

# MAINE STATE LEGISLATURE

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OF THE VARIOUS

Departments  Institutions

FOR THE YEAR

1899.

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VOLUME II.

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AUGUSTA  
KENNEBEC JOURNAL, PRINT  
1900

REPORT OF COMMISSIONERS

ON

# CONTAGIOUS DISEASES

OF

# ANIMALS

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Under the Law of 1887, Chapter 138, of Public Laws of Maine.

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HON. JOHN M. DEERING, SACO, ME., President.

HON. F. O. BEAL, BANGOR, ME., Treasurer.

DR. GEO. H. BAILEY, DEERING, ME., State Veterinarian.

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AUGUSTA  
KENNEBEC JOURNAL PRINT  
1899



## REPORT OF 1898.

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*To His Excellency, the Governor of Maine:*

We present our bi-annual Report of the year closing December 31, 1898, together with an account of our appraisals of horses and cattle destroyed under the provisions of the law of 1887, chapter 177, relating to the contagious diseases of this State, and as amended in 1892, chapter 194.

The first inspection of the year was ordered at Cornish, January 5th, but no appraisal was made.

Newhall, January 8th. A case of glanders was reported, but none found to exist.

North Dixmont, January 9th. Inspection was ordered in a herd of cows, but no contagious disease was discovered.

Hebron, January 13th. Tuberculosis was found in a Jersey cow, condemned. Appraisal, \$50.00.

Fryeburg, January 14th. Tuberculosis was found in a cow and heifer. Appraisal, \$50.00.

Bangor, January 16th. A case of tuberculosis was discovered. Appraisal, \$30.00.

Glenburn, January 17th. Tuberculosis was reported in a flock of sheep, but none discovered.

Franklin Road, January 18th. A case of glanders was discovered and destroyed. Appraisal, \$50.00.

Bangor, January 19th. Inspection was ordered in a herd of cattle, but no disease discovered.

Glenburn, January 19th. Inspection was ordered in a milk herd, but no disease discovered.

Bangor, January 20th. A herd of cattle was inspected, but no contagious disease found.

Portland, January 22nd. A case of glanders was discovered in a boarding stable. Appraisal, \$50.00.

Camden, January 25th. Tuberculosis was discovered in a herd of cows. Appraisal, \$30.00.

North Scarboro, January 29th. Inspection was ordered in a herd of cows, but no disease discovered.

Bangor, February 5th. A case of tuberculosis was discovered in a herd of cattle. Appraisal, \$35.00.

Newburg, February 6th. Inspection was ordered in a herd of cows, but no disease found.

Kittery, February 7th. Inspection was ordered in a herd of cows, but no disease discovered.

North Scarboro, February 8th. A case of glanders was discovered and condemned. Appraisal, \$36.00.

Bridgton, February 9th. A case of farcy was discovered and condemned. Appraisal, \$50.00.

Poland, February 12th. A case of glanders was reported, which proved to be chronic catarrh.

Cape Elizabeth, February 19th. A case of glanders was reported, but none discovered.

Bucksport, February 21st. A case of tuberculosis was discovered and condemned. Appraisal, \$30.00.

South Berwick, February 24th. The board of health requested an inspection of cattle, but no disease was found.

Canton Point, February 26th. A case of glanders was reported, but none found to exist.

Auburn, February 28th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Portland, March 1st. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Brunswick, March 3rd. A case of glanders was reported, but none discovered.

Winterport, March 3rd. A case of tuberculosis was discovered. Appraisal, \$40.00.

Winthrop, March 4th. Inspection was ordered in a herd of cattle, but no disease found.

Carmel, March 6th. Inspection was ordered in a herd of cattle, but no disease found.

Lewiston, March 7th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

New Auburn, March 8th. Inspection was ordered in a herd of cattle, but no disease discovered.

South Berwick, March 11th. A case of tuberculosis was discovered and condemned. Appraisal, \$25.00.

Portland, March 12th. A case of farcy was discovered in a boarding stable. Appraisal, \$50.00.

Lewiston, March 13th. A case of farcy was discovered and condemned. Appraisal, \$50.00.

Portland, March 15th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Chisholm's Mills, March 16th. A case of farcy was discovered and condemned. Appraisal, \$50.00.

Chester, March 18th. A case of tuberculosis was discovered. Appraisal, \$25.00.

Norway, March 19th. A case of tuberculosis was discovered in a herd of cows. Appraisal, \$35.00.

East Thorndike, March 19th. Inspection was ordered in a herd of cattle, but no disease found.

South Portland, March 21st. A case of glanders was discovered. Appraisal, \$50.00.

North Deering, March 24th. Glanders was reported, but none discovered.

Cumberland Center, March 25th. Inspection was ordered in a herd of cows, but no disease discovered.

Thomaston, March 26th. A case of tuberculosis was discovered and condemned. Appraisal, \$30.00.

Bridgton, March 28th. Inspection was ordered in a herd of cattle, but no disease found.

Turner, March 30th. Two milch cows were found affected with tuberculosis. Appraisal, \$90.00.

North Hartland, April 8th. A case of glanders was discovered and condemned. Appraisal, \$40.00.

South Warren, April 11th. A case of tuberculosis was discovered. Appraisal, \$40.00.

Saco, April 13th. Inspection was ordered in a herd of cows, but no disease found.

Nobleboro, April 13th. Glanders was reported in a stable of horses, but none discovered.

Waterville, April 14th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Norway, April 15th. A case of tuberculosis was discovered. Appraisal, \$35.00.

Winthrop, April 16th. A case of tuberculosis was discovered. Appraisal, \$40.00.

East Wilton, April 21st. A case of glanders was reported, but none discovered.

Augusta, April 22nd. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Wilton, April 23rd. A case of farcy was discovered and destroyed. Appraisal, \$50.00.

Portland, April 24th. A case of glanders was discovered, but no appraisal allowed.

Brooks, April 26th. Inspection was ordered in a herd of cows, but no disease found.

Mattawamkeag, April 28th. Inspection was ordered in two herds of cattle, but no contagious disease discovered.

East Deering, May 2nd. A case of glanders was reported, but none discovered.

Cumberland Junction, May 4th. A case of glanders was discovered. Appraisal, \$40.00.

Bangor, May 5th. A case of glanders was reported, but none discovered.

East Jackson, May 7th. A case of tuberculosis was discovered. Appraisal, \$28.00.

Winslow, May 9th. Inspection was ordered in a herd of cows, but no disease found.

Levant, May 10th. A case of glanders was discovered, but no appraisal ordered.

Monmouth, May 10th. A case of glanders was reported, but none discovered.

Wilton, May 11th. Inspection was ordered of a herd of cattle, but no contagious disease found.

New Sharon, May 12th. A case of glanders was reported, but none discovered.

Cornville, May 17th. A case of tuberculosis was discovered and condemned. Appraisal, \$35.00.

Portland, May 18th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

West Hampden, May 20th. Inspection was ordered of a herd of cows, but no disease found.

Lincoln Center, May 21st. A short-horn bull, that had just before been brought into this State, from Meredith, New Hamp-



shire, was found diseased by tuberculin test, and ordered returned to his breeder, which was done the same week.

Sabattus, May 24th. A case of glanders was discovered and condemned. Appraisal, \$25.00.

