

FINANCIAL EXHIBIT.

The following statement shows the amount of warrants drawn from June 30, 1893, to June 30, 1894, for which itemized bills are on file with the Auditor of State:

TO WHOM.	No. of days	Per diem.	Expenses.
M. Stalker	179	\$ 895.00	\$ 862.39
E. E. Sayers	28	140.00	159.59
G. A. Johnson	17	85.00	79.86
John McBirney	30	150.00	131.37
Gen. J. Howell	6	30.00	28.71
J. H. Platt	13	65.00	58.70
Louis A. Thomas	6	30.00	32.34
F. A. Brown	11	55.00	54.28
W. E. Watson	2	10.00	7.40
Totals	392	\$ 1,460.00	\$ 884.64
Grand total		884.64	\$ 2,344.64

ELEVENTH ANNUAL REPORT

OF THE

STATE VETERINARY SURGEON

OF THE

STATE OF IOWA,

FOR THE

YEAR ENDING JUNE 30, 1895.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. S. CORAWAY, STATE PRINTER.
1895.

OFFICE OF STATE VETERINARY SURGEON, }
AMES, IOWA, June 30, 1894. }

Frank D. Jackson, Governor of Iowa:

In accordance with the provisions of chapter 189, laws of 1884, the report of the veterinary surgeon, for the year ending June 30, 1895, is herewith submitted.

M. STALKER,
State Veterinary Surgeon.

REPORT.

I have the honor to submit this, the eleventh annual report of the state veterinary surgeon, containing a statement of expenses incurred by the office between June 30, 1894, and June 30, 1895. I have filed itemized vouchers with the auditor of state covering the amount expended.

The last year has not developed any new diseases of an infectious character, though the office has been called on for an unusual amount of work. The increase in demands for investigation has arisen almost entirely from increasing knowledge on the subject of tuberculosis, and a well grounded fear that the milk supply from some of the dairies of the state was fraught with danger to the public health. Local boards of health have in a number of instances become well advised of this danger and have made application through the legally constituted authorities for tests to be made on such suspected herds. I have, so far as possible, responded to these requests, and the results of the investigations have been such as to convince me and all the assistants associated with me in this work, that it is one of prime importance to the state. I know of no instance in which the health officers and local boards of health have not been in hearty accord with the work and results obtained. It may further be said that with few exceptions the owners of herds found to be diseased have cheerfully acquiesced in the results, though attended with pecuniary loss of a somewhat serious nature in some instances. It is to be expected that where the state does not compensate for diseased animals, some feeling of dissatisfaction would be awakened on the part of the loser. But it is gratifying to know that most owners of herds that have been thus unfortunate, have regarded the matter in the same light as the legislature passing the act, viz.:

that it is an advantage to be made acquainted with the nature of the disease, and have the affected animals removed from the herd, even without compensation.

The work has been so far increased by this class of demands on the office during the present year, that the regular appropriation of \$3,000 to be annually expended in that way, will evidently not be sufficient to carry on the work during the entire year. Either additional funds will have to be supplied from some other source than the regular appropriation, or the work will have to be discontinued before the end of December. I call your attention to this fact, and would further state that the amount is likely to prove inadequate in the future, owing to the increasing demand for this class of investigations.

I regard the question of bovine tuberculosis as one of such vital importance that I have decided to present a short discussion of the subject in this report. It is one that interests the stock-grower from a financial standpoint, and is unquestionably the most important problem the sanitarian has to deal with at the present time. Many of these facts have been collected by me in my capacity as state veterinary surgeon, others are the results of observations made during the progress of work in our state experiment station, and still others have been drawn from observations made by experimenters of recognized credibility in different parts of the world. I have endeavored to put this matter in such form as to be readily comprehended by the average reader, and not to make the discussion so extended as to be beyond the time that even a busy man could give to the subject. I have endeavored to select from the large amount of authentic information on the subject, that class of facts that will prove of most value to farmers and stock owners, as well as those charged with the important responsibility of securing proper sanitary safeguards for the people.

The interests are so vast, and the adoption of wise and efficient measures are so important, the subject should receive the fullest discussion with all the available facts before us. Personal interest and preconceived notions should not be allowed to influence our judgment. Recent discoveries and the application of new methods growing out of them, have led to the fear on the part of some, that great harm is likely to be done the live stock interest. While much misleading and unprofitable discussion has been going on, science has been patiently observing facts and bringing new discoveries to light.

Some points have been effectually settled; truth has been approximated on others, and yet there remains for settlement many of the practical details in dealing with the subject.

The scientific aspect of the question has made more uniform progress than the practical application of the facts discovered to the eradication of the disease. The scientist has only the difficulties of discovery to encounter. A variety of interests may be antagonized by the efforts at suppressing the disease and consequent opposition developed.

Within the last few years there has been a general awakening to the vital importance of this question all through the scientific world. The laboratories of the old world and the experiment stations of the new, are abundantly supplied with students of sanitary science who are bringing every available means to bear on this question. From these diversified opportunities and fields of observation, the problem is being gradually wrought out.

Investigators, working independently of one another, have arrived at the same conclusion on a number of points. This method is sufficiently conclusive in its results to set at rest discussion among scientists as to the trustworthy nature of the conclusions, and to furnish an intelligent basis for restricting the evil. It may be well to summarize at least a partial list of facts on which experimenters are so well agreed that little doubt exists as to their accuracy. Much of the ground has been gone over by the agricultural experiment stations of the more progressive states with remarkable uniformity as to results.

The following may be said to cover a portion of the ground that has been practically cleared from doubt:

1. Tuberculosis of the lower animals is identical with human consumption.
2. It is an infectious disease.
3. The disease may be transmitted from man to the lower animals, and from the lower animal to man.
4. Tuberculosis causes more deaths in the human family than any other disease.
5. Cows are especially susceptible to the disease and are extensively affected by it.
6. Milk from tuberculous cows may convey disease to the consumer.
7. Milk from tuberculous cows having non-affected udders may convey the disease.

8. The flesh of tuberculous animals may convey the disease.
9. A large proportion of the cases cannot be recognized by clinical examination.
10. No other test yet discovered than that afforded by tuberculin can detect any considerable proportion of cases in the living subject, and this test is practically infallible.
11. Injections of tuberculin cannot produce tuberculosis, nor are the results harmful.

