THE ARMY HORSE

IN

ACCIDENT AND DISEASE.

COMPILED BY

ALEXANDER PLUMMER, D. V. S.,

VETERINARIAN 4TH U. S. CAVALRY,

AND

RICHARD H. POWER, V. S.,

VETERINARIAN ARTILLERY CORPS,

U. S. ARMY,

FOR

THE INSTRUCTION OF FARRIERS AND HORSESHOERS

AT

THE SCHOOL OF APPLICATION

FOR

CAVALRY AND FIELD ARTILLERY,

FORT RILEY, KANSAS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1903.

THE ARMY HORSE

IN

ACCIDENT AND DISEASE.

COMPILED BY

ALEXANDER PLUMMER, D. V. S.,
VETERINARIAN 4TH U. S. CAVALRY,

AND

RICHARD H. POWER, V. S.,
VETERINARIAN ARTILLERY CORPS,
U. S. ARMY,

FOR

THE INSTRUCTION OF FARRIERS AND HORSESHOERS

AT

THE SCHOOL OF APPLICATION

FOR

CAVALRY AND FIELD ARTILLERY,

FORT RILEY, KANSAS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1903.

CONTENTS.

Chapter I.—Conformation and Points, and External Diseases.

II.—Stable Management of the Sick and Injured. Administration of Medicines. Weights and Measures.

III.—Anatomy.

IV.—Wounds, Sprains, Bruises, and Contusions.

V.—Diseases of the Respiratory System and Influenza.

VI.—Diseases of the Digestive, Urinary, Nervous, and Lymphatic Systems.

VII.—Miscellaneous Diseases.

VIII.—Diseases of the Skin and Eye.

IX.—Diseases of the Feet.

X.—Diseases of Bone, and Detection of Lameness.

XI.—Medicines, their Actions and Uses.

AUTHORITIES CONSULTED.

FRIEDBURGER AND FROHNER: Pathology and Therapeutics of the Domestic Animals.

WILLIAMS: Principles and Practice of Veterinary Medicine and Surgery.

BUREAU OF ANIMAL INDUSTRY: Special Report on Diseases of the Horse.

SMITH: Veterinary Hygiene.

MOLLER: Operative Veterinary Surgery.

FLEMING: Operative Veterinary Surgery.

LIAUTARD: Manual of Veterinary Surgery.

WYMAN: Diagnosis of Lameness in the Horse.

STRANGEWAY: Veterinary Anatomy.

CHAUVEAU: Comparative Anatomy of Domesticated Animals.

SMITH: A Manual of Veterinary Physiology.

DUN: Veterinary Medicines, Their Actions and Uses.

QUITMAN: Notes on Veterinary Medicine.

NEUMANN: Parasites and Parasitic Diseases of the Domesticated Animals.

CADIOT: A Treatise on Veterinary Therapeutics of the Domestic Animals.

BUREAU OF ANIMAL INDUSTRY: Emergency Report on Surra.

THE ARMY HORSE IN ACCIDENT AND DISEASE.

CHAPTER I.

CONFORMATION AND POINTS AND EXTERNAL DISEASES.

CONFORMATION AND POINTS.

The forehead should be broad and not bulging. The eyes should be full, clear, and prominent, with a mild expression, and not showing any of the white. The muzzle should not be large, as a coarse, large muzzle indicates ill breeding. The nostrils should be large and open. The face should be straight. The lower jaw should have ample width between the two sides for the development and play of the larynx (Adam's apple) and windpipe; and, in addition, to allow the head to be nicely bent on the neck.

The ears should be of medium size, set well on the head; they should not lop.

The parotid and submaxillary regions should be free from large glands and without any loose skin at the lower part of the throat.

The neck should be of moderate length, clean, and not too narrow at a point just in rear of the throat; a short, thick neck does not allow of free movement from side to side, and a long, slim neck is apt to be too pliable. The point of the shoulder should be well developed, and the point of the elbow should not be turned in, as the horse is very apt to turn his toes out. The opposite conformation is indicated by turned-in, or "pigeon toes."

The forearm should be long and muscular; the knee broad, and when looked at from the front should be much wider than the limb above and below, and taper off backward to a comparatively thin edge.

The leg immediately below the knee should be as large as any other part, and not "tied in," which indicates a weakness of the

part. A bending of the knee backward is called a "calf knee," and is very objectionable. The opposite condition is known as "knee sprung."

The fetlock joint should be of good size and clean, the pasterns of moderate length, and form an angle of between 45 and 60 degrees with the cannon bone.

The foot should be of moderate size; a flat foot or one too narrow at the heels is objectionable.

The relative proportions of the shoulders and exact shape desirable vary considerably in cavalry and artillery horses. Thus, when speed and activity are essential, as in the cavalry horse, the shoulder should be oblique (sloping), as it gives elasticity to the gait of the horse, while for the artillery horse, working in harness, a straight, upright shoulder enables the pressure of the collar to be more easily borne and allows the animal to exert his strength at right angles to his long axis.

The withers should not be thin and high, as this conformation will allow the saddle to slip too far forward and the pommel to rest upon the withers. The bars of the saddle will be forced against the shoulder blades, causing irritation and inflammation. The withers should not be low or thick, as the saddle is then apt to pinch them.

The chest should be of moderate width and have considerable depth, as a narrow chest indicates weakness, and a wide, heavy chest is suitable for heavy-draft horses only.

The capacity of the lungs is marked by the size of the chest at the girth, but the stamina will depend upon the depth of the back ribs. The barrel should not be broad back of the cinch, as it would cause the cinch to slip forward and chafe the body just back of the point of the elbow. The opposite conformation would allow the saddle and cinch to slip backward. The back should be short, with muscles well developed, and the upper lines of the back should bend down a little behind the withers and then swell out very gently to the junction of the loins, which can hardly be too broad and muscular.

The last rib should be placed close to the point of the hip, as this is an indication of strength, and the horse is more easily kept in good condition than one having the opposite conformation.

A slightly arched loin is essential to the power of carrying weight; a much arched or "hog back" is almost sure to give

uneasy action from its want of elasticity. The hips should be broad.

The quarters and gaskins should be broad. The muscles of the two quarters should come close together and leave no hollow below the anus, as that conformation would be an indication of a want of constitution.

The hock should be of good size, but clean and flat, and with a good clean point standing clear of the joint. The cannon bone should be short, not tied in below the hock, and the line from the point of the hock to the back part of the fetlock should be vertical.

The hocks should stand well apart, but not enough to give the horse the appearance of being "bow-legged."

"Cow-hocked," so called, is when the hocks are placed together and the hind feet wide apart, with the toes turned out. The fetlock should not bend forward, as it is an indication of weakness, and is known as "cocked ankle."

The pastern and feet should be formed to correspond with those of the fore extremity.

The croup should not have much slope; the dock should be large and muscular; the tail should be carried firmly and well away from the quarters.

EXTERNAL DISEASES.

Under this heading the diseases appearing upon the outside of the body are considered; they are commonly regarded as blemishes or defects and are the results of injuries more or less severe.

They may be enumerated as follows:

1. Diseases of bones.
2. Diseases of synovial membranes.
3. Diseases of muscles, tendons, ligaments, and skin.
4. Diseases of the foot.

1. Diseases of bones.

Bone spavin.—Location: Lower and inner part of the hock joint.

Splints.—Location: Usually appearing on the inner side between the large and small metacarpal bones.

Sidebones (ossification of lateral cartilages).—Location: Sides of the foot just above the coronet.

Ringbone.—Location: Between coronet and fetlock joint.

2. Diseases of synovial membranes.

Bog spavin (blood spavin).—Location: Front part of hock joint.

Thorough pin.—Location: Upper and back part of hock joint.

Wind puffs (windgalls).—Location: On the sides of the tendons just above the fetlock joints.

Other bursal enlargements may be found located on various parts of the legs, but no special name has been given to them.

3. Diseases of the muscles, tendons, ligaments, and skin.

Poll evil.—Location: In the region of the poll.

Fistulous withers.—Location: In the region of the withers.

Sweeny (atrophy or wasting of the muscles).—Location: Usually in the shoulders or the hip.

Broken knees.—Location: Front part of the kneejoint.

Capped elbow.—Location: Point of the elbow.

Capped hock.—Location: Point of the hock.

Curb.—Location: Lower and back part of the hock.

Sprung knees.—Location: Knees.

Cocked ankles.—Location: Fetlock joints.

Bowed tendons.—Location: Flexor tendons below the knees and hock.

Breakdown.—Location: Sprain of the suspensory ligament.

Saddle galls.—Location: On the saddle bed.

Cinch galls.—Location: On the parts coming in contact with the cinch.

Collar galls.—Location: On the parts coming in contact with the collar.

4. Diseases of the foot.

Thrush.—Location: Frog.

Canker.—Location: Frog and sole.

Chronic laminitis.—Location: Sensitive laminæ.

Corn.—Location: Between the wall and bar.

Quarter crack.—Location: Quarters of the hoof.

Quittor.—Location: Top of the coronet.

Contracted heels.—Location: Heels.

Toe cracks.—Location: At the toe of the hoof.

CHAPTER II.

STABLE MANAGEMENT OF THE SICK AND INJURED. ADMINISTRATION OF MEDICINES. WEIGHTS AND MEASURES.

CARE OF THE SICK.

The sick horse should be, if practicable, immediately removed to a large, clean, light and well-ventilated box stall, free from drafts and located as far as possible from other horses. Clean bedding should be provided, and the stall kept free from manure and moisture. If such a stall can not be provided a double stall, with the kicking bar removed and ropes or bars placed across the front of it, will answer the purpose.

If the patient is suffering from a febrile disease (fever) during the cold season of the year paulins or horse covers can be hung up in such a manner as to serve as a protection from drafts, care being taken to allow sufficient air to enter this improvised box stall. Such patients must be clothed according to the season of the year, the blanket drawn well forward on the neck and fastened in front, the legs hand-rubbed and bandaged with red flannels. These should be changed several times daily, and the legs thoroughly rubbed to stimulate circulation.

Horses with diseases of the nervous system require to be kept absolutely quiet, to do which they must be removed as far as possible from all noise. It is preferable that only one man be allowed to attend to their wants, as a change of attendants would very likely cause excitement and thus increase the severity of the disease. Animals suffering from debilitating diseases should be tempted with and fed any food that is rich in nourishment and easily digested. It should be given only in such quantities as the animal will readily eat, and any portion left over should be at once removed, as food constantly placed before a sick animal will have a tendency to deprive it of all appetite. Food that is wet, such as bran mashes or steamed oats, will soon sour in warm weather and will get cold or may freeze during the winter; if eaten in these conditions it may cause diarrhea, colic, etc. Feed boxes, water buckets, and all parts of the stall must be kept clean and free from odor. The hay should be clean and bright, and only the best given to the sick animal.

Pure water should be provided, and placed in such a position as to enable the animal to reach it without difficulty; a sick horse will frequently rinse its lips and mouth with water if given the opportunity, even if not thirsty. The water should be changed as often as necessary during the day to insure a pure and fresh supply at all times.

A horse suffering from colic requires sufficient space, well bedded, to prevent injuring himself by rolling during a spasm of pain. A man should be constantly in attendance, as there is danger of the animal becoming cast and unable to get up without assistance.

Undigested matter being the exciting cause in almost all cases of colic, food should be withheld for about twelve hours after all pain has disappeared, and then given only in small quantities during the next twenty-four hours, after which the ordinary ration may be resumed. A few swallows of pure water may be given at short intervals, special care being taken when the water is very cold.

CARE OF THE INJURED.

If the horse is seriously injured and stands with difficulty, he should be placed in slings to partially support the weight of the body. The slings must be properly adjusted, fitting closely behind the elbows in such a manner as to support the weight of the body on the chest and not on the abdomen. This position is maintained by the use of the breast piece and breeching, which prevent the shifting of the sling. A single stall, having a level floor, free from bedding, is more suitable than one allowing more motion to the animal.

If the horse is but slightly injured, there is no necessity of placing him in slings. An ordinary stall with a level floor is all that is required. After the injury has been dressed he should be allowed to stand without being disturbed. If very lame, and movement is painful, the quieter he is kept the more quickly will recovery take place. Absolute rest and perfect quietude are two very essential things, and when secured they will hasten the process of recovery without inflicting unnecessary pain upon the animal. In some surgical cases it is necessary to restrain the animal so that he can not injure himself by rubbing or biting the affected parts. This can be accomplished by tying up the

head, the application of side lines, or the use of the cradle. Bandages may be applied to the legs of horses for three different purposes: First, to give support to the blood vessels and synovial bursæ; second, as a vehicle for applying cold lotions; and third, for drying and warming the legs.

The pulse is the beating of the arteries, and is usually felt at the jaw (the submaxillary artery), or on the inner side of the arm (the brachial artery), and is an important guide in determining the physical condition of the animal; the normal pulsations are about 40 per minute. It is best taken by placing the fore or middle finger transversely on the artery. The slightest excitement, when the horse is sick, will cause an alteration in the pulse; therefore the animal should be approached very quietly. A strong and full pulse is an indication of health.

A full and bounding pulse denotes the first stages of fever, afterwards becoming small and weak. A very slow pulse denotes disease or injury of the brain or spinal cord. An imperceptible pulse indicates the approach of death.

At rest the healthy horse breathes from 13 to 15 times per minute. Difficulty in breathing is a prominent symptom of disease of the respiratory organs; it may also be observed in some cases of flatulent colic. Abdominal breathing is the respiratory movement performed with the ribs fixed as much as possible, owing to pain or mechanical obstruction in the chest, and is a symptom of pleurisy and hydrothorax (water in the chest).

Irregular breathing is that condition where there is a want of harmonious correspondence between the inspiratory and expiratory movements, and is observed in the disease commonly known as "broken wind" or "heaves." The inspiratory movement in this affection is performed quickly and with a jerky effort, while the expiratory movement is performed slowly and with a double action, more particularly of the abdominal muscles. Irregular breathing often becomes spasmodic or convulsive during the progress of the disease.

The mean temperature of the horse in those internal parts which are most easily accessible, as the mouth and rectum, may be estimated at from 99° to 101° F. In very young animals the temperature is commonly about 101°, but in very old ones it has been known to be as low as 96° F. The external parts of the body become lowered in temperature according to their distance

from the heart, and are liable to much variation from the state of the surrounding atmosphere.

The production of animal heat is due to certain chemical and vital changes which are continually taking place in the body, and consist in the absorption of oxygen by the capillaries in the lungs, the combination of that oxygen with the carbon and hydrogen derived from the disintegration of animal tissues, and from certain elements of the food which have not been converted into tissue.

This combination of oxygen, or oxidation, not only takes place in the blood, which may be looked upon as a fluid tissue, but in the tissue cells also, in all parts of the body, the animal heat being maintained by the natural changes which are essential to a healthy condition.

The lungs of a horse will contain from 1 to 1½ cubic feet of air, and at each inspiration about 250 cubic inches are drawn through the trachea. The surface of the lungs to which this amount of air is exposed is calculated to be equal to 289 square feet. Air, then, containing impurities, is exposed to an absorbent area within the body equal to five and a half times the surface of the skin. A horse in a state of quiescence gives off from 2 to 3 cubic feet of CO^2 every hour from the lungs, and a certain, though an undetermined, portion is also given off by the skin; but taking that from the lungs alone it would amount to from 48 to 72 cubic feet in twenty-four hours, or, if converted into carbon, would give us a solid block weighing about 2½ pounds.

The air from marshes contains an excess of carbonic acid gas and a diminished proportion of oxygen, consequently horses should not be kept in the vicinity of a marsh, as the blood would then contain an excess of carbonic acid gas (CO^2) and an insufficient amount of oxygen; it would be imperfectly purified; the vitality of the animal would be lessened, and he would be more susceptible and succumb more easily to any disease that he might contract.

A pure air will contain 20.99 per cent of oxygen; an average air 20.96 per cent. The expired air, in health, in 100 parts contains 19 instead of 21 parts of oxygen, and 1 to 2 per cent, instead of 0.03 to 0.04 per cent, of carbonic acid gas, which pure air should contain.

One thousand six hundred cubic feet of air space should be provided for each horse in the stable, and the stables be so arranged that fresh air may be admitted without causing drafts.

EFFECTS OF AN IMPURE SUPPLY OF WATER.

However harmless impure water may have been to animals in a wild state, the more we subject them to an artificial existence the more we remove them from the immunity they may have possessed against common causes of disease and the greater liability is there for the development of diseases which originally may never have existed.

ADMINISTRATION OF MEDICINES.

Medicines may enter the body through any of the following designated channels: First, by the mouth; second, by the lungs and upper air passages; third, by the skin; fourth, under the skin (hypodermically); fifth, by the rectum, and sixth, by intravenous injection.

1. *By the mouth.*—Medicines can be given by the mouth in the form of powders, balls, and drenches.

2. *By the air passages.*—Medicines are administered to the lungs and upper air passages by inhalations and nasal douches.

3. *By the skin.*—Care must be taken in applying some medicines over too large a portion of the body at any one time, as poisoning and death may follow from too rapid absorption through the skin. For domestic animals medicines are to be applied to the skin for local purposes or diseases only.

4. Medicines may be given by the rectum when we can not give or have them retained by the mouth; when we want local action; to destroy the small worms infesting the large bowels; to stimulate the peristaltic motion of the intestine and cause an evacuation, and to nourish the body.

WEIGHTS AND MEASURES.

Solid measure.

1 grain (gr.).	
1 dram (dr.)	60 grains.
1 ounce (oz.)	8 drams.
1 pound (lb.)	16 ounces.

Liquid measure.

1 minim (min.).	
1 fluid dram (fl. dr.)	60 minims.
1 fluid ounce (fl. oz.)	8 fluid drams.
1 pint (O.)	16 fluid ounces.
1 quart (O11.)	32 fluid ounces.
1 gallon (C1.)	4 quarts.

CHAPTER III.

ANATOMY.

The skeleton is the framework for the support of the softer structures, and is composed of 216 bones, exclusive of the teeth, of various sizes and forms.

Flat bones are found covering vital organs, i. e., skull, ribs, and scapula: long bones are found principally in the extremities, for the support of the body.

The spinal column is composed of bones of very irregular shape, which are divided into five groups according to their location, and are known as vertebræ. Commencing at the back of the head, the first seven are called the cervical vertebræ, or bones of the neck; the next eighteen are called the dorsal vertebræ, forming the main part of the back; the next six or seven, the lumbar vertebræ, form the loins; the croup or sacrum, composed of five bones, which in the adult animal are united together as one bone; and following this are found the coccyx or tail bones, numbering from thirteen to twenty.

The ribs are eighteen on each side, attached above to the dorsal vertebræ and below, the first eight (true ribs) by cartilage to the sternum or breastbone: the remaining ten, known as false or floating ribs, are attached by cartilage to one another and indirectly to the sternum: they form the walls of the chest and serve as a protection for the heart, lungs, and large blood vessels.