South Portland, May 30th. A case of glanders was reported, but none discovered.

Wiscasset, June 3rd. A case of tuberculosis was discovered in an ox. Appraisal, \$40.00.

West Stoneham, June 8th. Inspection was ordered in a milk herd, but no disease found.

Cornville, June 11th. Three milk cows were discovered, in two herds, affected with tuberculosis, and were destroyed. Appraisal, \$115.00.

Stetson, June 13th. Tuberculosis was discovered in an ox. Appraisal, \$30.00.

Chester, June 14th. Inspection was ordered in a herd of cows, but no disease found.

West Mt. Vernon, June 15th. Inspection was ordered in a herd of cattle, but no disease found.

Waterville, June 16th. A case of glanders was reported, but none discovered.

Rumford, June 18th. Inspection was ordered in a herd of cows, but no disease discovered.

Moose River, June 20th. Investigation of several herds was ordered, but no disease found.

South Orrington, June 21st. Tuberculosis was discovered in an ox. Appraisal, \$38.00.

Waterville, June 22nd. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Bangor, June 23rd. A case of glanders was reported, but none discovered.

Newburg, June 24th. A case of tuberculosis was discovered. Appraisal, \$30.00.

Westbrook, June 24th. A case of glanders was reported, but none discovered.

Portland, June 25th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Skowhegan, June 28th. A case of tuberculosis was discovered and destroyed. Appraisal, \$35.00.

Embden, June 29th. A case of tuberculosis was discovered in a herd of cows. Appraisal, \$40.00.

Portland, June 30th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Goodwin's Mills, July 6th. Inspection was ordered in a herd of cows, but no disease found.

Embden, July 7th. Two Jersey cows and one bull were found affected with tuberculosis. Appraisal, \$150.00.

Brownfield Center, July 8th. Inspection was ordered in a herd of cows, but no disease found.

North Fryeburg, July 9th. A case of tuberculosis was discovered. Appraisal, \$30.00.

Wiscasset, July 11th. A case of glanders was reported, but none discovered.

Alton, July 13th. Inspection was ordered in a herd of cows, but no disease found.

Albion, July 16th. A case of tuberculosis was discovered, but no appraisal allowed.

West Pownal, July 18th. Inspection was ordered of a herd of cows, but no disease discovered.

Corinth, July 19th. A herd was inspected, but no contagious disease discovered.

Winthrop, July 21st. A large herd of cows was tested, but no disease discovered.

Wiscasset, July 25th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

Bath, July 30th. A case of glanders and farcy was discovered and condemned. Appraisal, \$50.00.

Pleasantdale, August 8th. A case of glanders was reported, but none discovered.

Brunswick, August 11th. A case of glanders was reported, but none discovered.

Trevett, August 15th. Inspection was ordered in a herd of cattle, but no disease found.

Levant, August 16th. A case of tuberculosis was discovered and condemned. Appraisal, \$25.00.

Topsham, August 17th. A case of glanders was discovered and condemned. Appraisal, \$40.00.

Auburn, August 20th. A case of glanders was reported, but none discovered.

Portland, August 22nd. A case of glanders was reported, but none discovered.

Deering, August 25th. A case of tuberculosis was discovered that had been brought out of a herd of Guernseys from Connecticut, that had been exhibited at the New England Fair of 1897. Appraisal, \$20.00.

Westbrook, August 26th. Inspection was ordered in a herd of cattle, but no disease found.

Stockton Springs, August 30th. A case of glanders was reported, but none discovered.

Farmington, September 3rd. Inspection was ordered in a herd of cattle, but no disease discovered.

Scarboro, September 10th. A case of tuberculosis was discovered and condemned. Appraisal, \$40.00.

Lewiston, September 17th. Inspection was ordered in a herd of cattle, but no disease discovered.

Augusta, September 23rd. A case of glanders was discovered and condemned. Appraisal, \$40.00.

St. Albans, September 24th. A case of tuberculosis was discovered and condemned. Appraisal, \$40.00.

Ridlonville, September 26th. A case of glanders was discovered and condemned. Appraisal, \$50.00.

East Monmouth, September 28th. Inspection was ordered in a herd of cows, and one animal quarantined.

Linneus, (Aroostook county), September 30th. A case of glanders was reported by the "Board of Health," but which proved to be chronic catarrh.

Portland, October 1st. A case of glanders was reported, but none discovered.

South Portland, October 3rd. A herd of cows was tested, but no disease was discovered.

Biddeford, October 4th. A herd of milch cows was inspected, and a short-horn bull quarantined.

Augusta, October 5th. A case of glanders was reported, but none discovered.

Stroudwater, October 6th. A dairy herd was inspected, and a thoroughbred Ayrshire cow found diseased. Appraisal, \$70.00.

North Turner, October 7th. A case of tuberculosis was discovered and condemned. Appraisal, \$30.00.

Augusta, October 8th. A case of tuberculosis was reported, but none discovered.

Goodwin's Mills, October 11th. Two cows were found diseased, and condemned. Appraisal, \$55.00.

West Falmouth, October 14th. A case of glanders was reported, which proved to be catarrh.

South Windham, October 15th. A case of tuberculosis was discovered in a Guernsey bull that had come out of the same Connecticut herd as the heifer killed at Deering August 25th. The bull was condemned, but no appraisal ordered.

Chelsea, October 17th. A case of tuberculosis was discovered and destroyed. Appraisal, \$25.00.

St. Albans, October 22nd. A herd of cattle was inspected, and a cow found diseased. Appraisal, \$15.00.

East Deering, October 24th. A case of glanders was reported, but none discovered.

Lewiston, October 28th. Inspection was ordered of a herd of milk cows, but no disease discovered.

Rumford Falls, October 29th. A case of glanders was reported, but none found to exist.

Brunswick, October 31st. A case of glanders was discovered and condemned. Appraisal, \$40.00.

Bangor, November 1st. A case of tuberculosis was discovered and condemned. Appraisal, \$25.00.

Bunganuc, November 1st. A case of tuberculosis was discovered and destroyed. Appraisal, \$30.00.

South China, November 5th. Inspection was ordered in a milk herd, but no disease discovered.

Norway, November 7th. A case of tuberculosis was discovered and condemned. Appraisal, \$35.00.

Kezar Falls, November 8th. Inspection of a herd of cattle was ordered, but no disease found.

Saco, November 10th. Inspection was ordered of a herd of cows, but no disease discovered.

Unity and Troy, November 12th. Glanders was reported in both towns, but none discovered.

Pleasantdale, November 14th. A case of glanders was reported, which proved to be chronic catarrh.

Cornish, November 15th. Two car loads of cattle that had been bought in New Hampshire, were quarantined and tested, and afterwards released.

Gray, November 16th. A case of tuberculosis was discovered and destroyed. Appraisal, \$20.00.

Farmington, November 18th. Tuberculosis was discovered in a large ox. Appraisal, \$40.00.

Wilton, November 23rd. A case of glanders was reported, but none discovered.

Cliff Island, November 25th. Inspection was ordered of cattle on the island, but no disease found.

Poland, November 29th. A case of glanders was reported, but none discovered.

Bangor, November 30th. A case of tuberculosis was discovered in swine. Appraisal, \$12.00.