Any one of these assertions can be successfully defended by observation made on the part of experimenters of unquestioned credibility. Most of them have been verified by my own observations.

It is now about a year and a half since I began the work of applying in a practical way, and on a somewhat extensive scale, the tuberculin test. The purpose has been to satisfy myself as to the reliability of the test, the danger, if any, resulting from its use, and by making a series of observations in various parts of the state to gather information as to the prevalence of the disease, as well as to protect the communities against particular outbreaks.

METHOD OF APPLYING THE TEST.

For the benefit of those not familiar with the methods of making the test, a word of explanation will be in place.

First.—The temperature of every individual in the herd to be tested is carefully taken and recorded at intervals of two hours during the day preceding the test. The average of these readings will give a pretty accurate test of the individual temperature of the several animals, which is recorded as the normal, with which any variations are to be compared. Before midnight of the day on which the trial temperatures were taken, the injection of lymph is made. This consists in injecting beneath the skin, with an ordinary syringe, two cubic centimeters of tuberculin for every thousand pounds live weight of the animal. The result to be expected is a, more or less, well marked rise in temperature, shown by all individuals affected by tuberculosis. If the animal is free from the disease, no change of temperature will result. The rise in temperature will usually begin to manifest itself in from twelve to fifteen hours after the injection is made. From four to six hours later, the temperature in those showing reaction begins to decline and gradually reaches the normal. It is upon this variation in temperature alone that reliance is placed for determining the

presence of the disease. Every possible precaution should be observed, that the conditions may be the same under which the temperature was taken, before and after the injection. Varying conditions tend to slight modification of temperature, hence the necessity for the greatest precaution, that only the change resulting from the action of the tuberculin may be shown.

If a change of one and one-half or two degrees occurs, this is sufficient evidence on which to condemn the animal. A rise of four or five degrees is not infrequently noted. There is no well authenticated evidence that these marked differences in rise of temperature shown, correspond to like difference in the severity of attack.

RELIABILITY OF THE TEST.

With this feature of the subject, we are especially interested. If the results obtained should not show a fair degree of uniformity under like conditions then the test may be discarded as useless. If the test proves a means of condemning healthy animals it is a harmful and dangerous experiment and should be discarded at once. If diseased ones fail to respond to the test, then it is to be regarded as a means of concealing rather than pointing out real danger, and is worse than useless. With these thoughts in mind, the work has been done with such attention to details as would insure a fair and impartial trial.

The conditions under which I have been obliged to work, have not always been such as to allow all the privileges one could have wished for, in order to obtain the fullest results. It has not always been possible to secure for slaughter all the animals showing reaction. And as a matter of course, I have not had the opportunity of performing autopsies on any considerable number of those that failed to show any reaction. These are regarded as healthy and are not usually disposed of in a way to afford opportunities for post mortem. Out of eighty post mortems made on animals showing reaction, not a single case failed to give evidence of tuberculosis. And in no case where an opportunity was afforded to examine the carcass of one failing to show reaction, was the disease found to exist. In other words, the test has not failed in a single instance in my experience. Occasional failures have been noted by other veterinarians. Whether this was due to lack of attention to details in the work, to want of searching methods in examining the

cadaver, or to actual failure in the essential features of the test, I am not prepared to say. But it would not be a matter for surprise if there should be some contradictory results reported, owing to the many inexperienced hands into which the test has fallen. My experience with the test, however, tallies so closely with the results obtained at various United States experiment stations, as well as scientific institutions throughout the world, that it may be said there is practically no disagreement among the workers in this field of investigation, as to the uniformity of results. It may not be said of any drug in the pharmacopœia, that it is infallible in its action; that it was never known to produce other than its generally recognized effects, and that these invariably followed the administration. But this by no means breaks the law of uniformity or reverses the rule of action.

The New Jersey experiment station in its Bulletin, after detailing experiments made, summarizes its conclusions by saying: "Every case of undoubted reaction, proved to be undoubtedly tuberculous."

The Wisconsin station, where careful tests have been made, publishes the results in bulletin form and gives expression to the following: "We have then in this agent a means of detecting the disease if we desire. The use of this agent is to be recommended."

Dr. Law, in a bulletin issued from the Cornell University station, speaks of tuberculin as possessing "the highest value as a test of tuberculosis in animals." He further says, in the same bulletin, "This has now been employed on thousands of cows, and those who have used it most value it most highly, whereas many who at first reported reactions in non-tuberculosis animals are now acknowledging with Nocard that the fault has been mainly their own, for small tubercles were present, but were overlooked through their failure to examine the bones and other organs."

The same observations have been made by workers in the Maine Agricultural College experiment station. In the published reports of that institution we read: "With suitable instruments and professional skill it is comparatively easy for one man to examine a herd of fifty animals in less than twenty-four hours and detect every case of tuberculosis that may exist there."

The Massachusetts station, after a long and unsatisfactory attempt to rid the college herd of tuberculosis by the weeding-out process, decided to apply the tuberculin test. The bulletin of the station, in speaking of the effort to free the herd from this disease without the application of the test, says, "That in all probability we should never have been able to accomplish this is shown by a study of the records of the tuberculin test." Both those that reacted and those that did not were slaughtered, and the accuracy of the test fully demonstrated.

The North Dakota experiment station, through its bulletin, says: "We have taken pains to hold post mortems on all animals which have been tested up to date which yielded to the test, and in every one we have been able to demonstrate the presence of tuberculosis."

The conclusions of the Bureau of Animal Industry are thus summarized: "The number of instances in which the conditions indicated by the results of the injection do not conform to the conclusions founded on post mortem examination is so many times less the number of errors from all other methods used to diagnose tuberculosis, and there are so many cases of tuberculosis which could not possibly be detected by any other method, that even they who are least inclined to favor the use of tuberculin cannot fail to recognize its importance."

