

OKLAHOMA
AGRICULTURAL EXPERIMENT STATION.

Bulletin No. 27--June, 1897.

GLANDERS. TEXAS FEVER,
SYMPTOMATIC ANTHRAX,

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STILLWATER, OKLAHOMA.

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Glanders, Texas Fever, Symptomatic Anthrax.

SUMMARY.

GLANDERS.—There is no disease of our domestic animals that exists in so many different forms or is so easily mistaken for other diseases as glanders.

In all suspicious cases mallein should be used as a means of diagnosis. Mallein is obtained from cultures of the germ causing glanders and when injected into a diseased animal, causes a marked rise in temperature and a painful enlargement at point of injection.

The disease is regarded as incurable and any animal affected with glanders should be destroyed. Disinfect thoroughly the stall and all articles used about the animal.

Glanders may be communicated to man from diseased horses or mules.

TEXAS FEVER.—It has not been proved by any experiments that Texas fever is communicated from infected cattle to susceptible cattle by any other means than the southern cattle tick.

No experiments have been conducted to determine what medical treatment is best to adopt, but it is known that the removal of the ticks, administering a purgative and giving an abundance of nourishing food is very good treatment for this disease.

SYMPTOMATIC ANTHRAX.—The loss of cattle in Oklahoma from this disease is probably exceeded only by the loss caused by Texas fever.

Prevention can be accomplished by either vaccinating or by avoiding low, wet pastures during the season of the year when the disease is prevalent.

When a pasture once becomes infected the disease is apt to appear for several years, as the germ will live for a great length of time, and care must be exercised in disposing of dead animals in order to prevent reinfection.

Glanders.

The following experiments with mallein as an agent for detecting glanders were confined to four farms where glanders existed and includes the testing of six animals, three of which were found to be diseased. The difficulty in determining the exact nature of the disease in mild cases is very great, and it is in such cases that mallein finds its most useful application.

SYMPTOMS.—The symptoms of glanders will necessarily vary greatly, depending on the nature of the disease, whether acute or chronic, also whether the entire system is affected or if the disease is localized in some particular organ. The external form of the disease, commonly known as farcy, button farcy, etc., is not a distinct disease, but is due to the action of the same agent that causes glanders. In farcy the first symptom of the disease is the formation of small nodules under the skin. These most frequently appear on the inside of the thigh, below the hock and on the side of the neck, but may appear on any part of the body. These enlargements are at first hot and sensitive. The tissue is finally destroyed and a small ulcer is formed which discharges a thin, yellowish, viscid material, which soon forms scabs over the ulcers. The lymphatic glands and vessels in the region of the ulcers become swollen, appearing like cords under the skin, and several ulcers may form along the course of these vessels. The disease is very often chronic in its course, the symptoms disappearing for a time, or it may terminate in either acute or chronic glanders.

Glanders is most frequently observed in the chronic form, and may exist in an animal for a considerable length of time without producing any marked symptoms. Usually the first noticeable symptom is a thin, watery discharge from one or both nostrils. This may be followed in a short time by a thick, whitish, sticky discharge which is frequently tinged with blood.

Small nodules and ulcers are commonly seen in the membrane of the nose, and these ulcers give the characters so noticeable in the discharge. The ulcers are characteristic of the

disease. They first appear as small nodules which break down and form deep, pit-like ulcers with irregular and elevated edges. Frequently the ulcers are located in the upper portion of the air-passage and cannot be seen. The enlargement of the glands in intermaxillary space is another very important symptom, as they become nodular and appear as if attached to the bone.

In acute glanders all the symptoms described in connection with the chronic form become more marked. Constitutional symptoms are marked from the beginning. There is a rapid formation of tubercles and ulcers, profuse discharge from nostrils, which is frequently tinged with blood, rise of temperature and general debility.

CAUSE.—The cause of glanders and farcy is a germ, known as the *bacillus malleus* or glanders bacillus. The germ does not grow outside of the body except in artificial culture media, but will retain its vitality for a considerable time under ordinary conditions. When large quantities of the discharge are spread over feed boxes, mangers and stalls and protected from rain and strong sunlight, the deeper particles of such masses may retain their virulence for several months.

