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GLANDERS

C. A. CARY, VETERINARIAN.

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GLANDERS.

C. A. CARY, VETERINARIAN.

Glanders is a specific, contagious disease, most frequently found in the equine species; but may be transmitted (by innoculation or by ingestion of glanderous material) to man, sheep, goats, dogs, cats and some of the rodents. The susceptibility of the hog is yet questionable, but it is certain that horned cattle and domestic fowls are proof against glanders.

Temperate or cool climates appear to be more favorable to its development and maintenance than the hot, torrid zones. As far as known, temperate regions have the greatest outbreaks of this disease. Possibly this may be due to the facts that the temperate countries possess the greater number of domesticated equines, and that the highest civilization of the cooler climates recognizes and records the majority of the cases that occur.

History informs us that the primitive veterinarians of the fourth and fifth centuries recognized glanders in some of its forms. Although it is one of the oldest known diseases, many of its phenomena and conditions are yet unknown. With all the accumulated medical knowledge of the past twelve centuries, no effective remedy has been discovered.

Glanders produces its lesions or morbid processes in the lymphatic vessels and glands and connective tissue adjacent to them, of the skin and subcutaneous connective tissue; of the mucous membrane of the nasal passages and respiratory tract, and of the lungs and spleen. These places or parts are most

NOTE.—This Bulletin gives the results of the writer's observation on glanders as well as the conclusions of the best American and European authors. It is hoped that the farmers, by its aid, may be able to distinguish glanders from other diseases.

commonly affected in the beginning of the disease but the lesions do not confine their morbid changes to any one part or locality during the progress of the disease.

Gerlach and other authorities have divided glanders into the following classes: Nasal Glanders, Pulmonary Glanders and Farcy Glanders.

Nasal Glanders is the most common and may be recognized by the following symptoms:

1. Nasal Discharge.—This is generally the most prominent of all the symptoms and is of the least diagnostic importance. At first the discharge is thin and watery, gradually becoming thicker, sticky and pasty; it may be greenish yellow, grayish, almost black with dust or streaked with blood—the color usually depends upon the food eaten and the dust in the air inspired by the animal. The discharge from the nose is not as copious in chronic cases as in strangles (distemper) or acute catarrh. However, it is augmented during damp, rough weather and by poor ventilation, bad food, etc. The viscid, tenacious discharge adheres around the external opening of the nose and appears to lessen the diameter of the opening. It is said to occur more frequently from the left than from the right nostril; yet it may appear from both nostrils or from either the right or the left one. The discharge may be almost entirely inodorous, or it may give forth a strong stench. The rank, obnoxious smell does not appear until the ulceration attacks the bone or cartilaginous tissue of the nasal chambers. Many of the foregoing physical characteristics of the nasal discharge are similar to the nasal discharge in strangles, catarrh, caries of the teeth and neoplastic or new dental tissue growths in the sinues or cavities connected with the nasal passages. Hence the nasal discharge can be used as a diagnostic symptom only when associated with other more prominent characteristics.

2. Enlargement of the Lymphatis Glands in the Submaxillary Region.—This symptomatic condition of the glands—lying below the base of the tongue between the branches of the lower jaw, near the throat—is produced by the

aborption of glanderous matter by the lymphatics in the mucous membrane of the nasal passages. This absorbed glanderous material, on its way to the general circulation, excites a kind of a chronic inflammatory action in the submaxillary lymphatic glands. The swollen glands are soft and loose at first, but gradually become hard, nodulated and finally become firmly fixed high up on the inside of the jaw-bone, below the base of the tongue. These hard, nodulated glands vary in size from a hazel nut to a walnut, and are distinctly limited. The swollen glands usually appear on the same side upon which the nasal discharge occurs. For instance, if the nasal discharge occurs from the right nostril, the indurated, swollen, lymphatic gland will appear on the inside of the left branch of the submaxillary bone. If the discharge appear from both nostrils the glands may swell on one or both sides. Very rarely do these glands suppurate or form ulcers and are not to be confounded with the puffy, soft swelling of the subcutaneous tissue as is seen so frequently in strangles.