Our own station has had similar experience in dealing with the disease at home. No other means employed ever enabled us to free the college dairy herd from the disease. In every instance where post mortem proofs have been added to the findings of the tuberculin test, they have coincided. It is not necessary to multiply at length quotations from independent experimenters. They are to one and the same effect. But we have thought it worth while to present a very little of the mountain of evidence in support of this test to offset the reiterations of the objector. I have cited the most trustworthy and unbiased evidence; the observations of men employed by the government who have no occasion to become swift witnesses in support of any theory or any practice. Investigations carried on by the station authorities of Minnesota, Virginia, and Arizona, the sanitary board of the Dominion of Canada, and many other government stations and scientific bodies throughout the world might be drawn upon for added evidence to the proofs already furnished.

EFFECT OF TUBERCULIN ON THE HEALTH OF THE ANIMAL.

The statement has so frequently appeared in print that the use of tuberculin is harmful; that it induces tuberculosis, etc., that the results of my experience both in state work and that of the experiment station seems worthy of mention.

During the fall of 1894, ten cows that had previously reacted to tuberculin, received a second and a third injection. These animals were situated on different farms, and received the same treatment as the balance of the herd. No bad results followed in any way and in no case was the process of the disease apparently hastened.

During the spring and summer of 1895 three cows have been receiving regular injections of tuberculin. At this writing no unfavorable results have been shown.

Dr. Pearson, of the Pennsylvania experiment station says in discussing the probable danger from the use of tuberculin: "The experience of the state college agricultural experiment station herd is also against this theory, because its members have now been tested with tuberculin three times, each time being injected in practically the same spot and not the slightest evil result has manifested itself, although the period of observation now extends over two and one-half years."

A bulletin issued by the experiment station of Cornell university, after detailing a series of experiments on this subject, says, "So far as there is evidence before us, everything points to the harmlessness of a single test dose on a sound animal system."

The experience of the Minnesota station furnishes conclusive proof of the same nature.

RELIABILITY OF OTHER TESTS—THE MILK TEST.

It has not been alone the purpose of the station to prove or disprove the reliability of the tuberculin test, but to compare its value as a diagnostic agent, with other means of recognizing the disease. To this end a large number of tests have been applied to cows from which samples of milk had been subjected to examination.

Much has been said through the public press in favor of this method of detecting the disease and determining the dangerous quality of the milk. Samples of milk taken from cows in charge of the experiment station, which were known to be tuberculous were submitted to microscopic examination. These

samples were declared to be free from bacilli. This being the microscopic test of contamination, there could be nothing done but to pronounce such samples free from danger as far as this test applies. However, as above stated, the cows had been proven tuberculous beyond question. Again in ten herds where from 5 per cent to more than 50 per cent had been pronounced tuberculous by the microscopic test of the milk, not a single case of tuberculosis could be found by the most painstaking test. Conversely, eight cows in one herd were proven by the tuberculin test to be affected. They were slaughtered and all gave the unquestioned proof of being tuberculous. These had passed the ordeal of microscopic test of milk with a clean bill of health, though two of them were found upon post mortem examination to have miliary deposits throughout the udder.

These experiments have convinced me that the plan of microscopic examination of milk is altogether untrustworthy as a means of detecting the disease.

PHYSICAL EXAMINATION.

In cases where the herds were being subjected to the tuberculin test, careful physical examination of suspected and non-suspected cows has been made. These tests have proven to me that it is impossible to detect any considerable proportion of the cases in an affected herd by the most careful examinations of this nature. Cases that have presented no evidence to the senses on which to condemn, or even to suspect the presence of disease, have reacted to the test, and post mortem examination has in many cases revealed excessive tuberculous lesions. These have been found in all parts of the body, including extensive diseased conditions of the mammary glands.

EXPERIMENTS IN FEEDING THE MILK OF TUBERCULOUS COWS.

The use of milk on experimental animals for the purpose of artificially inducing the disease in otherwise healthy individuals is a practical way of putting to the test some of the theories as to sources of danger. If the milk from tuberculous cows, either taken in the ordinary way or injected directly into the circulation, can induce tuberculosis, the fact becomes one of no ordinary moment. The significance of the experiment has a two-fold importance.

First.—It enables us to account for many cases of the disease in young cattle. It has been shown by repeated observations

that congenital infection is rare. However, calves but a few months old are frequently found to be infected.

Second.—If milk from tuberculous cows possesses infectious properties, the health and safety of the human family becomes the important part of the question. If feeding the milk to lower animals under ordinary conditions will induce the disease, there is no avoiding the conclusion that it can be induced in the human family under the same conditions. This experiment has been repeated with sufficient frequency and under conditions to prove the certainty of results beyond question. If milk is contaminated with the bacilli of tuberculosis, it will convey the disease. But under what conditions will the milk be so contaminated, is a question for separate solution. It has been vehemently claimed that only milk from cows with udders in which the disease was localized was to be regarded as in any way dangerous.

An exhaustive series of experiments was undertaken by the trustees of the Massachusetts Society for the Promotion of Agriculture, with a view of gaining light on this question. One of the experiments consisted in feeding twenty-one healthy calves on milk from tuberculous cows. At the conclusion of their experiment they report, "Of these twenty-one animals, eight, or over 33 per cent, were shown to be tuberculous. That the cows from which the milk for these feeding experiments was derived were free from tuberculosis of the udder is shown by the following table (table omitted) of their history, and the results of the post mortem examinations." They draw the following conclusions:

"The possibility of milk from tuberculous udders containing the infectious elements is undeniable.

"With the evidence here presented, it is equally undeniable that milk from diseased cows with no appreciable lesions of the udder may, and not infrequently does, contain the bacilli of the disease."

Dr. McKenzie reports that in cases where there were no lesions of the udder, but where tubercular deposits were found in other parts of the body, the milk in 40 per cent of the cases proved to be infectious.

This is in accord with the best evidence on this subject, and especially does the extensive scientific work of Bang of Copenhagen coincide with these results.

Our station made experiments on three calves from tuberculous mothers. Two were allowed to take the milk from the

mothers. These cows were but slightly affected, the udders from all appearances being free from disease, and no bacilli were detected in the milk when examined under the microscope. Both of these calves developed tuberculosis. A third calf, from a tuberculous mother, was not allowed to take the mother's milk, but was taken as soon as born and kept on the milk of a cow that had been tested and found to be healthy. This calf never showed reaction when tested with tuberculin. It was slaughtered at the age of three months, and thorough examination failed to detect any sign of the disease.