The skull, containing cavities (or chambers), is composed of irregularly-shaped flat bones, the most important of which is the cranium, or brainpan, occupied by the brain and communicating with the bony channel passing through the center of the cervical, dorsal, lumbar, sacral, and sometimes the first two or

three coccygeal vertebræ. These cavities communicate with the brain by narrow passages, through one of which the optic nerve passes.

On each side, below the eye, are two closed cavities known as the superior and inferior maxillary sinuses; in the lower third of the skull are found the nasal chambers extending from the nostrils backward to the pharynx, and separated by a thin partition of bone and cartilage, the floor of these cavities forming the roof of the mouth. From the orbital fossæ the skull gradually becomes narrower and terminates a short distance below the nostrils in the premaxilla, which contains the six upper incisor teeth, which, with the corresponding teeth in the lower jaw, form the anterior boundary of the mouth, which extends backward to the pharynx. On the posterior upper portion of this cavity are found six molar teeth on each side, and that portion of the jaw between them and the incisors is called the interdental space. Situated on each side near to the incisor teeth in this space are found, in the male, the tushes or canine teeth.

The inferior maxilla, or lower jaw, a bone whose two segments are firmly united anteriorly, diverges backward somewhat in the form of a letter V, each branch terminating superiorly in an articulated surface which unites it to the skull proper. The diverging branches of the jaw, include a space appropriately called the maxillary space. Found in the united or front part of this bone are the inferior incisors, and in the male the canine teeth, and in the branches the inferior molars or grinders, which correspond with those of the upper jaw.

The space between the molars and incisors is the same as that in the upper jaw.

The front leg is composed of the following-named bones and joints, given in order from above downward: Scapula and humerus, forming the shoulder joint; humerus, radius, and ulna, forming the elbow joint; radius, carpus (seven or eight small bones), and metacarpus, forming the knee joint; metacarpal, os suffraginis, and two sesamoids, forming the fetlock joint; os suffraginis and os coronæ, forming the pastern joint; os coronæ, os pedis, and os navicularis, forming the navicular or coffin joint.

The hind leg is composed of the following bones: The pelvis, situated underneath the sacrum and part of the coccygeal

vertebræ, and formed of three irregularly shaped bones on each side, united at the bottom, and forming a cavity occupied by the bladder and the rectum; the femur, united with the pelvis, forms the hip joint; the femur, tibia, and patella form the stifle joint; the tibia, tarsus (six bones), and the metatarsal bones form the hock joint; the metatarsal, os suffraginis, and two sesamoids form the fetlock joint; below this the bones and joints are the same as in the fore leg.

JOINTS AND LIGAMENTS.

The joints are all formed between two or more separate bones, having a soft elastic substance interposed, whose structure varies with the amount of motion. Where this is extensive, as in the joints of the limbs, the adjacent surfaces are covered with a peculiar kind of cartilage arranged in a thin and very smooth layer upon them. In addition to this protection against friction and vibration the bones are firmly bound together by strong bands of white, fibrous, inelastic tissue under the general name of ligaments. A lubricating fluid (called synovia) is required to reduce the amount of friction; and to produce it, as well as to keep it within proper limits, a membrane (synovial) is developed. In the neck much greater freedom of motion is required to admit of lowering the head in grazing and the raising of it for various purposes, as well as for balancing its great weight at all times. Lateral flexion and rotation on its own axis are also necessitated for the purpose of directing the muzzle right or left of the straight line; and for these several movements the following ligament (ligamentum nuchæ) is provided:

The ligamentum nuchæ is formed entirely of yellow, elastic tissue, and occupies the angle formed posteriorly by the anterior dorsal spines and inferiorly by the cervical spinous process, thus separating the cervical muscles of the right side from those of the left.

Capsular ligaments are fibrous structures inclosing joints, their use being to form cavities around them inclosing and protecting the synovial or lubricating apparatus inside.

The suspensory ligament should be carefully studied on account of the numerous accidents to which it is liable. It is a long, strong band of fibrous tissue arising in the back part of the lower bones of the carpus (knee) and the upper part of the

metacarpus (cannon bone), occupying the space between the splint bones; it passes down immediately behind the cannon bone, lying between it and the tendon of the *flexor pedis perforans*, bifurcating (dividing into two) about the lower third of this bone and becoming attached to the *sesamoids*, whence the parts pass forward and downward, joining the tendon of the extensor pedis just above the pastern joint. It is thin and comparatively weak toward the knee, but as it approaches the fetlock joint it almost equals the back tendons (sinews) in substance, and its volume and wiriness to the touch may be taken as some test of the power of any particular leg to resist a breakdown.

The suspensory ligament of the hind leg corresponds in every particular with that of the fore leg.

The calcaneo-cuboid ligament stretches from the posterior border of the calcaneum to the posterior part of the cuboid, ending on the head of the external splint bone. A sprain of this ligament is known as a "curb."

MUSCLES AND TENDONS.

The muscles are divided into voluntary and involuntary muscles; the former being under the direct control of the will, as, for example, the muscles of the neck, legs, tail, etc.; and the latter acting independently of the animal's will, as, for example, the heart, intestines, etc.

The muscles form about one-half of the entire weight of the body. With regard to their form they are divided into long, wide, and short. Long muscles are generally found in the limbs; wide muscles are stretched beneath the skin or around the great cavities of the trunk, and the short muscles are found chiefly around the short bones.

Tendons are white, round or flattened cords affixed to the extremities of the long muscles. They stretch or contract the muscles, but do not themselves change form.

The wide muscles are provided with broad bands of fibrous tissue, by means of which they are attached to other structures.

Extensor muscles (extensors) have the power of extending one bone upon another and the flexor muscles (flexors) have the opposite action.

The *extensor pedis* is the principal extensor of the fore leg; it originates at the inferior extremity of the *humerus*, and its fleshy

portion continues to the lower third of the *radius;* there it becomes tendinous, and passing down over the knee continues along the front of the leg and becomes attached to the upper and front part of the *os pedis.* Action, to extend the leg.

The *flexor pedis perforatus* originates from the inner and lower part of the humerus; it passes down the back part of the leg, becoming tendinous just above the carpus; below the pastern it bifurcates, forming a ring for the passage of the tendon of the perforans and becomes attached to the sides of the *os coronæ.* Action, to flex the lower part of the leg.

The flexor pedis perforans originates with the *perforatus;* its fleshy portion passes down and is attached to the back part of the radius; its tendinous portion, beginning at the knee, passes down the leg between the cannon bone and the tendon of the *perforatus*, over the back of the fetlock and through the arch formed by the division of the tendon of the *perforatus*, and is attached to the under surface of the *os pedis.* Action, to flex the leg.

The *extensor pedis* of the hind leg originates at the lower and front part of the *femur;* its fleshy portion extends downward along the front surface of the *tibia* to the hock, where it becomes tendinous; passing thence down the front of the leg it is attached in the same manner as the *extensor pedis* of the front leg. Action, to extend the leg.

The *flexor metatarsi* is divided into two portions—a muscular and a tendinous. The tendinous part is a strong pearly white cord, situated between the muscular portion and the *extensor pedis.* It commences at the inferior extremity of the *femur*, finally terminating in two branches—a large one inserted in front of the superior extremity of the cannon bone and the other and narrower one deviating outward to reach the anterior surface of the *cuboid* bone. The fleshy portion originates on the anterior face of the tibia and is inserted by two tendons, one in the head of the large metatarsal bone, the other in the small cuneiform on the inner side of the hock. Action, to flex the hock.

The *flexor pedis perforatus* of the hind leg originates at the posterior lower part of the femur. Its fleshy portion extends about halfway down the *tibia*, then, becoming tendinous, it passes over the point of the hock, being continued down the back

of the leg, and is attached in the same manner as the *perforatus* is on the front leg. Action, to flex the hind leg.

The *flexor pedis perforans* of the hind leg originates at the upper and back portion of the *tibia*. Above the hock it becomes tendinous and passes down over the inner and back side of the hock, and is attached to the *os pedis* in the same manner as the *perforans* of the front limb. Action, to flex the joints below the hock.

The *panniculus carnosus* (fly shaker) is a flat muscle situated on the inner surface of the skin, covering most of the neck, sides of the chest, and belly. Action, to shake the skin.

The principal muscles of the back and loins are the *longissimus dorsi, gluteus externus, gluteus maximus,* and *gluteus internus.*

The *longissimi dorsi* is situated on the superior part of the back and loins, and is the largest and most powerful muscle in the body, occupying the space on either side of the dorsal and lumbar spines. It is broad and fleshy at its origin in the loins and becomes narrower as it proceeds forward. It is attached to the anterior part of the pelvis (*ilium*), first two bones of the *sacrum*, all of the lumbar and dorsal vertebræ, the external surface of the last fifteen or sixteen ribs, and to the last three or four cervical vertebræ. Action; it is brought powerfully into play by kicking and rearing, by elevation of the fore or hind quarters, according to whether the fore or hind limbs are fixed. Acting singly, the result is lateral flexion of the back and loins.

Gluteus externus is a V-shaped muscle situated on the external part of the croup. It originates on the anterior part of the pelvis and at the second and third sacral spines. Insertion, to the upper and outer part of the *femur*. Action, to draw the thigh outward.

Gluteus maximus is a very large muscle, originating in the lumbar region; it is attached to the pelvis and sacrum and is inserted on the upper and outer portion of the *femur*. Action, to extend the *femur* on the pelvis, and when the posterior limbs are fixed, to assist in rearing.

Gluteus internus is situated underneath the *gluteus maximus* and above the hip joint. It originates from the shaft of the *ilium* (anterior bone of the pelvis), and is inserted by a tendon to the superior part of the femur. Action, to draw the leg outward and rotate it inward.

THE RESPIRATORY SYSTEM.

The organs of respiration are the nostrils, nasal chambers, *pharynx, larynx, trachea, bronchii,* bronchial tubes, and air cells, which are all lined, except the air cells, with mucous membrane. The nostrils are two, right and left, oblong openings situated in the anterior part of the face, at the commencement of the nasal chambers. The nasal chambers extend from the nostrils to the pharynx and are separated from each other by the cartilaginous *septum nasi;* each chamber is divided by the turbinated bone into three passages, and all are lined with a delicate, pale rose-colored membrane, the Schneiderian membrane, which is continuous with the skin of the nostrils.

The *pharynx* is a muscular, membranous cavity, common to the digestive and respiratory canals, somewhat cylindrical in form, and extending backward to the larynx and the esophagus.

The *larynx* is a complex musculo-cartilaginous valve, situated at the anterior part of the trachea or windpipe. It gives passage to air and at the same time is the organ of voice. The anterior extremity opens into the *pharynx* and the posterior into the *trachea;* it lies in the posterior part of the maxillary space and is commonly known as "Adam's apple."

The *trachea*, or windpipe, is a cylindrical, flexible tube consisting of a series of incomplete cartilaginous rings, numbering from forty to fifty, according to the length of the neck. It succeeds the *larynx*, runs down the neck, enters the *thorax* or chest, and terminates at the base of the heart where it branches into the right and left *bronchii*, which enter the lungs and subdivide into branches termed bronchial tubes. These, becoming gradually smaller as they divide, finally terminate in air cells. The entire ramification, when isolated, has the appearance of a tree, the *trachea* being the trunk, the *bronchii* and bronchial tubes the branches, and the air cells the leaves. These structures are accompanied throughout by arteries, veins, and nerves.

The *thorax*, or chest, is formed by the ribs, sternum, and bodies of the dorsal vertebræ, the intercostal muscles, and the diaphragm. It contains the lungs, heart, large blood vessels, the *trachea*, esophagus, and a number of nerves. The *thorax* is lined by two serous membranes, the right and left *pleura*, each *pleura* lining one-half the thorax and enveloping the structures contained therein.

The lungs, the essential organs of respiration, are spongy organs of a conical shape, and are situated in the thoracic cavity, being very light and porous. (Healthy lungs float in water.)

The *diaphragm* or midriff is the muscular partition which separates the *thorax* from the abdomen.

DIGESTIVE ORGANS.

The digestive organs consist of the alimentary canal and its accessories, by which the alimentary matter (food) is subjected to the special actions which adapt it for the purpose of nutrition.

Each division is provided with accessories; the preparatory with the teeth and salivary glands, and the essential organs with the pancreas, liver, spleen, etc.

The *esophagus*, or gullet, is a musculo-membranous, cylindrical canal passing from the pharynx to the stomach, through which the food reaches the latter.

The *stomach* is a division of the alimentary canal, continuous with the esophagus and small intestines, where the food is converted into chyme by maceration and the action of the gastric juice; it is very small in the horse in proportion to his size. It lies in the abdominal cavity just behind the liver. Its internal, or mucous, coat is divided into right and left portions, the latter is the cutaneous portion and is continuous with the mucous membrane of the esophagus, which it resembles in structure and appearance, being of a pale white color. The right portion, the *villous*, or true digestive coat, is reddish in color, soft, very vascular, and velvety looking.

The capacity of the stomach is from 3 to 3½ gallons.

The intestines are divided into large and small. The small intestines are continuous with the stomach, rather more than an inch in diameter and about 72 feet in length. The large intestines, measuring about 22 feet in length, extend from the termination of the small intestines to the anus, and may be regarded as consisting of four parts, the *caecum, great colon, floating colon*, and the *rectum*.

The *anus* is the posterior opening of the alimentary canal, being below the root of the tail. It forms a round projection, which becomes less prominent with age.

The intestines are supported throughout their entire length by strong bands of fibrous tissue extending from the backbone.

The liver is the largest secreting gland in the body, weighing from 10 to 12 pounds. Its shape is very irregularly elliptical, thick in the center, gradually becoming thinner at the borders. It is situated immediately behind the diaphragm and secretes a fluid called bile, which is emptied directly into the small intestines, as the horse is not provided with a gall bladder.

The *pancreas* (sweetbread) is situated behind the stomach and in front of the kidneys. It is of a reddish cream color, and weighs about 17 ounces. Its function is to secrete pancreatic fluid, which is poured into the duodenum.

The abdominal cavity, or belly, is a large and somewhat oval cavity, bounded superiorly by the muscles of the back, inferiorly by the abdominal muscles, anteriorly by the diaphragm; posteriorly it is continuous with the pelvic cavity.

PHYSIOLOGY OF DIGESTION.

The food is received into the digestive or alimentary tube; there it is subjected to a series of agencies by which it is, in greater or less part, digested and worked up to a condition in which it can be sucked up by the appropriate vessels, and, while this portion is absorbed by the circulation, the effete remainder passes on and is discharged.

The digestive tube, beginning at the mouth, is continued to the stomach by the throat and esophagus or gullet, while the stomach is succeeded by the small and large intestines.

In its passage along this tract (tube) the food is subjected to both mechanical and chemical processes. The food is taken into the mouth by the lips, where it is masticated (or chewed) and mixed with saliva; it is then swallowed, passed into the stomach, acted upon by the gastric juice, and when thoroughly macerated (rolled, mixed, and soaked) it enters the first portion of the small intestines, and is acted upon by the secretions of the liver and pancreatic gland (bile and pancreatic fluid); from this point onward the food, having been brought in contact with and thoroughly mixed with the several fluids above mentioned, is now ready for the nutritive portions to be absorbed into the circulation for the nourishment of the animal, which is accomplished by little villi, situated in the mucous membrane lining the intestines. The villi are small projections of the mucous membrane of the small intestines.

The functional processes of digestion are prehension (the taking up of the food by the lips), mastication (chewing or grinding), and, simultaneously with this, insalivation, or mixing the food with saliva, which is secreted by the salivary glands, situated in different parts of the head; deglutition, or swallowing the prepared food by means of the tongue, *pharynx*, and *esophagus* (gullet).

Chylification, or the conversion of chyme into chyle, is a change which takes place in the duodenum by the action of the bile and pancreatic fluid, followed by the absorption of the nutritive material into the circulation, and finally, defecation, or excretion of the residual, inert matter.

The alimentary canal is a musculo-membranous tube, extending from the lips to the anus. Its walls are composed of muscular tissue and lined throughout by mucous membrane. It consists of a continuous series of tubes and cavities, the chief of which are the *mouth, pharynx, esophagus, stomach*, and intestines, where the food passes through various changes and is deprived of its nutritive properties, and the egestive or expulsive portions, by which the residue is expelled from the system.

The portion of the food which is not absorbed is called effete material (dung) and is expelled through the anus.

URINARY SYSTEM.

The organs of this system secrete the urine from the blood and excrete or expel it from the body. These organs are chiefly the *kidneys, ureters, bladder*, and *urethra*. The urine, which is a watery fluid, is secreted by the kidneys and carried off by their ducts, the ureters, to a special reservoir, the bladder, where it accumulates and from which it is finally expelled at intervals through the urethra. The kidneys are two in number, right and left, situated on either side of the spine, immediately below the lumbar vertebræ.

The *bladder* is a musculo-membranous organ and serves as the reservoir for the urine and is situated within the pelvic cavity.

The *urethra* is a long narrow tube extending from the bladder to the head of the penis.

The normal amount of urine, which is expelled from the bladder through the penis, secreted in twenty-four hours varies from 3 to 6 quarts. The color in health is of a yellowish cast.

CIRCULATION.

This involves the consideration of the heart, arteries, and veins.

Blood.

The fluid which enriches all living structures, being the medium by which nutritive material is conveyed to the solid tissues. It is an opaque, thickish, clammy fluid with a peculiar odor, sickly saline taste, and alkaline reaction. Its color varies in different parts of the same animal, that in the arteries being a bright red or scarlet, while that in the veins is of a dark purplish hue.

Heart.

The heart is a hollow organ of involuntary muscular structure, situated between the lungs, in the thoracic cavity; its average weight is about 6½ pounds.

The heart is divided into two parts, right and left, each part containing two cavities, one above the other, which communicate by valvular openings. The heart acts as a force pump for the blood, forcing the impure from the right side of the heart through the pulmonary artery into the lungs, where the blood gives off carbonic acid gas and takes up oxygen; the purified blood returns through the pulmonary vein to the opposite (left) side of the heart, and is then forced by it into the arteries, which carry it to all parts of the body, giving nourishment to the tissues and taking up waste material. This impure blood is returned to the right side of the heart by the veins, thus completing the course of the circulation.

The smaller arteries terminate in a system of minute vessels—the capillaries—which are situated between the termination of the arteries and the commencement of the veins. Their average diameter is about $\frac{1}{3000}$ of an inch.

Circulation of the extremities.

The humeral artery.—This artery descends along the inner side of the humerus; just above the elbow joint it divides into anterior and posterior radial arteries. The anterior radial descends over the anterior surface of the elbow joint, passes down in front of the radius and approaches the knee below the *extensor pedis* muscle, where it divides into numerous branches, supplying

blood to the surrounding tissues. The posterior radial is a continuation of the humeral artery, passing down the inner side of the foreleg with a vein and nerve of the same name, inclining backward and dividing at the lower end of the radius into large and small metacarpals.

