fluids, mashes, &c., are also demulcents, because they dilute acrimonious matter, and render it less active.

Diaphoretics are supposed moderately to increase the natural exhalations of the skin. Sudorifics are intended to do it more actively, and to occasion actual sweating. Vinegar will often produce a violent perspiration, but it is not a salutary one; yet the same liquid, neutralized by ammoniacal salts into Mindererus's spirit, will often excite a favourable but mild diaphoretic effect. Antimonials in repeated doses, assisted by diluting liquors and warm clothing, will likewise commonly produce some diaphoresis. Camphor, in considerable doses, will also

uniformly occasion determination to the skin. The principal diaphoretic action is, however, gained from nauseants, as aloes, white hellebore, &c.

DIGESTIVES are stimulant applications that produce or increase the tendency to suppuration: they are mostly of the warm terebinthinated kind, or the gum resins. Of the former, are turpentine, resin, pitch, and tar: of the latter, are myrrh, aloes, balsams, &c.

DIGITALIS.—Foxglove, or, as the Germans have it, *finger-hut*. Mr. Morton very justly forbids its use after it is a twelvemonth old; and when it is considered how universally it is diffused, the use of it is unpardonable when its virtue has evaporated. It has been most erroneously stated to be inert in veterinary practice, except in very large doses; and even then its salutary action was denied: but this opinion is losing ground. In moderate and *repeated* doses it seldom fails to lessen arterial action, and excite mild diaphoresis. It is, however, somewhat irregular in its action, and appears to act best when the constitution is already excited. In some cases it commences its operations by increasing the pulse; but it almost invariably, when sufficiently continued (in drachm doses every four hours), reduces the heart's action, and that in a particular manner: not altogether by diminishing the number of pulsations *regularly*, but by intermissions or lapses of pulsation between the beats. Thus a momentary pause is detected, and then the systole and diastole follow each other in uniform tenses until a new interruption. The tyro is apt to be alarmed at this; but it is the effect the established practitioner expects and even wishes to produce: he has arrested the impetuosity of the circulation, and in general cases has cut short the disease. In all great visceral inflammations this happens with the use of digitalis; but it is in pneumonia more distinctly visible: it is, therefore, a most valuable agent, but, like all active agents, requires much watching: without care it may be pushed too far, if, after the alteration of pulse just described, it is continued to be given in equal doses. To prevent this, it should be diminished in strength and frequency; instead of emetic tartar and nitre as accompaniments, it

should now be given with some tonic; when, in turn, it may give place to laudanum and æther. In this way digitalis will bear an equal palm with the white hellebore, and leave a horse convalescent sooner: they are, however, both valuable medicines in judicious hands; but we think the foxglove the safest. The infusion is made by pouring a quart of boiling water on an ounce of the powder. The tincture, by digesting three ounces of it in a quart of spirit. Foxglove should be gathered about its flowering time, and dried in the *dark*, which greatly increases its strength. A French apothecary is said to have been able to condense the active principle of digitalis, which he names *digitaline*. For cattle and sheep also, Mr. Morton tells us, digitalis appears an excellent febrifuge in combination with nitrate of potash, and the potassio-tartrate of antimony.

Discutients are remedies which dissolve impacted matter, as old enlargements formed by vascular deposits or extravasations.

Disinfectants have until lately been little more than a name; or the process of the decomposition of effluvium has been expensive, troublesome, and offensive in the extreme; but we have now a means, not only of completely disinfecting our houses and stables, but of instantaneously removing the fœtor of the most putrid substances. The *chloride of lime* does this by the use of a concentrated powder; this is cheap, and when it is mixed with ten times its quantity of water, and sprinkled around objects known to carry about them, or to throw off, unwholesome odours, as in malignant epidemics, glanders, &c., completely removes all the offence to smell. By washing the walls, standings, racks, mangers, head-stalls, brushes, curry-combs, &c., with this liquor, all risk is avoided, even where the most tainted horse has been placed. The chloride of zinc, however, accomplishes all this much more rapidly and more effectively. When an unpleasant smell exists, hang cloths saturated with the solution about the room. An ounce of chloride of zinc is sufficient to medicate two gallons of water.

Diuretics are such articles as stimulate the kidneys to a

greater separation of urine from the blood; as resin, turpentine, oxymuriate of mercury, soda, nitre, &c.

DRINKS, or DRENCHES, are the *liquid* remedies given to brutes. It is not so safe to give them by means of a bottle as by a horn; for instances have occurred of the neck of the bottle breaking. Mr. Bracy Clark recommends to reverse the drinking horn, closing up the large end, forming a moderate opening at the smaller end, and to introduce that into the mouth. In tetanus such a horn would be useful, and at all times it prevents the waste of the liquid; but in tetanus a patent syringe is a better means, and the tube can be introduced into the pharynx through the nostril. The usual method of giving a drink is, we presume, familiar to most persons, but cannot be practised without assistance. Insert the noose of a halter into the mouth, and by means of a stable-fork let the assistant raise the head high. The operator must now mount a stool or a reversed pail, &c. &c., on the off side of the horse, there steadying himself with his left hand; with the right he should introduce the horn gently into the mouth, and completely over the root of the tongue, when, by overturning the horn, the whole of the drink will escape into the back part of the mouth: withdraw the horn often or seldom until the fluid shall be swallowed. It will be prudent, however, to still keep up the head some time longer, as many horses obstinately retain much of it in the mouth; and while so held it is common to give the muzzle an unexpected tap, which takes off the attention from the resistance, and the remainder is then swallowed. Much of the success of giving a drink depends on not filling the horn too full; at once introducing it thoroughly into the mouth, turning the drink quickly out of it, and as quickly lowering the head and withdrawing the horn. A tin bottle with a strong neck is a good substitute for the common horn.

ELECTRICITY is seldom used in veterinary practice with us. On the Continent, powerful machines are found at the Veterinary Colleges of Alfort and Berlin for the treatment of cataract, gutta serena, paralysis, &c.

EMBROCATIONS are external remedies applied by rubbing them on the part with the hand, a sponge, flannel, or

brush, as occasion suits. The formulæ for them are very numerous, and it would extend beyond our limits to particularize any here.

EMETIC TARTAR (*Antimonii tartarizatum*).—See ANTIMONY.

EPSOM SALTS (*Magnesiæ sulphas*).—See SULPHATE OF MAGNESIA.

ESCHAROTICS, known among farriers by the more familiar term of caustics, are substances which destroy the texture of the parts they are applied to in the degree of their intensity, and therefore are often divided into *erodants* and *caustic*. The *mineral acids* are active caustics. Sulphuric acid, or *oil of vitriol*, is now seldom used. Nitrous acid (*aquafortis*) may be applied by means of a camel's-hair pencil to fungus on the foot. The chloride or muriate of antimony, commonly called the *butter of antimony*, is an escharotic or caustic in very general use in veterinary practice. Applied to a raw surface it instantly changes it white, destroying a thin layer of substance; hence it is a very convenient application in cankered feet, as, by means of a small camel's-hair brush, it can be spread over as much or as little a portion of parts as is necessary. In sandcrack, when the sensitive substance protrudes, it may be applied in a similar way. In obstinate cases of grease, the buds are sometimes beneficially touched with it: but in quittor, poll-evil, and other sinuses, it is not so proper as some other escharotics.—*Nitrated silver* (Argenti nitras), or, as it is popularly called, *Lunar caustic*, is a preparation from silver, which renders it expensive: it is, however, essentially necessary to the veterinarian's dispensary, from its being so completely under command in its action; not extending its effects beyond the immediate part it is applied to. It proves the most convenient caustic for destroying the edges of a contaminated wound, when not too extensive, as the bite of a rabid animal. Dissolved in five, six, or eight times its own weight of water, it forms an excellent liquid caustic, peculiarly useful as a dressing for the foot rot in sheep, and also to touch the protruded portions in sandcrack. Dissolved in twenty times its weight of water, it makes a useful detergent wash for foul ulcers, and to keep down too luxuriant surfaces.—Caustic potash (*po-*

tassa fusa), called *lapis infernalis*, formed into a solid body, is also another powerful caustic, quicker in its action than the lunar, and therefore more convenient for extensive use; but its ready liquefaction renders it unfit for tedious operations or deep-seated parts. Made into a paste with soap, it forms a useful escharotic to insert into the pipes of a quittor.—Oxymuriate of mercury (*hydrargyri oxymurias*), known by the term *corrosive sublimate*, is a very usual caustic employed, and is, perhaps, one of the best, for '*coring out*' quittors. In strong solution it is an excellent application for grease, often curing when every other means have failed.—The nitrous oxyde of quicksilver, called *red precipitate*, is also another preparation from mercury, and in very general use as an escharotic in horse practice. Sprinkled over very foul surfaces, it changes them quickly into a better state; and it acts equally beneficially on luxuriant sores, by destroying fungus, for which purpose its form of a powder renders it very convenient.—The sulphate of copper, called *blue vitriol*, is a much milder escharotic than most others, and much used in powder, to destroy fungus. A solution, of a drachm to six ounces of water, makes a detergent lotion for ulcers, as grease, &c. —The sulphate of zinc, or *white vitriol*, is also a good escharotic, and forms, in a saturate solution, the remedy for quittor, which it is said has been adopted by Mr. Newport.—*Quick lime* is sometimes used as an escharotic substance, for sprinkling over ulcerated surfaces, as cankered feet, &c.; for which purpose it is convenient, from its property of absorbing the moisture.

Euphorbium.—This most acrid substance is sometimes used as a substitute for cantharides. It irritates extremely, and therefore should never be used. See Blisters.