TREATMENT.—Spontaneous recovery of glanders is possible, but not probable. Medicinal agents have little if any influence on the course of the disease, and for this reason, and very properly so, it has come to be regarded as an incurable disease. In whatever form it may exist in an animal, from the mildest to the most acute, the animal is capable of infecting the premises and is dangerous to both man and beast. No stock-owner should hesitate to destroy an animal when he is convinced that it is suffering from any of the forms of this disease. Slaughtered animals should be either burned or deeply buried. All articles that have been used about the animal should be disinfected or burned. Burn all litter from the stable, wash all the wood work with a solution of corrosive sublimate (one drachm to one gallon of water) or 3 per cent. solution of carbolic acid. A whitewash of chloride of lime is a very useful application to apply after the use of one of the above solutions. Allow all the sunlight possible to reach the stalls and do not use for other animals for one or two months.

The following table shows the temperature records of the animals tested:

CASE NO. 1.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
Sept. 30.....	5 p. m.	102	Oct. 1	6:30 a. m.	99.6	Oct. 2	6:00 a. m.	102.2
Sept. 30.....	9:30 p. m.	100.8	Oct. 1	9:30 a. m.	100	Oct. 2	8:00 a. m.	101.8
			Oct. 1	12:30 p. m.	102.8			
			Oct. 1	3:00 p. m.	103.6			
			Oct. 1	5:00 p. m.	103.4			
			Oct. 1	7:00 p. m.	103.8			
			Oct. 1	9:00 p. m.	104.4			
			Oct. 1	11:00 p. m.	104.4			

CASE NO. 2.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
Sept. 30.....	5:00 p. m.	102.4	Oct. 1	6:30 a. m.	100.4	Oct. 2	6:00 a. m.	99.8
Sept. 30.....	9:30 p. m.	101	Oct. 1	9:30 a. m.	102.4	Oct. 2	8:00 a. m.	99.8
			Oct. 1	12:30 p. m.	103.4			
			Oct. 1	3:00 p. m.	103			
			Oct. 1	5:00 p. m.	102			
			Oct. 1	7:00 p. m.	102			
			Oct. 1	9:00 p. m.	99.4			
			Oct. 1	11:00 p. m.	99.2			

CASE NO. 3

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
Sept. 30.....	5:00 p. m.	100.4	Oct. 1	6:30 a. m.	100.2	Oct. 2	6:00 a. m.	99.5
Sept. 30.....	9:30 p. m.	100.8	Oct. 1	9:30 a. m.	100	Oct. 2	8:00 a. m.	99.8
			Oct. 1	12:30 p. m.	101.8			
			Oct. 1	3:00 p. m.	103.4			
			Oct. 1	5:00 p. m.	101.8			
			Oct. 1	7:00 p. m.	100.4			
			Oct. 1	9:00 p. m.	99.2			
			Oct. 1	11:00 p. m.	99.4			

CASE NO. 4

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
Sept. 30.....	7:00 p. m.	101.2	Oct. 1	8:00 a. m.	100.4	Oct. 2	8:00 a. m.	99.8
Sept. 30.....	9:00 p. m.	100.4	Oct. 1	10:00 a. m.	100.4	Oct. 2	10:00 a. m.	100.2
			Oct. 1	12:30 p. m.	100.2			
			Oct. 1	2:30 p. m.	100.4			
			Oct. 1	4:30 p. m.	100.6			
			Oct. 1	6:30 p. m.	101			
			Oct. 1	9:30 p. m.	100.8			

CASE NO. 5.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
Oct. 2	8:00 a. m.	101.4	Oct. 2	12:00 m.	100.6	Oct. 3	5:00 a. m.	102
Oct. 2	10:00 a. m.	101.6	Oct. 2	2:00 p. m.	101	Oct. 3	6:00 a. m.	101.2
			Oct. 2	4:00 p. m.	101.4	Oct. 3	7:00 a. m.	99.8
			Oct. 2	6:00 p. m.	102.6	Oct. 3	8:00 a. m.	99.4
			Oct. 2	8:00 p. m.	103.8	Oct. 3	9:00 a. m.	99
			Oct. 2	10:00 p. m.	104			
			Oct. 2	11:00 p. m.	103			
			Oct. 2	12:00 p. m.	103			