The large metacarpal artery is a continuation of the posterior radial. It runs down the back of the knee in company with the flexor tendons and the internal metacarpal vein and nerve; above the fetlock it passes between the tendons and suspensory ligament, dividing into the external and internal digital arteries.

The small metacarpal artery passes outward from the inner and back part of the knee, and running downward joins another artery supplying nourishment to the surrounding tissues.

Circulation of the hind leg.—The femoral artery is the artery of the thigh. Just above the back of the stifle joint it becomes the popliteal artery, which divides into two main branches, the anterior and posterior tibial, the latter supplying the posterior part of the gaskin and hock with nourishment, while the former winds forward between the tibia and fibula to the fore part of the leg, gaining it midway between the stifle and the hock. At the hock it passes obliquely outward, crossing the joint, and becomes the great metatarsal artery at the upper and external part of the metatarsus; it then passes under the small splint bone and gains the back part of the cannon, and then, passing down the leg, it divides just below the bifurcation of the suspensory ligament into two branches, the external and internal digitals.

The digital arteries, which are alike in the fore and hind limbs, originate at an acute angle just below the middle of the cannon bone in front of the flexor tendons, passing over the inner and outer side and accompanied by corresponding veins and nerves of the same names, the artery being central and the nerve posterior. Each runs down the side of the foot, inside the lateral cartileges, to the superior border of the wings of the *os pedis*, thence they reach the middle and under surface of the bone at either side of the *flexor pedis perforans* tendon. They supply numerous twigs to the flexor and extensor tendons, fetlock pad and joint, and give off the following branches, which are usually regarded as the arteries of the foot: They are five in number, *perpendicular, transverse, artery of the frog, preplantar ungual,* and *plantar ungual.* The arteries ramify through the foot, supplying it with nutrition.

The perpendicular artery arises at right angles below the middle of the *os suffraginis*, descends on the side of the digit, inclines forward and terminates above the coronary band by anastomosing (joining) with its fellow, their union forming the superficial coronary arch, which supplies the coronary band with blood.

The transverse artery is given off under the lateral cartilage, passes forward between the front of bone (*os coronæ*) and the extensor tendon and joins its fellow, forming the deep coronary arch, supplying the surrounding parts with blood.

The artery of the frog arises behind the pastern joint at the superior part of the lateral cartilage, enters the sensitive frog and divides into anterior and posterior branches. It supplies the sensitive frog with blood.

The *preplantar ungual* artery is given off just back of the wing of the *os pedis*, passes through the notch in the wing and along the *preplantar* groove in the wall of the bone, at the anterior extremity of which it terminates by several branches which enter the *os pedis* and anastomose with the *circulus arteriosus*. Before entering the bone two branches are given off which supply the bulbs of the frog and the lateral cartilage with blood.

The *plantar ungual* artery is the terminal branch of the digital, passes through the *plantar foramen* on the tendinous surface of the *os pedis* and enters the bone within which it joins its fellow, forming the *circulus arteriosus*, from which spring ascending and descending branches. The former are the anterior laminals, which leave the bone through numerous openings on its wall, supplying the sensitive laminæ with blood; the latter (descending branches) are the inferior communicating arteries, which average 14 in number. They pass through the foraminæ (openings) situated just above the edge of the *os pedis* and unite outside to form the circumflex artery which runs around the toe, giving off ascending branches to the sensitive laminæ and about 14 descending ones, the solar arteries, which supply the sensitive sole and unite posteriorly to form the inferior circumflex artery.

The veins of the foot are very numerous and arranged in an external and internal (interosseous) network.

They are valveless, allowing the blood to flow in either direction in sudden emergency.

The solar plexus is made up of a large number of small veins, which unite to form the large circumflex vein which accompanies the artery of the same name, passing back to the wing of the *os pedis* and thence to the coronary plexus.

The laminal plexus arises on the sensitive laminæ, the veins of which gradually increasing in size as they approach the coronet where they terminate in the coronary plexus. The coronary plexus surrounds the *os coronæ* and upper part of the *os pedis,* extending backward below the lateral cartilages and is formed by the veins of the solar and laminal plexuses. The veins of the frog extend over the external surface of the sensitive frog, ascending the sides of the lateral cartilage and unite to form a large vein, which, with branches from the coronary plexus, runs up the side of the *os coronæ*, all uniting near the upper part of the bone to form the digital vein. The internal or interosseous veins of the foot originate at the *circulus arteriosus;* they pass out of the bone through the plantar foraminæ, thence up the inner side of the lateral cartilages and unite with branches of the coronary plexus.

NERVES OF THE FOOT.

At the fetlock each metacarpal and metatarsal nerve divides into three digital branches; anterior, middle, and posterior.

The anterior branch descends in front of the digital vein and distributes its branches on the anterior surface of the foot.

The middle branch frequently anastomoses with the others, and always with the anterior branch. It supplies the fetlock pad and sensitive sole.

The posterior branch, by far the larger, and the true continuation of the metacarpal and metatarsal nerve, is continued behind the digital artery to the wing of the *os pedis,* entering the fissure and being distributed to the substance of the bone and the laminæ. It gives off branches to the flexor tendons and a filament which is carried forward and distributed to the sensitive frog; minute filaments accompany the plantar ungual artery into the pedal bone.

ANATOMY OF THE LYMPHATIC SYSTEM.

The lymphatic or absorbent system is connected with the vascular, and consists of a series of tubes which absorb and carry to

the blood certain fluids; a number of glandular bodies (glands) through which the tubes frequently pass; and the fluids themselves, which are lymph and chyle.

LYMPHATIC VESSELS.

These are called lymphatic vessels because they convey a clear, limpid fluid; or absorbent vessels, because they absorb alimentary matter. The absorbents of the chyle are called "lacteals."

The tubes which form the lymphatic system are distributed throughout the whole body and unite to form two large trunks, the thoracic duct, and the right lymphatic vein, both of which enter the venous system near the heart. The thoracic is the largest and longest vessel and receives all the others, except those of the right anterior extremity and right side of the head, neck, and thorax.

Lymph is a colorless fluid. Chyle is a milky fluid found in the lacteals or lymphatic vessels of the intestines during digestion. Since both the lacteals and posterior lymphatic vessels lead to the great lymphatic trunk or thoracic duct, it follows that the lymph and chyle become mixed.

Through the excessively thin walls of the capillaries the fluid part of the blood transudes (oozes) to nourish the tissues outside the capillaries; at the same time fluid passes from the tissues into the blood. The fluid, after it passes into the tissues, constitutes the lymph, and acts as a stream irrigating the tissue elements. Much of the surplus of this lymph passes into the lymph vessels, which, in their commencement, can hardly be treated as independent structures since their walls are so closely joined to the tissues through which they pass, being nothing more than spaces in the connective tissue until they reach the large lymph vessels, which empty into the lymph glands. These lymph glands are structures so placed that the lymph flowing toward the larger trunks passes through them undergoing a slight change in structure. The glands give lymph corpuscles to the lymph, which are identical with the white corpuscles of the blood.

From the fact of this arrangement lymph glands are subject to inflammatory diseases in the vicinity of diseased structures, because infective material being conveyed in the lymph stream lodges in the glands and produces irritation. The lymphatic vessels contain great numbers of valves.

ANATOMY OF THE NERVOUS SYSTEM.

The nervous system is divided into two minor systems, the *cerebro-spinal*, which is to a considerable extent influenced by the will of the animal, and the *sympathetic*, which is not directly influenced by the will.

In the first the center is made up of two portions, the brain and the spinal cord.

The brain is situated in the cranial cavity; the other, the spinal cord, is elongated and continuous with the brain and is situated in the canal of the vertebral column.

The communicating portion of this system consists of the cerebro-spinal nerves, which leave the brain and spinal cord in symmetrical pairs, and are distributed to the voluntary muscles, to the organs of common sensation, and to those of special sense.

The sympathetic system consists of a chain of ganglia (small brains) connected by a nerve cord. They extend from the head to the *coccyx* along either side of the spine; the nerves of this system are distributed to the involuntary muscles, mucous membranes, internal organs, and blood vessels.

A nerve consists of a bundle of tubular fibers held together by dense connective tissue.

The nerve fibers represent and form a conducting apparatus.

ANATOMY OF THE EYE.

The eye is the organ of sight and is situated in the orbital fossa. It is spherical in shape and filled with fluid. The front portion, called the *cornea*, is clear as glass, admitting the light to the back part of the eye, where it strikes the *retina*, an expansion of the optic nerve which transmits impressions to the brain. The colored portion, or *iris*, acts as a curtain, regulating the amount of light admitted, the center of the iris being known as the pupil. The *crystalline lens* is a small transparent body situated immediately behind the pupil; it is thick in the center and tapers toward the edges. Its function is to draw the rays of light to a focus and refract them on the retina. When the lens is diseased and no light can pass through it the animal is said to have a cataract. The eyelids are two movable curtains, superior and inferior, which protect the eye.

The *membrana nictitans*, or accessory eyelid (haw), is situated near the internal angle between the lids and the eyeball. This membrane serves as a finger for the removal of foreign bodies from the eye.

ANATOMY OF THE MOUTH.

The mouth is an irregularly oval cavity at the commencement of the alimentary canal, containing the organs of taste and the instruments of mastication. It is situated between the jaws, its long diameter following that of the head. It is pierced by two openings—the anterior, for the introduction of food, and the posterior, through which the latter passes into the pharynx. It is bounded in front by the lips and laterally by the cheeks; the roof is formed by the hard palate; its floor is occupied by the tongue, while the posterior boundary is the soft palate (*velum pendulum palati*), the membranous partition separating it from the pharynx. The mucous membrane, continuous with the skin at the lips, covers the whole free surface of the mouth and its contents, except the teeth. The lips are the organs of touch as well as of prehension. The soft palate is a valvular curtain suspended between the mouth and the *pharynx*, attached above to the palatine arch; the inferior border is free and rests on the floor of the pharynx. It is owing to the great size of this membrane that a horse is unable to breathe through his mouth.

The tongue is a movable musculo-membranous organ, situated on the floor of the mouth between the branches of the lower jaw. It is the special organ of taste and at the same time assists in mastication.

ANATOMY OF THE SKIN.

The skin consists primarily of two parts, the superior, non-vascular (without blood vessels) layer—the cuticle or epidermis, and, second, the deep vascular (with blood vessels) layer—the *corium*, *dermis*, or true skin.

The epidermis is the outer, scaly covering. The true skin or *derma* lies immediately below the epidermis, is much thicker, and contains the roots of the hair, sweat glands, which are simple tubes extending from the deeper layers of the skin to the surface of the body, pouring out perspiration which carries with it certain waste materials from the system. The evaporation of sweat cools the body and assists in regulating its temperature.

The sebaceous glands are branching tubes beginning in sacs and opening into the hair follicles. Their oily secretion gives gloss to the hair, prevents it becoming dry and brittle, and keeps the skin soft and supple.

ANATOMY OF THE FOOT.

In a broad sense we may regard the foot as consisting of three well-marked portions,—the base or skeleton, the highly sensitive or secreting portions, and a nonsensitive or protective portion. The latter two may be considered as modifications of the skin. The sensitive part corresponds to the *derma* or true skin, while its covering, the hoof, corresponds to the *epidermis*.

The study of the foot of the horse is of the greatest practical importance, owing to the many diseases and injuries to which it is liable. It resolves itself into the consideration of the hoof or horny case and the parts contained in it.

The bones.

The *os suffraginis*, or large pastern bone, passes obliquely downward and forward and articulates with the cannon bone above and the *os coronæ*, or small pastern bone, below. The articular surfaces of the bone are kept in apposition by strong bands of fibrous tissue, known as ligaments.

The *os coronæ*, or small pastern bone, is inclined obliquely downward and forward and is partially covered by the hoof. It articulates below with the coffin and navicular bones, and above with the *os suffraginis*. The sides of the *os coronæ* are roughened for the attachment of the *flexor pedis perforatus* tendon.

The *os navicularis*, or shuttle bone, is an irregular bone situated with its long axis transversely behind and below the *os coronæ* and behind the *os pedis*, with which it articulates, forming the so-called navicular joint.

The *os pedis*, or coffin bone, is an irregularly shaped bone situated within the hoof, and which, in a healthy state, corresponds somewhat to it in shape, being semilunar in form with the convexity to the front.

It is a very hard but porous bone, having many excavations and channels for the passage of the arteries and veins. The wall or anterior surface is the semicircular part in front, which

presents numerous depressions and channels, the latter being for the passage of the blood vessels and nerves, and the former for the attachment of the soft structures.

The highest portion in front is called the pyramidal process, to which is attached the tendon of the *extensor pedis* muscle. The sole or inferior surface, which lies on the sensitive or vascular sole, is slightly excavated and half-moon (crescent) shaped. Immediately behind this is the tendinous surface, to which is attached the tendon of the *flexor pedis perforans* muscle. The wings are irregular protuberances on the posterior part of the wall. The articular surface is divided into two small grooves separated by a slight ridge. The *os pedis* articulates above with the *os coronæ* and behind with the navicular bone.

ANATOMY OF THE HOOF.

The hoof of the horse corresponds to the finger nail of man. By maceration (soaking) it is divisible into three distinct parts—the wall, the sole, and the frog.

The wall is that portion which is visible when the hoof rests on the ground. It is generally divided into the toe, quarters, heels, and bars. The toe forms the front of the hoof and is the thickest part of the wall, which gradually declines in height as it turns backward to form the quarters. These occupy the space between the toe and the heel. The wall decreases in thickness from in front backward, and more markedly so at the inner portion. At the posterior part of the foot the walls take on each side a sudden bend, forming an acute angle, and are continued inward to the center of the foot, where their two parts (the bars) unite with the sole. The exterior surface of the wall is convex, smooth, and covered by a thin layer, the *perioplc,* which is continuous above with the coronary band. The internal surface of the wall presents throughout its whole extent parallel perpendicular plates of horn, the insensitive or horny *laminæ*, numbering from 500 to 600, and are separated from each other by deep fissures, in which are inserted the sensitive *laminæ.* The superior, or coronary, border of the wall presents an excavation or groove which slopes somewhat obliquely downward and inward, forming a circular gutter, in which is located the coronary band or ligament. In this are numerous orifices, into which are inserted the secreting *villi* of the coronary band. The

inferior border is that portion in contact with the ground and to which the shoe is fitted. In the unshod animal it is always in wear and protrudes beyond the rest, more especially around the outer quarter, and is known as the spread. The external layer of horn in the wall is distinctively known as the crust and is secreted by the coronary band, the rest being secreted by the sensitive *laminæ*. Supposing the foot to rest on a perfectly level plane, the line joining the toe to the middle of the coronary border should make with the ground an angle of about 50 degrees in the fore and perhaps a little more in the hind feet.

The sole.

The sole is the thick plate of horn which helps to form the inferior portion of the foot. It is situated between the inner border of the inferior part of the wall and the bars. The inferior, or external, surface is more or less concave; the superior surface (the internal) is usually convex, and is studded with a number of small orifices which run obliquely forward; into these are inserted the vascular *papillæ* of the sensitive sole. The external border or circumference of the sole is convex, and is united throughout its whole extent to the internal surface of the inferior border of the wall to which it is very closely united. The inner border represents a deep cut or notch in the form of the letter V, and is attached to the bars, except at the anterior part, where it is bounded by the frog.

The frog.

The frog is the somewhat pyramidal mass of spongy horn lodged between the bars and filling up the triangular space. The inferior, or external, surface is very irregular and presents a longitudinal triangular cavity, which varies in breadth and depth, being broadest and deepest in well-formed feet. This cavity is the cleft of the frog, bounding which are two sloping projections or branches, which unite at the apex of the frog anteriorly and diverge posteriorly where they join the heels. The superior or internal surface is also very irregular, but exactly the reverse of the inferior; where the one is hollow the other has a projection and vice versa. It presents over its whole surface numerous small orifices into which are inserted the vascular or secreting *papillæ* of the sensitive frog.

The base of the posterior extremities constitutes the heels or bulbs of the frog. These are two round, flexible, and elastic eminences formed by the two extremities and separated by the cleft. These extend upward and are continued around the external part of the superior surface of the wall in the form of a band, which is the coronary frog band. It is from this, on its inferior border, that the thin covering of the hoof is continued.

It is an acknowledged fact that white hoofs, like white skin, are more delicate, porous, and prone to disease than dark ones.

The parts contained within the hoof are the *os pedis, os navicularis*, and the lower extremity of the *os coronæ*, the ligaments by which they are connected together, insertions of the *extensor pedis*, and *flexor perforans* tendons, the blood vessels, and nerves.

There are also certain other structures proper to the foot, viz, lateral cartilages, sensitive frog, coronary ligament, sensitive *laminæ*, and sensitive sole.

The lateral cartilages are of an irregular, quadrangular form, situated inside the quarter and attached to the wings of the coffin bone. Attached to the inner surface of the hoof is the sensitive portion of the hoof, which may, like the hoof itself, be divided into the regions of the wall, the sole, the frog, and the coronary band. The *keratogenous membrane* is a sensitive sheath which envelops the *os pedis*. Its outer surface is endowed with the function of secreting horn tissue for the renewal of the various parts of the hoof.

The sensitive frog or plantar cushion.

The sensitive frog occupies the posterior and central parts of the foot, filling up the irregular space between the lateral cartilages, flexor tendon, and *os pedis*, bounded laterally by the lateral cartilages, above by the flexor tendon and below by the horny frog. It is continuous with the sensitive bars, sole, and the coronary ligament. The base looks backward and is divided into bulbous enlargements, which are united to the lateral cartilages. The external layers secrete the horny frog.

Coronary substance or coronary bend.

This is the vascular substance which occupies the coronary groove on the superior border of the wall. It consists of a dense, fibrous mass or band, which is connected with the coffin bone and

extensor tendon through the medium of dense cellular tissue. It secretes the horny tissues of the wall. The coronary band presents, along its upper border, a narrow lip or process—the perioplic ring—which secretes the horn of the *periople*, the thin outer covering or varnish of the wall.

The sensitive laminæ.

The sensitive *laminæ* form the continuation of the coronary substance and are attached to the coffin bone by dense, fibrous membrane which contains a large number of blood vessels that pass through the small openings in the coffin bone. The highly organized plates are interposed and firmly attached to the horny *laminæ* of the wall and are covered by numerous *papillæ*, which secrete the horny *laminæ*. On their inferior extremity are a few papillæ, which help to secrete the horny sole.

The sensitive sole.

The sensitive sole, continuous with the sensitive *laminæ* and frog, is firmly attached to the coffin bone. It secretes the horny sole.

PHYSIOLOGY OF THE FOOT.