Expectorants.—These are remedies that promote the removal of the irritating mucus formed in the bronchii and trachea. The principal of these are oxymel, and probably squills: nauseants likewise act in this way. The critic might say that the horse does not expectorate; but his bronchial secretion can be increased, and he can cough out the produce: thus this class of remedies is not without its value in veterinary medicine.

EXTRACT OF LEAD.—See LEAD preparations.

FOMENTATIONS are warm fluid applications to an injured part, generally by means of cloths wrung out of hot water, and re-applied as it cools. Infusions of various herbs have been employed for fomentations; but as the good effect is principally dependent on the warmth and moisture, so warm water alone is sufficient. Fomentations allay irritation, and are useful to stimulate the flagging powers in gangrene: by tending to unload the vessels, they also promote resolution; but they are seldom used sufficiently long, and attendants are very apt, when they are removed, to leave the part wet or uncovered, by which more harm than good is done, as the evaporation thus occasioned is a source of cold. We have in some cases fomented, and had a poultice afterward applied: as far as we know, the practice is singular, but it is beneficial.

GENTIAN is a useful stomachic bitter: it has now somewhat given place to articles more in fashion; but I doubt much whether more effective. Mr. Youatt considers gentian as a valuable animal tonic, so much so, as to supersede most others. Its dose may vary by circumstances from one to five drachms; but it should be always given with ginger. It is a useful adjunct to aloes.

GINGER is perhaps the best spice in the veterinary materia medica; but even this should not be wantonly used. As a warm cordial, it may be occasionally given in doses of two or three drachms; and in flatulent colic, in doses of four to six drachms: it will also form a valuable assistant to saline and other cold remedies, given to tender stomachs and bowels. For horses, for cattle, and sheep, it is an excellent carminative, and should be always employed when a warm stimulant is wanting. It is indeed one of the most valuable cordials to invigorate the stomachic and intestinal surfaces we know of. The dose for cattle is from two to four drachms; and half a drachm to a drachm for sheep.

GLAUBER'S SALT (*Sodæ sulphas*).

GLYSTERS.—See CLYSTERS.

GOULARD'S EXTRACT, } See LEAD, and Preparations of.
GOULARD'S WASH, }

GRAINS OF PARADISE are warm spicy seeds; and are given by grooms to promote a fine coat. In this way they often do mischief; but as an addition to other stomachics, when necessary, they may be still properly made use of.

GRUEL is an article of no small consequence in the veterinary materia medica, inasmuch as it is bland, mild, and diluting. In making it, care should be had to its intention: if as a cordial or for nutriment, it ought to be thick; if as a diluent, it cannot be too thin: it should likewise, when made, be perfectly clean, and free from smoke. Ignorant servants are apt to think any thing sufficiently clean for a brute, without being aware that the most delicate female is not half so susceptible to unpleasant sensations from dirt as is the horse; and if he once has gruel offered to him that has been smoked, it is only by force that he will ever after take any. A useful diluent is also made from bran, by pouring boiling water on it, when it is called *bran tea;* but it should be strained when cold, particularly when offered to horses in catarrh.

GUM RESINS are compounded of gum and resin. *Gum ammoniacum* is sometimes used in chronic cough. *Gum guaiacum* is now employed in farcy. *Gum myrrh* has outlived the reputation of all others; but it is questionable whether its virtue as a cordial, in the usual acceptation or meaning of the word, is not ideal; but as a permanent tonic it ranks higher.

HARTSHORN, SPIRIT of (*Aqua carbonatis ammoniæ*). See CARBONATE of AMMONIA.

HELLEBORE, WHITE (*Veratrum album*). This active vegetable is variously estimated: Mr. Percivall cherishes it as a valuable sedative and active nauseant, given in doses of a scruple or half a drachm, every four, six, or eight hours. Mr. Youatt also praised it much for moderating active internal inflammation. We also have used it with very beneficial effects; but in verification of the old proverb, that doctors will differ, we are told that Mr. Sewell held it in slight estimation; it has, however, crept into pretty general practice. As the horse was not intended to vomit, so it is exceedingly difficult to excite nausea in him. Aloes have been used for that purpose,

but they are uncertain, and in many cases cannot be prudently administered, from fear of drawing the neighbouring affections to the bowels. We are, therefore, forced to trust to the powdered root of the white hellebore, which is, perhaps, the most certain nauseant with which we are acquainted; but it is only safe under very watchful eyes and quick perceptions. It may be given to a certain point, and nothing but moderate nausea is observed: if pushed beyond this, the head droops in the manger, the mouth slavers, the pulse sinks, the horse reels too and fro, and purging comes on, which commonly proves a fatal symptom. It may be given in doses of a scruple every six hours, which may be increased to half a drachm; but the horse must be carefully looked to, and as soon as the pulse sinks and the mouth slavers, or any trembling appears, desist from its further exhibition, directly combating its debilitating and sedative effects by active stimulants. Hellebore lowers the system more speedily than digitalis, but digitalis more safely when there is time for its operation; at least so we have found: it is for the observant veterinarian to select the proper cases for both. It ranks high also with some veterinarians when used with setons by smearing them with the powder, but black hellebore is superior.

HELLEBORE, BLACK.—We understand that this root has lately been employed with much success as a local application in fistulous affections of the poll and withers. When the tumour has burst and been allowed to discharge two or three days, being dressed with an ordinary digestive, and the discharge being of the nature termed laudable; then take a few portions of the fibrous part of the root, sew in the seton passed into the sinuses, and allow them to remain a fortnight or more. Under this treatment Mr. Morton assures us he has observed its salutary action in several cases.

HONEY is an article of importance in the veterinary pharmacopœia, as it is a medium for making balls with.

HYOSCYAMUS (*Henbane*) appears to act as a sedative, without the constipating qualities of opium.

INFUSIONS are only different from decoctions by the article employed being *steeped* in boiling water instead of boiled.

IODINE.—Among horses this substance has not long made its appearance; but as a remedy for bronchocele it has been some years employed on dogs. It is now given to horses to promote a solution of the glandular swellings which frequently remain after catarrh. In daily doses of half a drachm to a drachm, it seems to have much resolving power, not over these only, but also over all other glandular enlargements. It appears also to possess tonic and alterative properties combined. It is almost a specific for profuse staling. Its purity may be tested by its becoming soluble in alcohol, and by evaporating entirely by heat. In Mr. Morton's *Manual of Pharmacy*, several preparations of it are given, with valuable notices thereon, which we recommend to consideration. It is by some veterinarians very highly thought of; we particularly allude to the *iodine of potassium*, which may be administered to the horse in doses from one to two drachms: to cattle it may be given in the same quantities. An ointment, *ung. potassi iodidi*, is also an active dispeller of glandular enlargements. Its effects, we may add, are often slow, but seldom unavailing. The iodide of lead is an excellent application rubbed upon swellings; so also is the iodide of sulphur for obstinate skin diseases.

IRON.—Almost all the preparations from this metal prove excellent tonics to the horse. Iron filings may be given in the corn or a mash, in doses of two or three ounces once or twice a day. The rust, or carbonate (*ferri carbonas*), is another form, and proves useful when given as the former, in doses of one ounce to two. Green vitriol, or copperas, as the sulphate of iron is called (*ferri sulphas*), is also given as a tonic, and some think it a preferable preparation, on account of its saline admixture. It is usually given in a daily dose of one drachm or two drachms: it has more lately been given with some success in that form of glanders which has been termed "insidious." All the preparations of iron appear to produce most effect when combined with aromatic bitters: they should not be united with any alkali, consequently ought not, in chemical strictness, to

be made up with soap; nor should any astringent vegetable enter the composition with them.

JALAP, though so strong a human purgative, is totally inactive in the horse.

JAPAN EARTH.—See CATECHU.

JUNIPER.—The essential oil is used as a warm stomachic and slight diuretic; it also can with advantage enter into mange ointments.

KALI.—See POTASH.

LARD.—Many practitioners are at a loss for a substitute for lard, which forms the basis of most of their unctuous matters. When, however, lard cannot be procured, or is extravagantly dear, the fatty matter, called *palm oil*, may be always obtained: as a medium for balls, it may, as a vegetable oil, be supposed much less disgusting to the stomach of the horse than an animal oil, as lard.

LAUDANUM.—A liquid preparation or tincture of opium. —See OPIUM.

LAXATIVES may be denominated milder purgatives, and, as acting with less irritation, are much to be preferred to purgatives in inflammatory affections. In some chronic cases, also, they are eligible, because they can be more frequently repeated. Of this latter kind are calomel with small doses of aloes. The laxatives proper in febrile cases are Epsom, Glauber's, or, in default of these, common salts, eight to twelve ounces, dissolved in thin gruel, and repeated every six to ten hours till effect is produced. In some cases, as bowel affections, from six to eight or ten ounces of castor or linseed oil, with a few ounces of watery tincture of aloes, form the best laxative, especially when guarded with half a drachm of chloroform. It must, however, be allowed, that most of these articles are uncertain in their action; but their uncertainty is by no means equal to that which it is the fashion to represent. The action of laxatives is much assisted by diluting drinks, bran mashes, raking, and clysters: indeed, both bran mashes and clysters are of themselves in many cases sufficiently laxative. Grass, particularly that of the salt marshes, forms an excellent laxative out of the stable; so does soiling in it.

LEAD.—Several preparations of this metal enter into veterinary practice. The principal of these is the

Lead, Acetate of (*Superacetas plumbi*).—This is still familiarly known by the old term of *sugar of lead;* originally so called from its sweet taste. It is of much importance in veterinary practice, forming a more convenient, and we think a more efficacious, mode of making *Goulard water*, as the solution of it is popularly called; but which liquor has been usually made from a preparation of litharge, called extract of saturn, or Goulard's extract. When this celebrated liquor is to be made from the acetate, do it as follows:

Goulard water.—Take acetate of lead, one drachm to two, proof spirit an ounce, soft water a pint: when the extract is preferred, it is thus made:—Liquid acetate of lead (*liquor plumbi acetatis*), one drachm to two; proof spirit an ounce; soft water a pint. Either of these preparations of the acetate of lead are excellent, and justly appreciated applications, in superficial inflammations; but, to produce the full effect, the part affected should be kept constantly wet with one or the other of them. Internally, this preparation is inert: even four ounces have been given without producing any visible effect.