New Limerick, (Aroostook county), December 5th. Contagious disease among horses was reported by the "Board of Health," and eight horses had died owned upon adjoining farms. Post-mortem examination revealed poisoning as cause of deaths.

Pine Point, December 8th. Tuberculosis was discovered among some swine, traced to drinking the milk from a diseased herd of cows. Appraisal, \$10.00.

Later another hog was found diseased. Appraisal, \$17.00.

New Gloucester, December 9th. Inspection was ordered of a herd of cattle, but no disease discovered.

South Portland, December 13th. A case of farcy was discovered and condemned. Appraisal, \$50.00.

North Yarmouth, December 15th. Inspection was ordered of a herd of cows, but no disease discovered.

St. Albans, December 14th. Inspection was ordered of a herd of cows, but no disease found.

Orrington, December 15th. A case of glanders was reported, but none discovered.

West Bath, December 16th. A case of glanders was discovered and destroyed. Appraisal, \$40.00.

Brunswick, December 21st. A case of glanders was discovered and destroyed, appraisal, \$20.00.

Richmond, December 22nd. Eight cows were quarantined, that had come into Maine, without permit; were afterwards tested and released.

Chisholm's Mills, December 23rd. A case of glanders was reported but none found.

West Falmouth, December 24th. A case of tuberculosis was reported, but none discovered.

Pittsfield, December 29th. A large herd of creamery cows was tested, and one found diseased with general tuberculosis. Appraisal, \$50.00.

A summary of the work of our commission for 1898 shows that we have attended one hundred and sixty-nine inspections from Kittery to the Aroostook, and from the mountains to the sea. During the year, one hundred and seven farms have been visited, and sixty-two stables have been inspected, forty-eight cattle have been condemned and destroyed at an appraisal of \$1,520.00 and thirty-four horses have also been condemned and destroyed at an appraisal of \$1,421.00, the total appraisals of the year amounting to \$2,941.00.

In our last annual report of 1897, the business of that year shows a marked increase over that of the present year, so that on January 1, 1898, the business of 1897, show that your commissioners had attended three hundred and fifty-two inspections, embracing almost every county in the State. During the year, two hundred and eighty-seven farms were visited, and sixty-five stables were inspected; and as a result, four hundred and fifteen head of cattle were destroyed at an appraisal of \$18,122.00 and twenty-eight horses were also condemned at an appraisal of \$1,085.00, the total appraisals of the year being \$19,207.00, so that the amount of appraisals of 1897 exceeded that of 1898 \$16,266.00, while the total bi-annual exhibit for the two years calls for a net expenditure of \$11,074.00 for horses and cattle actually condemned and destroyed by order of the cattle commission; leaving out of the above calculation any and all sums expended or received by your commissioners for salaries, expenses of travel, disinfection of premises, testing of cattle, quarantine regulations, etc., for the two past years. The large difference in the appraisals of 1897 and 1898, while it emphasizes the uncertainties and necessities of our work from one year to another, also challenges an explanation of why such a difference should exist, as would call for a gross appraisal of \$14,624.00 in the months of January, February and March, 1897, even

before the sixty-eighth legislature had adjourned, while the total amount of appraisals reached in 1898 was but \$2,941.00. The annual appropriation of recent years for the use of the commission has been \$5,000, but it will be seen that before the last bi-annual appropriation had been reached or agreed upon, the *net amount* due for cattle and horses destroyed, alone amounted to \$7,312.00, which already exceeded the annual appropriation by \$2,312.00, so that to provide for then existing emergencies, \$10,000.00 was appropriated for 1897 and \$5,000.00 for 1898.

In other words, there had been condemned and appraised, between the first of January, 1897, and the time the sixty-eighth legislature adjourned, the net sum of \$7,312.00 for eight horses and 310 head of cattle, to which was to be added the pay and expenses incurred by three commissioners in making up to that date, one hundred and sixty-six inspections between Kittery and Bar Harbor, including cost of testing all cattle that proved diseased, disinfection, etc., and which left at the disposal of our board but about six thousand dollars to continue our work for the next twenty-one months, up to the session of the present legislature.

With a gross appraisal of \$22,148 for the past two years, for horses and cattle proven by all tests to have been thoroughly diseased, and that have been condemned by order of our board, and many of which now remain unpaid for, we believe it would be discounting the good business sense of the present legislature, to make any further recommendation for an increased appropriation for this work, than is indicated by the "cold facts" which are given in this report.

Prominent among the causes leading up to the excess of calls upon the commission in the early part of 1897, were the unwarranted and libelous statements that were put in circulation at that time by interested parties, that a much larger per cent of our bovine population was affected with tuberculosis than all our annual reports had then, or since that time proved to exist, and which led many owners of large herds to request an inspection of their cattle, and resulting in such herds being subjected to a tuberculin test whenever a single animal was discovered to be diseased. The "boards of health" in several cities and towns in Maine had also issued regulations calling for the inspection of milch cows that were furnishing them with their milk supply,

so that all together much more work was called for than for several previous years. A majority of the cases discovered were confined to the eastern portion of our State, which has always exceeded those of the western part of Maine; largely accounted for probably by the greater number of cows bred and kept upon farms that are being utilized for the production of milk to supply the numerous creameries of the State, which consume about thirty-three per cent of the entire product of our State. Another factor in reaching that result was the discovery of tuberculosis in a large herd of Jersey cows at Westbrook, where thirty-six head of cattle, many of them registered cows, were condemned and destroyed at a gross appraisal of \$3,330.00.

A special committee of the Governor's Council was appointed to visit this herd in company with the cattle commissioners to decide what was best to be done, and the decision to condemn and destroy all diseased animals, was reached upon their recommendations.

The fact still remains, however, that there are many large herds in Maine whose owners have never requested an inspection, and from which young stock and dairy products are constantly being disposed of, that should be examined, not only from a sanitary standpoint, but also to determine if any one or more animals are being kept, that are not only a menace to other members of the herd, but also to the public health of intelligent communities.

We have repeatedly condemned diseased animals that have come out of herds never yet tested with tuberculin, that undoubtedly should be so tested for the benefit of all concerned, so that if the source of such disease is discovered, it may be promptly removed. The fact that it is now conceded that we have a less amount of tuberculosis than any other of the New England States, should not deter us from such inspections; but should furnish us all the greater reason why we should be supplied with sufficient means to so extend our work, that all such cases that are real and serious, may receive the attention they require and deserve.

The cattle commission for Vermont by their annual report recently issued we are informed that during the year 27,259



cattle have been tested with tuberculin, of which 872 were killed. The total amount paid for cattle destroyed was \$13,494. Expenses of commission were \$6,479.54, making a total expenditure for the year of \$19,973.54.

Since the work commenced, February 1, 1895, 60,000 cattle have been tested, 2,390 found diseased and killed and about \$55,000 has been paid by the State for the cattle killed and for doing the work. Of this amount \$35,948.42 has been paid for cattle killed and \$18,887.73 has been paid for testing and supervising the work. In support of the policy of the board in killing all animals that fail to pass the test the report says:

“Under right conditions the progress of tuberculosis through a herd is quite rapid, and the conditions necessary to this end are the presence in a herd of a badly diseased animal and poor sanitary conditions in the stable. With the best of sanitary conditions there is great liability to the spread of the disease, and the only safe course for the stock owner is to have no case of tuberculosis in his herd. The policy of killing off only the animals that show physical indications of the disease is very unsafe, as it is a matter of common experience that often very advanced cases show no physical indications of disease, and these animals might communicate the disease to a large number of animals before being suspected.”