The amount of moisture contained in the horn is considerable, the use of which is to keep the foot elastic and prevent it from becoming brittle.

In the unmutilated foot the too rapid evaporation of moisture in the wall is prevented by the periople: from the sole and frog by the accumulated masses of partly dead layers of horn; consequently, those protecting layers should not be removed, as this removal would cause the horn to become dry, brittle, and inelastic.

The wall is the weight-bearing portion of the hoof; the growth is three-eighths of an inch per month.

The bars afford a solid bearing to the posterior part of the foot, to give additional strength and to secure a more intimate union with the sole. They act as buttresses and assist in expanding the hoof on pressure.

The function of the sole is to afford protection to the sensitive sensitive parts above.

The function of the frog is to break the jar by receiving, in conjunction with the posterior wall, the impact of the foot on coming to the ground, and also to prevent slipping, and to stimulate the capillary circulation.

The lateral cartilages form an elastic wall to the sensitive foot, and their movements, caused by lateral expansion and contraction of the plantar cushion, assist the venous circulation. When weight comes on the foot, it is relieved by a yielding foot articulation on elastic walls, bars, and frog, and through this the plantar cushion. The elastic posterior wall is pressed outward by the compressed india-rubber-like frog and plantar cushion, and it slightly expands from the ground surface to the coronet.

At the moment of expansion the bulbs of the heels of the foot at the coronary edges sink under the body weight and come nearer the ground, as a result of which the anterior coronary edge retracts.

The pedal bone slightly descends through its connection with the sensitive laminæ and presses the sole down with it, while the wall of the foot diminishes in height under the compression to which it is exposed. Under these conditions the blood pressure in the veins of the foot increases and the blood vessels are emptied. When the weight is removed from the foot the blood vessels fill, the frog and the posterior walls contract, the bulbs of the heel rise, and the foot becomes narrower from side to side; at the same time the anterior edge of the coronet goes forward, and the pedal bone and sole ascend. The object of this expansion is to assist the venous circulation and counteract concussion.

Shoeing is a necessary evil, but by remembering the functions of the various parts of the foot the damage resulting may be limited to a comparatively small amount.

The following rules may serve as a guide for the shoeing of healthy feet:

1. The wall being the weight bearer it should be pared perfectly level to avoid placing extra tension on any of the ligaments, thereby causing the foot to be placed out of its true position.

2. Fitting the shoe accurately to the outline of the foot, not altering the latter to fit the shoe. Rasping away the exterior of the crust to fit the shoe not only renders the horn brittle but is so much loss of bearing surface.

3. The exterior of the wall should be left intact. The practice of rasping the wall for the sake of appearances destroys the horn and allows of so much evaporation from the surface of the foot that the part becomes brittle.

4. The sole should not be touched with the knife; it is there for the purpose of protection.

5. The bars should not be cut away; they are a part of the wall and intended to carry weight. The shoe should rest on them.

6. The frog should not be cut, but left to attain its full growth. No frog can perform its functions unless on a level with the ground surface of the shoe.

7. The shoe should have a true and level bearing and rest well and firmly on the wall and bars.

A plain light-weight shoe is the best—one plain on both ground and foot surface.

High nailing is injurious; do not use any more nails than are absolutely necessary, as the nails destroy the horn.

CHAPTER IV.

WOUNDS, SPRAINS, BRUISES, AND CONTUSIONS.

TREATMENT OF WOUNDS.

It consists of the bandaging and dressing of wounds. A dressing is a mode of local, periodically repeated treatment, producing a continued action, following ordinarily the performance of operations, and consisting in the methodical application upon the surface of wounds of special apparatuses which complete the effect of the operation and cooperate in the recovery.

Before applying a dressing the wound should be thoroughly cleansed and freed from blood, pus, the remains of previous dressing, and, in a word, of any foreign or other substances capable of becoming sources of irritation. This is best done with water, but its effect is frequently greatly improved by combining with it some of the antiseptics, such as carbolic acid, creolin, bichloride of mercury, etc.

It may be applied by carefully passing a ball of oakum over the surface of the wound, or it may be used more freely in larger

ablutions (washings). Crusts or scabs, if any, may be removed with the scissors or scraped away with the knife, but the fingernails must by no means be used for such a purpose, for the twofold reason that it is both filthy and dangerous. Handle the wound only as is necessary; all needless handling irritates. If the wound is deep, irrigations or injections can be combined with the lotion in cleansing it.

The essential condition of cleanliness applies not only to the wound but also to the materials used for dressings, and soiled cloths or bandages, and dirty oakum must be rigorously rejected; everything coming in contact with a wound must be absolutely clean, hands as well as instruments and dressings.

In applying the various dressings unnecessary pressure should be avoided, especially on the soft tissues.

In the treatment of all wounds cleanliness is of more importance then medication, but the two in combination, when thoroughly and intelligently carried out, will leave no room for the propagation and ravages of those germs that cause formation of pus, and retard the healing process. The first step in the treatment of a wound is to have all utensils thoroughly clean. The farrier, or whoever is to look after the injured animal, should have his hands thoroughly clean, and in a clean can or bucket provide a solution of creolin or other antiseptic 1 part, water 50 parts; and several clean pieces of cotton, gauze, or oakum. Sponges are cleaned with difficulty and should not be used. If the injury is one that can be sutured (sewed) a needle and silk should be immersed in a solution of creolin 1 part, water 50 parts; the hair around the wound should be either shaved or clipped with a pair of shears, the wound thoroughly cleansed by washing it with cotton saturated with the creolin solution; all dirt and hair must be removed, and all ragged edges, if any, cut away, and the edges of the wound placed in contact with each other if possible and held in place by the aid of sutures; the wound should then be wiped dry with another piece of cotton or gauze, and over the surface should be dusted some iodoform or acetanilid, and, if the location will allow it, it should be covered with a pad of gauze or absorbent cotton, and a cotton bandage wrapped around the parts to hold the pad in place. The wound should be dressed once or twice a day until the formation of pus, if any, ceases; then when the wound is dry, only the powder should be used.

If the wound is a large one, with the skin and tissues badly torn and lacerated, and it will not admit of the use of sutures, the torn and ragged edges, especially if the lower part of the wound should hang down, should be removed with the knife or scissors and the wound dressed as above directed. When the wound begins to granulate (fill with new tissue) care should be taken that the granulations are not allowed to grow out higher than the skin; in case they do so we will then have the condition known as proud flesh.

The treatment of proud flesh consists in the removal of the unhealthy tissue by the use of the knife or the application of the red-hot iron; or burnt alum or salicylic acid dusted upon the surface of the wound will destroy the unhealthy granules.

If hemorrhage is profuse the first step to be taken is to arrest the flow of blood by ligating (tying) the blood vessels or vessel with a piece of silk, or if none is at hand, a clean piece of string will do; if unable to tie the blood vessels a thick pad made of cotton or several layers of gauze or clean cloth, folded so as to cover the wound and held firmly in place by one or more cotton bandages will check the flow of blood. Before applying the compress and bandages, the edges of the wound should be brought in contact by the aid of sutures if possible. The compress should be left on until the hemorrhage ceases, and the wound treated as before mentioned.

Punctured wounds should be explored with a probe to ascertain if any foreign bodies are in the channel; if so, they should be removed, and if necessary a dependent opening be made to allow perfect drainage, and the parts syringed out thoroughly with a solution of creolin, 2 per cent; carbolic acid, 3 to 5 per cent; or, bichloride of mercury, 1 to 1,000, and the outside opening sprinkled with iodoform. This treatment should be applied twice daily.

An excellent antiseptic solution for the treatment of wounds, especially during fly time, is made by dissolving eight ounces of gum camphor in three ounces of carbolic acid. Apply with a clean swab several times daily.

PUNCTURED WOUNDS AROUND JOINTS.

Open joint is a wound situated on a joint and extending through the capsular ligament and allowing the joint oil to escape. The

capsular ligament is a broad, thin band of tissue, surrounding the whole of the joint; on the inside of this ligament is a membrane that secretes the oil-lubricating fluid of the joint.

Treatment.—Remove the hair and thoroughly clean the parts around the wound; unless a foreign body is known to be lodged in it do not probe or explore, as the introduction of any instrument, unless thoroughly clean, will be the means of setting up considerable inflammation. Wash thoroughly with a solution of bichloride of mercury 1 part, water 1,000 parts; then sprinkle with iodoform, and, if possible, bandage as before recommended; sutures may be used, provided movement of the joint and tearing can be prevented. When the wound is unlikely to heal quickly, or simple treatment has failed, a blister of cantharides 1 part, cosmoline 4 parts, may be applied, with a view of closing the opening, limiting motion, and relieving pain. Wounds of the lips, nostrils, and eyelids heal very rapidly; if of several days standing they should have their edges scraped and then be sutured, and iodoform or acetanilid dusted over the surface twice daily.

CAUSE AND TREATMENT OF SPRAINS.

Sprains affect the muscles, tendons, and ligaments. The fibers of which they are composed are severely stretched, sometimes torn in serious cases, causing inflammation and subsequent contraction, and, in case of muscles, atrophy (wasting away, sweeny).

Muscular sprains are found in various parts of the trunk and limbs; thus, a horse may be strained in the neck, as a result of falling on the head; the muscles of the dorsal region may be sprained by the hind feet slipping backward. When a muscle is strained the injury is succeeded by pain, swelling, heat, and loss of function.

An inflamed muscle can no longer contract; hence, in some strains the symptoms resemble those of paralysis.

SPRAINS OF THE SUSPENSORY LIGAMENT AND FLEXOR TENDONS.

The fibrous structures situated behind the cannon bone, both in the front and hind legs, is often the seat of laceration or sprains resulting from violent efforts or sudden jerks. The injury is easily recognized by the changed appearance of the parts, which

become more or less swollen, sometimes extending from the knee down to and even involving the fetlock itself. It is always characterized by heat and is variously sensitive, ranging from a mere tenderness to a degree of soreness which shrinks from the lightest touch. The degree of lameness corresponds to the severity of the injury.

CURB.

The calcaneo-cuboid ligament, situated at the back part of the hock, uniting the calcaneum, the cuboid, and the external splint bones, is frequently sprained. This condition is known as a "curb."

The various ligaments entering into the formation of joints are subject to sprains and injuries. This condition is indicated by lameness, accompanied by pain, heat, and swelling.

In dislocation of the patella (stifle bone) the ligaments holding it in position are severely stretched and in some cases sprained or ruptured. The capsular ligament when sprained very often becomes weakened, resulting in distension of the synovial sac. These enlargements receive different names, according to their location.

Treatment.—Perfect rest is absolutely necessary and must not be overlooked in the treatment of all sprains; therefore the injured animal should be at once removed to a level stall where it can remain until recovery has taken place. In connection with rest, hot or cold applications should be applied to the injured parts. These applications should be in the form of fomentations (bathing), or bandages saturated with water. They must not be allowed to dry while in contact with the injured parts, as a flannel bandage applied wet shrinks in drying, and will not only retard the reparative process, but cause unnecessary pain. Cold water is often materially assisted in accomplishing the desired results by the addition of acetate of lead or sulphate of zinc, witch-hazel, or nitrate of potash. A convenient solution is made as follows: Acetate of lead and sulphate of zinc, each 1½ ounces; water, 1 quart; or, 1 pint of witch-hazel, 1 ounce of acetate of lead, and water enough to make 1 quart. If pain is very severe the following may be used: Tincture opium, 4 ounces; acetate of lead, 2 ounces; water to make 1 quart. This application is of more benefit when applied warm. Such applications should be used several times daily.

If, after the inflammation is reduced, the parts remain large and swollen, benefit will result from the application of tincture of iodine, well rubbed in, twice a day. If this treatment fails to restore the parts to their normal condition in a reasonable length of time, a blister should be applied. It is made as follows: Cantharides (powdered) 1 part, cosmoline 4 to 5 parts; or, cantharides (powdered) 1 part, biniodide mercury 1 part, cosmoline 4 to 6 parts.

Before applying either the blister or the iodine the hair should be clipped from the parts to which the medicine is to be applied. To obtain the best results from the blister it should be well rubbed in for at least fifteen minutes. The animal must be tied in such a manner that he can not reach the blistered part with his mouth: the blister should be left on for a period of twenty-four to forty-eight hours: it must then be removed by washing with warm water and soap. After the blister has been removed the animal can be untied. The parts should be kept clean and free from scabs.

Rest is necessary throughout the treatment, and even to test his soundness the animal should not be moved more than is necessary.

BRUISES—CONTUSIONS.

In the cavalry horse the most frequent bruise we find is that condition known as saddle and cinch galls, and bruise of the withers, caused by undue pressure of the saddle.

Certain horses suffer more than others, depending on the presence of old sores, scars, or scabs, or on peculiarities in form interfering with the fitting of the saddle. Among these may be included abnormally high or low withers, flatness of the ribs, keel-shaped breast and short sternum (breastbone), and distension of the abdomen, causing the cinch to slip backward or forward.

Old horses sometimes have the muscles in the saddle bed atrophied (wasted away), and are therefore more liable to contract saddle galls. The mechanical cause of saddle galls may be divided into three groups: First, unequal distribution of weight; second, faults in saddling; third, errors in riding.

Treatment.—To prevent the condition it is advisable to leave the saddle on for one-half to one hour after dismounting, as where

an injury has taken place the blood vessels are compressed and almost empty.

If pressure be now suddenly and completely removed, blood is vigorously forced into the paralyzed vessels, and may thus rupture their walls. On the other hand, if the saddle is allowed to remain some time in position, circulation is gradually restored without injury.

As soon as the swelling is noticed, the application of cold in the form of pads kept saturated with cold water and massage in the form of gentle stroking with the fingers will aid the absorption of the swelling.

Injuries to the withers require different treatment—cold applications without pressure and without massage.

A solution made of the following is a very good application for bruises: Sugar of lead 1 ounce, laudanum 4 ounces, water to make 1 quart. To be applied several times daily. Or a poultice made of flaxseed meal, to which has been added an antiseptic, such as creolin, carbolic acid, etc.

Bruises of the neck and shoulders of artillery horses may be treated in the same manner; if the skin is broken or chafed bathe with cold water to which creolin is added in the proportion of 1 to 50, and then apply iodoform 3 parts, tannic acid 1 part, or acetanilid and boric acid in equal parts.

The artillery horse is sometimes subject to the same bruises caused by the saddle as a cavalry horse, and should be treated in the same manner.

The white lotion, composed of 1 ounce each of sugar of lead and sulphate of zinc, water 1 quart, is a most excellent remedy for abrasions.

BRUISES OF THE SOLE AND HEEL.

These are quite frequent, and should be treated by hot or cold applications, best applied by holding the foot in a tub or pail of water, or have the foot incased in a flaxseed-meal poultice.

CAPPED ELBOW—SHOE BOIL.

This is a bruise at the point of the elbow, and is caused by the horse lying on his shoe; remove the cause by placing a large roll around the pastern at night, and the application of tincture of iodine twice daily, until the swelling is removed.

CAPPED HOCK.

A swelling, more or less soft, found on the point of the hock, and usually caused by kicking in the stall, or by bruising the parts during transportation by rail or sea. Tincture of iodine is a very good remedy for this injury.

Only in extreme cases is it advisable to use the knife in the treatment of shoe boils and capped hock. As soon as the parts are opened pus rapidly forms, and the inflammation (infection by germs) may extend to the inner structures, and we may have a condition that will not readily yield to treatment.

Bruises caused by kicks or running against an obstacle should be treated by applications of water, and if painful an anodyne liniment applied. The following makes a good anodyne: Witch-hazel 2 parts, tincture opium 1 part, tincture aconite ¼ part, water 2 parts. Apply locally.

SITFAST.

Sitfasts are dry, dead, circumscribed portions of the skin, and may involve the deeper tissue; they are caused by continuous pressure of the saddle, cinch, or collar; may be situated on the side of the body, back, side of withers, shoulder, or neck.

Treatment.—With the knife remove all dead and bruised tissue, stimulate the sore at the sides by the use of lunar caustic, and treat as a common wound. When there is no more formation of pus, and the parts are perfectly dry, do not apply liquids, but use iodoform until well.

FISTULOUS WITHERS.

Fistulous withers is an abscess having a more or less chronic discharge of pus from one or more openings situated in the immediate vicinity of the withers; it may involve only the soft structures, or the bones may also be affected; it is caused by a bruise from an ill-fitting saddle.

Treatment.—The knife must be freely used; cut away all dead and bruised tissue, and make a large opening down to the lower part of the abscess so as to allow of good drainage; unless this precaution is taken pus will burrow into the deeper structures, and may eventually find its way under the shoulder blades. Remove all particles of diseased bone, if any, and treat as a common wound.

POLL EVIL.

Is similar to fistulous withers, but situated on the poll, and will yield to the same treatment.

CHAPTER V.

DISEASES OF THE RESPIRATORY SYSTEM AND INFLUENZA.

ACUTE NASAL CATARRH.

Acute nasal catarrh (simple cold in the head) is usually produced by cold caused by standing in a draft, and may be detected by the discharge from the nostrils. It is usually accompanied by a cough, loss of appetite, and elevation of temperature (fever). The discharge is at first of the consistency of water, but may in severe cases become much thicker, and form dry crusts on the edges of the nostrils.

Treatment.—The mild form does not require treatment; it ends rapidly in a cure. In severe cases, fumigation (steaming) with hot water, to which is added a small quantity (1 ounce to ½ pail of hot water) of creolin or carbolic acid, constitutes an excellent local treatment. Give bran mashes, and administer twice daily 1 teaspoonful of saltpeter, or 1 tablespoonful of chloride of ammonia until the animal has recovered. If the cough is frequent and the horse has difficulty in swallowing, the following liniment should be applied to the throat: Ammonia 1 part, oil of turpentine 1 part, olive oil 2 parts. Apply twice daily.

CHRONIC NASAL CATARRH.

Usually an unfavorable termination of simple catarrh; or it may be the result of injury and chronic inflammation of the nasal cavities, tumors, parasites, abscesses, etc., of the nasal cavities, diseases of the teeth, and chronic diseases of the respiratory (breathing) apparatus in general, and chronic constitutional diseases.

Symptoms.—The discharge is quite thick and becomes glued to the sides of the nostrils; its color varies from a dirty to a yellowish gray; it frequently has a fetid (foul) odor: the quantity

varies; the discharge is usually from one nostril, but both may be affected; in very old cases small ulcers may occasionally be seen in the nostrils; they are superficial and defined by sharp edges that are not thickened, and heal without leaving a scar. The ulcer of glanders may be found in the nostril, but the edges are shaped like saw teeth, and when healed a jagged scar remains.