Lead, Carbonate of (*Plumbi carbonas*).—White lead is sometimes used as a desiccative, being sprinkled over a sore.

LIME is, in some cases, when *quick*, a useful caustic; and, when pulverized, is found good to sprinkle over cankered feet, greasy heels, or any foul surface, where an absorption of moisture, as well as an escharotic process are desirable.

Lime Water.—Six pounds of lime, infused in two gallons of water, may, after standing three or four hours, be strained off, and kept in a *closely stopped* bottle for use, without which care it will be useless. Lime water is a good application for mange; and is also sometimes recommended internally for obstinate coughs and nephritic complaints.

Chloride of Lime is a most valuable disinfectant: it is used as an external application to wounds having a putrid tendency; in the latter use it is inferior to the

chloride of soda, and more especially of zinc. In a retention of the placenta, called *not having cleansed*, in a cow, where the putridity had become so great as to produce larvæ or maggots and intolerable fœtor, there was injected a wine-glass of *chloride of lime*, diluted with a pint of warm water, into the vagina; which itself brought away, in two hours' time, several quarts of putrid matter, by which the cow was greatly relieved; but some fœtor returning, a second injection was passed the next day, which again sweetened the cleansing, and prevented further putrefaction. But as the placenta was not yet ejected, two ounces of the chloride of *soda* was now given in a pint of gruel every hour; the consequence of which was, that after the sixth dose the placenta came away, much decomposed, but without fœtor; and the cow was evidently saved by these means, though apparently before in a dying condition.

Liniment is a fluid preparation of oil and other matters.

Linseed.—The seeds boiled form a thick mucilaginous drink, used in catarrh, sore throat, and all chest affections. *Linseed meal* makes a convenient poultice, particularly where a close application of the poulticing medium is required.

Liquid Blister.—See Blister.

Liquor Ammoniæ Acetatis.—See *Acetated Liquor of Ammonia.*

Lotions.—See Washes.

Malt.—This forms an excellent cordial in cases of debility, and, when continued, it becomes a permanent tonic: it has also some pectoral qualities; but in active inflammations of the chest it is too stimulating for use. Malt is also an excellent alterative: in farcy, in grease, and in mange also, when accompanied with emaciation, it has been used with extreme efficacy: but, in such cases, it should be given in considerable quantities without other corn, and even with as little hay as possible, so that almost all the nutriment received by the constitution may be malt. This practice is not generally known, but it has proved, in some cases, singularly efficacious: the best mode of giving malt is by mashes.—See Mashes.

Mashes are much in request in stable management, and are

made from oats, barley, bran, malt, linseed, and sometimes chaff: they are also given cold or warm; but, in either case, should always be made hot. In making them, care is necessary to avoid smoking the water, and not to stir them with any thing dirty, or the horse will refuse them. The mode of mashing is sufficiently known: boiling water is poured on the bran, corn, or whatever is the subject of the mash, sufficient to render it of the consistence of a poultice; it should be covered over, and suffered to remain an hour or two, unless it is to be used hot to steam the head, as in catarrh; but even here it should not be hung round the neck immediately, or it would alarm the horse. Some horses will not readily eat bran mashes without a handful of corn to make it palatable: when horses are weakly and much emaciated, it is prudent often to mash all their corn. The quantity intended for them the ensuing day may be put into a vessel the over-night, and boiling water poured on it: in this way it is rendered more easy of digestion, and hence more nutritive. *Speared corn* has been sometimes recommended; which is nothing more than malting a quantity, by soaking it in cold water for twenty-four hours, and then spreading it two inches thick on a floor; this will make it soon sprout, when it may be given. In this way, it must be made from day to day, or it will become musty or mouldy.

MERCURY (*Hydrargyrus*), or QUICKSILVER.—This singular mineral yields us some of our most active medicinal agents.

Corrosive mercury (*Hydrargyrus oxymurias*), popularly called corrosive sublimate, forms an excellent medical agent in judicious hands. As an alterative, it may be given in doses of ten to twenty grains daily: in glanders and farcy this quantity may be gradually increased to as much as the horse will bear without inconvenience; but as its noxious effects are often sudden, so it must be most carefully watched. *Externally*, also, its effects are considerable. As a caustic, it has already been noticed among *Escharotics*. It formed a discarded wash for mange; and was often employed as an auxiliary to the stimulant properties of blisters, when used for exostosis. It appears

to have a very peculiar effect on cattle: received by the stomach, a considerable quantity may be given with impunity: but sprinkled on a wound, comparatively a small quantity destroys.

Red precipitated mercury (*Hydrargyri oxydum rubrum*), or *red precipitate*, is a useful, active, and convenient caustic, by the ease with which it may be sprinkled over sores. (See ESCHAROTICS.)

Black sulphuret of mercury (*Hydrargyri sulphuretum nigrum*), or *Æthiops Mineral*, is less frequently given in horse practice than it deserves. There is too much fashion in our pharmacy, and too little experiment. In all skin affections we have found this a valuable alterative, and also vermifuge, in daily doses of two or three drachms.

MINT and PEPPERMINT.—See OILS.

MURIATE OF ANTIMONY.—See ANTIMONY.

MURIATE OF BARYTES.—See BARYTES.

MURIATE OF SODA, or COMMON SALT.—See SALTS.

MYRRH.—This excellent gum resin is a valuable tonic to the horse, in doses of an ounce, particularly if united with a salt of iron, and any warm bitter. There are two tinctures of it; one simple, and one compounded with aloes: both of which are much used externally, as warm digestives, in wounds and sinuous sores, and the application is frequently attended with striking benefit: the aloetic tincture is by much the most stimulant. To cattle also it proves a stimulating tonic and valuable antiseptic in doses from one ounce to two ounces.

NAPHTHA.—See TAR.

NARCOTICS.—In the present instance, it is not necessary to separate the consideration of these from what lessens irritation and eases pain. — See ANTISPASMODICS and ANODYNES.

NATRON.—See SODA.

NITRATE OF SILVER (*Argenti nitras*). This is popularly called *lunar caustic*, and is in veterinary practice a valuable external application.—See ESCHAROTICS.

NITRE (*Potassæ nitras*) is a very general mineral product, and is as useful as it is general: it is compounded of nitric acid, and vegetable alkali, whence its chemical

name *nitrate of potash*. It is the most useful, powerful refrigerant: it greatly diminishes febrile action, and determines its depleting action more certainly to the kidneys than any of the saline articles we use. It is also antiseptic and diaphoretic, and therefore of great consequence in active fever, given two or three times a day, in doses of three or four drachms. As an alterative it is also well known; but it is not a good plan, as practised by some grooms, to infuse it into the water which horses are to drink; it is apt to disgust them with all liquids. Nitre is sometimes used as a cooling lotion for inflammatory swellings arising from sprains.

Nitre, Sweet Spirit of (*Spiritus ætheris nitrici*).—This is a valuable preparation of nitre, inasmuch as it is a refrigerant, and yet, in some measure, a cordial, from its æthereal composition; therefore it is a useful medicine in the more advanced stages of fever, in doses of four ounces two or three times a day. It is also a useful article to give in the immediate approach of the first cold fit of fever, in a dose of two ounces.

Nitrous Acid (*Acidum nitrosum dilutum*), or *aquafortis*.—See Caustics.

Oak Bark.—See Barks.

Oils.—These are either fixed or volatile. The *fixed oils* are so called because they are not liable to be changed into vapour under any high degree of temperature, and are also generally gained in quantities by expression. The *volatile oils*, on the contrary, are produced by distillation, and evaporate by a moderate heat. The fixed kind, in horse practice, are,—

Oil of Bay, an expressed oil from bay berries: now obsolete, except in the recipes of the country smith.

Oil of Castor.—See Castor Oil.—In very large doses this occasions some disturbance in the bowels, and does not often operate as a laxative; but in doses of eight or ten ounces, repeated every five or six hours, it proves frequently an excellent laxative when more drastic matters are inadmissible. It is apt to be decried, and numerous experiments are detailed to prove that it is noxious as well as inert; but hardly any two experiments agree.

Mr. Blaine had given it for years, without experiencing any ill effect, but often the best, from its use. It is true, it can never gain a character as a certain aperient; it is, on the contrary, an uncertain one, unless joined with a watery tincture of aloes, or with neutral salts, when the mixture seldom fails, if mashes have been in use: alone, it must be owned, it is not always certain as a purgative, but in quantities that produce much irritation. It is most safe when guarded by Chloroform.

Oil of Olives.—The best olive oil may be substituted for castor oil, when the latter cannot be obtained. It is the principal medium in the composition of liniments, and enters into many ointments.

Oil of Linseed.—It is a pretty certain laxative, and is more to be depended on than olive oil; and in many instances more than castor oil.

Oil of Palm.—This has the consistence of lard; with the addition of a fragrant smell. As it does not become rancid, it is greatly to be preferred: it must also be less noxious to the stomach of the horse than the animal oils. It is the produce of the kernels of the fruit of the Cocos Butyracea, or Mackaw tree, or Brazilian palm.

The *essential* or *volatile* oils are,—

Oil of Amber.—An antispasmodic not much in use. It is said to have a peculiar property of hastening the action of aloes.

Oil of Anise Seeds.—This is an excellent warm aromatic, and may very properly be added to cordial balls.

Oil of Caraways may be used in the same way, and considered in a similar point of view.