The importance of the past work of the Maine cattle commission, and its continuance can best be expressed by reference to the number and value of the domestic animals of this State, which includes 255,859 head of cattle, valued at \$3,656,392; 142,027 head of horses, valued at \$6,389,545; 238,319 sheep, valued at \$584,066, and 37,951 swine, valued at \$202,901. The total valuation of \$10,832,904, all of which are directly under the supervision and control of the cattle commissioners, whenever and wherever affected with contagious disease.

A war against tuberculosis has just been started in England, and the Prince of Wales presided at a private meeting at Marlborough House, December 20, 1898, convened by him to promote a war against tuberculosis.

The Marquis of Salisbury, the Earl of Rosebery and a number of noted scientists and physicians spoke of the urgent necessity of educating the people in the means of preventing con-

sumption and of checking the spread of tuberculosis among cattle.

The Prince of Wales, who promised his heartiest support to the movement, said that Great Britain ought to follow the good example set her in the United States and Germany, in the effort to stamp out disease. He mentioned the fact that the Queen had ordered the destruction of thirty-six of her dairy cows, which had been found tuberculous. It was an example, he urged, such as the farmers ought to follow."

The disease is liable to become more intensified in special herds of high-bred or in-bred cattle, while native cattle with a varied ancestry seem to offer a longer resistance to the affection.

Prof. W. A. Henry, in "Feeds and Feeding," says: "The extensive Danish investigations conclusively show that the dairy farmer can not hope to measurably increase the percentage of fat in his milk by any practical system of feeding. The dairyman who wishes to improve the quality of his milk must look to breed rather than feed." He also states that it is remarkable that dairymen have so generally held an erroneous opinion regarding the ability of feed to permanently affect the value of milk, and expresses the opinion that they have been led to this belief because any marked improvement of the ration of the cow is always accompanied by a larger flow of milk and consequently by a larger total amount of fat.

The history of our domestic animals abounds in practical lessons and demonstrations to that effect. In western Germany and Holland, for instance, the moist atmosphere, the low lying soil, with its rank vegetation and succulent feeds, have combined to produce a cow yielding a large quantity of comparatively watery milk; while the scanty vegetation and rich feeds of the Channel Islands have developed a breed prized for its rich milk. These breeds are simply what their environment and breeding have made them. It would be impossible to reverse the conditions and maintain either without modification. Both breeds are subject to material variation when transferred to the Mississippi Valley. There are many similar illustrations pointing conclusively to the fact that ultimately feed does not affect the composition and quality of milk.

The depletion, in 1898, of many of our dairy herds, of their best cows for export to "Brighton market," still continues at

practically the same ratio of the previous year. In 1897, eleven thousand, nine hundred and fifty-seven cows were shipped to Massachusetts, and in 1898, eleven thousand, four hundred and thirty-six cows were also shipped in addition to three or four hundred calves per week, but very few oxen are being sold; and while the trade is a perfectly legitimate one, as far as the drovers are concerned, the fact that only selected cows are exported removes from our State many of its most desirable animals, while the number coming into Maine each year will not much exceed one hundred animals, either for breeding or dairy purposes, and these all have to be tested with tuberculin before being released from quarantine. All cattle going to Massachusetts, as well as the men who do the testing, have to be acceptable to the cattle commissioners of that state, as by a decision reached by them last year, "Their board will only accept the tests of such men as they approve of." The duty of the Maine board is limited to disposing of such animals as are reported to us as found diseased, while making such tests, and in 1897, four such cases were reported, and but two in 1898, as coming from all the twenty-four men at present vouched for by the Massachusetts board.

Under date of February 2nd, Dr. Austin Peters, chairman of the "Massachusetts Cattle Commission" writes me as follows: "For some reason it seems to me that the animals that react cannot be reported to you.

You speak of having six cows reported to you as all that were rejected the last two years. On page 33 of our annual report you will find a letter addressed to veterinarians who test for the 'Brighton market' and you will find a number of responses from veterinarians in different states. Sixteen Maine veterinarians have replied stating that they have tested 19,178 head of cattle for the Brighton market, of which 180 have been rejected or 93 of 1%. You will notice that the percentage of cattle diseased in Maine according to these reports is very much smaller than in any other state. *New Hampshire having over 10% rejected; New York over 4%, and Vermont about 2½%.* I think this supports your belief in the healthfulness of Maine cattle.

I do not care to say that you refuse to kill cattle that you know to be diseased, but I infer from what the cattle men say that they think it is hard work to get the money for cattle that are condemned as tuberculous in your state. I suppose this may be on account of the appropriation made for the use of your board being so small that you do not always have the funds to pay for animals when they are condemned, *therefore, the drovers would rather set the cattle aside than to report them as diseased.*"

Comment seems unnecessary, although one of the largest buyers of Maine cows for Brighton market, not long since said to me. "We are not in this business for our health, Doctor, we cannot afford to pay *forty dollars* for a cow, and turn her over to you and take *twenty for her.*"

In the annual address of the secretary of the Maine Board of Agriculture delivered in January at Augusta, he said in part, "I am firm in my opinion that the tuberculin test, as at present managed in our State, is a detriment to the best interests of our live stock industry, and am not sure but that some legislation in relation to it similar to that in Massachusetts, which prohibits its use except on the written consent of the owner or person having the charge of animals or upon animals which have been condemned as tuberculous upon physical examination, would be wise."

If it is to be implied from the above, that compulsory tests have ever been ordered by the Maine Cattle Commissioners, we wish to promptly correct such an impression, as none other than voluntary testing with tuberculin has ever yet been employed. Whenever it has been possible, in the inspection of a herd, to safely condemn a single animal by physical examination, the owner has always been advised to have the balance of his herd tested, and we have never met with other than a ready acceptance and co-operation of such advise; the only exception to this being where the owner himself has applied for the tuberculin test without any previous inspection, and no change or amendment to our present law will be asked for by the cattle commissioners. The recent discovery of tuberculin, and its application to the diagnosis of bovine tuberculosis, has led to much prejudice and opposition, and the fear on the part of some that great harm is likely to be done our live stock interest, and much misleading discussion has been indulged in which is always apt

to be the case, whenever a variety of interests may be antagonized by the efforts to suppress contagious diseases among domestic animals. The presence, however, of a single case of tuberculosis in any herd is a constant menace to all members of the herd, to the attendants, to the consumers of the meat and dairy products of the herd, and to other herds into which members of this herd may be sent.