Treatment.—It is essentially local and comprises the following means: Fumigation (steaming) with hot water, to which may be added 2 ounces of creolin or 2 ounces of carbolic acid to a half-bucketful of water, steaming to continue at least one-half hour twice daily, and the injection into the nostril or nostrils of the following: A 5 per cent solution of creolin or a one-half per cent solution nitrate of silver three times daily, or iodoform may be blown into the nose. In most cases, when the discharge is from one nostril only, an operation is necessary to effect a cure. As the symptoms of this disease are so similar to glanders, the animal should be isolated. The utensils, such as buckets, forks, brooms, currycombs, blankets, etc., should not be used about other horses.

PHARYNGITIS AND LARYNGITIS—SORE THROAT.

This is an inflammation of the lining membrane immediately in the rear of the mouth and is caused by irritating bodies bruising the tissues, cold, sudden changes in the temperature, and infection.

Symptoms.—Diminution of the appetite, cough, stiffness of the head, soreness when pressure is applied to the throat, a considerable amount of mucous and saliva in the mouth, escaping in long, transparent threads. Drinks are ejected through the nose and are often of a greenish color and contain quantities of food. Swallowing of liquids is painful. Temperature may range from normal to 106° F., with difficulty in breathing.

Treatment.—The sick animal should be separated from the well ones and be placed in a comfortable box stall, free from drafts, but well ventilated, and should be given green food or very fine hay, steamed oats, bran, or flour slops; fresh water should be left within reach.

The lips and nostrils should be kept perfectly clean and the mouth washed frequently with fresh water, to which may be added a little vinegar or salt. Cold compresses should be used

if the parts are hot, tender, and painful. If an abscess is likely to form, poultices of linseed meal may be applied, and the abcess, when ready, should be opened, but never with a knife. Cut through the skin only and then insert a blunt instrument, or the finger, and allow the pus to escape.

If the animal breathes with great difficulty, manifested by making a loud, wheezing sound, an opening should be made in his windpipe, the edges of the opening held apart by inserting a suture in both sides, and tied up over the neck, or a tube may be inserted in the opening.

The patient should never be drenched.

Fever may be combatted by cold-water injections into the rectum, 1 to 2 gallons at a time.

STRANGLES, COMMONLY CALLED "DISTEMPER."

Strangles of the horse is an acute, infectious disease. It usually attacks young horses.

Symptoms.—The disease begins with a high fever, ranging from 104° to 106°; a discharge from the nose, at first watery, rapidly becoming thicker, and later assuming a whitish-gray or greenish-yellow color. The glands below the lower jaw become swollen, hot, and painful; loss of appetite, depression, great muscular weakness, and swelling of the hind legs follow. Sometimes a swelling may be found on some portion of the windpipe.

Treatment.—Separate the sick animal from the well ones and place him in a well-ventilated stall, free from drafts; clean the nostrils frequently; clothe the body according to the season of the year; open the abscess as soon as pus is formed and wash it twice daily.

Give easily digested food, green fodder, roots, or slops made of bran or steamed oats, and in his drinking water ½ ounce of saltpeter, but do not drench, as the throat in many cases is sore, and if the horse should cough while taking medicine in that way it might enter the lungs and cause pneumonia.

PNEUMONIA (LUNG FEVER).

Pneumonia is an inflammation of the lung structure, and runs a course of from seven to ten days.

Causes.—Among the external causes of the disease we must particularly mention excessive exertion and cold; also carelessness in giving a drench, particularly if the animal has a sore throat.

Symptoms.—The first symptom is an intense fever accompanied by a chill, which is marked by great fatigue and muscular weakness; temperature ranges from 103° to 107°, the appetite is diminished, at times almost wanting; the patient is constipated, breathing is rapid and difficult; the nostrils are much dilated, and expired air is warmer than usual. There is frequently a reddish or yellowish discharge (rusty discharge) from the nose. The animal remains standing constantly, with the forelegs spread, or it may lie down for a short time only; a cough may or may not be present.

Treatment.—Great care should be given to the diet; give any food that the animal will eat, try and keep up the strength; steamed oats, carrots, or green grass if possible, gruel, etc. Place in a well-ventilated box stall free from drafts, and clothe body and legs according to the season of the year; warm blankets wrapped around the chest if the weather is not too hot will be of advantage. In warm weather, if flies are troublesome, a thin sheet made of gunny sacks should be placed upon the animal. If the fever is very high give acetanilid, 2 to 4 drams every six hours until the fever is reduced. Quinine sulphate 1 dram, gentian root 2 drams, make a good tonic. It should be repeated three times daily.

Cold injections into the rectum will reduce the fever.

In old, debilitated animals, alcohol in a dose of 4 to 5 ounces should be given in the drinking water. Do not push the acetanilid, as it has a tendency to weaken the heart. If the heart is weak 1-dram doses of fluid ext. digitalis should be given twice daily.

INFLUENZA (PINK EYE).

Influenza is a contagious disease. It affects first the respiratory tract, but also involves the nerve centers, circulatory system, the lining membranes of the intestines, and the eyes.

Symptoms.—The first symptoms are loss of appetite, depression and weakness; the temperature rises rapidly to 105° or 107° in severe cases; the animals hold their heads low and have a stupid look; they stagger when walking, and the visible mucous membranes are of a yellowish tinge.

When the digestive organs are affected colics are observed quite frequently. In the beginning constipation is the rule, the dung is coated with a whitish-yellow or mucous layer; later

diarrhea occurs; the dung is doughy, soft, or liquid. The eyelids are sometimes swollen shut and are hot and sensitive to the touch. The legs and sheath are sometimes swollen and the lower portion of the belly may be similarly affected.

Treatment.—Isolate sick animals for their own comfort and the safety of healthy subjects, as influenza is usually a serious disease. Diet, hygienic care, and a regulated ventilation of the stables are sufficient. The fever may be reduced by rectal injections of cold water.

Intestinal troubles may be relieved by the administration of bicarbonate of soda in dram doses three times daily: if pain is very severe, 2 drams of cannabis indica may be given. Bathe the eyes, if swollen, with warm water. Good nursing and laxative food are essential, cold water being kept where the animal can help itself.

CHAPTER VI.

DISEASES OF THE DIGESTIVE, URINARY, NERVOUS, AND LYMPHATIC SYSTEMS.

Diseases of the Digestive System.

SPASMODIC COLIC—GRIPES.

Spasmodic colic is a painful contraction of the intestine. The usual seat of the trouble is the small intestine, and it is usually caused by internal or external cold.

Symptoms.—The suffering is very violent but of short duration; the spasms appear suddenly and disappear with the same rapidity. The horse paws, stamps, looks around at his flanks, lies down and rolls, and if the pain is very severe, sweats profusely. During the attack a few pellets of dung may be passed, and attempts to pass urine are frequently made. This latter symptom has misled many persons, they being under the impression that the disease was located in the "urinary organs."

Treatment.—Place the animal in a large, well-bedded stall and give the following: Cannabis indica 2 to 4 drams, aromatic spirits ammonia 1 ounce, water to make 1 pint. Or, fluid extract belladonna 2 drams, nitrous ether 2 ounces, water to make 1 pint.

Either one of these prescriptions can be given at one dose and repeated in three-quarters of an hour.

Warm-water injections, per rectum, are often of advantage.

Morphine is an excellent remedy.

FLATULENT COLIC.

Flatulent colic is generally due to the animal having eaten food that is especially fermentable. This form of colic is quite frequently observed in horses that have the habit of wind sucking.

Symptoms.—The rapid swelling of the belly constitutes the characteristic symptom. The abdomen is distended, the pain is not so severe as in spasmodic colic, but more constant. With the increase of swelling the breathing becomes more difficult, anxiety and restlessness are shown, the walk is painful, and the animal staggers, lies down and rolls, but only for a short time.

Treatment.—Place the horse in a large, roomy stall, and give the following drench: Sulphuric ether 2 ounces, aromatic spirits of ammonia 1 ounce, fluid extract belladonna 2 drams, water to make 1 pint. Repeat in one hour if necessary. Cold-water injections into the rectum are sometimes of advantage. If the abdomen is very much distended with gas, the trocar and the canula must be used. This is an instrument for puncturing the intestine, but should be used only by one having a knowledge of the operation. The instrument, as well as the seat of the operation, should be thoroughly disinfected.

INFLAMMATION OF THE BOWELS.

Cause.—This disease is sometimes due to the action of cold in all its forms; sudden chilling when the body is in a perspiring condition, the swallowing of very cold water, of frosted or frost-covered or moldy fodder, etc. It is sometimes a complication of colics and is frequently seen as a result of impaction or twisting of the bowels.

Symptoms.—The mucous membrane of the nose, mouth, and eyes is congested and reddened, the mouth is hot and dry. Respiration is increased, pulse is hard and rapid, temperature is elevated, 103° to 105° F. Colicky pains are continuous; the horse walks about the stall, paws, lies down carefully, rolls, and tries to balance himself on his back. As a rule the bowels are constipated, but when this disease is due to irritating foods or medicines purgation and flatulency may be present.

The small, hard pulse; high temperature; aged and anxious appearance of the head; continuous pain, which is increased upon pressure; position of the horse when down, and coldness of the ears and legs, will enable anyone to diagnose a case of enteritis (inflammation of the bowels). When mortification (death) of the bowels sets in, all pain ceases and the animal will stand quietly, sometimes for several hours. Toward the last he sighs, breathes hard, staggers and pitches about, and dies in a state of delirium.

It is a very serious disease and in the majority of cases proves fatal. Death takes place in from six hours to several days.

Treatment.—To control the pain give large doses of powdered opium, laudanum, or cannabis indica.

The following prescription is recommended: Opium, powdered, 2 drams; calomel, ½ dram. Make into a ball; give at once, and repeat in one or two hours if necessary. Blankets wrung out in hot water and applied to the abdomen are sometimes of benefit, but to obtain good results they must be kept hot for several hours.

CHRONIC INDIGESTION.

Chronic indigestion is a chronic cartarrh of the stomach and bowels, the cause of which is irregularity in feeding and watering; feeding when the animal is in an exhausted condition; imperfect mastication and incomplete salivation of food due to irregularities of the grinding surfaces of the molar teeth, and food of a poor quality, deficient in nutriment.

The presence of worms is a frequent cause of this disease.

Symptoms.—Appetite diminished or capricious and depraved, frequent gapings, constipation; periodic colics are frequently observed, the coat is rough and staring, and the skin is tightly adherent to the body, being the condition known as "hidebound." The animal has an unthrifty appearance generally.

Treatment.—Give small quantities of good, nutritious, and well-salted food three times daily.

The water should be pure and given regularly.

Regular exercise and good grooming will hasten recovery, by stimulating the skin as well as other parts of the body.

If the appetite is diminished give such tonics as gentian, iron, nux vomica, and nitrate of potash. Gentian 2 ounces, iron sulphate 1 ounce, nux vomica 1½ ounces, nitrate potash 1½ ounces. Mix. Make twelve powders. Give one powder twice a day.

Bicarbonate of soda is a very useful medicine to counteract the acidity (sourness) of the stomach. Dose, one dram twice a day, and may be continued for several days.

If intestinal worms are the exciting cause, they must be removed and until this has been accomplished the animal will retain its unthrifty condition although it may brighten up temporarily.

The following prescription is recommended: Spirits turpentine 2 ounces, oil linseed 4 ounces. Give before feeding and repeat once a day for four days; then follow up with 1 pint of linseed oil.

DIARRHEA.

This term is applied to all cases of simple purging in which the feces (dung) are loose, liquid, and frequently discharged.

Diarrhea may be a spontaneous effort to discharge from the intestines something which is obnoxious to them or the system generally. It is caused by various agencies, such as indigestible food, sudden change of diet—particularly from a dry to a moist one—medicinal substances, worms, derangement of the liver, or large drafts of water when the animal is heated. Some animals are particularly predisposed to diarrhea from trivial causes. Narrow-loined, flat-sided, and loosely-coupled horses—that is to say, horses in which the distance between the point of the hip and last rib is long—and those which are of a nervous temperament are apt to purge without apparent cause. These are called washy horses. They are hard to keep in condition and require the best of food.

Symptoms.—Purging, the fecal matter being semifluid, of a dirty-brown color, without offensive odor, or clay-colored and fetid. If the condition continues long the animal loses flesh and the appetite is wanting.

Treatment.—When the purging arises from the presence of some offending matter in the intestinal canal (sand, worms, undigested food, bad water, etc.) its expulsion must be aided by a moderate dose of linseed oil (1½ pints).

If the purging arises from no apparent cause, or if the bowels do not regain their normal condition after the action of the oil has subsided, it will be necessary to give astringents, such as tannic acid, 1 to 2 drams, or the following prescription may be used: Gum camphor 1 ounce, opium, powdered, 1 ounce. Mix. Make eight powders and give one powder every three or four

hours, according to the severity of the case. Great care must be exercised, as evil results may follow if the bowels are checked too soon.

Diseases of the Urinary System.

Inflammation of the Kidneys—Acute Nephritis.

Causes.—It is at times produced by the action of cold; it also happens frequently in the course of infectious diseases. It is then the result of renal (kidney) elimination of irritating products (waste materials, etc.); irritating medicines, such as turpentine, absorption of cantharides from a large blistered surface; molds, rust (in feed), etc.

Symptoms.—The most important and often the only manifestations of nephritis (in the course of infectious diseases, for instance,) are furnished by the urine. Its quantity is diminished; it is thickened; of abnormal color; occasionally it is the color of blood. Micturation (pissing) is painful; the urine often runs off drop by drop only, notwithstanding the violent efforts made by the patient. In serious cases the urinary secretion may be completely suppressed.

The lumbar region is very sensitive to the pressure of the hand. At the beginning of the disease we often find renal (kidney) colics. The back is arched, the gait stiff and staggering, rising is painful; the animal remains almost constantly standing. The appetite may be lost. The temperature is elevated; in some cases it may range very high.

Treatment.—Remove the cause if possible; give absolute rest, and avoid all irritating food or medicines. Try to induce sweating by energetic rubbings upon the surface of the whole body; also by warm blankets, wet, tepid compresses applied upon the trunk. Give the following physic; it has a most favorable action, because it will draw a large quantity of water from the organism: Aloes 6 drams, calomel 1 dram, ginger 1 dram. Sig: Make into a ball and give at one dose.

If there is a total suppression of urine, ½ ounce of fluid extract digitalis, well rubbed in on each side of the loins over the kidneys, will have a beneficial effect by stimulating the kidneys without causing irritation. This application should not be used more than once.

DIABETES INSIPIDUS—SIMPLE DIABETES (PISSING).

A disease characterized by great thirst, excessive urination, and great languor and emaciation.

In the majority of cases it is caused by poor (tainted) food. In some cases it seems to be due to a constitutional cause.

Symptoms.—Excessive urination, from 6 to 12 gallons every twenty-four hours; great thirst, the animal sometimes drinking from 20 to 25 gallons of water in twenty-four hours; depraved appetite; urine of a very pale color, sometimes as clear as water; the skin is harsh and the coat is unhealthy looking.

Treatment.—Give good, clean, and nutritious food. Administer iodine in 2-dram doses twice a day and diminish quantity as the thirst is lessened and the urine is diminished.

RETENTION OF THE URINE.

An inability, total or partial, to expel by natural effort the urine contained in the bladder. It is caused by spasm of the neck of the bladder, and is often a complication of colic.

Symptoms.—Frequent and ineffectual attempts to urinate; if standing the animal will stretch itself out, strain violently, and groan with pain, discharging but a few drops of urine, or none at all; examination per rectum shows the bladder greatly distended, the distension of the bladder being the diagnostic symptom.

Treatment.—Pass the catheter and draw off the urine. If retention of urine is due to an accumulation of dirt in the penis it must be removed by washing. A horse will normally pass from 4 to 6 quarts of urine every twenty-four hours.

DISEASES OF THE NERVOUS SYSTEM.

CONGESTION OF THE BRAIN—MEGRIMS.

This disease is caused by an accumulation of blood in the vessels of the brain, due to some obstacle to its return to the veins.

Causes.—Disease of the heart, excessive exertion, the influence of extreme heat, sudden and great excitement, artificial stimulants, by any mechanical obstruction which prevents the return of blood through the veins to the heart, such as a small ill-fitting collar, which often impedes the blood current, tumors or abscesses pressing on the vein in its course, extreme fat—such animals

and those with short, thick necks being especially liable to attacks of congestion of the brain, compression of the distended vascular structures (arterial capillaries) by an abnormal gaseous tension in the stomach and intestine, over-feeding after a prolonged abstinence or when the exercise is insufficient, and foods difficult of digestion.

Symptoms.—Congestion of the brain is usually sudden in its manifestation and of short duration.

The animal may stop very suddenly and shake his head, or stand quietly braced on his legs, then stagger, make a plunge and fall; the eyes are staring, breathing hurried and snoring, nostrils widely dilated; this may be followed by coma (insensibility), violent convulsive movement, and death.

Generally, however, the animal gains relief in a short time, but he may remain weak and giddy for several days. If it is due to organic change in the heart or disease of the blood vessels in the brain the symptoms may be of slow development, manifested by drowsiness, diminished or impaired vision, difficulty in voluntary movements, diminished sensibility of the skin, loss of consciousness, delirium, and death.

Treatment.—Prompt removal of all mechanical obstruction to the circulation. If it is due to venous obstruction by too tight a collar, the loosening of the collar will give immediate relief. If due to tumors or abscesses, a surgical operation becomes necessary to afford relief. To relieve the animal, if he becomes partially or totally unconscious, cold water should be dashed on the head and if this does not afford relief, recourse must be had to bleeding to lessen arterial tension. If symptoms of paralysis remain after two or three days, an active cathartic (1 ounce aloes) and iodide of potassium should be given in 1-dram doses three times daily. Place the animal in a cool, dark, well-ventilated stable, keep him perfectly quiet, and give cooling diet.

SUNSTROKE.

Sunstroke is a cerebral trouble which is produced by solar (sun) rays falling directly upon the cranium.

HEATSTROKE.

Heatstroke is caused by the overheating of the whole body and by excessive exertion.

Symptoms.—Sunstroke is manifested suddenly; the animal stops, drops his head, begins to stagger, the breathing is marked by great snoring, the pulse is very slow and irregular, cold sweats break out in patches on the surface of the body, and the animal often dies without recovering consciousness.

In heat exhaustion the animal usually requires urging for some time previous to the appearance of any other symptom. Generally perspiration is checked, he becomes weak in his gait, the breathing grows hurried or panting, the eyes watery and bloodshot, nostrils dilated and highly reddened to a dark purple color, the pulse is rapid and weak, the heart bounding, followed by unconsciousness and death. If recovery takes place convalesence extends over a long period of time, during which incoordination of movement may be present.

Treatment.—The treatment consists in the application of cold in the form of ice, or cold water on the head, cold injections per rectum, and the administration of stimulants, such as 1 ounce carbonate of ammonia with 2 ounces alcohol; repeat in one hour if necessary. Place the animal in a cool and shady place.