Oil of Juniper.—This is often added to diuretic balls, to increase their effect: it acts, however, principally, as a warm aromatic. It is now mingled with mange applications.

Oil of Tar is a cheap penetrating distillation from tar. It may be employed in mixture with whale oil, as a suppling matter for the hoofs.

Oil of Turpentine.—See TURPENTINE.

Oil of Origanum.—This warm penetrating oil was formerly much used as an external stimulant; but it

possesses no powers superior to turpentine, and is therefore little used by modern practitioners.

Oil of Vitriol.—See SULPHURIC ACID.

OINTMENTS are greasy applications for covering excoriated surfaces. The numerous preparations of this kind are much reduced in number.

OPIUM.—We believe it has been attempted to prove that this valuable antispasmodic is nearly inert in the horse, and it is true that it requires a large dose to exert a narcotic effect; on the contrary, its action is rather that of a stimulant when the system is already excited; it therefore is injurious in direct increased vascular action; but in indirect vascular action, the consequence of some great irritation, it then exerts its sedative properties. In enteritis of the horse, nevertheless, after blood has been abstracted, it has had a most salutary effect. Its advantages also are apparent in tetanus, where its benefits are sometimes most striking: in spasmodic colic its powers are particularly observable after very enormous doses; in which cases, also, it may be given in clysters as well. It greatly assists the action of astringents in diarrhœa; and, in profuse staling, united with alum and catechu, it has proved singularly efficacious; as also in difficult staling, not dependent upon spasm of the neck of the bladder. In farcy and skin complaints, it combats the ill effects of too large doses of active minerals. It increases the pulse, in repeated doses of one to two drachms every six hours; hence it is an useful auxiliary remedy in the debile stages of irritative fever.

Laudanum is the tincture of opium, and is a most effective preparation. It must, however, be given to the horse in doses of one ounce, and even larger, according to the necessity of the case.

OXYMEL, SIMPLE.—This is made by simmering a pint of vinegar with two pounds of honey. Sugar is sometimes substituted, but this is never advisable, as it destroys a considerable portion of the efficacy of the compound. Oxymel, properly made, will be found a valuable remedy in pneumonia, and all catarrhal affections; particularly in conjunction with nitre, tartar emetic, and foxglove; the dose from four to six ounces.

PALM OIL.—See OILS.

PEPPERS.—The various kinds of peppers are sometimes used, particularly in colic. Mr. B. Clark has written a treatise expressly on the virtue of the pimento berry. As a domestic remedy, any of them may be very properly given in doses of three drachms to six; except the Cayenne, which, as being very strong, admits of only a drachm as a dose: the peppers are sometimes used as stomachics, or to warm other more permanent tonics, like steel, bitters, &c.

PHYSIC.—See CATHARTICS.

PITCH is used to give a consistence and adhesiveness to plaisters and ointments, and is also the basis of charges. It has a strong *medicinal* quality as its relationship with terebinthinated substances convinces.

POTASH (*Potassa*) has been commonly called the *vegetable alkali*, to distinguish it from soda, or the *mineral alkali*. Potash in its pure state is a potent caustic, and enters as a base into the composition of salts. The *nitrate* and the *supertartrate* have potash as their foundation: the former has been noticed as nitre; the other is popularly called, cream of tartar.

Supertartrate of Potash (Potassæ supertartras, *cream of tartar*).—This is not a very active medicament in horse practice, but is however slightly febrifuge, and mildly diuretic: it has some alterative powers, and unites with those medicines which are generally employed when horses are labouring under cutaneous affections.

POULTICES.—In veterinary practice, bread would be too expensive an article to make poultices of in common cases. Bran, therefore, is very commonly used; and, to give it a proper consistence, some linseed meal, if thought necessary, may be mixed with it; or, in default of this, a little of any other meal. A *poultice* should be made of a sufficient consistence, that it may not run through the cloth it is put in; and yet it should not be so thick as to dry too quickly, for a poultice acts principally by its moisture; therefore it should be frequently wetted through the cloth. In applying poultices to the legs, care should be taken not to tie them too tight, as is frequently done, and thereby the mischief is aggravated instead of relieved: a piece of broad list is, for this reason, very proper to

fasten them on with. A poultice should never be applied too hot; very little good can be derived from it, and much pain may be occasioned. A hot poultice soon sinks to the heat of the part. Poultices are likewise, in many cases, applied cold. A very convenient mode of applying a poultice to the extremities is by means of an old stocking cut off at the ancle. The leg of it being slipped over the hoof, is brought around the part, and secured below by means of broad list. The poultice is then put into the stocking by means of the hand, and afterwards secured above by another piece of broad list. In cases where it is found difficult to keep a poultice on any part of the extremities, from its inclination to slip down, still by no means tighten the supporting bandage; but, instead, pass a long tape from it over the withers if in front, or back if behind, and attach it to the other side of the bandage; it will then be effectually secured from slipping.

A common softening Poultice.

Bran, any quantity; pour on it boiling water, to form a thick paste; add linseed meal sufficient to make it adhesive. After this, stir in one or two ounces of sweet oil.

A cooling Poultice.

Bran, any quantity; pour on it a sufficient quantity of cold water to form a poultice; and, as it dries, moisten with more water.

Cleansing Poultices in general use for Grease, or ichorous Discharges, or for gangrenous Wounds.

Oatmeal	half a pint.
Linseed meal	half a pint.
Powdered charcoal	four ounces.
Stale beer and bran grounds	sufficient to make a poultice.

Or,

Carrots, scraped	sufficient to make a poultice.

Or,

Turnips, boiled and mashed	sufficient to make a poultice.

To either of these last two four ounces of charcoal may be added, if thought proper. Or,

Linseed meal, or oatmeal, any quantity; mix with boiling water, and ferment with a table-spoonful of yeast: as it rises, apply to the part.

POWDERS.—Pulverized medicines, without much taste, may be conveniently given by mixing with a mash, or in the

corn. If in the latter, and the matters given are very dry and light, the corn should be first sprinkled with water, to prevent the powder being blown away by the breath of the horse or the snorting of the animal. But whenever a horse is delicate in his stomach, and refuses his food on this account, the attempt to give them thus should not be persisted in.

PURGES.—See CATHARTICS.

QUASSIA, a useful bitter in doses of six to ten drachms.

QUINA, often called *quinine*, is a disulphate of quina; and, as far as our own experience goes, is a very valuable brute as well as human tonic in doses of from one drachm to two drachms, and is more particularly so if conjoined with camphor. We need not say that its costliness prevents its use save in particular cases.

RAKING is a method of emptying the bowels by means of the hand. The right-hand arm being stripped and oiled, with the left hand the tail is drawn aside, when the right being made as small as possible, should be gently introduced up the fundament, and any hardened excrement the hand meets with carefully removed. From this it will be at once evident that *back-raking* must be useful in a vast variety of cases. It should always be made use of previously to giving a clyster, otherwise the hardened matter may cause the rejection of the fluid. It is also always proper in colic; and in all cases of costiveness it should never be dispensed with.

RED PRECIPITATE.—See MERCURY.

REPELLENTS.—Medicines whose action was supposed to consist in driving back humours from one part to another. Modern physiology allows no such power; and it appears, from the theories now received, that all repellents, as they were termed, act simply by their tonic force.

RESIN, or ROSIN, is either yellow or black. The yellow is the one used in veterinary practice; internally, as a diuretic; and externally, in charges, plaisters, &c.

SALTS:—

Common Salt.—This is a useful remedy in veterinary practice; for when Epsom or Glauber's salt cannot be conveniently got at, this may be substituted as an ape-

rient. It also proves itself a vermifuge, and in solution assists the effects of opening clysters. It may be given in doses of from six to eight ounces. The *chloride of sodium* or common salt is an invaluable tonic and alterative, and is so palatable that it induces the animals before whom it is placed to eat it with avidity. It increases the digestive powers; and we believe it to be a vermifuge also. As a remedy for the rot in sheep, Mr. Youatt bears evidence of its excellence.

Salt, Epsom (Magnesia sulphas).—See SULPHATE OF MAGNESIA.

Salt of Steel.—See IRON.

Salt of Tartar.—See POTASH.

SAVIN.—It is efficacious against warts.

SEDATIVES.—These form a class of valuable remedies calculated to diminish the irritability of the system, either by acting on the immediate part or on the whole sensorium. In some cases they may be supposed to act by enabling the system to resist irritating impressions; in others they lower the animal powers by a narcotic or soporific effect. In the horse we have no remedies that are decided soporifics; but we have such as lessen irritation and check spasmodic action (see ANTISPASMODICS). Opium, hyoscyamus, digitalis, cicuta, belladonna, camphor, nauseants, and the cold bath, are sedatives adopted in different stages succeeding upon injuries or fever. Some irritative states are best combated by tonics, as the mineral acids, &c.

SILVER furnishes us with a *nitrate* known as the lunar caustic, whose properties as an escharotic are detailed under that head.

SODA is the *mineral* alkali, the medicinal properties of which do not differ materially from potash, or the vegetable alkali.

Chloride of Soda is a detergent, and a disinfectant. As an application for malignant and spreading ulcers it possesses very great efficacy. It forms also a good stimulating injection for poll-evil and fistulous withers; and in grease it may be often advantageously employed.

SPANISH FLIES.—See CANTHARIDES.

Spurred Rye, or *Secale Cornutum*, or *Ergot of Rye*, acts as a uterine excitant. It should be kept in well-stoppered bottles, and even then it must not be kept too long. It acts in doses of two to four drachms; but it should not be given until the regular forcings of the womb have proved ineffective. It has been administered to the foaling mare with effect, but it appears to exert its powers most successfully in cows and sheep. The *secale* is certainly an emmenagogue of great power, yet it should be employed only when other means have failed.