This nodular lymphatic swelling in the submaxillary region is not, by itself, sufficient in importance to determine the presence or absence of glanders. It should be accompanied by a more important symptom than nasal discharge in order to "proclaim" glanders. Hence its characteristic presence is the only real symptomatic indication it possesses.

3. Nodules and Ulcers on the Visable Mucous Membrane of the Nose.—These are found mainly on the septum nasi—the partition between the right and left nasal passage. The tubercles are, at first, red or gray and hard, varying in size from a millet seed to a pea; in a short time they become soft and yellowish; finally break open (erupt) and discharge a brownish yellow, oily liquid which resembles raw linseed oil. This viscid yellowish brown discharge is said to be so acrid that it forms serpentine channels in the mucous membrane as it flows over the surface. On the edges and sides of the ulcers formed by the erupting of the primary nodules, secondary nodules form and erupt. The primary nodules and ulcers may be so near each other that the tissue separating them may soon

become eroded by secondary nodules, and the larger ulcers thus become confluent or united. Thus the "pit like, ragged edged ulcer," or chancres are formed and enlarged. In some instances the resistance of nature or medical agents arrest the development of the chancres, and healing takes place, leaving white scar tissue to mark the spots of ulceration. These scar tissue spots are sometimes star-shaped, but their outlines always correspond to the previous ulcers. By no means does the presence of this scar tissue indicate the complete recovery of the case; for, upon the slightest provocation—as bad hygienic conditions or withholding the medicinal treatment—the ulcers will return or the morbid processes will appear in some other part of the body—in the lungs or subcutaneous connective tissue. The nodules, chancres and scar tissue are not confined to the visable mucous membrane of the nose, but they may be on the mucous membrane of the sinuses of the turbinated bones, of the pharynx, larynx or trachea (wind-pipe). Nodules or tubercles may also be present in the connective tissue of the lungs. According to Percivall nasal glanders is very frequently accompanied by tubercles in the lungs and they occur on the same (?) side upon which the nasal discharge, ulceration of the septum and the indurated submaxillary glands occur. When the nodules and ulcers are numerous on the nasal mucous membrane, the irritation caused by them may induce an acute inflammation throughout the nasal mucous membrane and a catarrhal exudate will appear on its surface. Hence, the discharge from the nose, during certain stages in glanders, may be composed of the catarrhal exudate from the inflamed mucous membrane, the yellowish, oily eruption from the nodules and ulcers, particles of food from the pharynx (throat) and dust from the air. Ulcers may be found on the visable mucous membrane as a direct result of injuries to the membrane or bones surrounding the nasal chambers—as splinters penetrating the nasal tissues or bruising of the tissues by contact with hard bodies or fractures of facial bones by the falling of the animal and by barbarous use of clubs and whip stocks. In such cases the com-

plete recovery and healing of the wounds readily occur under proper treatment. Yellowish streaks and bluish lead-colored tints are said to be premonitory symptoms of coming nodules and ulcers. These signs are, however, uncertain; and, no doubt, are present in other diseases, as catarrh, pneumonia, etc.

There are a few minor attending indications in nasal glanders that may aid the reader in detecting the disease. A slight hemorrhage (bleeding) may occur periodically from the nose. A small amount of blood may be found on the manger, feed box or on the front legs, left or smeared in such places by the animal rubbing its nose over them. This hemorrhage will appear without any indications pointing to a cause, like heavy pulling, overwork or to bleeding from the lungs in large quantities. Again there may be a dry, soft "heavy" cough with slightly increased rapidity in breathing. The coat or hair may look rough and the animal may present considerable emaciation. One or more of the limbs may swell suddenly and the animal become suddenly lame from some unaccountable cause. Occasionally there is a manifest swelling of the skin and subcutaneous tissue around the external nares, or openings of the nostrils. This indurated swelling and the drying, sticky nasal discharge materially decrease the diameter of the opening.

These minor characteristics are not constant and generally appear when nasal glanders is complicated with one or both of the other forms.