Diseases of the Lymphatic System.

Acute inflammation of the lymph gland usually occurs in connection with some inflammatory process in the region from which the lymph is gathered.

The lymph glands between the branches of the lower jaw almost invariably become affected in strangles, nasal catarrh (acute or chronic), diseased or ulcerated teeth. Similar results obtain in other parts of the body.

Symptoms.—The glands swell and become painful to the touch, the connective tissue surrounding them becomes involved, suppuration usually takes place, and one or more abcesses form. If the inflammation is of a milder type, the swelling may disappear and the gland will resume its normal condition without suppuration. The temperature will be elevated. Sometimes the glands will remain hard and considerably swollen for some length of time. In man these swollen glands are known as kernels.

In tropical countries lymph glands are very liable to become inflamed and diseased; suppuration rapidly follows, the gland will open, discharge its accumulation of pus, and the open sore so formed will be healed with the greatest difficulty.

Treatment.—Fomentations with hot water will relieve the soreness, unless an abcess is forming. If such is known to be the case a poultice of bran or flaxseed meal should be applied, and as soon as fluctuation can be felt a free opening must be made and the abcess washed with a solution of bichloride mercury 1–1000, or creolin 1–50. If the gland does not suppurate, the enlargement may be reduced by tincture of iodine applied twice daily.

LYMPHANGITIS.

Inflammation of the lymphatic structures, usually affecting the hind leg, very seldom the fore leg. This disease is very sudden in its attack, exceedingly painful, accompanied by a high temperature and great general disturbance.

Causes.—It usually attacks well-fed animals, especially after one or two days' rest, and in such cases may be due to an excess of nutritious elements in the blood.

Symptoms.—The first symptom noticed will be lameness in one leg and swelling on the inside of the thigh. The swelling gradually surrounds the whole limb, continuing downward until it reaches the foot. The limb is excessively tender to the touch and is held up. The breathing is increased, pulse hard and quick (80 to 100), and the temperature may reach 106°. The bowels early become constipated and the urine scanty and high colored. Occasionally the lymphatic glands (in the groin) undergo suppuration, blood poisoning may supervene and prove fatal.

Treatment.—Fomentations with warm water, to be continued for one hour and repeated several times daily. Give a physic (purgative) composed of 6 to 8 drams of aloes, 1 dram ginger, and water to make a ball. Give at once. After the physic has operated give ½-ounce doses of nitrate of potash twice daily. After the pain abates, moderate exercise and massage (hand rubbing) will be of benefit. If the glands suppurate, open, and wash them out with an antiseptic. The irrigations must be continued until the gland is well.

CHAPTER VII.

MISCELLANEOUS DISEASES.

HEMORRHAGICA—PURPURA—PETECHIAL FEVER.

This is an acute, infectious disease, the pathology of which is as yet unknown. It is characterized by numerous *petechiæ* (reddish spots) on the skin and mucous membranes, to which phenomena are soon added swelling of the skin and mucous membranes and infiltration (an exudation) of the subcutaneous (under the skin) connective tissue. Sometimes it is primary; in other instances it follows other infectious diseases, strangles, pharyngitis, contagious pneumonia, influenza, etc.

Symptoms.—Petechial fever is generally manifested by the appearance upon the mucous membranes of numerous dark red *petechiæ* (reddish spots); sometimes they are insignificant as a flea bite, then again they may attain the size of a pea or an acorn; they often become joined and form spots or bands of variable length. In serious cases the nasal mucous membrane becomes affected by gangrene (death of the affected spot) or covered over with ulcerations. The discharge is bloody and of bad aspect, breathing is very laborious, and the expired air has a fetid odor. The general condition sometimes becomes very rapidly aggravated; then, in the majority of cases, the disease ends in death.

Corresponding with the appearance of the reddish spots, or a few days later, the skin becomes swollen; this symptom, which is the most prominent, is often the first symptom noticed. The swellings on the skin may be circumscribed, and will range in size from a ten-cent piece to a silver dollar; they are usually upon dependent regions, such as the head, extremities, abdomen, sheath, and chest. These swellings are not hot and only slightly sensitive; they gradually extend until they grow together and we have in a few hours the swelling up of the legs, legs and belly, or the head, to an enormous size; they have always the characteristic constricted border, which looks as if it had been tied with a cord. They end abruptly and are sometimes as much as 1 inch in thickness.

The swelling in the legs will cause stiffness. The head may be swollen to an enormous size, resembling that of a hippopotamus rather than that of a horse; the caliber of the nostril may be so

lessened as to cause the horse to breathe with difficulty. The pulse, if altered at all, is a little weaker than usual, the appetite remains normal as a rule, although at times the animal will have difficulty in mastication. The temperature at first is normal, but in a few days it may have reached 102°, 103°, or 104°.

Over the surface of the skin covering the swollen parts we find a slight serous sweating, which loosens the epidermis and dries, giving it the appearance of an eruption of some cutaneous (skin) disease. If this is excessive we may see irritated spots, followed by suppuration. This suppuration may become excessive from the great distension and loss of vitality of the skin.

Colics may sometimes occur during the course of this disease.

The dung is ordinarily coated.

Later the pulse may beat 60 to 80 times per minute.

High temperatures indicate complications.

The mortality is about 50 per cent.

Treatment.—Place the patient in a clean, well-ventilated, roomy box stall, the halter and surcingle must be removed; give sloppy food, clean hay, and green fodder if possible, and plenty of fresh pure water to drink.

When the legs and parts of the body are covered by the dried serum the surface must be softened by the application of cosmoline, to which may be added a small amount of creolin (1 to 50) or of carbolic acid (1 to 25).

If sloughing has taken place, the sores must receive surgical attention; dead tissue must be removed and antiseptics applied, such as creolin, or bichloride of mercury, or carbolic-acid solutions.

If the animal has great difficulty in breathing, we must resort to the use of the tracheotomy tube.

Give tonics to increase the appetite and try to sustain the strength of the animal. Spirits of turpentine, 3 to 4 ounces, given daily, will have a beneficial effect by stimulating the heart and kidneys; sponge the head, where swollen, with either ice-cold or very warm water; repeat this several times daily.

AZOTURIA—HEMOGLOBINEMIA.

Azoturia is not a disease of the kidneys.

The principal cause of azoturia in the horse is the action of cold. An abnormal sensitiveness to the action of cold is acquired

by a rest of several days in a hot, badly ventilated, and damp stable, and the animals are especially predisposed to the disease if, during the time of inactivity, they have been given full rations. The high temperature of the stables acts by rendering the organism less resistant to cold.

Symptoms.—They consist of troubles of locomotion (movement), which appear within a quarter to half an hour, generally during exercise.

The disease commences very suddenly. It begins in an unusual degree of restlessness, with profuse perspiration, which symptoms are speedily succeeded by a desire to lie down, by great sluggishness, loss of motor power in the hind limbs, violent spasms of the large muscles of the loins and thighs and hind quarters or the shoulders. The pulse usually becomes rapid.

If they are down they make efforts to stand up, but from the total loss of all motor power in the hind limbs they are unable to do so.

The affected muscles are swollen and very hard.

The temperature rarely increases, even in the grave form.

The appetite is seldom diminished, and, as a rule, they will drink large quantities of water.

The urine is coffee colored and generally retained in the bladder. The affected muscles may atrophy, especially those located above the stifle.

Treatment.—When the disease has set in we must by all means give the animals rest. Keep them on their feet if possible. If there is danger of the horse lying down, and if able to partially support his weight on his hind legs, the suspending slings must be brought into use.

Encourage the horse to drink as much water as possible, as this will assist the kidneys in carrying the poisonous material out of the blood. A ball of aloes should be administered, and only good hay and laxative food given. We must avoid food that heats, especially oats and corn.

In the first stages, if the pain is very severe, give 2 drams of cannabis indica (fluid extract). If the animal is down and can not get up, he must be supplied with lots of bedding and frequently turned from side to side. If he has retention of urine the bladder must be emptied several times daily; this can be accomplished by passing the hand into the rectum and applying

moderate pressure upon the bladder or by the introduction of the catheter.

Preventive treatment.—When the horse is left resting for twenty-four or forty-eight hours or longer, the food ration has to be diminished and the animal must be given a little exercise in the open air every day, thus keeping the animal accustomed to the outside temperature. The ventilation of the stable should be arranged in such a way as to avoid drafts, and it must be seen to that the temperature remains moderate.

GLANDERS AND FARCY.

Glanders is one of the equine diseases which has been longest known.

Glanders and farcy are one and the same disease.

Glanders is the name given to this disease when it affects the Schneiderian membrane and internal organs.

Farcy, so called, is when the disease is located in the lymphatic glands situated on the external parts of the body.

Glanders is a contagious constitutional disease of the horse, ass, and mule, rarely communicated to other animals. This disease is due to the "bacillus mallei."

It is divided into acute and chronic glanders. In acute glanders the bacilli enter the blood and the disease always becomes generalized.

Chronic glanders.

The beginning of chronic glanders is often hidden from view and passes unobserved.

The first symptom is generally a discharge from one or both nostrils of a yellowish green matter of bad aspect; quite frequently it is tinged with blood.

Upon the Schneiderian membrane we generally observe pimples and ulcers. The lesions, however, may appear a long time after the beginning of the disease. The pimples are of short duration; they are soon transformed into ulcers more or less deep, with sawtooth-shaped, thickened edges; these may heal, but will always leave a scar.

The enlargement of the lympathic glands situated in the space between the lower jaw is another important symptom. In the beginning the gland is a little sensitive, slightly doughy, and adherent to the base of the tongue or to the lower maxillæ; in

some subjects it is adherent to the skin. In exceptional cases the enlargement of the gland is wanting.

The general health of the animal suffers as the affection progresses; emaciation appears; the hair becomes dull and bristly.

We frequently observe the symptoms of asthma and the patient becomes rapidly fatigued.

Cough is frequently present.

Farcy.

Farcy is more rare in the chronic than in the acute form of the disease; its favorite regions are the inner side of the extremities, shoulders, neck, chest, and abdomen.

The pimples and tumors vary from the size of a pea to that of a walnut, or larger; they suppurate and discharge a yellow, sticky liquid of bad aspect. They rarely heal, and if they do a jagged scar remains.

Acute glanders.

Symptoms.—Acute glanders is rare in the horse (10 per cent). It is, on the contrary, the ordinary form in the ass and mule. Sometimes it appears from the beginning, in other instances it follows the chronic form, where the vitality of the animal is lessened by other acute affections.

It runs a rapid course, producing an ulcerous destruction of the respiratory mucous membrane, and also involves the skin, lungs, and other organs.

The disease begins with a chill, followed by intense fever, which reaches 107° F. We observe a sticky, yellowish, irritating, bloody nasal discharge. The nasal mucous membrane is overrun with pimples and ulcers, which rapidly join one another; they may perforate the septum nasi. The respiration is rattling, wheezing, and moaning (laryngeal contraction); to these symptoms are often added those of farcy. We may find diarrhea. The patient is extremely weak and emaciation progresses rapidly.

In general, acute glanders has a rapid course; its usual termination is in death. This ordinarily takes place within from three to fourteen days.

In the horse there is no disease of which an exact diagnosis is so important as that of glanders. Other horses and mules are not alone liable to contract the disease from affected animals; it can be communicated to man as well.

In order to correctly diagnose obscure cases (those with no outward symptoms) we must resort to the use of mallein. This is a liquid, the injection of which will cause a reaction (rise in temperature) in glandered horses apparently enjoying the best of health.

Treatment.—This disease is not only contagious to horses, mules, and men, but is incurable in all alike: therefore the first step to be taken when a suspicious case presents itself is to isolate the animal, and as soon as you are satisfied that glanders exists the animal should be killed at once and the carcass burned. Everything in the way of partitions, mangers, feed boxes, buckets, and all stable utensils must be burned, and the stalls and surroundings thoroughly disinfected. Chloride of lime 8 ounces, water 1 gallon, make a good and efficient disinfectant. With this solution all parts of the stable in which the affected animal stood must be thoroughly washed.

SURRA.

(Taken from the Emergency Report on Surra, issued by the U. S. Bureau of Animal Industry, Agricultural Department, 1902.)

This is a disease of the Tropics, and is caused by a very small parasite which lives in the blood, the evidence now accessible indicating that this parasite is transmitted by means of fly bites. It is chiefly a wet-weather disease, and is reported as very fatal to horses and mules.

Symptoms.—The sick animal at first shows a temperature ranging from 103° to 107° F.; pulse full; breathing increased and abdominal; appetite variable from poor to good, but never entirely lost: the membranes slightly congested; swellings of the belly, sheath, and legs soon appear. In some cases they may not be present, emaciation taking place instead. At this point in progress of the disease the temperature is variable and of intermittent character. Some of the cases last for a long time, being in the hospital for two or three months before ending in recovery or death. As the disease progresses toward a fatal termination the animal grows very weak, particularly in the hind legs, sways from side to side when walking, and may go down and be unable to get up.

The feces are of a normal character, no marked constipation or diarrhea being present. The urine seems to be increased in quantity.

Urticarial (pimply) eruption is a prominent symptom.

Treatment.—No satisfactory treatment has been found, but the administration of arsenic has been followed by good results.

Prevention is difficult; it should consist in protecting horses and mules from flies.

TETANUS—LOCKJAW.

Tetanus is an infectious disease, the specific cause of which is a bacillus (rod-shaped germ) which is very common and appears in the shape of a fine, straight little stick provided with a small head.

The germ is found in the superficial layer of the earth in gardens, around buildings, stables, etc.

This disease, when present, is always caused by a wound, more especially one produced by a nail puncture.

The germ will not develop in the presence of oxygen, consequently all punctured wounds of the foot should be freely opened to admit of the introduction of air, as well as to allow of thorough cleansing with an antiseptic. A horse with a wound so treated is not very liable to develop tetanus.

In warm countries, especially in tropical climates, cases of tetanus are much more frequent than in cold regions.

Symptoms.—Tetanic spasms (a spasmodic and continuous contraction of the muscles) appear, as a rule, in the muscles of the neck and head; from these it extends to the shoulders, trunk, and extremities; or the stiffness may start in the region of the injured organ or member.

Contraction of the masseter muscles; the inferior maxillary is no longer able to execute the slightest movement, then the prehension and mastication of food become difficult or quite impossible. This inability to open the jaws has caused this disease to be given the name of lockjaw.

Contraction of the great posterior muscle of the eye causes a retraction of this organ within the orbit (orbital fossa), and a protrusion of the membrana nictitans (haw) upon the eyeball.

The animal is very stiff, holds his head in an extended position as if suffering from a sore throat; the tail is elevated and the

ears drawn closer together; the nostrils are much dilated: the legs stand apart; the eyes indicate excitement and anxiety, the mucous membranes are injected (reddened): some muscular groups, principally the masseters and the muscles of the back of the neck, are hard and distinctly outlined, as if carved: the muscles of the jaws, neck and shoulders, back, lumbar region, croup and tail are as hard as wood.

The tail and ears are elastic; when they are moved they immediately return to their former position.

There is profuse sweating when the animal is disturbed or when in a spasm; respiration is accelerated and laborious. When approaching the patient in order to examine it the excitement increases instantly: the lower jaw is pressed hard against the upper, and can not be separated from it, even by the most violent traction upon it; on parting the lips a fetid liquid runs out of the mouth, which is more or less filled with particles of food; if the head is lifted the whole *membrana nictitans* obscures the greater part of the eyeball.

Backing is extremely difficult or even impossible; turning is also very laborious; the trunk, neck, and shoulders can not be flexed, the extremities are as stiff as stilts.

Course.—The course of tetanus is variable, according to the individual. It commonly develops rapidly, and death takes place in two or three days. In some cases death occurs more slowly within four to eight days on an average. In others, again, where the spasm is moderate and of little extent, the disease may continue for several weeks.

Recovery before the third week is rare; about this time the spasm begins to decline, the appetite returns, respiration becomes calmer, and the movements more free; very often recovery takes place only at the end of five or six weeks; there may be a continuance of the stiffness of movement and tension of the extensors of the spinal column for a long period of time.

Treatment.—A systematic course of food and the freedom of the patient from all kinds of excitement are the two main indications of the treatment. It is advisable to place the patient in a dark stall, so situated as to be isolated and free from all noises, and only one man should be in attendance, as strangers entering the stall of a patient affected with only a mild attack may cause

excitement and the animal be thrown into a violent spasm and die in a short time.

Give the patient green fodder, slop, mealy drinks, liquid food, and cold water as often as he may show a desire to eat or drink.

Medicinal agents are of secondary importance in the treatment of lockjaw. Large doses (2 to 8 ounces) of bromide of potassium should be given in the drinking water several times daily. The administration of medicines by the mouth is not practicable by reason of the lockjaw as well as through causing excitement.

The infected wound requires special care. It should be well opened up, disinfected, foreign bodies extracted, etc.

Some authors recommend the use of the suspending sling.

In the horse the mortality from this disease is from 80 to 85 per cent of cases.

DISEASES OF THE TEETH.

On account of the character of its food the horse has been supplied with molar teeth, having the grinding surfaces roughened; it must be remembered that the lower jaw is narrower than the upper jaw, and the table (grinding) surfaces are sloping. The distance from the gum to the grinding surface is the greatest on the outside surface of the upper molars and the reverse is the case in the lower molars.

On account of this conformation a sharp ridge (or points) is liable to develop on the outside of the upper molars and may be found on the inside of the lower ones. These points are sometimes very sharp, and may lacerate the cheeks and tongue during mastication. A horse so affected will frequently bolt his food before thoroughly masticating it, thereby causing chronic indigestion. It may also interfere with the reining of the animal and cause great annoyance to his rider.

Such irregularities can be easily detected by an examination of the animal's mouth by the hand, and when found, these sharp edges must be removed by the use of a float.

Decayed teeth.

All teeth are apt to decay, such decay being generally due to an injury.

A decayed tooth will be found in one of the following conditions: Split, broken, or shorter than the surrounding ones, and

having a fetid odor. The opposing tooth in the opposite jaw is often found to be elongated.

Treatment.—A diseased tooth must be extracted and the elongated one, if any exist, must be shortened to correspond with its fellows.

Symptoms of irregularities in teeth.—Quidding of the food, holding the head to one side while masticating food or drinking water, slobbering, chronic catarrh, fetid breath, swelling of the superior maxilla in the neighborhood of the teeth, general unthrifty appearance, etc.

THUMPS—SPASM OF THE DIAPHRAGM.

Caused by severe exertion.

Symptoms.—In the left costal region and in the corresponding flank we observe shocks which shake the whole body at times; they are usually accompanied by a short, jerking expiration, and by a dull, thumping sound which is heard at a distance of several paces.

Treatment.—Quietude must be insisted upon.