Squills (*Scilla Maritima*).—Squills are highly recommended by Mr. White. By their stimulating properties they may assist the bronchial secretions in a slight degree; but in cases of emergency they ought not to supersede more active agents.

Starch.—In diarrhœa, starch clysters have proved very useful. Starch may also in such cases be given internally, united with chalk and opium.

Stimulants.—The veterinarian is doomed to hear the word *cordials* so often, that he will gladly recognize all proper matters under this head in preference to the former much abused one. *Stimulants* are medicines that exert an influence on the system by increasing the power and action of a part; hence they may be considered as very numerous, and the term as of very extensive signification. *Local stimuli* are all such matters as either promote the vascular, the nervous, or the absorbing energies; as friction, rubefacients, blisters, &c. *General stimuli* act on the sensorium at once, through the medium of the senses: the voice of the hounds stimulates the horse; the exertions of a fellow will likewise stimulate; and the stallion's fire is drawn forth by the scent of the mare. *Absorbing stimulants* are heat, cold, friction, depletion, mercury, &c.

Stomachic stimulants.—Such may be called *cordials*, as are intended to have a temporary effect on the stomach; and those may be noted as *stomachics* whose action is more permanent. Both the one and the other appear to act by a sympathetic effect they excite between the stomach and the brain: warm spicy matters possess some

efficacy; but, as might be supposed, such cordials (i.e. stomachics) appear to act best when they are received into the system at large, as generous food, malt, gruel, ale, &c.

No. 1.—Gentian, powdered ..... eight ounces.
Ginger, powdered ..... four ounces.
Oil of anise seed ..... half an ounce.

Make into a mass with lard, honey, treacle, or conserve of roses, and give one ounce for a dose.

No. 2.—Of the preceding mass ..... one ounce.
Gum myrrh ..... one drachm.
Balsam of Tolu ..... one drachm.

No. 3.—Of the first mass ..... one ounce.
Camphor ..... one drachm.
Opium ..... one drachm.

Either of these may be given as a drink also, by infusing the powders in a pint of ale.

As *stimulants*, Mr. Vines, in his *Treatise on Glanders*, enumerates the following articles:—Cantharides, canella bark (*canellæ cortex*), capsicum berries (*capsici baccæ*), cubebs or Java pepper (*cubeba*), ginger root (*zingiberis radix*), grains of paradise (*grana paradisi*), pellitory of Spain (*pyrethri radix*); all the different sorts of peppers, as the common, black, Cayenne, Chili, long, and white; pimento or allspice (*pimentæ baccæ*), sweet flag-root (*calami aromat. radix*), Winter's bark (*Winteræ cortex*).

More permanent stomachic stimulants are such as act not only by determining a greater quantity of blood to the stomach, but also by strengthening the muscular tone of that organ, enabling it to act with more energy in its digestive movements. The following formulæ are inserted, and are proper in cases of convalescence, or recovery from debilitating diseases which have impaired the appetite:—

Powdered canella alba ..... four drachms.
Ginger ..... one drachm.
Sulphate of copper (*blue vitriol*) ..... one drachm.

Make into a ball with conserve of roses.

Decoction of chamomile ..... three pints.
Watery tincture of aloes ..... one ounce.
Ginger, in powder ..... half an ounce.
Sulphate of iron (*green vitriol*) ..... half an ounce.

Mix, and divide into four drinks.

Gum myrrh	two drachms.
Mustard flour	one drachm.
Cantharides	five grains.
Gentian powder	four drachms.

Make into a ball with thin Venice turpentine.

Powdered gentian	three drachms.
Powdered quassia	three drachms.
Powdered grains of paradise	three drachms.

Make into a ball with Venice turpentine.

Tonic stimulants are supposed to exert their influence on the muscular fibre, and to improve its tone: this they do, in some instances, through the medium of the stomach, and are then called stomachics; or they are received into the blood. *Tonics* are, therefore, stimulants of permanent action; from which we may learn that this class is numerous, and is, in fact, diffused through the whole materia medica. A complete knowledge of their number and effect can only be gained by an intimate acquaintance with the animal economy, and the nature of the various agents employed in acting upon it. Either of the subjoined may be given daily:—

Gum myrrh	two drachms.
Sulphate of iron (*green vitriol*)	two drachms.
Gentian powder	three drachms.
Ginger powder	one drachm.

Mix into a ball with turpentine or palm oil; or into a drink with a pint of mild ale.

Arsenic	four grains.
Gentian, powdered	three drachms.
Cascarilla, powdered	three drachms.

Mix into a ball with conserve of roses; or, like the above, into a drink.

Gum myrrh	three drachms.
Powdered gentian	three drachms.
Carbonate of iron	two drachms.

Make into a ball.

As tonics, Mr. Vines also enumerates Angustura bark (*Cusparia cortex*), Buckbean (*Menyanthes trifoliata*), Cascarilla bark (*Cascarillæ cortex*), Chamomile flowers (*Anthemides flores*), Gentian root (*Gentianæ radix*), Quassia wood (*Quassiæ lignum*).

STOPPINGS are articles introduced into the hollow at the bottom of the hoof to moisten the horn; and in other

instances also, as in cases of corns, or bruised soles. For the first purpose, any thing that will retain moisture may be used; the following will be found as good as any, as it not only moistens but renders the horn tough:—

Linseed meal	four parts.
Tar	one part.

This may be taken out of the foot, and re-applied; thus sufficient to stop the foot once, is made to serve several times.

Clay is not a good stopping. It dries too soon, and then rather adds to the evil of hardening the hoof than diminishing it. In cases of pricks, &c., tar is not improperly used as a stopping. Pieces of tow are dipped into it, and are then retained by means of tough strips of wood, as withy from the broom-binding, which may be laid across. Oil of turpentine one part, horse turpentine one part, and grease a third part, make also a good stopping for similar purposes. Sole pads are now invented of thick felting, which, being passed within the shoe, and then wetted, swell, so as to be permanently retained, and yield moisture.

STORAX.—See BALSAMS.

STYPTICS are remedies that restrain hæmorrhage, either internally or externally. Those used in the first case, are acetate of lead, sulphate of zinc, alum, and catechu; in the last, pressure, division of the vessel, cold, hot iron, cobwebs, down, galls, or any substance that has a coagulable property.

SUBLIMATE.—See MERCURY.

SUDORIFICS.—These are uncertain remedies in the horse. We can procure a slight relaxation of skin by diluents, warmth, and diaphoretic medicines; but actual perspiration we can seldom excite, except by violent nauseants. Vinegar, however, in frequently repeated doses of six ounces, will generally produce it; but it appears to excite much action in the system, and hence is not to be recommended. Increased clothing will generally produce it; but by exciting increased action, it may do more harm than good. In common cases, it will be therefore prudent to content ourselves with diluents, antimonials, and

acetated liquor of ammonia: in important ones we may use nauseants.

SULPHUR.—Flour of sulphur is a very common remedy in veterinary practice; internally as an alterative, and externally as a cure of eruptions of the skin: for the latter purpose, the black sulphur, which is cheaper, should never be used, as it is apt to contain arsenic.

SULPHURIC ACID, or Oil of Vitriol (*Acidum sulphuricum*), is seldom used in horse practice but as an escharotic, or in a diluted state as a lotion.

SULPHUR, BALSAM OF (*Oleum sulphuretum*).—Brimstone, boiled in oil, was used formerly in old coughs and thick wind; but, as may be supposed, with little advantage. Anisated balsam of sulphur was made by adding oil of aniseed to the former.

SULPHATE OF COPPER (*Cupri sulphas*).—See COPPER.

SULPHURET OF QUICKSILVER (*Sulphuretum hydrargyri nigrum*), or Æthiop's mineral.—See MERCURY.

SULPHATE OF MAGNESIA (*Magnesiæ sulphas*), Epsom Salts, is a valuable medicine oftentimes to the veterinarian. In cases requiring a loose state of bowels, but where aloes are inadmissible, as in inflammatory affections, this salt is often a resource: in fevers it appears to have a double effect; one as a febrifuge, the other as an aperient. It requires from six or eight ounces to twelve, dissolved in water or gruel, to open the bowels; and sometimes it is necessary to repeat the dose before the effect is produced. It cannot, therefore, be considered altogether as a certain laxative; but when combined it seldom fails, particularly if assisted by bran mashes. In opening clysters, also, it may be very properly added.

SUPERTARTRATE OF POTASH (*Potassæ supertartras*), or Cream of Tartar.—See POTASH.

TAR is a very useful article to the veterinarian. Equal parts of tar and fish oil make an excellent application for the hoofs of horses, applied daily with a brush. Tar is also an excellent stopping for the bottom of the feet, in the proportion described under STOPPINGS: it is, also, either alone, or mixed with oil of turpentine, often used with advantage as a salve in pricks and bruises of

the sole. Tar has also been given inwardly in balls for coughs.

Tar, Barbadoes.—This is the more cleanly preparation to be employed as an internal remedy, and is often given for coughs. Mr. Hart has attempted to sanction the use of it, under the name of Green Naphtha, as an internal remedy in all chronic chest affections.

TANNIN is prepared from oakgalls; when concentrated with gallic acid, it then effectually becomes a powerful astringent.

TARTARIZED ANTIMONY (*Antimonii tartarizatum*).—See ANTIMONY.

TENTS are substances introduced into wounds, to prevent their too early closing. In deep lesions having a narrow outlet, or when any foreign body remains to be expelled, they may be very properly employed; and any soft substance, as lint or tow, may be introduced for this purpose.

TIN.—This is used as a vermifuge for horses. It has, however, but moderate efficacy, and, when given, it should be always in fine filings, and not levigated, as there is reason to believe its action is purely mechanical; in which case, tin must be preferable to pewter filings, as being harder; but the last are generally substituted. Dose, three ounces daily.