CASE NO. 6.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.	Date, 1896.	Time.	Temp.
			Oct. 3	12:00 m.	101.2	Oct. 4	5:00 a. m.	99.4
			Oct. 3	2:00 p. m.	101.4	Oct. 4	6:00 a. m.	99.4
			Oct. 3	4:00 p. m.	102	Oct. 4	7:00 a. m.	99.4
			Oct. 3	6:00 p. m.	101.8	Oct. 4	9:00 a. m.	99.8
			Oct. 3	8:00 p. m.	101.8			
			Oct. 3	10:00 p. m.	101.6			
			Oct. 3	12:00 p. m.	101.4			

No. 1. Black horse, age seven years. Painful enlargement at point of injection, which had almost disappeared by end of second day. Both submaxillary glands enlarged. Discharge from both nostrils. Small ulcers on nasal septum. Farcy buds on right hind limb below hock. General condition of animal poor, and appeared very weak after the test.

No. 2. Mule two years old. No discharge. Enlarged submaxillary glands. Animal very stiff in the joints. Abrupt, painful swelling at the point of injection.

No. 3. Gray mare. Sound. Very small oedematous swelling at point of injection. Disappeared during first day.

No. 4. Mare four years old. Poor condition. Discharge from left nostril. Slight enlargement of submaxillary gland. Small enlargement at point of injection. Probably a case of catarrh.

No. 5. Mare four years old. Discharge from both nostrils. Submaxillary glands enlarged and felt as if attached to bone. Nasal septum partially destroyed by ulcers. Respiration difficult. General condition of animal poor.

No. 6. Mare six years old, in excellent condition. Had

been exposed to supposed cases of glanders. Slight enlargement of the left submaxillary gland and thin, watery discharge from nostril on same side.

The mallein for the above tests was furnished by the Bureau of Animal Industry, of the United States Department of Agriculture. In every case 1 c. c. of the mallein was injected under the skin on the side of the neck, the enlargement at the point of injection appearing on the affected animals in from four to six hours, and a rise of from two degrees to four degrees in from eight to twelve hours after injection.

Mallein is a very reliable and safe means of detecting suspicious cases of glanders, as well as freeing animals from suspicion when suffering from diseases having symptoms similar to glanders.

Texas Fever.

A part of the summer of 1896 was devoted to work along the National Quarantine Line in Oklahoma, and much information was obtained regarding the amount of loss stockmen suffer from Texas fever, as well as learning something of the general ideas prevalent concerning the nature of this disease.

The fact that the quarantine laws of the Territory are practically directed against this disease, and the ease with which it may be controlled when once understood makes it of importance to know something of its nature.

TEXAS FEVER. This disease is known by various names in different sections of the country, some of the most common being southern cattle fever, acclimation fever, Spanish fever, splenetic fever, and red water. Texas fever is a specific fever communicated by infected cattle when moved north among susceptible cattle, or may be contracted by susceptible cattle when taken into the infected area. Many experiments have been conducted by the Bureau of Animal Industry and various experiment stations relating to Texas fever, and the conclusion in every case has been that Texas fever is communicated from infected to non-infected cattle by means of the southern cattle tick (*Boophilus Bovis*).

This has been proven experimentally by placing on susceptible cattle young ticks hatched in the laboratory, also by scattering ticks over pastures where susceptible animals graze.

In order to understand the nature of the disease and to work intelligently to control it, it is necessary to know the life history of the infecting agent, the tick. The following is a brief outline of the life history as first described by Dr. Cooper Curtice:

“The time required for the ticks to reach maturity is from twenty-one to twenty-three days. The young ticks do not reach sexual maturity until they have been attached to the animal for about two weeks. The female then becomes greatly enlarged and falls to the ground at the end of about three weeks. After from three to six days she begins to deposit eggs in great numbers. One fully matured tick may deposit as many as 2,000 eggs. The length of time required for the eggs to hatch depends greatly upon the temperature. During the warm season the time may vary from fifteen to twenty days, but becomes greater as cool weather approaches.

“After leaving the egg the young ticks crawl up on the grass and weeds, attaching themselves to animals as they brush against them. The ticks are completely parasitic, and no development will take place until they become attached to some animal.”

It will be seen that the time of appearance of the disease among cattle grazing over infected pastures will vary greatly, depending upon the season of the year. In summer the fever may appear in from thirty to thirty-five days from the time the pasture becomes infected, the time becoming longer as cool weather approaches, and the disease disappearing entirely after severe frosts.