Give the following: Aromatic spirits ammonia 2 ounces, water 1 pint. Or, sweet spirits of niter 2 ounces, fld. ext. belladonna 2 drams, water to make 1 pint. Either mixture may be repeated in one hour if necessary.

CHAPTER VIII.

DISEASES OF THE SKIN AND EYE.

ERYTHEMA.

Erythema is a congested or slightly inflamed condition of the skin, unattended by any eruption. The parts are slightly swollen, hot, tender, or itchy, and dry, and if the skin is white there is redness.

Erythema may arise from a variety of causes, as chilling or partial freezing, heat and burning, chapping, urine, and medicine.

Treatment.—Apply the following several times daily: Sulphate of zinc 1 ounce, acetate of lead 1 ounce, water 1 quart. Or, use the following ointment twice daily: Oxide of zinc 1 ounce, cosmoline 6 ounces.

SCRATCHES.

Scratches is allied to grease, but not so severe, but if neglected may terminate in that disease. It is usually of a dry nature, with shallow cracks in the skin, and often discharging a thin liquid, which does not irritate the skin. The disease is located in the back part of the pastern joint.

Treatment.—Cleanse thoroughly with castile soap and water, dry, and apply: Sulphate of zinc 1 ounce, acetate of lead 1 ounce, water 1 quart. Or, oxide of zinc 1 part, lanolin 10 parts. Or, tincture of iodine may be resorted to.

GREASE.

Grease heel is a chronic inflammation of the skin of the back part of the fetlock and pastern.

The skin is at first red, swollen, painful, and hot. It is soon covered by vesicles (blisters) which burst and discharge a thin, yellowish liquid, which is at first without odor. The hairs are matted together, erect, or have fallen out in large quantities.

Grease produces, in the course of time, serious alterations in the pastern. The excreted liquid becomes decomposed and softens the epidermis. A kind of sticky, doughy exudate is formed, which is of bad aspect, of fetid odor, and very irritating.

The back part of the pastern and fetlock becomes the seat of granulating wounds, the granulations ranging in size from that of a pea to a large grape (the so-called grapy stage).

Treatment.—In the first stage cleanliness and the application of the ordinary drying powder or antiseptic ointments are sufficient. In cases where proud flesh exists, the granulations must be removed with the knife and burned with red-hot iron or lunar caustic and then treated as a fresh wound.

MANGE (SCABIES).

This is a contagious skin disease produced by parasites and can be transmitted to man.

There are three parasites that cause mange; two varieties burrow into the deeper layers of the skin, one being found about the head and neck, though it may spread over the surface of the body; the other variety is found at the roots of the mane and

tail, while the third species does not burrow into the skin and is found on the extremities.

Symptoms.—This disease is characterized by great itchiness, associated with the formation of pustules. As the disease develops, large surfaces become destitute of hair and are covered by powdery crusts of variable thickness. At a later period the skin becomes thickened, wrinkled, and fissured, assuming the appearance of the skin of the rhinoceros.

Treatment.—The first essential is the separation and isolation of the unhealthy from the well animals. Wash the affected parts thoroughly with warm water, soap, and a scrubbing brush, and apply the following: Acetanilid 10 parts, creolin 5 parts, cosmoline 20 parts. Melt the cosmoline and mix with the other ingredients while cooling. This ointment should be applied twice a day and the parts thoroughly washed every other day. Continue the treatment until the skin becomes healthy.

SIMPLE INJURIES TO THE EYE.

Inflammation of the mucous membrane lining the eyelids may be caused by bruises or the presence of a foreign body, such as sand, chaff, etc.

Treatment.—If due to the presence of a foreign body it should be removed at once and the eye bathed with cold water and the following eye lotion applied: Sulphate of zinc 20 grains, boric acid 1 dram, water 4 ounces.

A clean, dark cloth should be placed over the injured eye so as to exclude the light. The cold-water irrigations and the medicinal treatment should be continued twice daily until the parts assume their normal condition. If the eyelids should become torn great care must be exercised in suturing, as the needle may puncture the eyeball and blindness may follow.

OPHTHALMIA—CONJUNCTIVITIS.

Inflammation of the outer parts of the eyeball, the exposed vascular and sensitive mucous membrane (conjunctiva) which covers the ball, the eyelids, and the haw.

The causes of external ophthalmia are mainly those which act locally—blows with whips, clubs, and twigs; the presence of foreign bodies, such as chaff, dust, sand, ammonia arising from the excrement, etc.

Symptoms.—Watering of the eye, swollen lids, redness of the mucous membrane exposed by the separation of the lids, and a bluish opacity of the cornea, which is normally clear and translucent. The eyelids may be kept closed, the eyeball retracted, and the haw protruded over one-third or one-half of the ball. If the affection has resulted from a wound of the cornea, a white speck or fleecy cloud is formed, and often blood vessels begin to extend from the adjacent vascular covering of the eye to the white spot, and that portion of the cornea is rendered permanently opaque.

Treatment.—The first thing is to remove the cause. Place the horse in a dark stall, bathe with tepid water and the following lotion: Zinc sulphate 20 grains, boric acid 1 dram, water 4 ounces. This treatment should be applied and continued twice daily until the parts assume their normal condition.

RECURRENT OPHTHALMIA—MOONBLINDNESS.

This affection, sometimes called periodic ophthalmia, is an inflammation of the interior of the eye, and is intimately related to certain soils, climates, and systems, showing a strong tendency to recur again and again, usually ending in blindness from cataract or other serious injury.

Symptoms vary according to the severity of the attack. In some cases there is marked fever. The local symptoms are in the main those of ophthalmia; opacity advances from the margin over a part or the whole of the cornea. An attack lasts from ten to fifteen days. The attacks may follow each other at intervals of a month, more or less, but they show no particular relation to any particular phase of the moon. From five to seven attacks usually result in blindness, and then the second eye is liable to be attacked until it also is ruined.

Treatment.—Is largely the same as that for common ophthalmia. During recovery a course of tonics is often very beneficial and acts in assisting to ward off another attack. Such a tonic is the following: Sulphate iron 1 ounce, gentian 1½ ounces, nux vomica 1½ ounces. Make into twelve powders and give one powder, in feed, twice a day.

CATARACT.

Cataract is opacity of the crystalline lens. No treatment will restore it to its normal condition.

CHAPTER IX.

DISEASES OF THE FEET.

CORNS.

A corn is the result of a bruise, involving the structures of the sensitive sole, appearing as a reddish spot due to congestion of blood in small ruptured vessels in the triangular space included between the bars and the wall at the heel; occuring in the fore feet.

Treatment.—Remove the shoe, give exit to pus if the corn has festered, then poultice. The radical cure, however, is to be effected by proper shoeing. Do not allow the shoe to bear on the corn.

THRUSH.

Thrush is a disease of the frog, characterized by an offensive discharge.

Symptoms.—At first there is simply an increased moisture in the cleft of the frog, accompanied by an offensive smell. After a time a considerable discharge takes place—thin, watery, and highly offensive—changing gradually to a thicker, putrid matter, which rapidly destroys the horn of the frog.

Treatment.—As a rule the diseased and ragged portions of the horn are to be pared away, the foot poulticed for a day or two, the cleft of the frog and the grooves on their edges to be cleaned and well filled with dry calomel, blue vitriol, or alum; if the discharge is profuse the dressing should be changed daily, otherwise it may be left on for two or three days at a time. As the disease is due to filth the horn must be kept clean and dry, and if necessary a leather boot can be put on.

CANKER.

The symptoms of this disease are strongly marked, and consist of an abundant, fetid, colorless discharge from the frog or sole,

which is large, spongy, and covered by pallid, stringy prominences of a fungoid nature, intermixed with offensive smelling, semidried, cheesy masses of matter.

It usually commences in the frog and rapidly extends to the sole, and even the sensitive laminæ.

Treatment.—Remove all pieces of sole or frog covering the diseased parts, and with a red-hot iron destroy all unnatural growth; cleanse thoroughly with hot or warm water and then apply the following: Equal parts of sulphate of iron, sulphate of zinc, and sulphate of copper. Pack the foot with oakum and place it in a boot, as pressure is necessary; change the dressings twice a day and destroy all unnatural growths, if any, by the red-hot iron or lunar caustic.

PUNCTURE OF THE FROG AND SOLE.

Puncture of the frog and sole is usually the result of a horse stepping on a nail, and, if the nail penetrates into the sensitive structures of the foot, inflammation and lameness will follow; and unless the wound is well opened, so as to allow a thorough cleansing and the application of a 4 per cent solution of creolin or a 5 per cent solution of carbolic acid, pus will form. Unless the pus has a good outlet it will burrow into the surrounding tissues and terminate in canker. Another reason for opening a wound is that the germs of tetanus (lockjaw) are present around stables: the nail carries with it a certain amount of dirt, and if this dirt is impregnated with those germs, and is deposited in the deep tissues and left there undisturbed, lockjaw is very apt to develop.

Pricks in shoeing are of two kinds, namely, those actually penetrating the sensitive parts, and those where the nail, not actually penetrating the sensitive structures, is driven so near as to cause bulging of the inner layer of horn and pressure upon the sensitive interior, leading to inflammation and great lameness, with or without suppuration.

To detect punctured wounds of the feet it is necessary to remove the shoe from the foot affected, then to examine all around the margin of the sole by pressing it and the crust with the pincers; when the seat of the injury is pressed the horse will generally evince pain.

Pricks in shoeing usually manifest themselves shortly after the horse has been shod, but occasionally there may be no sign for three or four weeks.

Treatment.—When inflammation is present the application of warm water is very beneficial; this is best accomplished by placing the injured foot in a pail of warm water for about one hour; continue this twice daily. Warm flaxseed poultices are very good; a solution of creolin 4 per cent, or carbolic acid 5 per cent, should be mixed with the poultice. When the inflammation is reduced and the formation of pus, if any, has ceased, the hole should be closed with a piece of oakum, saturated with pine tar.

QUITTOR.

Quittor is a fistulous wound situated on the heels or hind quarters of the hoof, generally caused by pricks, bruises, or suppurating corns. The symptoms of quittor are lameness, swelling upon the coronet, about the center of which one or more small orifices are seen, discharging either a thin liquid secretion or a soft, thick, perhaps cheesy, pus. From the external orifices sinuses (tubes) are found, generally leading in a downward direction, beneath the coronary substance, lateral cartilage, and into the soft tissues. In many cases the animal is extremely lame and scarcely able to put the foot to the ground. A quittor differs from a wound, or a recent abscess on the coronet, by the condition of the parts, which have taken on a peculiarly unhealthy action, by the character of the surrounding swelling, which is hard to the touch, and by the presence of sinuses.

Treatment.—This will depend upon the cause. If it be anything within the foot, as a festered corn or prick, a dependent opening must be made in the sole to allow the escape of pus, and then treat it as a punctured wound of the sole. In a case of quittor where no communication exists between the wound and the plantar surface of the foot it will have to be treated by injections of creolin, carbolic acid, or bichloride of mercury. If after a few days of this treatment the wound does not show a tendency to heal the following solution can be used: Bichloride mercury 1 dram, water 1 ounce. One or two injections of this will cause the exposed surface of the wound to cast off a thin slough and leave a healthy granulating surface. Poultices assist the separation of the slough and tend to soothe the irritation. They should

therefore be continued for several days. If this treatment is not successful after a reasonable length of time, a surgical operation will have to be resorted to.

LAMINITIS—FOUNDER.

Laminitis is an inflammation of the sensitive laminæ and may involve the adjacent structures.

There are three forms of the disease—acute, subacute, and chronic.

The exudation is greatest at the toe, the foot being most vascular at this point. The pain of laminitis is most persistent and agonizing, because the sensitive foot is invested within an unyielding horny box, pressing upon the engorged blood vessels, preventing free exudation and swelling, and thus proving a barrier to the method by which congested blood vessels are relieved.

Causes.—The most common are concussion, overexertion, exhaustion, rapid changes of temperature, and eating of various improper foods (musty grain, etc.).

Symptoms.—In laminitis of both front feet the animal is excessively lame, almost immovable, especially at starting: he seems as if all his body were cramped: stands with his hind legs drawn under the belly and the fore feet advanced, in order to relieve them of as much weight as possible; occasionally he may be seen to sway himself backward, elevating the toes and throwing the weight for a moment upon the heels of the fore feet, and then resuming his original position. If compelled to move he elevates his feet with great difficulty, not because the muscles of locomotion are inflamed, as is sometimes supposed, but because he requires all of his feet to be on the ground at the same time to bear the weight of his body. He will often groan with pain, while sweat bedews the skin.

To diagnose a case quickly the best method is to push the horse backward, when it will be seen at once that he will elevate his toes and throw his weight upon the heels.

The pulse of laminitis is full, strong, and rapid, and will maintain the character of strength and fullness even after general debility has manifested itself. In some instances the animal will lie down upon its side with the legs stretched out for hours together, evidently feeling great relief from the assumption of this

position; while in others, particularly during the early period of the disease, it will stand persistently.

When the hind feet only are affected the patient stands with all his four feet together; the fore feet are pushed under the body and not extended as when they are inflamed; the hind ones are brought forward in order to throw the weight upon the heels.

When all four feet are affected the symptoms will consist of a combination of the foregoing, with local heat in all the feet, some degree of throbbing of the plantar arteries, and tenderness upon manipulation or to the touch of the hammer.

Treatment.—Remove the shoes from the affected feet, and place them in hot poultices, changing them every hour as they become cold. After two or three days these can be replaced by cold water, which can be applied either in the form of a foot bath or by standing the animal in a running stream for five or six hours at a time.

As soon as the pain diminishes moderate exercise is beneficial, and it may be gradually increased until the animal shows no further sign of the disease.

If at the end of the fifth or sixth day prominent symptoms of recovery are not apparent, apply a stiff blister of cantharides around the coronet, repeating the blister if necessary. In addition to this local treatment saltpeter in doses of 2 to 4 ounces can be given three times daily, and if constipated give 1 quart of raw linseed oil.

CHAPTER X.

DISEASES OF BONE AND DETECTION OF LAMENESS.

SIDEBONES.

Sidebone is an ossification of the lateral cartilage.

Symptoms.—A hard unyielding condition of the lateral cartilage, which may become very prominent, with or without lameness.

Treatment.—If the enlargement causes lameness, a blister should be applied and repeated in ten days if necessary. If the animal is still lame, firing, followed by rest, may prove beneficial

BONE SPAVIN.

Bone spavin is a disease involving the bones in the hock joint, and appears as a bony enlargement, situated at the inner and lower part of the tarsus.

Causes.—Weakness, faulty conformation, severe strains, hard and rapid work, etc.

Symptoms.—A hard, bony enlargement situated at the inner and lower part of the hock joint, usually accompanied by lameness. In the first stages of the disease lameness is noticed only when the animal is first moved after a rest, and then the toe is generally placed upon the ground first.

The "spavin test" is sometimes useful in diagnosing spavin lameness. It consists in keeping the hock joint flexed for one or two minutes, and then trotting the horse. The lameness is very marked.

Treatment.—The treatment of bone spavin is the same as that prescribed for ringbone.

RINGBONE.

Ringbone is a bony enlargement, more or less prominent, situated upon either the *os suffraginis* or *os coronæ*, and it may also involve the articular cartilages.

Causes.—Injuries, such as blows, sprains, jumping, and fast work on hard roads.

Symptoms.—Chronic bony enlargements, accompanied usually by lameness, are the most prominent symptoms.

Diagnosis is assisted by palpitation (feeling) and comparison of the two legs. The enlargement is hard, painless on pressure, and the skin covering it is movable.

Treatment.—The foot must be pared perfectly level, and a blister applied to the enlargement and repeated in two weeks if necessary. Perfect rest and quietude for four to six weeks are essential, or no beneficial results can be expected.

If the rest and blisters fail to remove the lameness firing may sometimes be resorted to. Puncture firing in two or three rows is often very effective. After firing the animal must be kept quiet in a single stall for at least one month.

SPLINTS.

Splints are bony enlargements, usually situated between the inner splint bone and the cannon (large and inner small metacarpals) at their upper third.

Causes.—Faulty action or unequal distribution of pressure in the knee may throw an excessive load on the inner small metacarpal and cause rupture in the periosteum affixing the small to the large metacarpal. The irritation produces growth of bone.

Symptoms.—A bony enlargement is found, usually situated on the inner and upper part of the cannon bone, and may or may not be accompanied by lameness.

Treatment.—If there is lameness give the animal absolute rest, and apply a blister composed as follows: Biniodide of mercury 1 dram, cosmoline 5 drams. Repeat in ten days if necessary.

DETECTION OF LAMENESS.

Severe lameness is readily recognized, even when the animal is at rest. Distinct symptoms, such as pointing or frequent raising of the affected limb, are noticed. The animal's instinct leads him to place the affected part in a position to relieve the pain. In locating the lame leg, trot the horse with the halter on, leaving 1½ feet of rope, thus allowing free play to all muscles concerned in locomotion, and have him trotted slowly toward and from the observer.

If lame in one fore leg, the right one for instance, the head will nod more or less when he steps on the left fore leg, while the head jerks up at the moment the right leg (the lame one) is placed upon the ground.

Hence, the head of the lame animal always nods when the sound leg is planted. Should there be lameness in both fore legs the action is stilty (stiff); the natural, elastic stride is wanting; the steps are shortened, and the feet kept close to the ground. Almost invariably the hind legs are picked up higher than normally; the shoulders appear stiff and the head is carried rather high, while the lumbar region is arched.

Lameness behind is seen by trotting the horse from the observer, the croup being the essential part to be watched, since it falls or drops with the sound leg and rises with the lame one.

If lame in both hind legs, the stride is shortened and awkward; the fore legs are kept back of the vertical line, and are apt to be

raised higher than usual, while the head is lowered. Backing is difficult, and it is almost impossible to keep the animal at a trot when he is lame in more than one leg.

Horses lame in both fore or hind legs show a waddling gait behind, often mistaken for lameness originating in the lumbar region. This peculiar motion is simply due to the fact that the hind legs are unduly advanced under the body for their own relief or that of the front legs. Close attention is to be paid to the animal's action as he turns while being trotted to and from the observer, as at this moment—that is, while he turns—any hitch becomes visible; as, for instance, spavin or stringhalt lameness.

Always place the lame leg in its natural position and inspect the various parts of the leg both with the hand and eye, comparing them always with the sound leg to find anatomical changes.

In all cases examine the foot thoroughly and carefully. Heat, pain, and swelling are always guides in the diagnosis of lameness.

All lameness is divided into two classes: First, swinging-leg lameness, which is shown by a shortened stride and a more or less dragging of the leg; second, supporting-leg lameness, which shows itself when the leg supports the weight of the body. The former is shown in diseased condition of the muscles. The latter is shown in disease of bone, tendons, ligaments, and the hoof.