Among the cases of especial interest that have occurred the past year, was the destruction of thirty-four cases of glanders, the major part of them being western horses, that, owing to the low price such horses command, have been brought into Maine in large numbers within the past few years. The discovery of several cases of tuberculosis among swine, which can all be traced to drinking the milk from tuberculous cows; the inspection of a short-horn bull affected with tuberculosis, that had been brought from New Hampshire without any permit, and was sent out of the State again to the party who bred and sold him, also the discovery of two diseased registered Guernseys from Connecticut, that had been admitted into Maine to exhibit at the New England Fair in 1897, and were sold without the knowledge of our commission to parties in this State, both of which were condemned and destroyed. We have also had several cases reported the past year of swine plague and hog cholera; and Dr. Salmon reports, "The infectious diseases of swine have long caused such enormous losses that swine growers have been discouraged and many of them financially ruined, while the Federal government has been greatly concerned on account of the destruction of property and the menace to an important item of the food supply and of the export trade. Veterinary science has had much to contend with before it could offer a practical and efficient solution of the problem of preventing these losses. It was necessary to consider the vast number of animals liable to the disease and the great extent of territory over which they are distributed; also the relatively small value of each individual and the fact that the losses are caused by two distinct diseases, each of which requires its own specific treatment, while the symptoms are so obscure that it is difficult in the field to distinguish one from the other."

There remains but one resource to which we can turn with hope of relief. That is the use of anti-toxic serum. The

researches made in this direction have shown that it is possible to produce a serum that will immunize animals of both of these diseases, and that will also cure both. This treatment was first tried with small animals such as rabbits and guinea pigs in the laboratory, and, being successful there, was tested late last year with herds of infected swine. Of about 250 animals in infected herds, over 75% were saved, while in herds not treated 85% died. This year, the results, with about the same number of animals have been even better and the prospects are that over 80% of the animals in infected herds may be saved by this method.

In anti-toxic serum we have a most valuable agent for the control of swine diseases, but it can best be used under professional supervision. The State should regard it as an invaluable addition to its resources for eradicating the disease from our territory. If the State adopts it and provides for its systematic use wherever the infection appears, it will not be long before swine can be raised with more safety and profit, and the fifty or one hundred millions which are now annually blotted out by this scourge will go into the pockets of our farmers increasing the wealth and prosperity of the nation. Several car-loads of cattle that had come into Maine in violation of our quarantine regulations, have been tested at the owner's expense and released; and which has given rise to further notice of quarantine being issued by the managers of our railroad corporations of which the conditions are as follows:

MAINE CENTRAL RAILROAD COMPANY.

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GENERAL FREIGHT DEPARTMENT.

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Portland, Me., Nov. 17, 1898.

CIRCULAR NO. 75.  
ALL AGENTS:

The following notices have been received from the Board of Cattle Commissioners, State of Maine:

NOTICE OF QUARANTINE.

The Cattle Commissioners of the State of Maine, having found from recent experience that it has become absolutely necessary to supplement our former notice of quarantine issued January 1st, 1892, so that it shall include not only Massachusetts, but all other states, order that no cattle for dairy or breeding purposes shall be brought into this State either by road, water, railroad or other conveyance until further notice; and all such cattle entering our State without a permit signed by some member of our Board will be subject to quarantine at the owners' expense, and the attention of all persons is directed to Chapters 177 and 194 of the Public Laws of Maine, which will hereafter be rigidly enforced.

John M. Deering, President.

F. O. Beal, *Treasurer*.

Geo. H. Bailey, D. V. S.,

*State Veterinary Surgeon.*

Deering, November 12th, 1895.

## TO WHOM IT MAY CONCERN.

After May 20, 1898, no more permits to bring cows or other cattle into this State from Massachusetts, or other New England States, under the pretense that they are for beef, or to be turned to pasture, will be issued by our board until further notice.

Animals for breeding and dairy purposes that have been properly tested and approved, will be admitted as heretofore.

By order of the Cattle Commissioners.

John M. Deering, *President*.

Flavius O. Beal, *Treasurer*.

Geo. H. Bailey, *Veterinarian*.

Agents at junction points will refuse to receive from connecting lines any cattle from outside the State, and agents at Maine Central stations outside of State of Maine will refuse to receive or forward cattle destined to points in Maine, unless accompanied by a permit as specified above.

Agents will endorse on the permit, "Cancelled by shipment ....." (insert date of way-bill) and attach it to the way-bill.

Agents will understand that all previous permits issued by the Commissioners, up to this date, are hereby cancelled, and that all future imports into Maine will have permits at date of shipment, to be also cancelled when used.

D. C. PRESCOTT, G. F. A., M. C. R. R. CO.

W. K. SANDERSON, A. G. F. A., M. C. R. R. CO.

A permit was issued in October to bring into Maine two carloads of milch cows from Canada, to be tested with tuberculin upon their arrival upon the premises of the owner at Lewiston, Maine. These cows arrived at Vanceboro, where they were stopped by the United States inspector at that point, and tested before being released, and in correspondence with the director of the "Bureau of Animal Industry" at Washington, D. C., we were furnished with a copy of the law of 1897, which we publish for the benefit of future shippers.



## UNITED STATES DEPARTMENT OF AGRICULTURE.

OFFICE OF THE SECRETARY.

*Washington, D. C., January 23, 1897.*

## REGULATIONS FOR THE INSPECTION AND QUARANTINE OF ANIMALS IMPORTED FROM CANADA INTO THE UNITED STATES.

In pursuance of sections 7, 8, and 10 of the act of Congress entitled "An act providing for the inspection of meats for exportation, and prohibiting the importation of adulterated articles of food or drink, and authorizing the President to make proclamation in certain cases, and for other purposes," approved August 30, 1890, and of an act of Congress entitled "An act making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1897," the following regulations, to take effect from and after February 1, 1897, are hereby prescribed for the inspection and quarantine of animals imported from Canada into the United States, and all orders and regulations or parts thereof inconsistent with these regulations are hereby revoked in so far as applies to inspection and quarantine of animals imported from Canada:

1. With the approval of the Secretary of the Treasury, the following-named ports along the border or boundary line between the United States and Canada have been designated as quarantine stations, and all animals imported from Canada into the United States for which inspection is required by these regulations must be entered through these ports, viz: Vanceboro and Houlton, Maine; Beechers Falls, Island Pond, Newport, Richford, and St. Albans, Vermont; Rouses Point, Ogdensburg, Charlotte, Suspension Bridge, and Buffalo, New York; Port Huron and Detroit, Michigan; Duluth and St. Vincent, Minnesota; and Port Townsend, Washington.

2. The word "animals" when used in these regulations refers to and includes all or any of the following kinds: Horses, neat cattle, sheep, and other ruminants, and swine. The term "con-

tagious diseases" when used in these regulations includes and farcy, maladie du coit, anthrax, contagious pleuro-pneumonia, Texas or splenic fever, tuberculosis, actinomycosis, foot-and-mouth disease, rinderpest, sheep pox, foot-rot, sheep scab, hog cholera, swine plague, and erysipelas. Animals found affected with any one of these contagious diseases must be returned to Canada or killed without compensation.

3. All animals imported into the United States from Canada must be accompanied by an affidavit made by the owner or importer, declaring clearly the purpose for which said animals are imported, viz: whether for breeding purposes, for milk production, for work animals, for grazing, feeding, or slaughter, or whether they form part of settlers' effects, or whether they are horses entered for temporary stay, as provided in section 7 of these regulations. Said affidavit must be presented to the collector of customs at the port of entry, who will decide whether the animals are entitled to entry under these regulations, and who will notify the inspector of the Bureau of Animal Industry in all cases where these regulations require an inspection to be made.