In a report on Texas fever issued by the Bureau of Animal Industry, conclusions were reached that—

First—The cause of Texas fever is a protozoa; a one-celled animal that lives in and destroys the red blood corpuscles.

Second—The infection is carried by young ticks from southern cattle to susceptible cattle and in this way only.

Third—Texas fever is more fatal to adult than to young cattle.

SYMPTOMS. The severest attacks of the disease are seen

in the months of July, August and September, becoming less severe in the fall. In animals that can be handled the thermometer is useful in determining the presence of fever, which usually precedes any other well marked symptom of the disease by one or two days; a temperature of 104 degrees to 106 degrees often being found when the animal is first noticed to be sick. Loss of appetite, dullness and a tendency to leave the herd are usually noticed.

As a rule the bowels are constipated and remain in this condition during the period of high fever. The condition of the blood, when combined with other symptoms, affords valuable information in determining the disease. The rapid destruction of the red blood corpuscles causes the blood to become very thin and watery. This is particularly noticeable in making post mortem examinations, but may be noticed in the animal before death by making a slight incision in the skin. The passing of red colored urine is a very important symptom. Extreme weakness is common, and is frequently so great that the animal is unable to stand.

Cases will be seen where one or more of the symptoms described will not be observed. They are generally present in acute cases but the mild non-fatal type so often seen during the fall months frequently causes very little disturbance of the health of the animal.

TREATMENT.—Medical treatment is usually not very successful unless the disease is recognized in the earliest stages. The destruction of the blood cells has been going on for some time before the symptoms become well marked and remedies used at this time give little beneficial results. The bowels should be opened by giving linseed oil (raw) one quart, or salts, one pound for the adult animal. Quinine is frequently beneficial in doses of two to four drachms three times daily.

In addition to any medical treatment the ticks should be promptly removed from the animal and destroyed. They may be either picked off and destroyed, or killed by applying oil to the animal. For general use a mixture of cotton seed oil 75 parts and kerosene 25 parts will be found very efficient, or crude cotton seed oil may be used alone. Such a mixture can be applied effectively and rapidly by means of a large brush. This will not only remove ticks but if applied at intervals of two weeks

during the summer will keep the cattle free from ticks. A stanchion can be so constructed that the oil can be applied very rapidly to an animal, and for small herds this is probably the cheapest method of freeing cattle from ticks.

In an outbreak of fever, the cattle should be freed from ticks and if possible removed from the infected ground as this removes them from the possibility of being attacked later by more young ticks. On most farms this cannot be done and in such cases the ticks should be removed and kept off as already described. As the disease is more easily prevented than cured it follows that preventive measures should always be adopted.

A large area of the Territory is infected with the cattle tick and observations made this spring show that the past winter was not severe enough to disinfect pastures, young ticks having appeared on cattle in pastures that were known to be infected last year.

If the quarantine laws are observed the loss from Texas fever will be comparatively small, and by destroying ticks on cattle any farm may be thoroughly cleansed in one or two years. To keep such farms clean it is only necessary to remove the ticks from animals before adding them to the herd. Other means of ridding farms of this pest may be adopted depending on the conditions, but whatever method is used thoroughness in its application should be the rule. If ticks are the only means of transmitting the fever, and it is believed they are, northern cattle may be shipped into the infected area with safety when not placed on infected pastures or exposed in any way to the tick, or very young cattle may be shipped during the fall and placed on infected pastures, the disease appearing in a mild form at this season.

PATHOLOGY.—Much may be learned by making post mortem examinations. Changes occurring in the internal organs as a result of Texas fever, are very marked and characteristic of the disease. These changes may be in some cases mistaken for those of anthrax but the most noticeable condition common to both diseases is the enlarged spleen, which is two or three times its normal size and of a dark color. The blood in anthrax is dark and tarry in consistency while in Texas fever it is thin and watery, due to the loss of blood corpuscles.

In Texas fever the liver is greatly enlarged and yellowish

in color, due to retained bile. The gall bladder is filled with a thick yellowish fluid that contains a large amount of solids. Usually the bladder contains a considerable quantity of red colored urine but this condition is not always present.

These conditions will vary in different cases depending upon the length of time the disease was present, but the conditions described taken in connection with the presence of the fever tick on northern cattle should enable any one to determine whether the disease is Texas fever or not.

GENERAL CONSIDERATIONS.