TINCTURES are solutions of vegetable or other matter in spirituous liquors, of various strengths and of different kinds. When any of the resinous gums are to be dissolved, pure spirit of wine should be used. When the roots, bark, leaves, &c. of plants are to be made into tinctures, dilute or proof spirit is sufficient. Most of the tinctures of the human pharmacopœia may occasionally be employed in veterinary practice, but, for the above reasons, this will never be a very useful formula. The principal ones in use are tincture of aloes; compound tincture of benjamin; tincture of myrrh; and tincture of Spanish flies; all of which are occasionally used. Internally, also, all of them are stomachics and tonics. Tincture of catechu likewise may sometimes be useful in astringent drinks. The tincture of opium also would be of use. Foxglove,

as being a powerful remedy, may likewise be often given in tincture; so also would many others.

TOBACCO.—This is a very powerful narcotic. An instance is mentioned by Mr. White, of two ounces having been given by an ignorant groom to produce a fine coat, which occasioned almost immediate death. But this very activity, when we are better acquainted with its mode of action, may be made subservient to important medicinal purposes.

TONICS are remedies so called from a supposed property of giving tone to the living fibre; by which they increase the action of the heart and arteries through the medium of the stomach principally.—See STIMULANTS.

TURNER'S CERATE.—See CERATES.

TURPENTINE forms an article of very considerable importance in veterinary medicine. There is no great difference between the Venice and the common, which are the kinds principally used in our practice. The oil is the essential principle: the Venice turpentine is less potent, and owes its slight activity to the little oil which it contains.

Turpentine, Oil of.—This terebinthinated preparation is far more in use than the Venice turpentine. Internally, in doses of two to four ounces, it forms an antispasmodic in flatulent colic, and half the quantity in daily doses is a vermifuge; in both chronic and acute indigestion it is also serviceable. Externally, its use is still more frequent: it is a ready and never-failing stimulant; and more dilute, it forms an application for old strains and bruises.

UNGUENTS.—Synonymous with ointments; which see.

VERDIGRIS (*Æruga*).—See ACETATE of COPPER.

VERJUICE is only an apple vinegar, and hence applicable to similar purposes with acetic acid.

VERMIFUGES are such substances as remove worms from the body. Tin or pewter, iron filed fine, but not levigated, or powdered glass, two or three ounces of either are in general use. Common salt, six to eight ounces; oil of turpentine, two to three ounces; savin, one to two ounces; cowhage, half a drachm; calomel, a scruple; arsenic, ten grains; aloes, till they purge; tartar emetic

in drachm doses for six mornings, and then a purging ball; all these are, or have been, thought to be excellent vermifuges, but the last is now most confided in. Worm medicines should be given fasting.—See WORMS, in the DISEASES.

VESICATORIES, blistering articles.—See BLISTERS.

VITRIOL, WHITE (*Sulphas zinci*).—White vitriol, or sulphate of zinc, is an excellent styptic and astringent: applied externally: Mr. Morton speaks of it in solution, as very useful in reducing the swellings of horses' legs, gorged by over exertion. But instead of the common linen or woollen bandages usually employed, Mr. M. recommends those made of chamois leather, which not only retain the moisture, but by their elasticity give a continued compression to the relaxed or gorged limb. In ophthalmia it forms the best wash for the middle and latter stages. It is also a good detergent in grease and other ill-conditioned sores.

Vitriolated Copper.—See BLUE VITRIOL.

Vitriolated Iron.—See GREEN VITRIOL.

Vitriol, Oil of.—See SULPHURIC ACID.

VINEGAR, Dilute Acetic Acid (*Acetum*).—The acetous acid is very frequently used in veterinary practice; it is of the utmost consequence, therefore, that it should be pure. It is, however, unfortunately, very liable to be adulterated with, or wholly made of, sulphuric acid, and then becomes very unfit for use as an internal remedy, being changed into an active stimulant instead of a refrigerant. Vinegar, not neutralized by salt or sugar, is capable of proving very noxious to the horse. We have instances on record of a pint of strong vinegar destroying life; but, neutralized with carbonate of ammonia, it forms a most excellent febrifuge, under the old name of Mindererus's Spirit. Neutralized with sugar or honey, it forms a valuable expectorant called oxymel. As an external application, the acetous acid is likewise no less useful. In strains, bruises, and other local injuries, it is the base of the best remedies, either in combination with acetate of lead when active inflammation exists, or mixed with crude sal ammoniac, or the bay salt, to counteract the effects of distention.

Vinegar, distilled.—This preparation is nothing more than the common vinegar deprived of its water and feculent parts.

Washes are watery solutions, or infusions, of various substances, to be *washed* over the parts to which they are to be applied.

Wax, White and Yellow.—The yellow is principally used by the veterinarian, to thicken and give consistence to ointments.

Willow Bark.—See Bark.

Worm Medicines.—See Anthelmintics.

Zinc.—See Vitriol, Calamine, and Chloride of Zinc.

INDEX.

Abscess, 432. 439. 455.
——— chronic, 459.
Abdomen, anatomy of, 225.
——— regions of, 236.
——— stones in, 422.
——— wounds of, 442.
Absorbents, 121.
——— functions of, 122.
Abstraction of blood, 594.
Abuse of purgatives, 600.
Action of the muscles of respiration, 215.
Acute indigestion (cattle), 389.
——— laminitis, 522.
Adhesive inflammation, 439.
Aëration of the blood, 221.
Age, the teeth with regard to, 36.
——— of horned cattle, 47.
——— of sheep, 48.
Alimentary canal, diseases of, 385.
Amaurosis, 506.
Ammoniacal blisters, 592.
Amputation of the penis, 587.
——— tail, 588.
Amputations, 586.
Anasarca, 417.
Anatomy and physiology of the foot, 259.
——— of the abdomen, 225.
——— of ganglia, 162.
——— of spinal marrow, 163.
——— of spinal nerves, 164.
Anchylosis, 496.
Ancient English writers, 5.
Anconeus, 100.
Animal poisons, 425.
Antea spinatus, 98.
Anterior aorta, 127.
——— cava, 144.
——— extremities, 79.
Aorta, 127.
——— anterior, 127.
——— posterior, 136.
Appearance of really aged horses, 41.
Appendage to bone, 96.
Apoplexy, 375.
Arteries, 119.
——— course of, 120.
——— of the brain, 135.
——— wounds of, 451.
Arteriotomy, 594.
Articles used for purgatives, 601.
Articular cartilage, 90.
Ascites, 415.
Axillary artery, 129.

Back (the), when well formed, 32.
——— sinews, rupture of, 473.
Bars, 263.
Bel (M. St.) successful in 1790, 7.
Belly, dropsy of, 415.
——— wounds of, 442.
Biceps rotator tibialis, 109.
Bishoping horses to disguise their age, 43.
Bites of venomous reptiles, 427.
Bladder, 242.
——— arteries of, 130.
——— inflammation of, 338.
——— spasm of the neck of, 339.
Bleeding, 594.
Blistering, 589.
Blood, abstraction of, 594.
——— aëration of the, 221.
——— circulation of the, 218.
——— spavin, 478.
Bloody urine, 410.
Blown, 389.
Blows on the point of the shoulder, 470.
Bog spavin, 470.
Bone spavin, 492.
Bones, 63.
——— appendages to, 90.
——— of the foot, 84.

Bones of the pastern, 82.
——— posterior extremities, 85.
——— shank, 82.
——— skull, 64.
Bony trunk, 73.
Bowels, inflammation of the, 333.
Brain (the) and its meninges, 150.
——- base of the, 153.
——- diseases of the, 374.
——- inflammation of the, 299.
——- structure of the, 155.
Breast, chest, or counter, 25.
Broken knees, 449.
——— wind, 348.
Bronchii, 220.
Bronchitis, 342.
Bruises, 475.
Bursæ mucosæ, 118.
——— enlarged, 479.

Calculus concretions, 422.
——— intestinal, 422.
——— urinary, 423.
——— vesicular, 424.
Calving, dropping after, 291.
Canine teeth, or tushes, 39.
Canker, 556.
Cannon, or shank bone, 26.
Capped hock, 481.
Capsules, renal, 246.
Carcass, or trunk, 31.
Carotid, common, 131.
——— external, 132.
——— internal, 135.
Cartilage, 90.
——— articular, 90.
——— non-articular, 90.
Casting, 562.
Castration, 567.
——— by cauterization, 569.
Cataract, 505.
Catarrhal fever, or influenza, 277.
Cattle, the horns denote the age of, 48.
——— the permanent teeth of, 48.
Cava, vena, anterior, 144.
——— posterior, 148.
Cellular tissue, 173.
Cerebral nerves, 156.
Cervical ligament, 208.
Channel (the) should be wide, 20.
Charter granted to the Veterinary Profession by Her Majesty, 10.
Chest, counter, or breast, 25.
——— dropsy of, 413.
Chronic abscess, 457.
——— cough, 345.
——— founder, 526.
——— indigestion, 388.
Circulation of the blood, 218.
——— fœtal, 254.
——— greater, 219.
——— pulmonic, 236.
Coats of the eye, 183.
Cœcum, 225.
Cold, or cough (cattle), 296.
Coleman and Morecroft (Messrs.) appointed joint professors, 8.
Coleman (Mr.), summary of his merit, 9.
Colic (cattle), 388.
——— spasmodic, 385.
College, Veterinary, History of, 6.
Colon, 236.
Colours, or marks, of the horse, 49.
Colt (the), 258.
Committee, medical, established, 8.
Common cold, 341.
——— integument, 168.
Complexus major, 105.
Composition of bone, 59.
Condition, 51.
——— always means one thing, 52.
——— getting a horse into, 54.
——— morbid, 53.
Conformation of the exterior of the horse, 15.
Coraco humeralis, 100.
Corns, 539.
Costiveness, 397.
Coverings of the body, 168.
——— of the viscera, 168.
Cribbiting, 401.
Customs, induce material change in horses, 13.
Cuticle, 169.
Cutis, 176.
Cystitis, 338.