Pulmonary Glanders.—The lungs are the chief organs in which this form of the disease occurs. In the acute attack there are small spots, inflamed as in lobular pneumonia; but if the case becomes chronic, small glanderous nodules are formed in the connective tissue of the lungs. These tubercles may undergo resolution or the successive changes known as fatty, cheesy and calcareous conditions, depending upon the duration of the morbid processes. In the chronic form of pulmonary glanders the symptons are indicated by a soft, dry cough, difficult or labored breathing, and a general unthrifty condition of the animal. There are instances, however, where the horse may thrive quite well, presenting only that peculiar cough

and breathing common to an animal affected with "heaves;" and yet such an animal may communicate the disease to healthy horses. No doubt this occult form of glanders is responsible for many of the so-called spontaneous outbreaks of the disease. Fortunately, occult or hidden pulmonary glanders is not common, although fewer cases are recorded than actually occur, because this form of the disease cannot be determined, in all instances, prior to the death of the animal. Even the expert veterinarian cannot detect the presence of this occult form of glanders until he holds a *post mortem* examination and finds the tubercle leisons in the lungs or other internal organs. But if horses have contracted glanders from contact with a horse "suspected" of this trouble, it is quite evident that the "suspect" should be isolated and watched for further manifestations; or, better still, hold a *post mortem* examination at once. Pulmonary glanders is very frequently associated with nasal glanders, and in some instances it accompanies farcy glanders. When the visable and external symptons of farcy glanders or nasal glanders have disappeared or have been "hushed" by medical treatment, and the disease has become apparently latent, very often the tubercles in the lungs remain in such a condition as to enable the animal to transfer the virus to healthy horses.

Obviously pulmonary glanders, although very infrequent, is the most dangerous and microbe distributing form of glanders, because of its occult or hidden nature.

Farcy Glanders.—The lesions of this kind of glanders are in the lymphatic vessels and glands of the skin and connective tissue lying immediately beneath the skin. The lesions or morbid changes begin by the formation of nodules under the skin; are at first hard, hot and sensitive to the touch, gradually become soft in the center, and finally erupt, discharging a brownish yellow, viscid, sticky liquid similar in appearance and consistency to raw linseed oil, except it is at times, tinged with blood. After a time the discharge becomes more and more purulent (mixed with pus) indicating that nature is trying to heal the ulcers. The tubercles, farcy "buds" or "but-

tons,' vary in size from a pea or hazelnut to a walnut, and the ulcers formed by the eruption of the nodules are ragged edged with gray, dirty bottoms and with the drying, sticky discharge surrounding their borders and matting the hair. The chancrous ulcers have little tendency to heal; in case they do heal, they leave hard, button-like tubercles which may break open again; or should they disappear entirely, new nodules are certain to appear in the same region or other parts of the body—the lungs or nasal membranes. The inflammation in the lymphatic vessels and glands—caused by the absorption of glandrous material containing the specific microbe—retards or checks the return of lymph to the general circulation, and swelling or œdema of the affected parts is the result. This accounts for the swelling of the limbs when one (most frequently a hind limb) or more of them are affected. Either before the swelling appears, or after it wholly or partially disappears, the thickening and distension of the walls of the lymphatic ducts and valves, make the vessels or ducts appear like knotted cords which are usually hot and sensitive to the touch. [The lymphatic vessels and glands are found in nearly all parts of the body. The lymphatic vessels are about as many in number as there are veins and arteries, and they convey a watery lymph from all parts of the body to the largest veins and to the heart. The lymphatic glands are situated along the course of the ducts or vessels and act as filters or in some way change the lymph of the vessels.] The farcy ulcers and nodules, buds or buttons may appear on any part of the surface of the body; but they are seen most frequently on the inside and outside of the thighs, on the legs below the knee and hock, on the inside of the front limb in the axillary region, on the sides of the neck along the jugular veins, and on the sides of the lips. In nearly every case of farcy which the writer has observed, the location of the nodules, ulcers and swelling was in one of the hind limbs—the ulcers appearing in the region of the hock in some cases, and in others on the inside of the thigh. Generally the nodules or buds precede the swelling, but they may appear after the engorgement, or are not noticed until after the swelling is

manifest. The swelling of the limb or limbs resembles the swelling in what is known as "big leg;" but in "big leg" (sometimes called "water farcy") the characteristic buds and ulcers are wanting; also there are no ulcers in the nostrils. In some rare cases the swelling entirely subsides and all that remains to indicate the presence of farcy are the knotted and corded lymphatic vessels with here and there a farcy bud or ulcer, or scars marking the spots where buds and ulcers have been. The nodules and ulcers are the important symtomatic conditions in farcy and they "pronounce" the animal to be affected with farcy glanders.