It is believed by many that sick cattle will not infect other susceptible animals, but this is erroneous. The infection frequently occurs sufficiently early in the season to allow young ticks to develop, and when such is the case, the disease will appear later in the season as if the infection had been direct from southern cattle.

There are considerable areas in what is considered the permanently infected territory that are free from ticks and cattle raised in such pastures are susceptible to the fever. This is the reason of so many outbreaks among herds that are gathered from different pastures and kept on infected ground. Probably the cause of the greatest loss is the driving of infected cattle across the national quarantine line into the safe area. In order that the best quarantine service may be had it is necessary to have the co-operation of stockmen and farmers along the line. The more thoroughly the cause of infectious diseases is understood the more satisfactorily the quarantine laws can be enforced.

The following is from an article by Dr. Curtier on the "Cattle Tick Plague:"

"When the infected lands are completely cleared there can be no reason for quarantine. Though there may be infected lands which will produce the disease, a condition which has until now not been proven to exist, the disease cannot be carried to other cattle when the infected cattle are transported excepted through inoculating agencies. The disease will then be confined to those localities which may be accurately mapped and finally some means of extermination found. The facts now show that the greater part if not all of the southern lands are

intermittently becoming infected and disinfected and that infection follows ticky cattle.

“Extermination of the pest is the only practical, rational method of treatment of the tick plague. All other plans are but temporizing makeshifts and in the end most expensive. Quarantine is at present but a necessary evil which will eventually become useless.

“Vaccination, excepting of calves by natural methods by pasturing on infected lands, is comparatively useless, since the same results are permanently gained by destroying the ticks.

“Future prophylactic work in the tick-plague lies in cleansing farms from ticks and contracting the line about the infected area until the country is cleansed.”

Special Order Modifying the Quarantine Line of Oklahoma.

U. S. DEPARTMENT OF AGRICULTURE, }
OFFICE OF THE SECRETARY. }
WASHINGTON, D. C., Feb. 2, 1897. }

In accordance with the regulations concerning cattle transportation issued by the Department January 27, 1897, the Territory of Oklahoma has located a quarantine line, described as follows: Beginning on the Red river, at the southeast corner of the county of Greer; thence northerly, following the course of the north fork of the Red river to its intersection with the southern boundary line of Roger Mills county; thence easterly along the southern boundary line of Roger Mills and Washita counties to the southeast corner of Washita county; thence northerly along the eastern boundary of Washita county to the northeast corner of said county, continuing in a northerly direction along the eastern boundary of the county of Custer to the southwest corner of the county of Blaine; thence east along the southern boundary of Blaine county to the southeast corner of said county; thence north on the eastern boundary of said county to the northwest corner of Canadian county; thence east on the northern boundary of said county to the northeast corner of said county; thence north along the eastern boundary of Kingfisher to the northeastern corner of said county; thence east along the southern boundary of Garfield county to the southeast corner of said county; thence north along the eastern boundary of Garfield county to the northeast corner of said county; thence east along the southern boundary of Kay county to the west line of the Ponca Indian reservation; thence north along the west line of said reservation to the northwest corner of said reservation; thence east along the northern boundary of the Ponca reservation to the Arkansas river; thence in a northerly direction fol-