Danger of purgatives, 600.
Deglutition, 205.
Depressor capitis major, 107.
——— minor, 107.
Descent of the testicle, 255.
Description of Plate I., 60.
——— II., 92.
——— III., 117.
——— IV., 119.
——— V., 149.
——— VI., 175.
——— VII., 209.
——— VIII., 224.
——— IX., 250.
——— X., 260.
Diaphragm, 213.
——— rupture of, 442.
Diarrhœa, 398.
——— (cattle), 400.
Diffused inflammation, 272.

Digestion, 231.
Disease of the alimentary canal, 385.
——— bone, 488.
——— brain, 374.
——— divisions of, 271.
——— of the eye, 497.
——— feet, 522.
——— generally, 269.
——— glands, 407.
——— navicular joint, 537.
——— nerves, 374.
——— skin, 507.
Diseased collections of fluid within the cavities, 412.
——— of fluid within the cellular membrane, 417.
Dislocated patella, 486.
Dislocations, 481—486.
Distribution of the arteries, 127.
Diuretics, 606.
Division of disease, 271.
——— the flexor tendons, 585.
——— the sentient nerve of the foot, 581.
——— the temporal artery, 594.
Docking, 588.
Dropping after calving, 291.
Dropsy of the abdomen, 415.
——— belly, 415.
——— chest, 413.
——— head, 412.
——— heart, 415.
——— skin, 417.
Duodenum, 234.
Dysentery, 331—368.
——— cattle, 370.

Ear (the), 176.
Earl of Plymouth, the first to stable hunters, 58.
Early writers of Greece, 2.
——— Rome, 2.
Ears, how they should be carried, 17.
Ecchymosis, 420.
Elbows of the horse, 25.
Embryotomy, 566.
Encysted tumours, 478.
Enlarged bursæ mucosæ, 479.
Epidemic of 1841-42, 297.
Erectores capitis major, 106.
——— minor, 106.
Exostosis, 488.
——— of the coffin bone, 496.
Extensor pedis, 102.
——— posterior, 113.
——— accessorius, 113.
——— metacarpi magnus, 101.
——— obliquus, 101.
——— suffraginis, 102.
Exterior conformation of the horse, 15.
External iliac arteries, 138.
——— tumours, 478.
Extravasation of blood, 420.
Extremities anterior, 79.
Eye (the), 179.
——— coats of, 183.
——— humours of, 180.
——— use of, 181.
Eyelids, 186.
Eyes, the mode of examining them, 17.

Face, bony, 67.
—— of the horse, 19.
Fœtal circulation, 259.
Fall of the veterinary profession in the Dark Ages, 2.
False quarter, 560.
Farcy, 362.
——— water, 418.
Fat, 72.
Fauces, 199.
Feet, diseases of, 522.
—— inflammation of, 522.
—— should be of a proper size, 26.
Femoral artery, 141.
Fetlock joint, sprain of, 473.
Fever in cattle, 288.
——— pure, 271.
Firing, 588.
Fistulous parotid duct, 464.
——— withers, 463.
Flanks, 33.
Flexor brachii, 100.
——— metacarpi externus, 102.
——— internus, 102.
——— medius, 102.
——— pedis perforans, 102—115.
——— perforatus, 102—115.
——— radialis accessorius, 104—115.
——— tendons, division of the, 585.
——— rupture of, 473.
——— sprain of, 471.
——— their ligamentous connexions, 471.
——— their sheaths, 471.
——— ulnarius, 103—115.
Folly of turning a horse out to grass, 52.
Foot, anatomy and physiology of the, 259.
—— division of the sentient nerve of the, 581.
—— interior of the, 263.
—— pumiced, 536.
—— prick in the, 547.
—— punctured, 547.
Fore-arm (the) should not be too large, 26.

Founder, acute, 522.
——— chronic, 526.
Fractured arm bone, 485.
——— bones of the extremities, 484.
——— cannon, 485.
——— face, 483.
——— femur, 485.
——— humerus, 484.
——— ilium, 486.
——— jaw-bone, 484.
——— navicular bone, 486.
——— olecranon, 485.
——— pastern bones, 486.
——— patella, 486.
——— pelvis, 484.
——— ribs, 484.
——— scapula, 484.
——— scull, 483.
——— tibia, 485.
——— vertebræ, 484.
Fractures, 481.
French method of castrating, 574.
——— Revolution (the), favoured veterinary medicine, 4.
Fret, 385.
Frontal sinuses, 190.
Functions of the eye or sight, 188.

Ganglia, anatomy of, 163.
Gangrene, 435.
Garget, 293.
Gastrocnemii externus, 114.
——— internus, 115.
Gemini, 113.
Gestatory term, 256.
Getting a horse into condition, 54.
Glanders, 353.
Glands, diseases of, 407.
——— of the head, 283.
Glass eyes, 508.
Gluteus externus, 108.
——— internus, 112.
——— maximus, 108.
Good and bad form, 15.
Gracilis, 110.
Grant of a Charter by Her Majesty, 10.
Grease, 507.
Greater circulation, 219.
Gripes, 385.
Gutta serena, 506.
Guttural pouches, 178.

Hæmorrhage, modes of stopping, 451.
Hair, 168.
Head, bones of the, 63.
——— dropsy of, 412.
——— of the horse, 16.
——— and neck generally, 207.
Heart, 216.
——— dropsy of, 415.
Hepatitis, 334.
——— (cattle), 335.
Her present Majesty grants a Charter, 10.
Hernia, congenital, 406.
——— intestinal, 402.
——— strangulated, 404.
History of the Veterinary College, 6.
——— Veterinary Medicine, 1.
——— in Great Britain, 4.
Hock (the) and its conformation, 35.
——— capped, 481.
Hæmaturia (cattle), 337.
Hoof (the), 260.
Hoose, cattle, 296.
Horn, 262.
Horns (the) denote the age of cattle, 48.
Horny sole, 262.
Horse and dog, comparison between, 14.
Horses of great age mentioned, 45.
Hove, cattle, 389.
Humeralis, 100.
Humours of the eye, 180.
Hydrocephalus, 412.
Hydrops pericardii, 415.
Hydrothorax, 413.

Iliac arteries, 138.
Iliacus, 112.
Ilio femoralis, 111.
Importance of thorough drainage, 57.
Impregnation, 252.
Indigestion, acute (cattle), 389.
——— chronic, 388.
Inflammation, adhesive, 439.
——— of the bladder, 338.
——— brain, 299.
——— cornea, 497.
——— feet, 522.
——— heart, 325.
——— intestines, 326.
——— local, 430.
——— of the liver, 334.
——— (cattle), 334.
——— kidneys, 335.
——— lungs, 303.
——— (cattle), 324.
——— (sheep), 324.
——— and pleuræ, 303.
——— mucous surfaces, 331.

Inflammation of the peritoneum, 332.
——— pleuræ, 313.
——— throat, 342.
——— veins, 452.
——— udder, 293.
——— womb, 340.
Influenza, 277.
——— (cattle), 226.
Interior of the foot, 263.
Internal ear, 177.
Intestinal calculus, 422.
——— hernia, 406.
Intestines, 234.
——— morbid displacement of the, 402—406.
——— strangulation of the, 406.
Ischio femoralis, 110.

Jaundice, 407.
——— (cattle), 408.
——— (sheep), 408.
Jaw, lower, 69.
Job possessed horses, 12.
Jugular vein, bleeding from the, 597.

Kidneys, 240.
——— inflammation of the, 335.
Knee and its bones, 81.
——- joint penetrated, particularly of, 448.
——- of the horse, 26.
——- broken, 449.

Lacerated knee, 450.
Lactation, 257.
Lamina, sensitive, 265.
Laminitis, acute, 522.
——— chronic, 526.
Lampas, 391.
Large intestines, 235.
Larynx, 200.
——— muscles of the, 201.
——— use of the, 202.
Latissimus dorsi, 96.
Legs, swelled, 419.
Levator humeri, 96.
Ligaments, 92.
Lips, 194.
Lips and nostrils, 20.
Lithotomy, 577.
Liver, 238.
——— inflammation of the, 334.
——— (cattle), 334.
Local inflammation, 430.
Lock-jaw, 379.
Loins, their importance, 32.
Longus colli, 107.
Loose boxes better than stalls, 56.
Lower jaw, 69.
Lumbrici, 116.
Lungs, 219.
——— inflammation of, 303.
——— (cattle), 324.
——— (sheep), 324.

Madness, 299.
Mad, sleepy staggers, 299.
Majesty, Her present, grants a Charter, 10.
Mammary gland, 249.
Mane, and how to dress it, 21.
Mange, 520.
Marks of the mouth, 37.
Medical Committee established, 8.
Medicine, Veterinary, the sixteenth and seventeenth centuries favourable to, 3.
——— history of, in Great Britain, 4.
Medulla, or marrow, 91.
Megrims, 376.
Membrane, cellular, 173.
——— of the placenta, 253.
Mesenteries, 137.
Mesentery, 226.
Messrs. Coleman and Morecroft appointed, 8.
——— Mayor, chief in obtaining the Charter, 11.
Mineral poisons, 425—429.
Minimus, 100.
Mode of performing neurotomy, 583.
Molars, or grinders, 38.
Morbid displacement of the intestines, 402—406.
Mouth, 193.
——— muscles of the, 193.
Mr. Morecroft resigns the joint professorship, 8.
Mr. Morton, chemical lecturer, 10.
Mr. Sewell appointed head professor, 10.
Mr. Simonds added to the Veterinary College, 10.
Mr. Spooner appointed head professor, 10.
Muscles of the anus, 116.
——— ears, 176.
——— generally, 93.
——— of the globe of the eye, 185.
——— larynx, 201.
——— mastication, 206.
——— the mouth, 193.
——— nose, 192.
——— part of the neck, 96.
——— the pharynx, 203.