SYSTEMIC CONDITIONS AND OTHER CHARACTERISTICS.

There are systemic or general conditions which are considered as signs accompanying the foregoing. They may be present in all classes of glanders. In acute glanders the temperature rises to 103°—108° F.; the breathing or respirations are increased; the pulse is quickened, diminished in volume and becomes weak and feeble; the appetite is impaired, and marked debility and emaciation soon appear unless the acute attack is cut short by death or it merges into the chronic form. The acute form may resemble, at first, the first stage of acute pneumonia; but in a few days the nodules, ulcers, etc., appear on the nasal membranes or the characteristic indications of farcy glanders are manifested. Acute glanders is generally found in mules and is rarely found among horses. Chronic cases are by far the most common in the horses of this country. In fact, every authority and every official veterinarian claim that chronic glanders, in all its various manifestations, differs from acute glanders in degree of intensity and duration. An acute case may last from a few days to a few weeks and terminate in death or chronic glanders; but a chronic case, like some tuberculous persons, may live for months or years, passing a sort of a life-in-death existence. And during their prolonged, decaying existence, they may do regular work and

communicate the disease to a large number of horses. The intensity of all the morbid conditions in chronic glanders is low; consequently the morbid changes are not rapid. The temperature is variable or periodic; at times, it is normal; but when there are sudden changes in the atmospheric temperature, or rough, damp weather, or the food is poor from partial decay or fermentation, or when bad hygienic conditions exist, the temperature rises a few degrees and other conditions will be present, which generally attend a slight fever. Or, the unhealthy surroundings, poor food, etc., may produce an acute attackin an animal affected with chronic glanders. However, the nodules, ulcers, swellings and corded lymphatic vessels are generally well marked in the chronic form; because they re tain their characteristics longer than in the acute cases. Heavy doses of aloes or hypodermic injections of turpentine, in many instances, will intensify the effects of chronic glanders Nasal glanders and farcy glanders may be present in the same animal. Virus from a farcy case may produce nasal glanders when inoculated into a healthy animal. In truth, the specific microbes may produce any of the various forms and conditions of glanders irrespective of origin. This interchangableness of the partially distinct forms of glanders is due the fact that the same exciting cause produces all forms of the disease.

CAUSES AND TRANSMISSION.

Under this heading we find two classes of causes—predisposing and exciting.

The predisposing causes are variable and are simply preparing conditions that get the system ready for the exciting cause, and thus enable the exciting or disease producing microbes to gain admission to the system and intensify their destructive work. Anything which lowers the vitality and resisting power of the system acts as a predisposing cause. Sudden changes in the weather with respect to moisture, temperature and light —as hot, sultry, damp, cloudy weather—lower the vitality and resistance of the body tissue and liquids. Bad drainage, ill ventilation, coarse, rough and partially decayed hay, damaged

food, impure water, strangles, catarrh, carious teeth, bronchitis, pneumonia and many other debilitating diseases, are predisposing causes. Hereditary causes are likewise predisposing in their influence. It is still a question as to whether the offspring may receive the microbes of glanders during fœtal life; but it does inherit a predisposed tendency—a prepared condition of cell, of organic structure which admits the germ into the body more readily and feeds the microbe upon more of its favorite food than the system otherwise not predisposed by an inherited tendency. The writer has heard veterinarians and stock raisers claim that farcy glanders was not transmitted from dam to offspring. That may be true in regard to the microbe or its spores; but the strong predisposing tendency is inherited and the constant contact after birth of the colt with its dam affords ample opportunity for the transmission of the germs. In all the cases which the writer has observed, the offspring has developed glanders (sufficient for a distinct manifestation) before maturity, and in one case before the weaning of the colt.