4. All animals imported into the United States for breeding purposes, for milk production, for grazing or feeding, horses for work, and swine for slaughter must be inspected by an inspector of the Bureau of Animal Industry at the port of entry. All animals covered by this section except horses, and swine for slaughter, must be accompanied with a certificate signed by a Canadian official veterinarian, stating that no contagious disease except tuberculosis and actinomycosis in cattle, affecting the species of animals imported, has existed in the district in which the animals have been kept for six months preceding the date of importation, excepting animals which are part of settlers' effects, or belonging to Indian tribes, which may be entered without certification or inspection. The owner or importer must present an affidavit that said certificate refers to the animal or animals imported. The certificate for cattle for breeding and for milch cows must also show that they have been submitted to the tuberculin test and found free from tuberculosis, giving the date of testing, with the chart of reaction, and a description of the cattle, with age and markings. All animals imported for breeding purposes, milk production, grazing or feeding, when not accom-

panied by the required affidavits and certificates, must be detained in quarantine for one week, at the expense of the owner or importer, under the supervision of the inspector in charge. During this detention a rigid inspection will be made, and cattle for breeding or milk production will be *tested with tuberculin*. Animals found free from disease at the end of this period will be released. Cattle and sheep for grazing or feeding, if accompanied by the required affidavits and certificates, need not be unloaded for inspection, but all other animals covered by this section must be unloaded and carefully inspected.

5. All Canadian animals will be admitted at any port of the United States for transit in bond to any Canadian port without inspection.

6. Cattle and sheep in bond for export will be admitted without inspection at any of the ports named in section 1, in transit to and for export from Portland, Me., Boston, Mass., and New York, N. Y. Horses will be admitted in bond at any port of the United States without inspection for export from any part of the United States. All animals admitted for export will be subject to inspection at port of export.

7. Horses for temporary stay, whether for pleasure driving, teaming, exhibition, racing, or used in connection with stock raising or mining, cattle and sheep for slaughter, and animals belonging to Indian tribes or forming part of settlers' effects will be admitted through any port without inspection or certification.

8. The railroad cars used in the transportation of animals specified by these regulations must be thoroughly cleaned and disinfected before said animals are placed therein. All litter from previous shipments must be removed, and the car white-washed with lime and carbolic acid, one pound of commercial carbolic acid to five gallons of lime wash. Unless this regulation is complied with Canadian animals will not be allowed entry into the United States, and animals from the United States will not be admitted into Canada. Shippers should see that cars are properly cleaned and disinfected before animals are loaded.

J. STERLING MORTON,  
*Secretary.*

Early in December, our board received the letter which we publish, from a member of the Board of Health of Aroostook county, dated :

“Limestone, Me., December 1, 1898.

Dr. Geo. H. Bailey,  
Deering, Maine.

DEAR SIR: Seven horses on two farms in our town have died suddenly and the eighth is now sick. The cause of the trouble cannot be learned and we earnestly request you to come at once to investigate the matter. Dr. Robert Neal of Houlton and several others have seen the horses and are completely baffled as to trouble.

Trusting 'twill be so you may come at once I am

Sincerely yours,

WENDALL C. BOYD, M. D.

Dr. Bailey, Veterinarian of the Maine board, went to Aroostook county and found the last horse supposed to be deceased, had died the morning he arrived, and he was enabled to obtain a post-mortem examination, which proved the horses had not died of any contagious disease, but had all undoubtedly been either accidentally or intentionally poisoned, the further proving of which would devolve upon the local authorities and not upon the Cattle Commission.

## TUBERCULOSIS IN CATTLE.

BY DUNCAN McEACHRAN, F. R. C. V. S., D. V. S.  
Chief Veterinary Inspector for Canada.

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The following concise and instructive circular, on tuberculosis, is used by the kind permission of its author, Dr. D. McEachran, of McGill Veterinary College of Montreal:

### FARMERS' BULLETIN ON TUBERCULOSIS.

In issuing this bulletin on a subject affecting very intimately not only the extensive and rapidly growing cattle industries of Canada, but also having a close and direct bearing on the health and lives of the people, an effort is being made to convey to everyone interested, more especially the farmers, dairymen and stock-raisers, in a condensed form and in non-technical language, a simple statement of facts as to the nature, causes, symptoms and prevention of this disease.

The statements contained herein are excepted generally by scientific men as facts, and our farmers may accept them as such, care having been taken to avoid making statements on debatable points. The Minister trusts that interested parties will carefully read the bulletin, preserve it for future reference, and apply the suggestions contained therein to their own individual cases.

### TUBERCULOSIS.

This disease claims for its victims nearly, or perhaps we might say, all the domestic animals, and few of the wild animals subjected to domestication resist the contagion, as is well known to keepers of menageries. Rats, mice, and other vermin which inhabit houses and outbuildings not only contract the disease but are active agents in spreading it.

Some species are more susceptible than others and contract it readily by eating food containing the germ of the disease, or inhaling the dried germs given off from the lungs and throats of animals affected in these organs.

The most susceptible of the domestic animals are cattle, swine, chickens, goats and rabbits. These contract it readily in the natural way, but it can be produced in sheep, dogs, cats and horses by inoculation with tuberculous material.

Tuberculosis in the lower animals is identical with consumption in the human family. It is due to the same germ, (*Bacillus Tuberculosis*).

It is communicable from other animals to man, and just as readily from man to the lower animals, by natural infection and by inoculation.

#### TUBERCLE.

The germs (*bacilli*), which are living organisms of minute microscopic size, when they reach and become located in a tissue, produce local irritation and the formation of small reddened areas infiltrated with fluid and cells. These are the tubercles. As they become a little older they enlarge, and their color is greyish or yellow from changes that take place within causing the death of the central tissues. Their appearance and consistence in this way resemble that of cheese.

These nodules may vary in size from a pin head to a cocoon, often they are of stony hardness from the presence of lime salts. The tubercles may be confined to one organ or tissue of the body, such as the lymphatic gland, for example, of the mesentery or thorax, or the throat, or udder, or ovaries, etc., or they may be generalized throughout the body, the germs travelling in the blood circulation. In this way the abdominal organs (liver, spleen, kidneys, etc.) may all be involved as well as those of the thorax, lungs, pleura, heart, lymph glands, etc. Often the pleura and peritoneum are covered with grape like excrescences whose appearances are characteristic of this disease. Whenever tubercles are lodged for any length of time, much destruction occurs in the affected tissue.

## THE TUBERCLE BACILLUS

Is described as a rod-shaped organism with rounded ends and a slight curve, requiring complex laboratory methods of cultivation and staining, to prepare it for microscopic study.

It is a parasitic organism, which is only found in the bodies and excretions of animals affected by this disease. It thrives badly in the sunlight, which is said to kill it in from a few minutes to several hours. This fact should be remembered in dealing with it with a view to preventing it.

The invasion of the animal's body by the entrance into it of living bacilli is effected either through the digestive organs, (ingestion) or by the respiratory organs (inhalation), by transmission to the sexual organs when the testicle is invaded, and by inoculation, or by a cut or abraded surface.

Without the entrance of the living bacillus into the body, tuberculosis cannot affect it. It is the seed from which it grows and it is as essential to the development of the disease as oats, peas, or potatoes are to reproduce these plants.