This experiment tends to show that calves from tuberculous mothers are not necessarily tuberculous at birth, but that infection will take place when the udders are healthy and when there is no external evidence of disease.

ORIGIN OF THE DISEASE IN IOWA.

It is quite impossible to trace accurately the appearance of the disease in our state. I have known of its existence among our cattle for twenty-five years, and undoubtedly it traces back to a very early period in the history of our cattle industry. I first became acquainted with it in herds of well-bred cattle, especially those that were represented by imported individuals. Comparatively little was known at that time of the history and real danger from the disease, and nothing of the modern methods of detection. But long before there were any laws on our statute books making provisions for control of contagious diseases I assisted many of our breeders in their endeavors to get rid of tuberculosis by selecting out and destroying the affected individuals in their herds. The introduction of imported animals was doubtless an important factor in the introduction of the disease.

TO WHAT EXTENT DOES THE DISEASE PREVAIL IN IOWA.

The work done through this department during the last year, the occasional discovery of a seriously affected herd, and more frequently less severe outbreaks, have led to the frequent repetition of this question.

While a considerable number of tests have been made, and these in various parts of the state, we are not yet in possession of a sufficient amount of evidence on this point to furnish more than an approximation to a definite answer. The evidence of the existence of tuberculosis has been demonstrated over and over; but to attempt to deal with percentages, would be to

enter the field of conjecture. It must be kept in mind that tests have been made where some form of disease was known to exist, or was believed to be present. The unsuspected herd has not, as a rule, been tested. Under these circumstances, the number of cases found to be diseased in proportion to the whole number tested, will greatly exceed the general average of cases in the state to the entire number of cattle. Again, the proportion of affected individuals in a diseased herd varies greatly. The time during which animals have been kept, whether closely confined or in the open fields; these, and many other conditions, will have a marked influence on the degree to which the herd has been invaded. We append the figures taken at random from tested herds that will show the extent to which the disease prevailed in these instances:

About fifty herds have been tested in the counties of Black Hawk, Kossuth, Story, Boone, Page, Harrison, Sac, Wapello, and Floyd. Taking 873 animals as they occur in these herds that were subjected to the test, 122 reacted and were pronounced tuberculous. These facts give some suggestions as to the distribution of the disease, and the per cent that may be reasonably expected to react in herds that are reported for examination.

HOW THE INFECTION IS EXTENDED.

A living vegetable organism, the bacillus tuberculosis is the reproductive agent which gives rise to the disease. When this germ finds lodgment in suitable tissues, and is uninterrupted by any antiseptic agent, or opposing force, it tends to multiply with a certain degree of rapidity, and the results in the affected tissue is the deposit of tubercle. Any organ of the body may be assailed, though lymphatic and other glandular tissues, the lungs, liver and spleen are parts particularly prone to be the seat of the disease. Any animal affected with the disease becomes a center of infection from which the disease may spread. Its distribution is never rapid, but a single case in a herd is certain to be followed by others in the course of time if unrestricted co-habitation is allowed. The bacilli are coughed up or expelled from the body through other channels. These may be at once conveyed to the body of a susceptible animal, or they may lie in a dried and dormant condition for months and be revived into activity when implanted in a suitable soil. Every individual going out from an affected herd becomes a menace to the animals with which it is brought in

contact. Doubtless the sale of breeding stock has had more to do with the general distribution of the disease than any other agency. A general indictment cannot be entered against the breeding stock of the state, but many of our breeders can testify to the trouble they have experienced in their endeavor to free their herds from the scourge.

INFLUENCE OF MANAGEMENT ON EXTENDING INFECTION.

The fact is admitted by investigators generally, that the character of the buildings exert a certain influence either for or against the dissemination of the disease. It is a universally admitted fact that cattle kept in ill ventilated underground barns, with inadequate air space, furnish favorable conditions for increased contamination. This has been my own observation in conducting examinations on herds so situated. This fact has been emphasized to the extent that some have come to the conclusion that this cause alone furnishes practically all the explanation that is necessary to account for the disease in our herds. Not so. Bad sanitary conditions can no more originate the specific poison of tuberculosis than the virus of small pox can be developed by the same methods. Both diseases may be aggravated and the cases multiplied by such exposure, but neither disease can be so generated. It is by no means true that extensive invasion of any herd is to be found only when the animals are kept under such conditions. Some of the very worst outbreaks I have investigated were confined to animals that had never been kept in barns. In one herd of forty-one animals six had died during the latter half of the summer, and ten more were found diseased by the tuberculin test. They were all slaughtered and the tubercular conditions verified by the post mortem examination. This herd was at pasture and had never been kept indoors. From another herd of twenty-eight animals five died in the course of three months. The tuberculin test found nine additional cases. These had never been kept in any better quarters than an open plank barn. Here were two herds that led practically an out of door life, yet they were both rapidly dying out. The station has made abundant observations of a similar nature in other instances. If an infected individual is brought into a herd of perfectly healthy animals, it becomes a menace to the health of that herd, no matter what the conditions are under which the cattle are kept, so long as they co-habit in an unrestricted way. Let no man flatter himself that his herd is safe in the presence of

a single case of tuberculosis, no matter what the extent of acres over which they may range. True, these favorable conditions will lessen the chances of infection, but they cannot remove them. Several instances have come under my observation where badly affected animals came from the best kept breeding herds in the state.

Cases that are fairly established may be hastened rather than retarded by out door conditions when these mean exposure to all the inclemency of the unfavorable season. The protection of a comfortable barn, though not in the very best sanitary condition, may prolong life beyond the period that would be reached, were the creature forced to fight for existence against storms and sudden changes of temperature.

WHAT ARE THE SYMPTOMS OF THE DISEASE?