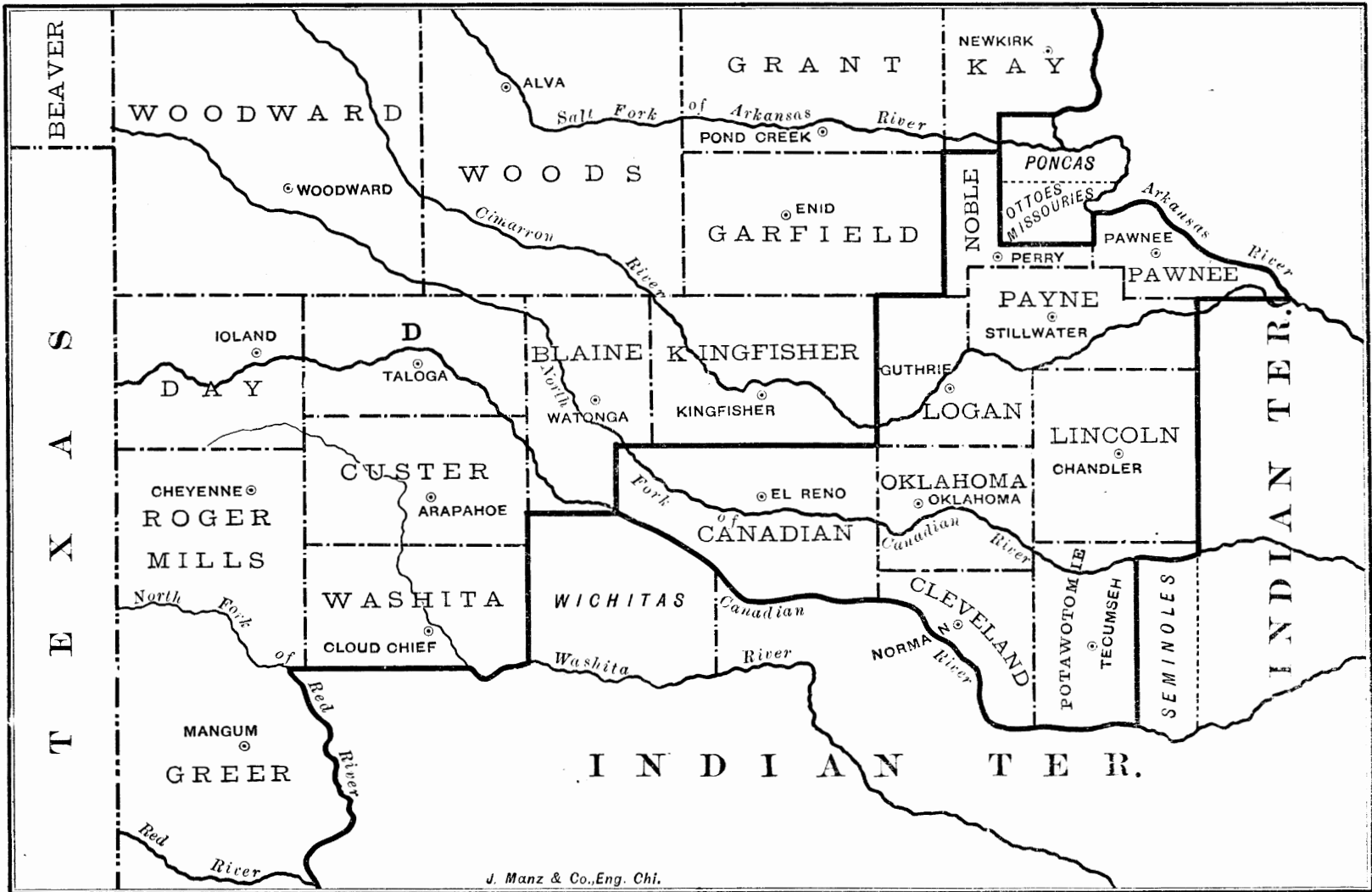
lowing the course of said river to its intersection with the thirty-seventh parallel of north latitude at the southern boundary line of Kansas. So much of the quarantine line for the state of Texas described in the order of January 28, 1897, beginning at a point in the Red river and its intersection with the southern boundary line of Roger Mills county and extending northerly and westerly therefrom is hereby revoked during the enforcement of the above line for Oklahoma.

And whereas the above quarantine line as set forth is satisfactory to this Department, and legislation has been enacted by the Territory of Oklahoma to enforce said quarantine line; therefore, in accordance with the regulations of January 27, 1897, the above quarantine line is adopted for the Territory of Oklahoma by this Department for the period beginning on February 15, 1897, and ending November 15, 1897, in lieu of the quarantine in said order of January 27, 1897, for said area unless otherwise ordered.

J. STERLING MORTON.

The Oklahoma quarantine line as now established coincides with the National quarantine line from the southeast corner of Greer county to the southeast corner of Blaine county. From this point the Oklahoma quarantine line follows the course of the South Canadian river to the southeast corner of Potawatomie county, thence north and east between Oklahoma and the Indian Territory until it reaches the Arkansas river at the southeast corner of Pawnee county. It then follows the course of the Arkansas river to the eastern boundary of the Otoe and Missourie Indian reservation, following the boundary of the reservation, as shown on map, until it reaches the southern boundary of Kay county, where it coincides with the National quarantine line, as already described.

The Oklahoma quarantine line is in effect from February 15 to November 15 of each year.