## WHAT RENDERS CATTLE SUSCEPTIBLE TO THIS DISEASE?

Impaired health from whatever cause it arises renders cattle susceptible to tuberculosis. Heredity has been proved not to be an active cause of its propagation, it is, however, a predisposing one, and while it is well established by the experiments of Prof. Bang and others that calves may be bred from tuberculous mothers, and if removed before the cow licks them, or they have sucked their mother's milk, are placed in absolutely healthy surroundings and fed on milk from healthy cows, they can be reared and remain, so far as any inherited disease is concerned, perfectly free; but commonsense will teach us that in such animals we are likely to find a predisposition, that is a condition favorable to the growth and development of the tubercular bacillus, animals likely to contract the disease when exposed to contagion which their neighbors not so predisposed would resist successfully.

In-and-inbreeding is another predisposing cause, by producing animals with reduced vitality. Over-milking, under-feeding, want of sunlight and pure air, insufficient exercise, breeding too

young, are all what may be termed predisposing causes to tuberculosis, and should be avoided.

One breed of cattle is just as subject to this disease as another when subjected to the predisposing and exciting causes. Dairy cattle are most subject to it because they are most exposed, they are more congregated, more closely and continuously housed, their vitality more drained by heavy milking and they are kept longer. Their calves are more liable to milk infection, as they are fed on mixed milk, whereas the beef breeds usually suckle their calves. The majority of beef cattle are killed off at three or four years old, hence they are exposed to the contagion for a shorter term of life which is spent more in the open air and in sunlight.

HOW THE DISEASE IS USUALLY INTRODUCED INTO A HERD AND  
HOW IT EXTENDS IN IT.

A tuberculous bull is probably the most active agent in spreading this disease, both by cohabitation and sexual connection.

Farmers cannot be overcautious in buying a bull or in having cows served by one till he has been subjected to the tuberculin test and found free from the disease.

Nothing should induce a breeder to allow contact with his healthy cattle by a bull till he has every assurance that he is free from tuberculosis.

Tuberculous animals of any kind should be prevented from coming in contact with cattle.

TUBERCULOUS ATTENDANTS.

Tuberculous attendants; men or women suffering from pulmonary consumption should on no account be allowed to feed, milk, or have anything to do with cattle or pigs.

The intercommunicability of the disease from animals to man, and from man to animals is an established fact no longer open to discussion.

The bacilli from the throats and lungs of diseased people or animals, being coughed up adhere to and dry on the woodwork, walls, floors and feed boxes in buildings, cattle trucks or stock yards, and the dust being moved about by air currents; or, mixing with the food in the hay rack or feed-trough, find access to the stomach and intestines, thence through the blood or lymph channels to the abdominal glands and other organs.



## DANGER FROM MILK.

The virulence of milk from tuberculous cattle especially when the udder is diseased has been clearly demonstrated. Milk is dangerous even when the udder is not specially diseased. It will communicate the disease even when diluted by mixing with large quantities of other milk in the creamery or cheese factory; whey is equally dangerous.

The germs remain active in the skim-milk and whey, and may produce the disease in calves fed on it. Milk obtained from creameries in districts where tuberculosis prevails should be raised in temperature for 10 minutes to 160° before being given to calves, otherwise living bacilli may be taken into the stomach, and entering the lymph channels produce the disease. As a precautionary measure, milk from tuberculous cows should not be received at creameries or cheese factories. All skim-milk and whey should be heated to 160° for ten minutes before being given out to farmers from the factories for feeding calves or swine. Unless this is done creameries and cheese factories may become distributing agents of this disease to healthy herds. Milk from tuberculous cows is a frequent source of communicating the disease from cattle to people, especially children and old feeble persons; meat from diseased cattle is also dangerous, although it may be sterilized by heat.

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## HOW TO PREVENT ITS INTRODUCTION TO A HERD.

See that your animals to begin with are free from the disease.

Never bring any animal into the byre till you have ascertained beyond a doubt that it is healthy.

Keep your own bull. Your neighbor may be obliging, but if careless about the health of his stock, you may suffer irreparable injury by accepting even the free use of his bull should the animal happen to be tuberculous.

Conversely, if you have a bull, be exceedingly careful to see that no tuberculous cows are brought to him for service.

Never allow a consumptive person to have anything to do with your cattle, make no mistake about this.

Your byres must be well lighted, almost as light as outdoors; disease germs are killed by sunlight.

Pure air and plenty of it is essential to health. This can only be provided by sufficient space. Let your cow stable be roomy.

Drainage is essential to purity of the air. Without proper and efficient drainage the air must become contaminated by emanations from the droppings and urine of the cattle as well as by the decomposing vegetable matters with which they are mixed.

Drain your buildings, and do it thoroughly.

The ventilation is all-important. By properly arranged ventilators the impure air is removed and replaced by pure, the oxygen of the air is constantly being consumed in the process of breathing, and unless it is replaced it becomes unfit to sustain animal life. The constant change of the air in buildings inhabited by animals is absolutely necessary to preserve health.

During summer weather most buildings are sufficiently ventilated by the doors and windows being left open; it is during the winter when cattle are housed that they suffer from imperfect ventilation.

Proper ventilation provides for the admission of the pure and the escape of the foul air. As a rule farmers' architects do not make sufficient provision for either.

The air may be admitted by openings near the floor and by windows hinged at the bottom and dropping inward.

The ventilators or air shafts are usually too small. Most buildings require shafts three feet square placed about twenty feet apart, in the middle aisle of the byre. The shafts should be divided inside into two by a partition extending from the top to within three feet of the ceiling; the opening being controlled by trap doors opened or closed by cords running through pulleys.

#### CATTLE STANDING HEAD TO HEAD OBJECTIONABLE.

The common plan of arranging the byre, so as to save labor in feeding, by having an alleyway with the heads of the cattle opposite each other is objectionable from a health standpoint, as it exposes animals opposite tuberculous cattle much more to the contagion than when they are placed with their heads to the wall. They may be easier fed the former way, but they are easier cleaned the latter, and it has a decided sanitary advantage should contagious disease exist.

Running water in troughs placed in front of the cattle is objectionable if tuberculosis is present, as by this means the germs may be carried in front of the whole herd.

#### SYMPTOMS AND DIAGNOSIS OF TUBERCULOSIS.

In the majority of cases the symptoms are obscure, and till the discovery by Prof. Koch of the reaction produced by the injection of tuberculin (being a most reliable test for discovering this disease in obscure cases unrecognizable by symptoms) the majority of cases could not be detected even by experts.

When affecting the lungs, throat and respiratory organs generally, it is accompanied by a frequent cough but no fever. There is disturbance of respiration; the breathing is quickened by slight exertion or excitement; the cough is produced by changes of temperature. The expert can detect dull spots surrounded by areas of increased resonance on examination of the lungs by the usual methods.

Usually the superficial glands, in the throat, between the jaws, under the ear, or the udder, may be hard and swollen. The animals may continue for months or even years to maintain fair condition. They are sometimes fat while the lungs may be found studded by large tubercular masses.

When the disease is abdominal and the glands and organs in the belly are chiefly affected, the symptoms of defective nutrition are early apparent; emaciation, lessened secretion of milk, indigestion, breathlessness, and general failure more or less rapid. Many cases cannot be detected by symptoms, but can be almost to a certainty (in 98 per cent at least) by the Tuberculin Test.