In giving a definition of glanders the writer stated that it was a *specific contagious* disease. By specific I mean that the exciting cause is a definite micro-organism, a parasitic microbe, The definite germ that causes glanders is the *bacillus mallei* and was discovered in 1882 by Loffler and Schutz. This germ is found in the tissues of the nodules and ulcers and in the yellowish, viscid discharge from them. Pure cultures are obtained from unbroken farcy buds and from tubercles in the lungs and spleen. The nasal discharge contains this microbe, but the discharge is also thronged with numerous air germs which makes the cultures from that source impure and of no value unless the *bacillus* of glanders can be isolated and cultivated separately. The glanders microbe in the nasal discharge may be isolated by inoculating a guinea pig with a small amount of the discharge. The glanders microbe is the only germ that will develop in the body of the guinea pig, showing peculiar enlargement of the lymphatic glands from which pure cultures of the *bacillus mallei* may be obtained. Thus the

guinea pig acts as a perfect natural culture media for the specific microbe, and at the same time resists the development or growth of the air germs. The microbe of glanders is also found in the lymph of the lymphatic vessels in the neighborhood of glanderous ulcers and nodules, but before the lymph reaches the general circulatin the lymphatic glands have separated the germs from the lymph by filtration. However, when the tissues have become greatly ulcerated it is quite probable that the capillaries and smaller blood vessels absorb some of the glanderous material and the microbes are then found in the blood. In acute cases some authorities claim that the germ is found in the blood during the stage of excessively high temperature or early fever. This microbe will also grow on some of the artificial culture media—as sterilized potato, blood serum, etc.

The contagion or germs of glanders are transferred chiefly by the nasal discharge. It is scattered about promiscuously—in feed boxes, over mangers, stalls and floors, on buckets, bridles and harness, in watering troughs, etc. The discharge from the farcy ulcers is likewise a source of contagion; however, it is small in quantity and does not become so profusely and generally distributed as the nasal discharge. The germs may gain entrance to the system by way of the digestive tract when the discharge is present in the drinking water or in the food. It thus encounters the action of the fluids of digestion and must be absorbed by the blood vessels or lymphatics. It is quite certain that the spores of the bacilli could thus enter the system by way of the alimentary canal. This is, no doubt, the source of many cases of glanders where the mesentary lymphatics and the lungs are the chief or beginning seats of the nodules or tubercles. The discharge may become dry, float about in the air of the stable and enter the nasal or respiratory passages; along with the dust the particles of dry discharge settle upon the mucous membrane and the bacilli penetrate the tissues or gain entrance into the tissues by uncommon abrasions. In the time of Percivall glanders was transmitted by spreading the nasal discharge from a glandered horse over

the septum of healthy horses and mules. This method acted with perfect or absolute certainty. Therefore, it is not improbable that glanders may be communicated by dried discharge as above described. The certainty of the transmission of glanders by inoculation is too evident to be questioned. In such cases the glandered material is introduced into an ulcer, a wound, or injected beneath the skin, into veins or arteries. The disease is, however, not transmitted by a healthy animal breathing the exhaled air from a glandered horse. This has also been demonstrated by actual experiment. The germs do not come from the living animal in a volatile form.

It is with pleasure we learn that Pearson, Hellman, Kalming, Preusse, and other European investigators, have obtained gratifying results with *glander lymph* or *mallein*. The lymph is prepared from artificial cultures (growing on potatoes, &c.) of glanders bacilli. The mallein or lymph is used to diagnose or determine cases of glanders where the seats of the disease or the diseased places are hidden from view and are without definite manifestations, or where the disease has not progressed sufficiently to admit of diagnosis. The lymph is introduced into the system by hypodermic injection; and, if glanders be present, the specific reaction is indicated by a rise of temperature. The glander lymph acts very like the Koch lymph in tuberculosis.

THE VITALITY OF GLANDERS BACILLI OR VIRUS.