This is one of the questions most frequently asked by the farmer. It is a difficult question to answer because of the extent of detail involved in making a full statement of the case. From what has been previously said in these pages it will be understood that almost any organ of the body may be the seat of disease. The symptoms will be correspondingly various. The pulmonary type, or that form of the disease in which the lungs are extensively affected, may be said to be the typical form. In nearly all cases where the disease is allowed to run its course the evidence of lung affection will become apparent before death relieves the animal. This form of the disease is attended with difficult respiration, high temperature, frequent and feeble pulse, painful cough, failure of milk, emaciation, diarrhoea and finally death. Occasionally the first symptoms may be severe lameness from tubercular deposit in the articulations. Swelling and abscesses about the throat and the udder of cows are not infrequent manifestations. When non-vital organs are the first seat of the disease the animal may continue in a fair state of general health for months, and even years. Doubtless there are occasional cases of final permanent recovery. This disease in nearly all cases assumes a chronic type, which is misleading to the owner. But it must be accepted at once and for all, that it is impossible to detect any considerable proportion of the cases at any given time by the most searching physical examination of the expert. If it is the fixed purpose of the owner to find the real extent of the infection in a diseased herd he must have recourse to slaughter, or apply the tuberculin test.

RELATION OF MEAT AND MILK SUPPLY TO PUBLIC HEALTH.

That the mortality in the human family from tuberculosis exceeds the death roll from all other infectious diseases put together, is a generally admitted fact. Statistics place the death rate from this cause as high as 14 per cent. At some of our Indian agencies, where the habit of eating uncooked meat is a general one, the mortality statistics show that 50 per cent of the deaths is due to tuberculosis. It is a very difficult matter to determine approximately how much of the mortality from human consumption is to be attributed directly to infection from the lower animals. The causes in most of the cases are so hidden in obscurity that a definite explanation is impossible. But there is abundance of positive proof, and still more collateral evidence, to show that the food supply derived from the animal kingdom is no small factor in the distribution of the disease.

There are few experimenters, who have been close observers of these phenomena, who cannot cite cases that point at least in the direction of these conclusions.

One case came under my observation, where five young people of one family, between the ages of twenty and thirty years, died of consumption during a period of two years. Not a trace of the disease had ever been known in the family of either the father or the mother of the victims. On the farm where the deaths occurred I found seventeen cases of tuberculosis in the herd of cattle, and others had died before the investigation was made.

Another bit of history in connection with a diseased herd that was under test is worthy of mention. A mother and child died; the mother from undoubted consumption, the child from intestinal trouble highly suggestive of the same disease. The cow that had supplied milk to the mother and child was tested and found to be tuberculous. Post mortem examination of the cow revealed a badly tuberculous condition of the udder. Similar observations on the part of other station workers and practicing physicians have been made so frequently that the conclusion is unavoidable that to some extent to our meat supply, and in a much larger way to our milk supply can be traced many of the cases of tuberculosis in the human family.

HOW CAN HEALTHY HERDS BE SECURED, AND HOW CAN THEY
BE KEPT FREE FROM DISEASE?

This is the practical question toward which all the others tend. It is of little consequence to know that the disease exists unless that knowledge can be made to aid us in averting the evils we have found. The means by which total extermination of the disease can be accomplished do not seem to be in sight. So long as there remain cases of consumption in the human family, there remains the possibility of occasional re-infection of bovines. But the probabilities of infection from this source are remote, and should not be taken as arguments against any restrictive measures that might be adopted.

While absolute extermination of the disease at once may not be practical, we believe it to be entirely feasible to so far restrict its dangers, as to render them of slight consequence. The state has already, with small expense, eradicated the disease in a considerable number of dairy herds. And what is of more value to the public at large than freeing these herds from disease, it has demonstrated the possibility and the practicability of the plan, and has done much to educate the people as to the sources of danger. The result is that many owners of herds have voluntarily, and at their own expense, had the tuberculin test applied, and the diseased animals destroyed. The work the state has done, is in this way supplemented; and the practice of testing dairy cows is likely to have a very large increase in the future, without the aid of compulsory measures. Once the herd is free from disease, it can readily be kept in this condition by exercising due precaution in the introduction of fresh stock. Dairymen who have had unfortunate experience with the disease, have adopted the practice of admitting none but tested cows to their purified herds. This practice, if universally adopted would very soon render the dairy herds of Iowa free from tuberculosis. If in addition to these precautions, similar vigilance were exercised over the introduction of breeding stock to the herds, the chief sources of infection could thus be shut off. If restrictive measures of this kind were applied to these two classes of cattle, practically all the cases of tuberculosis in the state would soon be found, and its ravages reduced to the minimum. The measures adopted in a few score of dairy herds in the state, if applied to the remainder, would go very far toward eradication. It is possible to

reach most important practical results without the expenditure of large sums of money or the sacrifice of important interests.

All animals suffering from the disease in any of its stages should be at once removed from contact with other cattle. It is my judgment that any plan which contemplates keeping tuberculous animals on the farm, and attempting to avert danger by segregation and other like precautionary methods will defeat its own ends. The less the number of possible sources of infection in the country the more successful will be the efforts at eradication. Buildings where tubercular animals have been confined are to be regarded as infected, and no healthy animal should be assigned quarters in such enclosure until thoroughly disinfected.

It is true a single test may not in every instance free the entire herd. After-infection may take place. It would be wise in those cases where a number of badly affected animals have existed to take the precaution of applying additional tests some months after the first. All this involves care, the expenditure of a certain amount of money, and the occasional loss of an animal. But the animal already suffering from an infectious and highly fatal disease cannot be considered to possess any high value. The inconvenience and expense attending such precautions are small in comparison with the loss and risk involved in allowing the disease to run its natural course in the herd, and the sale of dangerous products for human consumption.

VETERINARY LAWS.

CHAPTER 189.

VETERINARY SURGEON.

AN ACT for the appointment of a State Veterinary Surgeon and Defining his Duties.
Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. The governor shall appoint a state veterinary surgeon who shall hold his office for the term of three years unless sooner removed by the governor; he shall be a graduate of some regular and established veterinary college and shall be skilled in veterinary science; he shall be a member of the state board of health, which membership shall be in addition to that now provided by law. When actually engaged in the discharge of his official duties he shall receive from the state treasury as his compensation the sum of five dollars per day and his actual expenses, which shall be presented under oath and covered by written vouchers before receiving the same.

SEC. 2. He shall have general supervision of all contagious and infectious diseases among domestic animals within, or that may be in transit through the state, and he is empowered to establish quarantine against animals thus diseased or that have been exposed to others thus diseased, whether within or without the state, and may, with the concurrence of the state board of health, make rules and regulations, such as he may deem necessary for the prevention, against the spread, and for the suppression of said disease or diseases, which rules and regulations, after the concurrence of the governor and executive council, shall be published and enforced, and in doing said things or any of them, he shall have power to call on any one or more peace officers whose duty it shall be to give him all assistance in their power.