The stifle is the only joint liable to dislocation in the horse. In this trouble the patella is forced outward, and thus makes the joint immovable, the leg being extended backward and the foot resting on the toe. If the animal is forced to move he drags the leg, being unable to bring it forward in the natural manner on account of the dislocation of the patella.

The treatment consists in reducing the dislocation. This is performed in the following manner: A rope being placed about the pastern, the leg is steadily drawn forward by one or more assistants, while the operator presses the patella forward and inward. When the bone regains its proper position the animal has proper control of his leg. If the parts are inflamed frequent application of acetate of lead and sulphate of zinc, 1½ ounces of each to a quart of water, will relieve the inflammation. When this has been accomplished a smart blister must be applied—cantharides 1 part, cosmoline 5 parts. At the same time the animal must be kept perfectly quiet.

CHAPTER XI.

MEDICINES; THEIR ACTION AND USES.

Antiseptics.—Remedies which arrest putrefaction. They kill or prevent the development of those bacteria which produce septic decomposition.

Examples: Corros. sub., carbolic acid, creolin.

Disinfectants.—Destroy the specific poisons of communicable diseases by killing or arresting the development of those germs which produce disease.

Examples: Lime, sulphur gas, etc.

Deodorants.—Disguise or destroy odors.

Examples: Iron sulphate, carbolic acid, etc.

Antidotes.—Counteract poisons.

Rubefacients.—Cause redness of the skin.

Examples: Alcohol, turpentine, etc.

Vesicants.—Cause a discharge of serum from the skin.

Example: Cantharides.

Stomachics.—Promote digestion.

Examples: Gentian, ginger, etc.

Vermicides.—Kill worms.

Examples: Turpentine, iron sulphate, etc.

Anthelminthics or *Vermifuges.*—Remove intestinal worms by purgation.

Parasiticides.—Destroy parasites.

Examples: Carbolic acid, creolin, etc.

Purgatives.—Evacuate the bowels.

Examples: Aloes.

Cholagogues.—Promote secretion of bile.

Examples: Aloes, calomel.

Diaphoretics.—Increase perspiration.

Examples: Warm clothing, ethers.

Diuretics.—Increase secretion of urine.

Examples: Potass. nit., turpentine.

Tonics.—Gradually but permanently improve appetite and increase vigor.

Examples: Quinine, iron, gentian, etc.

Stimulants.—Promptly but temporarily increase nervous vigor, thus increasing action of the heart and other functions.

Examples: Alcohol, ammonia, ether.

Alteratives.—Correct morbid conditions without causing marked physiological effects.

Examples: Mercury, iodine, iodide of potassium.

Astringents.—Contract living tissues.

Examples: Alum, zinc sulphate, tannic acid.

Sedatives.—Depress (slow) both the nervous and circulatory systems.

Examples: Aconite, acetanilid, potas. bromide.

Anodynes.—Relieve pain by diminishing the excitability of nerves and nerve centers.

Examples: Opium, belladonna.

Antispasmodics.—Prevent or remove spasmodic contractions of voluntary or involuntary muscles.

Examples: Belladonna, sulphuric ether.

Carminatives.—Aid in the expulsion of gas from the intestines by increasing peristalsis, stimulating circulation, etc.

Examples: Capsicum, ginger, aromatic spts. ammonia, etc.

Febrifuges or antipyretics.—Agents which reduce high temperature of the blood.

Examples: Cold water, acetanilid.

VETERINARY MEDICINES.

Acetanilid.—Is a febrifuge and antiseptic. Used internally to lower fever and to relieve the pain of rheumatism, in doses of from 1 to 4 drams. Used externally as an antiseptic in the form of a dry dressing.

Acid, arsenious (arsenic).—Is an irritant, corrosive poison, given internally in doses of from 1 to 6 grains as a digestive tonic, and for skin diseases, usually in combination with iron sulphate and gentian. Externally it is used to remove warts, in the form of an ointment, 1 part of arsenic to 8 or 10 of lard.

Acid, boracic.—Action, antiseptic; a 10 per cent solution is very useful in conjunctivitis. With oxide of zinc it makes a very nice dressing for abrasions, scratches, etc.

Acid, carbolic.—A valuable antiseptic and disinfectant. A 5 per cent solution makes a very good wash for all wounds. A very good prescription for local use is the following:

Carbolic acid, 6 drams.
Glycerin, 1½ ounces.
Water to make 1 pint.

Acid, salicylic.—A useful antiseptic. A valuable remedy in the treatment of rheumatism. The dose given is from 3 to 6 drams. Best given mixed with boracic acid.

Salicylic acid, 3 to 6 drams.
Boracic acid, 1 to 3 drams.

Make into one powder, and repeat three times a day.

Salicylic acid dusted upon a wound will remove the granulations of proud flesh.

Acid, tannic.—An astringent and antiseptic. It is given internally in diarrhea and dysentery. Dose, 30 grains to 1 dram.

The following prescription may be given:

Acid, tannic, ½ to 1 dram.
Opium, powdered, ½ to 1 dram.

Make into one ball and repeat every two hours until the diarrhea is checked.

Tannic acid is an excellent remedy, used in the form of a saturated solution (with water), for hardening tender shoulders.

Aconite.—Is a dangerous poison and should not be used internally, but locally. Mixed with other drugs it makes a good anodyne liniment:

Aconite, 2 ounces.
Alcohol, 5 ounces.
Opium, tincture, 4 ounces.
Witch-hazel, distilled, 5 ounces.

Mix, and apply several times daily.

Alcohol.—Stimulant. Given for weak heart in debilitating diseases, such as lung troubles, etc. Dose, 2 to 4 ounces in 1 pint of water, and repeated every four to six hours, as required.

It is useful in the formation of liniments.

Aloes, Barbados.—A purgative; it is the general purgative for the horse. Dose, 6 to 8 drams.

Aloes, Barbados, 6 to 8 drams.
Ginger, 1 dram.

Make into a ball and give upon an empty stomach.

A purgative should never be given in diseases of the respiratory system.

It generally takes about 24 hours to operate.

Alum.—Astringent. It is useful as a wash for sore mouths; used in the strength of ½ ounce to 1 quart of water. Externally it is a valuable remedy in the treatment of thrush. Burnt alum is useful for the removal of proud flesh.

Ammonia, aromatic spirits of.—Stimulant and carminative. A very useful remedy in the treatment of colics.

Aromatic spirits of ammonia, 1½ ounces.
Fluid extract cannabis indica, ½ ounce.
Powdered ginger, ½ ounce.
Salicylic acid, 3 drams.
Water, 1 pint.

Give in one dose, and repeat in forty-five minutes to one hour if necessary.

Ammonia, solution of.—Used externally only, in combination with other drugs, as a stimulating liniment.

Ammonia, solution of, 1 part.
Turpentine, oil of, 1 part.
Olive oil, 2 parts.

To be well shaken before using. It is an excellent external application for sore throat.

Ammonia, chloride of.—Used in all cases where an expectorant is indicated, such as diseases of the respiratory system. Dose, 1 to 4 drams. For catarrhal diseases it is usually combined with quinine and nitrate of potash, prepared in the following manner:

Ammonia, chloride of, 3 ounces.
Quinine sulphate, 6 drams.
Nitrate of potash, 3 ounces.

Make into twelve powders and give one every three or four hours.

Expectorants act upon the mucous membrane of the respiratory organs and cause an expulsion of their secretions.

Belladonna, fluid extract.—Antispasmodic and anodyne. Used in cases of colic in conjunction with other medicines. Dose, 1 to 2 drams.

When applied to the eyes it dilates the pupil and soothes the irritated membrane. Generally used in combination with sulphate of zinc or boracic-acid solutions.

A very useful wash for the treatment of conjunctivitis is made as follows:

Sulphate of zinc, 20 grains.
Belladonna, fld. ext., 2 drams.
Water, 3½ ounces.

Apply twice a day.

Camphor, gum.—Antispasmodic and antiseptic. Dose, 1 to 2 drams. A very good remedy for diarrhea is made as follows:

Camphor, gum, 1 dram.
Opium, powdered, 1 dram.

Make into a ball; give, and repeat every two hours until relief is afforded.

Externally it is useful for sprains, combined with other medicines, forming what is known as the soap liniment.

Castile soap, 10 parts.
Camphor, 5 parts.
Alcohol, 70 parts.
Water, 15 parts.

To be used only externally as a mild, stimulating, anodyne liniment.

Cannabis indica (Indian hemp).—Antispasmodic and anodyne. Its main use is in colic, as it relieves pain without causing constipation. Dose, 2 to 4 drams.

Cannabis indica, 2 to 4 drams.
Ammonia, aromatic spirits, 1 ounce.
Water, 1 pint.

Give at one dose and repeat in three-quarters of an hour if necessary. This is an excellent remedy for colic.

Cantharides, powdered (Spanish fly).—Used only for its blistering effect. A most excellent blister to be kept in stock is made in the following manner: Take 5 ounces of powdered cantharides and 1 pound of cosmoline, put them into a vessel made like a glue pot (water bath) and let them heat for about one hour; stir continuously while cooling. Small quantities can be made by rubbing with a spatula the cantharides and cosmoline together on a piece of glass.

Capsicum (cayenne pepper).—Stomachic and carminative. Given internally in combination with gentian and ginger in mild cases of indigestion attended with flatulency. Dose, ½ to 1 dram.

Charcoal.—A mild antiseptic and deodorant. It is very good mixed with poultices, especially for wounds and sores that have a foul odor. It may be dusted on the surface of foul sores and will soon destroy the odor. Internally it is given in doses of 2 to 4 drams, and is useful in chronic indigestion and diarrhea.

Copper sulphate (blue vitriol, bluestone).—Used principally as a local stimulant and antiseptic for thrush and canker. A good remedy for thrush or canker is equal parts of sulphate of copper (powdered), sulphate of zinc, and sulphate of iron. This powder can be applied two or three times daily.

Collodion.—When painted over wounds it forms an air-tight coating and in small wounds keeps the edges in a fixed position and promotes healing. Especially valuable when applied to punctured wounds of joints.

Chloroform.—Antispasmodic, stimulant, and anodyne. Useful in colics. Dose, 1 to 2 drams, well diluted.

Anæsthesia is its principal action—the meaning of which is "to produce unconsciousness;" literally, "loss of sensation." It may be added to anodyne liniments.

Cosmoline.—A by-product of petroleum. Used as a base for ointments.

Creolin.—A nonpoisonous, nonirritating antiseptic and parasiticide. It is one of the best medicines that we have: not only as a valuable application for all wounds, but it will destroy all parasites with which the animal may become infested.

Used in solution or ointment in a strength of 1 to 50 down to 1 to 20. In mange it is used in a 5 per cent solution.

Digitalis, fluid extract of.—A very dangerous poison, and should not be administered internally.

Ether, nitrous (sweet spirits niter).—Stimulant, antispasmodic, diuretic, and diaphoretic. Dose, 1 to 2 ounces.

A very useful stimulant in all cases of weakness of the heart's action. For its stimulating and antispasmodic actions it is given in colics combined with belladonna or cannabis indica.

Ether, sulphuric.—Stimulant, antispasmodic, and carminative. Dose, 1 to 2 ounces well diluted.

Combined with belladonna or cannabis indica its antispasmodic action is increased.

Fenugreek.—Aromatic and stomachic. Sometimes combined with tonics to disguise their odors. Dose, 1 ounce.

Flaxseed meal.—Used for poultices.

Gentian.—Stomachic and bitter tonic. It improves the appetite and general tone. Dose, ½ to 1 ounce.

Ginger.—Stomachic and carminative. Combined with purgatives it diminishes their tendency to gripe, and also somewhat hastens their action. Dose, ½ to 1 ounce.

Glycerin.—Used as a base in the same manner as Cosmoline.

Iodine.—Given internally in diabetes insipidus. Dose, 20 grains to 1 dram, to be repeated three times daily until the quantity of urine is lessened. Best given made into a ball with flaxseed meal.

Externally it is used for the removal of swellings, curbs, enlarged tendons, etc. It is also a useful stimulant for indolent sores and ulcers. A good solution for external use is made as follows:

Iodine, 1 ounce.
Iodide of potassium, 3 ounces.
Water, 1 pint.

To be applied several times daily.

Iodoform.—Antiseptic. Used externally as a dry dressing, either alone or combined with other drugs, such as boracic acid, acetanilid, etc.

Iron, tincture of the chloride of.—A valuable tonic, building up the system and enriching the blood. Useful in purpura and in convalescence after all debilitating diseases. Dose, ½ to 1 ounce, well diluted.

Used externally as an astringent and styptic in serious hemorrhages. A small piece of cotton saturated with it and applied to the bleeding part is the proper mode of application.

Iron, sulphate of.—Tonic. It increases the appetite and builds up the system. Dose, ½ to 1 dram. Frequently combined with nux vomica, etc.

Lanolin.—Used as a base for ointments in the same manner as cosmoline.

Lead, acetate of.—Astringent and a valuable remedy for relieving local pain. Used externally to cool and relieve sprains, inflamed tendons and joints, and to relieve itching skin diseases.

Used in the form of powder, ointment, or dissolved in 20 to 40 parts of water.

The white lotion is made as follows:

Acetate of lead, 1 ounce.
Sulphate of zinc, 1 ounce.
Water, 1 quart.

Shake well and apply several times daily.

The lotion is a very valuable remedy for the relief of all external diseases accompanied by heating and swelling.

Lime, chloride of.—This is the best disinfectant that we have. Four ounces to 1 gallon of water is the proper strength. This solution should be used as a wash for the disinfection of stables. A small portion of choride of lime placed around in stables will destroy the odor arising from decomposed urine.

Lunar caustic.—Used for the removal of warts and proud flesh. Four grains to one ounce of water make a good application for the removal of the cloudiness remaining after an attack of ophthalmia.

Mercury, bichloride of (corrosive sublimate; antiseptic tablets).—Dissolved in water this is the most energetic antiseptic. One to 1,000 solution is the proper strength to use in the treatment of all wounds.

Mercury, mild chloride (calomel.)—Internally, a cholagogue. Dose, ½ to 2 drams. It is not used alone, but is combined with aloes.

Calomel, 1 dram.
Barbados aloes, 4 drams.
Ginger, 1 dram.
Water to make a ball.

Externally, antiseptic and drying. Used in the treatment of ulcers and thrush.

Mercury, biniodide.—Used as a blister; its effects are very penetrating. Used principally in the treatment of spavins, splints, sidebones, ringbones, and all bony enlargements.

Biniodide of mercury, 1 part.
Cosmoline, 6 to 8 parts.

Mix and rub together thoroughly.

Apply with friction for at least ten minutes.

Nux vomica, powdered.—A nerve stimulant and tonic. Dose, ½ to 1 dram. It is a very useful tonic in building up the tone of the system in convalescence from debilitating diseases and general lack of vitality. Generally given in combination with gentian, iron, and other tonics.

Oil, linseed.—Laxative (mild purgative). Dose, ½ to 1 quart. Do not use boiled oil.

Oil, olive.—Generally used as a vehicle in making liniments and oily solutions.

Oil of tar (pine tar).—Useful for plugging holes and cavities in the hoof after all suppuration has ceased.

Oil of turpentine.—Diuretic, stimulant, antispasmodic, anthelmintic and expectorant. Dose, 1 to 3 ounces diluted with oil.

Externally it is used in the formation of liniments (see Solution of Ammonia).

Opium, tincture of (laudanum).—Anodyne, antispasmodic. Checks secretion of mucous membrane. On account of these properties it is a valuable remedy in diarrhea and dysentery.

Very useful in the treatment of all abdominal pain where there are no symptoms of constipation, but as a rule belladonna and cannabis indica are preferable. Dose, 1 to 2 ounces.

Externally, opium tincture is used to relieve pain of sprains and bruises.

A very good anodyne lotion is made as follows:

Opium tincture, 4 ounces.
Acetate of lead, 1 ounce.
Water to make 1 quart.

Apply every few hours.

Opium, powdered.—Not used externally. It is used internally for the same purpose as the tincture. Dose, ½ to 2 drams.

Potassium bromide.—Nerve sedative. Dose, ½ to 2 ounces. In tetanus this medicine can be given in large doses.

Potassium nitrate (saltpeter).—Alterative, febrifuge, and diuretic. Dose, 1 to 4 drams. In the treatment of laminitis the dose is 2 to 4 ounces, repeated three times a day. Externally it makes a good cooling lotion:

Nitrate potassium (saltpeter), 5 ounces.
Chloride of ammonia, 5 ounces.
Water, 16 ounces.

Mix and keep the affected parts saturated with this lotion.

Internally, saltpeter is a most excellent medicine in the treatment of catarrhal and febrile diseases. It is also useful in the treatment of swollen legs.

Potassium iodide.—Alterative, diuretic, and expectorant. Dose, 2 to 4 drams. It is given to promote absorption of enlargements, such as enlarged glands in lymphangitis, and in partial paralysis resulting from injury to the brain or spinal cord.

For such purposes full doses are given twice a day for two weeks.

Potassium permanganate.—Disinfectant and deodorant. Useful for the removal of foul odors arising from unhealthy wounds; also for cleaning hands and instruments. From 1 to 4 drams, water 1 pint, is the proper strength of the solution for use.

Quinine, sulphate of.—Tonic, stomachic, antiseptic, and mild febrifuge. Dose, ½ to 1 dram, repeated three times a day. It is given in all febrile and debilitating diseases. Combined with sulphate of iron it is very useful in purpura. In influenza and pneumonia it is generally combined with gentian and nitrate of potash, made into powders in the following proportions:

Quinine sulphate, 1 ounce.
Gentian, 3 ounces.

Make twelve powders and give three times a day.

Salol.—Antiseptic and antirheumatic. Used chiefly in rheumatism. Dose, 2 to 4 drams, three times a day. Also used externally for its antiseptic properties.

Sodium bicarbonate.—Carminative, stomachic, relieves acidity of the stomach. Dose, 1 to 2 drams. This is an excellent medicine in chronic indigestion and flatulency.

Sulphur.—Parasiticide. This medicine may be used for the treatment of mange, but it is inferior to creolin or carbolic acid.

Witch-hazel.—A cooling astringent wash, very useful when combined with other medicines in the form of liniments.

Zinc sulphate.—Externally it is much used as a stimulant and astringent for wounds, foul ulcers, etc. It is an excellent remedy for the treatment of thrush and canker.

Sulphate of zinc -- }
Sulphate of copper } Equal parts.
Sulphate of iron -- }

Zinc oxide.—Antiseptic. Used either as a dry powder dusted on the wounds or can be made into an ointment with lanolin:

Zinc oxide, 1 part.

Lanolin, 6 parts.

Zinc chloride.—An irritant and corrosive poison, never given internally. Externally it is applied as a stimulant, astringent, caustic, and parasiticide. It is also used as an antiseptic, disinfectant, and deodorant. From 2 to 4 drams to the pint of water are used for ordinary antiseptic purposes.