Bouley, Gerlach, Renault, Cadaec, Malet and other authorities, have demonstrated the following facts:

1. By slowly drying (artificially or in sunshine) the nasal discharge or virus, exposed to free air, the bacilli lose their virulency. 2. The bacilli lose their virulency very slowly if exposed to damp, cool weather. 3. If the nasal discharge or virus be rapidly dried the bacilli retain their activity longer than when slowly dried. In some instances rapidly dried virus remained virulent for three months. 4. Glandered matters or nasal discharge dropped into water, or kept in an atmosphere saturated with moisture, remain virulent for a long time.

Moreover, many authorities claim that thirty days of ordinary weather will entirely destroy exposed bacilli; but the foregoing conclusions of eminent authorities will not corroborate the thirty days limit. In truth, the bacillus of glanders has its principal place of abode—its natural home or habitation—in the fluids and tissues of the body of the mule or the horse; and all the facts, relating to the life of the bacillus outside of the animal body, have not been discovered. But since the germ or bacillus lives under unfavorable conditions outside of the animal body, it becomes less difficult to destroy the bacilli in infected barns, stalls, etc. Proper disinfection will effect this result.

DISINFECTION.

What should one do with stalls, harness, etc., which have come in contact with a horse affected with glanders? If the stable, etc., are old, and not very valuable, it is safest and best to burn them. However, complete disinfection is possible without burning. Remove all filth and dirt from the stalls, and clean them by washing and otherwise as thoroughly as possible; then white-wash all the wood work, mixing one ounce of carbolic acid with every bucket of white-wash. After all the stalls, etc., are white-washed, fumigate the entire barn with sulphur fumes. This may be done by purchasing commercial sulphur brick, especially prepared for disinfecting purposes; or you may burn one pound of sulphur in a kettle of live coals, closing the doors, windows, etc., to keep the sulphur fumes in the barn. For very thorough disinfection one pound of sulphur may be thus burned in every stall. The harness should be thoroughly cleansed in boiling water, and oiled with hot oil. Finally, the stable, stalls, etc., should be ventilated; sunshine and fresh air are natures best disinfectants. The stalls, harness, etc., should not be used for one month or more after the above mentioned disinfectants have been applied.

SUSPECTED AND EXPOSED CASES.

Horses or mules that have been "exposed" to glanders, by working with, or coming in contact with, glandered animals, or by being stabled in infected stalls or barns, should be isolated and watched closely for (six to eight) weeks, until certain that such exposed animals are or are not affected. Every exposed animal will not contract the disease. The writer has known instances where one horse in a stable had contracted glanders, while the remaing horses of the same stable failed to take the disease. The writer can also recall an instance where one horse had been affected for some time, and during this time had been worked with its mate; yet the mate failed to contract the disease. This does not mean that glandered animals may be carelessly thrown in contact with healthy horses or mules, without spreading this fearful disease. It does mean that a healthy animal can resist for some time the attacks of the glanders virus or bacillus.

TREATMENT.

It is useless, dangerous and expensive to attempt to treat glanders in the horse or the mule. I know medicine venders and empirics will attempt treatment of anything; but the very best and most reliable authorities are unanimous in declaring that glanders in the horse or mule is practically incurable. The danger of contracting the disease is far greater than one would suppose when one sees men so reckless and knowingly careless in handling glandered horses. Recently a farmer gave the writer an idea of the expense incurred by handling and retaining a glandered horse on his farm, in the following words: "Had I destroyed the first case of farcy that appeared on my farm I would have saved hundreds of dollars." Hence, when you are certain that one of your animals is affected with glanders, destroy it at once and burn or deeply bury the carcass.

GLANDERS IN MEN.

The human family may be attacked by this loathsome disease. In man it appears in any of the three forms and the symptoms are somewhat similar to those in the horse. Glanders in man, in its acute stage, may be mistaken for *typhoid fever*, *rheumatism*, *pyæmia* (blood poisoning), or *erysipelas;* and chronic cases in man simulate chronic *syphilis* or *tuberculosis* (consumption). The *occupation* and *history* of the afflicted person must always be thoroughly considered; since man contracts this disease by carelessly handling glandered animals. The microbes or bacilli gain admission to the system through ulcers or broken places in the skin of the hands and face. The nasal discharge may be blown into the face or get on the hands. Moreover, filthiness or uncleanliness of person, make such an one more susceptible or more liable to become infected. As we have previously stated, glandered animals should be destroyed and deeply buried with as little handling as possible.