SEC. 3. Any person who wilfully hinders, obstructs or resists said veterinary surgeon or his assistants; or any peace officer acting under him or them when engaged in the duties or exercising the powers herein conferred, shall be guilty of a misdemeanor and punished accordingly.

SEC. 4. Said veterinary surgeon shall, on or before the 30th of June of each year, make a full and detailed report of all and singular his doings since his last report to the governor, including his compensation and expenses, and the report shall not exceed one hundred and fifty pages of printed matter.

SEC. 5. Whenever the majority of any board of supervisors, city council, trustees of an incorporated town or township trustees, whether in session or not, shall in writing notify the governor of the prevalence of, or probable

danger, from any of said diseases, he shall notify the state veterinary surgeon, who shall at once repair to the place designated in said notice and take such action as the exigencies may demand, and the governor may, in case of emergency, appoint a substitute or assistants with equal powers and compensation.

SEC. 6. Whenever in the opinion of the state veterinary surgeon the public safety demands the destruction of any stock under the provisions of this act he shall, unless the owner or owners consent to such destruction, notify the governor, who may appoint two competent veterinary surgeons as advisors, and no stock shall be destroyed except upon the written order of the state veterinary surgeon, countersigned by them and approved by the governor, and the owners of all stock destroyed under the provisions of this act, except as herein provided, shall be entitled to receive a reasonable compensation therefor, but not more than its actual value in its condition when condemned, which shall be ascertained and fixed by the state veterinary surgeon and the nearest justice of the peace, who, if unable to agree, shall jointly select another justice of the peace as umpire, and their judgment shall be final when the value of the stock does not exceed one hundred dollars, but in all other cases either party shall have the right to appeal to the circuit court, but such appeal shall not delay the destruction of the diseased animals. The state veterinary surgeon shall, as soon thereafter as may be, file his written report thereof with the governor, who shall, if found correct, endorse his finding thereon, whereupon the auditor of state shall issue his warrant therefor upon the treasurer of state, who shall pay the same out of any moneys at his disposal under the provisions of this act; *provided*, that no compensation shall be allowed for any stock destroyed while in transit through or across the state, and that the word stock, as herein used, shall be held to include only neat cattle and horses.

SEC. 7. The governor of the state, with the state veterinary surgeon, may cooperate with the government of the United States for the objects of this act, and the governor is hereby authorized to receive and receipt for any moneys receivable by this state under the provisions of any act of congress which may at any time be in force upon this subject, and to pay the same into the state treasury to be used according to the act of congress and the provisions of this act as nearly as may be.

SEC. 8. There is hereby appropriated out of any moneys not otherwise appropriated the sum of ten thousand dollars for use of 1884 and 1885, and three thousand dollars annually thereafter, or so much thereof as may be necessary for the uses and purposes herein set forth.

SEC. 9. Any person, except the veterinary surgeons, called upon under provisions of this act, shall be allowed and receive two dollars per day while actually employed.

Approved April 14, 1884.

ACTS PASSED BY THE TWENTY-FIRST GENERAL ASSEMBLY.

AN ACT to amend chapter II, title 24, of the Code, Relating to Contagious Diseases in Domestic Animals.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That sections 4058 and 4059 in chapter II, title 24 of the Code be hereby repealed, and sections 2 and 3 of this act be substituted therefor and be known hereafter as sections 4058 and 4059 of the Code.

SEC. 4058. Any person or persons driving any cattle into this state, or any agent, servant, or employe of any railroad or other corporation, who shall carry, transport or ship any cattle into this state, or any railroad company or other corporation, or person who shall carry, ship or deliver any cattle in this state, or the owners, controllers, lessees, or agents, or employes of any stock yards, receiving into such stock yards or in any other enclosure, for the detention of cattle in transit or shipment, or reshipment, or sale, any cattle brought or shipped in any manner into this state, which at the time they were either driven, brought, shipped or transported into this state, were in such condition as to infect with or to communicate to other cattle pleuro-pneumonia, or splenetic, or Texas fever, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than three hundred dollars and not more than one thousand dollars, or by both fine and imprisonment in the county jail not exceeding six months in the discretion of the court.

SEC. 4059. Any person who shall be injured or damaged by any of the acts of the persons named in section 4058, and which are prohibited by such section, in addition to the remedy therein provided, may bring an action at law against any such persons, agents, employes, or corporations mentioned therein, and recover the actual damages sustained by the person or persons so injured, and neither said criminal proceedings, nor said civil action, in any stage of the same, shall be a bar to a conviction or to a recovery in the other.

[Chapter 30, Laws of Twenty-first General Assembly.]

Part of Section 1. If any person shall sell or exchange, or expose for sale or exchange, deliver or bring to another for domestic use or to be converted into any product of human food whatsoever, any * * * milk taken from an animal having disease, sickness, ulcers, abscesses or running sore, or was taken from an animal fifteen days before, or less than five days after parturition, shall, upon conviction thereof, be fined not less than twenty-five dollars (\$25.00) nor more than one hundred dollars (\$100.00), and be liable in double the amount of damages to the person or persons upon whom such fraud shall be committed.

SEC. 4055. If any person knowingly sell any kind of diseased, corrupted, or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, he shall be imprisoned in the county jail not more than thirty days, or by fine not exceeding one hundred dollars.—Code of 1873.

SEC. 4041. If any person throw, or cause to be thrown, any dead animal into any river, well, spring, cistern, reservoir, stream or pond, he shall be punished by imprisonment in the county jail not less than ten nor more than thirty days, or by fine not less than five nor more than one hundred dollars.—Code of 1873.

SHEEP INSPECTION.

[Chapter 48, Laws of Twenty-fourth General Assembly.]

AN ACT to Provide for the Appointment of Sheep Inspectors, and Prescribing Their Duties.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. The county board of supervisors of any county in the state when notified in writing, by five or more sheep owners of such county, that sheep diseased with scab, or other malignant contagious disease exists in such county, shall, at any regular or special meeting, appoint and commission a suitable person, to be known as county sheep inspector, who shall take an oath of office prescribed by the board of supervisors and whose duties shall be hereafter prescribed, and whose term of office shall be two years, or until his successor is appointed and qualified.