Muscles of the respiration, 212.
——————— action of, 215.
——————— tail, 116.
——————— tongue, 196.
——— voluntary, 95.
Mucous surfaces, 331.

Nasal organs, use of, 192.
Natural history of the horse, 11.
Navicular joint disease, 537.
Naviculararthritis, 537.
Neck of the horse, 20.
Nerve, the sentient, of the foot, division of, 581.
Nerves (of), 165.
——— (the), 155.
——— cerebral, 156.
——— diseases of, 374.
——— of the fore extremity, 161.
——————— hind ditto, 162.
——————— spinal, 159.
——————— sympathetic, 164.
Neurotomy, 581.
Nicking, 588.
No determinate figure of the horse possible, 16.
Nose (the), 184.

Obstetrics, veterinary, 565.
Obturator, externus, 112.
——————— internus, 113.
Œsophagus, 209.
Of the urinary organs, 242.
Omentum, 228.
Open joint, 445.
Operations, 561.
Ophthalmia, periodical, 499.
——————— simple, 497.
——————— specific, 499.
Orbits, 67.
Organs of generation (female), 247.
——————— (male), 244.
Overreach, 472. 551.

Palate, bleeding from, 594.
Pancreas, 293.
Panniculus carnosus, 174.
Paracentesis abdominis, 414.
Paralysis, 377.
Parasitic animals (cattle), 395.
Parotid duct, fistulous, 464.
Parturition, 257.
Pastern (the) should not slant too much, 28.
Patella, sprain of the ligaments of, 474.
Pectoneus, 111.
Pectoralis anticus, 104.
——————— magnus, 104.
——————— transversalis, 104.
Penis, amputation of, 587.
Permanent nippers, 39.
——————— (cattle), 48.
Periodic ophthalmia, 499.
Periosteotomy, 584.
Peritoneum, 91.
Peritonitis, 332.
Pharynx, 203.
Phlebitis, 452.
Phlebotomy, 596.
Phrenitis, 299.
Physicking horses, 599.
Physiology of secretion, 167.
Physiology of the viscera, 237.
Placenta, 252.
——————— membranes of, 253.
Plantarius, 114.
Plantar vein, 596.
Pleuræ, 210.
Pleurisy, 313.
Pleuro-pneumonia (cattle), 315.
Pneumonia, 303.
Poisons, 425.
——— animal, 425.
——— mineral, 425—429.
——— vegetable, 425—428.
Poll-evil, 460.
Popliteus, 115.
Postea spinatus, 98.
Posterior cava, 148.
Power and safety of horses, 212.
Prick in the foot, 547.
Profuse staling, 411.
Properties of the blood, 222.
Psoas magnus, 111.
——— parvus, 111.
Pulmonary vessels, 142.
Pulmonic circulation, 218.
Pulse, 124.
Pumiced foot, 536.
Punctured foot, 547.
Pupils taken at the Veterinary College, 8.
Pure fever, 271.
Purgatives, 599.
——————— articles used for, 601.
——————— danger of, 600.
——————— treatment of, 604.
Purpura hæmorrhagica, 284.
Pyriformis, 112.

Quarter, false, 560.
Quittor, 551.

Rabies, 425.
Ramus anastomoticus, 135.
Real thigh bone of the horse, 35.
Rectum, 236.
Red water, true (cattle), 409.

Regions of the abdomen, 225.
Renal capsules, 241.
Reproductive system, 250.
Reptiles, venomous bites of, 427.
Restraints, various, 561.
Rheumatism, 476.
——————— (cattle), 477.
Rhomboideus, 96.
Ring-bone, 495.
Roaring, 343.
Romans (the) exported horses from England, 12.
Rot (cattle), 370.
—— (sheep), 372.
Rotator capitis, inferior, 106.
——————— internus, 107.
——————— superior, 106.
Round bone, sprain of the ligaments of, 474.
Rupture, 406.
——————— of the back sinews, 473.
Ruptured diaphragm, 442.
——————— flexor tendons, 473.
——————— suspensory ligament, 472.

Sanderack, 544.
Sartorius, 109.
Scalenus, 107.
Scapulo humeralis major, 100.
Scapulo ulnarius, 97.
Scarifications, 596.
Scouring in calves, 401.
Sense of taste, 198.
——————— touch, 171.
Sensitive lamina, 265.
Sentient nerve of the foot, division of, 581.
Serratus magnus, 97.
Setons, 593.
Setting on of the horse's head, 16.
Sewell (Mr.) appointed professor, 10.
Shoeing, 527.
——————— general remarks on, 531.
Shoulder (the) should slant, 23.
——————— sprain of, 468.
——————— point, blows upon, 470.
Sight, 188.
Simonds (Mr.) added to the Veterinary College, 10.
Simple ophthalmia, 497.
Situation of the viscera, 225.
Sixteenth and seventeenth centuries favourable to veterinary medicine, 3.
Skull of the horse, 62.
Sleepy staggers, 299.
Slinging, 564.
Sloughing, 434.
Small pox in sheep, 515.
Sore throat, 392.
Spasm, 378.
——————— of the neck of the bladder, 339.
Spasmodic colic, 385.
Specific ophthalmia, 499.
Spavin, blood, 478.
——————— bog, 480.
——————— bone, 492.
Spleen, 240.
Splenius, 104.
Spinal nerves, 159.
——————— anatomy of, 162.
Splint, 490.
Spooner (Mr.) appointed professor, 10.
Sprain of the fetlock joint, 473.
——————— flexor tendons, 471.
——————— ligamentous connexions of the flexor tendons, 471.
——————— patella, 474.
——————— sheaths of the flexor tendons, 471.
——————— shoulder, 468.
——————— stifle, 474.
——————— whirl bone, the ligaments of, 474.
Sprains, 466.
Stable (the) itself, 55.
Stables are kept too warm, 56.
Staling, profuse, 411.
Sterno maxillaris, 107.
——————— thyro-hyoideus, 107.
Stifle corresponds to the human knee, 35.
——————— sprain of, 474.
Stomach, 229.
——————— staggers, 299.
Stones in the bladder, 424.
——————— intestines, 422.
——————— kidneys, 423.
Stony concretions, 422.
Strains, 466.
——————— of the ligaments of the femur, 474.
Strangles, 457.
Strangulated hernia, treatment of, 404.
Strangulation of the intestines, 406.
Stringhalt, 384.
Structure of the brain, 155.
Styptics, 451.
Subscapularis, 98.
Summary of Mr. Coleman's merit, 9.
Summering of hunters, 58.
Suppuration, 433.
Surgical operations, 561.
Suspensory ligament, rupture of, 472.
Sutures, 437.
Swelled legs, 419.
Swellings, encysted, 478.
Symptomatic fever, 282.
Synovia, 92.

Tail, amputation of the, 588.
—— and how it should be set on, 34.
Taking a horse up from grass, 54.
Taste, 198.
Teeth, 70.
—— of the calf at birth, 47.
—— with regard to age, 36.
Temporal artery, division of, 594.
Temporary and permanent teeth, 37.
Tendons, 95.
Tensor vaginæ, 108.
Teres externus, 97.
—— internus, 97.
Testicle, 144.
—— descent of, 255.
Tetanus, 379.
Thick wind, 347.
Thorax, viscera of the, 210.
Thorough-pin, 481.
Throat, sore, 342.
Thrush, 542.
Toe, bleeding from, 595.
Tongue, 195.
Touch, 171.
Trachea, 208.
Trachelo mastoideus, 105.
Tracheotomy, 579.
Trapezius, 96.
Tread, 551.
Treatment connected with physicking, 604.
—— of strangulated hernia, 404.
Triceps abductor femoris, 110.
Triceps extensor brachii, 99.
True red water (cattle), 409.
Trunk, bony, 73.
Tumours, external, 478.
Tusks, or tushes, or canine teeth, 39.

Udder, inflammation of, 293.
Ulceration, 459.
Ureters, 241.
Urethra, 246.
Urinary organs, 242.
—— calculus, 423.
Use of the larynx, 202.
—— nasal organs, 192.

Various restraints, 561.
Varix, 478.
Vas deferens, 245.
Vastus externus, 111.
—— internus, 111.
Vena portæ, 148. 238.
Vesical calculus, 424.
Vesicular disease, 295.
Veterinary obligation to John Hunter, 9.
—— obstetrics, 565.
Veins generally, 143.
—— inflammation of, 452.
—— of the head and neck, 146.
—— hind extremity, 147.
—— wounds of, 452.
Viscera of the chest, 210.
—— physiology of, 237.
—— situation of, 225.
Voluntary muscles, 95.
Vomition, 233.

Warbles, 459.
Water farcy, 418.
Warts, 519.
Whether the litter should be removed or not from under horses, 57.
Whirl-bone of jockeys, 35.
—— sprain of the ligaments of, 474.
Wind broken, 347.
—— galls, 479.
—— thick, 348.
Withers, fistulous, 463.
—— (the) should be high, 22.
Womb, inflammation of, 340.
Worms, 390.
Wounds, 436.
—— of the abdomen, 442.
—— arteries, 451.
—— articular cavities, 444.
—— chest, 442.
—— neck, 441.
—— particular parts, 441.
—— veins, 452.
Writers of the seventeenth century, 3.

Yellows (cattle), 408.

THE END.

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