The following is the only law in Alabama relating to the disposal of glandered animals:

[From Acts 1886-7, page 95.]

AN ACT

For the Prevention and Suppression of Infectious and Contagious Diseases of Horses and other Animals.

SECTION 1. *Be it enacted by the General Assembly of Alabama,* That it shall be the duty of any person, who is the owner or possessor of a horse, mule, or other animal having the glanders, or other fatal contagious or infectious disease, to keep such diseased animal away and removed from any public or other place where horses, mules or other animals are usually kept in said counties, and also to keep such diseased animals at a distance from any common rendezvous for animals therein, whether such rendezvous or place of resort be maintained for public or private use and conveniences; and any person refusing or wilfully neglecting to obey this provision of law, by bringing such diseased horse, mule, or other animal, or causing the same to be brought to any rendezvous of animals or other place where the same shall be usually kept, shall be deemed guilty of a misdemeanor, and

may be indicted therefor; and upon conviction thereof by or before any court of this State competent at this time to try and punish misdemeanors committed in said counties, shall be fined not exceeding fifty dollars, nor less than five dollars, for any violation of this law; *Provided*, That the prosecution and conviction of any person under this statute shall not be a bar to an action for civil damages against said person for loss or injury incurred by reason of the violation thereof.

Approved February 28, 1887.

The station solicits correspondence upon all diseases of live stock—especially upon all forms of contagious, infectious or spreading diseases.

In writing the station regarding diseases, direct all communication to the veterinarian, and briefly state the conditions as follows:

1. History of affected animals.
2. Conditions before becoming sick.
3. How fed; source and kind of water; kind of pasture, &c.
4. Give age, sex and breed.
5. Are all sick at one time? How long affected?
6. Give symptoms—how sick animals act, &c.
7. Examine animals thoroughly after death and give the results.
8. Send specimens of desease tissues or organs and of parasites (worms, &c.) in alcohol, by express, (prepay express).

RECAPITULATION.

I. Nasal Glanders is recognized chiefly by the ulcers on the visable lining membrane of the nose. The ulcers are generally accompanied by a nasal discharge, and by a small, hard, deep seated swelling under the lower jaw, high up near the throat, under the base of the tongue; this swelling, or enlarged lymphatic gland, rarely suppurates or discharges pus.

II. Farcy Glanders is manifested by the presence of hard buds or buttons and ulcers or chancres, found most frequently on the inside of the thigh, or on the inside or outside of the hind leg below the hock joint, but may occur on any part of the surface of the body.

III. Pulmonary Glanders manifests itself by a dry, rough coat, indigestion, ematiation, and by that irregular breathing exhibited in a horse with the heaves ("Bellows"). But a case of pulmonary glanders can not be diagnosed with certainty until the suspected animal dies or communicates the disease to another horse or mule, or glanders becomes apparent in one or both of the other forms of the disease.

IV. Any one, or any two or all three of the foregoing forms of glanders may appear in a single animal.

V. Glanders in any or all of its forms is caused by a plant parasite—the *bacillus mallei.*

VI. The germs or microbes are transmitted from the diseased to the healthy animal by direct or immediate contact of the healthy with the diseased; or by the healthy horses or mules coming in contact with the virus, the nasal discharge, in watering troughs, buckets, mangers and stalls, infected by a glandered animal.

VII. Man may become inoculated in sores or broken places in the skin and thus contract glanders. This occurs not infrequently with men who carelessly handle glandered horses.

VIII. All animals afflicted with glanders should be destroyed and their carcasses should be deeply buried in some out of the way place. Never throw the carcass of any animal into the river to breed disease and filth.

IX. Disinfect thoroughly all infected stables, watering troughs, buckets, harness, stable utensils, &c.

X. Strictly and completely quarantine or isolate all exposed or suspected animals until certain they are, or are not, glandered.