SEC. 2. It shall be the duty of the county sheep inspector, upon the information of three or more sheep owners that any sheep within his jurisdiction have the scab, or any other malignant contagious disease, to immediately inspect and report in writing the result of his inspection to the county auditor of his county to be filed by him for reference by the county board of supervisors, or any party concerned; and if so desired, shall command the owner or agent to dip or otherwise treat such diseased sheep, and shall inspect such diseased sheep every month thereafter until such disease shall be cured or otherwise eradicated.

SEC. 3. Should such owner or agent fail to comply with the provisions of section 2 of this act, he or they shall be subject to a fine not to exceed one hundred dollars, and such fine shall be a lien on such sheep, and shall be recovered in an action of debt, together with all costs in any court of competent jurisdiction; and it is hereby made the duty of the county board of supervisors and county attorney to prosecute such cases of negligence.

SEC. 4. It is hereby made the duty of the sheep inspector to dip or otherwise treat such diseased sheep, should the owner or agent refuse to do so; and all costs, expenses or charges together with a per diem of three dollars per day shall be charged against such sheep for such costs, expenses or charges, and may be collected, together with all costs, in any court of competent jurisdiction.

SEC. 5. The compensation of sheep inspector shall be three dollars per day, and shall be paid by the owner of the sheep or his agent, if the disease is found to exist.

SEC. 6. Upon the arrival of any flock of sheep within the state from a distance of more than twenty miles outside the boundaries of the state, the

owner or agent shall notify the inspector of the county in which such sheep are being held and he shall inspect such flock of sheep at the expense of the owner or agent, and if the sheep are found sound shall furnish the owner or agent a certificate which shall be a passport to any part of the state. *Provided*, however, in transport on board of railroad-cars, or passing through the state on such cars, shall not come within the provisions of this act. Any violation of the provisions of this act by the agent or owner of any sheep shall subject the owner to a fine not to exceed one hundred dollars, and shall be a lien and may be collected as in section three of this act. This act shall be in full force and effect from and after its passage.

Approved April 9, 1892.

[Chapter 79, Laws of 1886, as amended by Chapter 67, Laws of 1888.]

AN ACT to Prohibit the Traffic in Hogs Infected with Swine Plague or Hog Cholera, and to Prevent the Spread of the same.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. All traffic in swine which have died with the swine plague or hog cholera, or from other contagious or infectious diseases within the state is hereby prohibited, and it shall be unlawful for any person to haul in any vehicle or public conveyance any dead hogs which have so died or known to be affected with such disease, upon any public road or highway or upon any enclosure other than that upon which said hogs have died.

SEC. 2. Any person having in his possession swine which have died from the swine plague, hog cholera or other infectious disease, shall, within a reasonable time, cause the same to be burned or buried to the depth of at least thirty inches so as to prevent the spread of the disease.

SEC. 3. Any person violating or failing to comply with any provision of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by fine of not less than five dollars nor more than one hundred dollars, at the discretion of the court. [It shall be unlawful for any person, negligently or willfully, to allow his hogs, or those under his control, infected with hog cholera, or other plague, or contagious disease, to escape his control or run at large.—*Chapter 67, Laws of 1888.*]

SEC. 4055. If the owner of sheep, or any person having the same in charge knowingly import or drive into this state, sheep having any contagious disease, or turn out, or suffer any sheep having any contagious disease, knowing the same to be so diseased, to run at large upon any common highway, or unenclosed lands, or sell or dispose of any sheep, knowing the same to be so diseased, he shall be deemed guilty of a misdemeanor and punished by a fine in any sum not less than fifty dollars nor more than one hundred dollars.—*Code of 1873.*

SEC. 4056. If any person knowingly import or bring within this state, any horse, mule or ass, affected by the disease known as nasal gleet, glanders or button-farcy, or suffer the same to run at large upon any common highway or unenclosed land, or use or tie the same in any public place, or off his own premises, or sell, trade, or offer for sale or trade, any such horse, mule or ass, knowing the same to be so diseased, he shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished by a fine of not less

than fifty dollars, nor more than five hundred dollars; and in default of payment shall be imprisoned for any period not exceeding twelve months, or by both fine and imprisonment, at the discretion of the court.—*Code of 1873.*

SEC. 4057. If any horse, mule or ass, reasonably supposed to be diseased with nasal gleet, glanders or button-farcy, be found running at large without any known owner, it shall be lawful for the finder thereof to take such horse, mule or ass, so found, before some justice of the peace, who shall forthwith cause the same to be examined by some veterinary surgeon, or other person skilled in such diseases, and if, on examination, it is ascertained to be so diseased, it shall be lawful for such justice of the peace to order such diseased animal to be immediately destroyed and buried; and the necessary expense accruing under the provisions of this act shall be defrayed out of the county treasury.—*Code of 1873.*

SEC. 1484. The sheriff, constable, police officer, officer of any society for the prevention of cruelty to animals, or any magistrate, shall destroy any horse or other animal having the disease called and known as glanders, or any disabled creature unfit for other use.—*Code of 1873.*

RULES AND REGULATIONS.

OFFICE OF THE IOWA STATE BOARD OF HEALTH,
DES MOINES, December 28, 1884.

Pursuant to authority vested by chapter 189, laws of the Twentieth General Assembly, the state veterinary surgeon by and with the approval of the state board of health, the governor and the executive council, does hereby make and establish the following rules and regulations for the prevention and restriction of contagious diseases among domestic animals:

RULE 1. All cattle brought within this state from any county or parish within the United States where pleuropneumonia is known to exist, shall be subject to quarantine for a period of not less than sixty days.

RULE 2. The carcasses of all animals that have died from anthrax, shall, without removal of the hide, or any part of said carcass, be burned or buried not less than four feet deep in the ground, and thoroughly covered with kerosene before covering with earth.

Reasons for Rule 2.—To prevent the possibility of a recurrence of this disease from germs existing in the grave, which, if not destroyed by some powerful agent will retain their vitality for a number of years, so as to impart the disease.

As anthrax is communicable by inoculation to human beings, great precaution should be used in handling animals affected with this disease.