Map of Oklahoma showing location of National and Oklahoma Quarantine Lines.

Symptomatic Anthrax.

This disease is known under a variety of names as disease of the thigh, black quarter, black-leg and cold gangrene. Symptomatic anthrax has been described as anthrax fever, but it is now known to be a different disease from anthrax, as a special germ is found in the diseased animals that will produce the disease when inoculated into susceptible animals. The disease manifests itself under a variety of forms and is most fatal to young and rapidly growing animals that are from six months to four years old. But animals that have never been on infected pastures may contract the disease when exposed, no matter what their age may be.

From inquiries received concerning this disease it is probable that black-leg, or symptomatic anthrax, is the cause of considerable loss in Oklahoma during the summer and fall. It is a true infectious disease, associated with external swellings that appear on the shoulder, neck, thighs or throat. Certain pastures and ranges seem to be infected with the germ of symptomatic anthrax, as the disease appears in the same localities year after year. The germ has the power of forming spores, which is a more resistant state of the germ, and may remain virulent in this condition for several years. The spores resist the action of disinfectants to a much greater extent than the bacteria. It is generally admitted that the disease is contracted in cattle through wounds (on the legs and in the mouth) which the animal may receive in pasture.

Sheep as well as cattle are susceptible to infection with this germ, but horses only show a local swelling at point of inoculation. Some animals, as swine and dogs, are naturally immune. One attack of symptomatic anthrax, if not fatal, renders the animal immune in all cases.

Symptoms are both general and local. The general symptoms are loss of appetite, dullness and high fever. They are not essentially different from those of other acute infectious

diseases. Within a very short time after the general symptoms appear, swellings can be seen on the limbs, head or neck. These tumors are at first hot and painful, but spread rapidly and soon become filled with gas. Soon after gas begins to form in the tumors they make a crackling sound when handled, are not sensitive to the touch, and the skin becomes cool and dry over the center. If the tumor is opened at this time it is found filled with a frothy red or dark colored fluid having a disagreeable odor. Very little pain is manifested by the animal during the operation.

There are not many changes of importance noticeable on making a postmortem examination. A considerable quantity of bloody fluid is sometimes found in the chest and abdomen. The tissue surrounding the tumor is filled with a jelly-like material, while the muscles under the tumor are dark-colored and easily broken down.

The following are the most important and easily recognized differences between symptomatic anthrax or black-leg and anthrax :

Symptomatic anthrax is characterized by external swellings containing gas, while the tumors of anthrax, if present, do not contain gas. It is characterized by the normal condition of the blood and spleen while in anthrax the spleen is greatly enlarged, and the blood is very dark and not coagulated.

There are many marked differences in the germs of the two diseases and their action when inoculated into susceptible animals. If injected into the circulation the germ of symptomatic anthrax produces a mild affection and confers immunity, while germ of anthrax causes death. Inoculations of symptomatic anthrax in the thickness of the skin give no results while that of anthrax always shows positive results.

Very little can be accomplished by treatment after the disease is fully developed. The disease is very rapid in its course; death frequently occurring in from twelve to twenty-four hours after the first symptoms are noticeable. Treatment is essentially preventive, and much may be done to prevent the disease or to prevent its spread or infection of pastures when it has made its appearance. The swelling or tumors may be opened by deep incisions and treated by applying a strong solution of carbolic acid. Inserting setons in the breast and bleed-

ing have been recommended as preventive measures. Different methods of treatment have gained local reputations in some instances where they seemed to be effective but it is doubtful if any of the so-called cures would stand the test of a careful experiment.

Vaccination as a means of prevention has been favorably reported on by many stockmen. Dr. Salmon, Chief of the Bureau of Animal Industry, in the Tenth and Eleventh Annual Report, says:

“Vaccination as a preventive has of late years been adopted in many countries, and appears to be quite successful.”

In controlling outbreaks of the disease it is well to know that animals contract the disease from pastures or hay from infected land and that the most important source of infection is from bodies of dead animals. All animals dying from the disease should be either burned or deeply buried and all soiled grass or bedding around the animal should be burned. Hides should never be removed from animals dying of this disease as this would be one means of scattering the infection. Whenever the disease makes its appearance all the well animals should be moved at once to another part of the farm and infected pastures should be avoided during the season of the year that cattle are most likely to contract the disease.

REFERENCES.

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