RULE 3. No person owning or having the care or custody of any animal affected with glanders or farcy, or which there is reason to believe is affected with said disease, shall lead, drive, or permit such animal to go on or over any public grounds, unenclosed lands, street, road, public highway, lane, or alley; or permit it to drink at any public water trough, pail, or spring; nor keep such diseased animal in any enclosure, in or from which such diseased animal may come in contact with, or close proximity to, any animal not affected with such disease.

RULE 4. Whenever notice is given to the trustees of a township, or to the health officer of a local board of health, of

animals suspected of being affected with glanders or farcy, said trustees, or health officer, shall immediately require such suspected animals to be isolated and kept separate and apart from all other animals until released by order of the state veterinary surgeon or some person acting by his authority.

RULE 5. An animal must be considered as "suspected" when it has stood in a stable with, or been in contact with an animal known to have the glanders; or if placed in a stable, yard, or other enclosure where a glandered animal has been kept.

RULE 6. Whenever any animal affected with glanders or farcy, shall die, or shall be killed, the body of such animal shall be immediately burned, or buried not less than four feet deep, without removing the hide from the carcass.

RULE 7. No animal diseased with glanders or farcy shall be deemed to have any property value whatever, and no appraisal thereof will be made.

Reasons for Rule 7.—Glanders is an incurable disease, and there is no warrant for expending public money in appraising property manifestly worthless, and which can be compensated for only at "its actual value in its condition when condemned." Also to prevent the introduction of diseased animals into the state, and the inoculation of worthless ones for speculative purposes.

RULE 8. Whenever the owner, or person having in charge any animal declared by the state veterinary surgeon or other authorized person to have the glanders, shall neglect or refuse to destroy said animal, the premises whereon such animal is kept shall be quarantined until such animal is destroyed and the premises thoroughly disinfected.

QUARANTINE.

RULE 9. The term "quarantine" shall be construed to mean the perfect isolation of all diseased or suspected animals from contact with healthy animals, as well as the exclusion of such healthy animals from the yards, stables, enclosures, or grounds wherever said suspected or diseased animals are, or have been kept.

DISINFECTION.

Among the most efficient and convenient agents for destroying disease germs are heat, solutions of carbolic acid, sulphate of iron, caustic soda, or sulphate of copper, fumes of chlorine, chloride of lime, slaked lime, lime water, whitewash and kerosene oil.

Heat.—This conveniently applied by means of boiling water or oil, and is especially recommended for disinfecting fabrics of all kinds, leather or

wood. Articles of iron or other metals may be purified by heating in a fire. All bedding, litter, excrement, etc., that have accumulated about animals affected with any form of contagious disease, and the carcasses, together with all blood, or other fluid elements that have escaped from such carcasses, should be burned, as surest means of eradicating the disease.

Dirt or earth floors of stables wherein animals affected with glanders or anthrax have been kept, should be removed to the depth of four inches and burned.

SOLUTIONS.

Carbolic Acid.—Add one part of the acid to five or ten parts of water or oil.

Sulphate of Iron, Copper and Caustic Soda.—Add as much of the substance to a given quantity of warm water as will be dissolved.

Whitewash.—For disinfecting interior walls of buildings, feed boxes, mangers, yard fences, etc., the application of a coating of whitewash prepared rom lime in the ordinary way, so thoroughly done as to completely cover every part of the surface designed to be cleansed, is an economical method.

FUMIGANTS.

Chloride of Lime. Chloride of lime and slaked lime for disinfecting floors, yards, carcasses and ground where dead or diseased animals have lain, should be scattered thickly, in fine powder, over the surface of the object to be disinfected, so as to form a complete covering.

Chlorine. To generate, take peroxide of manganese (to be obtained at any drug store), place it in an earthen dish and add one pound of hydrochloric acid (sometimes called muriatic acid), to each four ounces of the peroxide of manganese. Care should be taken not to inhale the gas.

After the floors, walls, etc., of a contaminated building have been cleansed, they should be fumigated by some of the foregoing agents. The doors should be closed, and the building otherwise made as tight as possible. Fumes should then be evolved in the building for not less than half a day, and the doors kept closed not less than twenty-four hours, when air and sunlight should be freely admitted.

BURIALS.

Kerosene Oil. Carcasses buried in the earth, where there is danger of exhumation by other animals, should previous to burial be thoroughly saturated with kerosene oil. This will tend to destroy the virus, and will prevent carnivorous animals disturbing the carcass and thereby spreading the disease.

FREEZING.

It has been demonstrated repeatedly in Iowa, that the frosts of winter thoroughly disinfect pasture lands that have been poisoned with the virus of Texas fever by herds of southern cattle during the summer months. From the first of April to the first of November, the virus is likely to retain its vitality, and the strictest precaution is necessary to prevent communication of the disease to northern cattle. The purifying effect of frost, however, cannot be relied upon for destroying the virus of any other disease than Texas fever, liable to attack live stock in Iowa.

It is for the interest of every community, on the appearance of contagious or infectious diseases among animals, to adopt speedy measures to eradicate the same, and to cooperate with the state veterinary surgeon in securing such result in the shortest possible time.

M. STALKER,

State Veterinary Surgeon.

Approved:

W. S. ROBERTSON,

President State Board of Health.

L. F. ANDREWS,

Acting Secretary State Board of Health.

B. R. SHERMAN,

Governor.

J. A. T. HULL,

J. L. BROWN,

E. H. CONGER,

} *Executive Council.*

FINANCIAL EXHIBIT.

The following statement shows the amount of warrants drawn between June 30, 1894, and June 30, 1895, covering per diem, personal and incidental expenses. Itemized vouchers are on file with the auditor of state for the several amounts drawn.

M. Stalker.....	\$1,831.80
John McBirney.....	645.24
S. H. Kingery.....	29.46
A. R. Wake.....	280.05
G. A. Johnson.....	188.31
C. M. Day.....	47.21
T. A. Brown.....	10.00
T. A. Goddes.....	52.44
E. E. Sayers.....	289.87
G. J. Howell.....	79.20
J. H. Platt.....	8.77
W. B. Niles.....	354.38
Graham Stearns.....	40.00
E. M. Steadman.....	31.50
Total.....	\$3,800.23