#### THE TUBERCULIN TEST.

Until the discovery by Prof. Koch, in his experiments to discover a cure for consumption in human beings, that the injection of tuberculin invariably caused a rise in temperature when the person or animal was tuberculous; while it produced no effect whatever when free from it, the detection of the disease in early stages or when slightly affected was considered impossible in most cases. This test is most delicate and reliable (about 98 per cent,) where it is properly applied.

*Tuberculin* is a soluble product of cultures of tubercle bacilli, of which a glycerine extract is made which is sterilized by heat and filtered through porcelain, so that it contains no living germs, and therefore cannot produce tuberculosis in animals injected with it. It has therefore, no effect on healthy animals, in some cases the disease is aggravated by it when it exists, but, it cannot be produced by it. The lymph must not be exposed to sunlight. It must not be frozen; must be kept well corked to exclude air.

*Tuberculin injection has no bad effects on the secretion of milk.* The consensus of opinion of those most experienced is that it does not lessen the secretion of milk in dairy cattle, consequently they may be tested even when in full milk without disturbing its secretion.

*Dose.*—The dose varies with the size and age. As issued by this department it is ready for use, with doses marked on the bottle, viz: 20 drops for calves, 40 for small or medium sized animals, 60, larger, and 80 drops for very large ones.

When second tests are considered necessary at least thirty days should elapse and the doses be slightly increased.

#### PREPARATIONS FOR THE TEST.

It being decided to test a herd, the following suggestions should be considered. If the weather is extremely hot, or very cold wait till it moderates. If the animal is suffering from any inflammatory disease when the temperature is over 102° from any cause, a cow being bulling—a bull being sexually excited, scarcity of water, impure air, irritation from flies, pregnancy in advanced stages, are all unfavorable for reliable testing.

*Instruments necessary.*—The following instruments are required: one or more Fahrenheit (clinical) thermometers, a hypodermic syringe with three strong hypodermic needles and a fine trocar and cantula, a fine brad-awl, and a pair of clippers or curved scissors, and several glass droppers.

*The Thermometers* in use for this purpose cost about \$1, are self-registering, and can be bought at any drug store.

*Syringes.*—Metallic syringes, strong and easily taken apart to be cleaned and disinfected, costing \$3, can also be obtained at drug stores, or instrument makers.

*The Scissors and Brad-awl* are easily and cheaply procured at any hardware store.

*Charts for recording tests* which should be numbered, and the name or number of the animal, the color and markings, sex, age, breed, hours at which the temperatures were taken before and after injection, and a column for the decision should be arranged.

*Disinfectants.*—Professional men generally prefer a solution of corrosive sublimate, 1 part to 1,000 of water, but equal results will be obtained by using a 5 per cent solution of carbolic acid or creolin, and they have the advantage of being less poisonous. Such a solution is required to wash the hands and instruments in, and when used to disinfect the skin it has the advantage of being anesthetic locally.

*The Cattle should be Stabled.*—If the cattle are at pasture, they should be stabled, tied up in their accustomed stalls, numbered as they stand, handled quietly, by those accustomed to feed and milk them.

They should be allowed to remain undisturbed for some hours, being careful not to disturb the temperature by large draughts of cold water or overabundant feeding.

*Taking the Temperature Before Injection.*—Two men to whom the cattle are accustomed should assist the person taking the temperature. One takes the nostril with finger and thumb with one hand, and the horn with the other. The second stands at the hip to prevent her from moving from side to side. The thermometer with the mercury forced down by a few sudden jerks, as if shaking ink off a pen, till it marks below 100°, is inserted into the rectum, where it should remain for three minutes. Enter the temperature in a book or chart every three hours, commencing at 5 p. m., and 8 p. m.

The hands and thermometer should be dipped in the disinfectant solution before inserting it into another animal. When there is a large number to be tested three thermometers may be in use simultaneously, so as to save time.

The best place to inject the test is in the loose skin on the side of the chest above and behind the elbow. The hair should be closely clipped off in a circle about three inches in diameter, and the skin well washed with a 5 per cent solution of carbolic acid.

*Injecting the Test.*—The dose of diluted tuberculin is now taken into the syringe, all air being forced out. The operator, if he is a fairly tall man, and the animal not very large, should stand on the opposite side, and reaching across the shoulder, he takes up the disinfected loose skin with the fingers, and if the needle is strong and sharp enough, he penetrates it and pushes the needle its full length into the loose cellular tissue beneath the skin; if not he should with the brad-awl pierce the skin and insert the needle into the puncture, then slowly inject the fluid withdrawing the needle gradually. The advantage of this position is that the animal, when pricked with the needle, cringes from it, and needles are often broken, whereas in this position it cringes towards instead of from the operator.

*The Best Time to Inject the Test.*—The injection may be commenced after finishing taking the normal temperatures, say, nine o'clock in the evening.

*Temperatures After Injection.*—Commence to take the temperatures at 6 o'clock next morning, take them every three hours till it falls to normal again. If tubercle is present there will be a rise of temperature, which attains its highest point usually about mid-day, sometimes later and generally it falls gradually till in about twenty-four hours from the hour of injection it is normal again.

The rise in temperature is no indication of the extent of the disease. Often the reaction is a high temperature, and post-mortem examination shows but slight affection.

A rise in temperature of two or more degrees will indicate tuberculosis. In tuberculous herds, one and a half degree would indicate the disease also; but that temperature in a single animal in a herd would indicate suspicion only, and suggest retesting after thirty days.

### SAMPLE OF CHART.

CHART NO.....

Tuberculin Test at..... of Cattle owned by Mr .....

Number.	Age—years.	Sex.	Breed.	Colour.	Date ..... 189									Normal.	Reaction.			
					TEMPERATURE.													
					BEFORE INJECTION.				AFTER INJECTION.									
					5 P. M.	8 P. M.	6 A. M.	9 A. M.	12 A. M.	3 P. M.	6 P. M.	9 P. M.	MAXIMUM.					
*1	5	Cow....	Ayrshire .....	Red and white .....	101½	101½	101½	101½	100	100½	102	102	102	102				
†2	8	Cow....	Shorthorn.....	Roan.....	101½	101½	103½	106	107	106½	105½	104½	101½	107				

*Decision*—\* Healthy. † Tuberculous.

## OFTEN NO REACTION IN ADVANCED CASES.

It is usually found that in animals in advanced stages of the disease, owing to there being a superabundance of tuberculin in the system already, there is little or no reaction.

Fortunately in such cases the symptoms are so apparent, such as coughing, wasting, enlarged glands, etc., that the owner has little difficulty in recognizing the disease.

## HOW TO DEAL WITH A DISEASED HERD.

When tuberculosis is discovered in a herd immediately remove the diseased ones from the healthy to another isolated stable, or a part of the byre may be partitioned off by close boards as far as possible from the rest of the herd.

In the case of low-priced cattle the owner will best serve his own interests by slaughtering them at once.

When they are specially valuable and in calf, the experiments of Prof. Bang and others show that the calf may be saved by removing it as soon as born, and before the cow has licked it, or it has been suckled by its diseased mother, and by placing it in an uninfected building, and feeding it on milk from tested cows, it will in all probability grow up free from tuberculosis, although, as previously explained, it may have a predisposition to contract the disease.

The herd should be tested every six months, and those which react likewise removed, till all trace of it disappears.

## DISINFECTION OF PREMISES.

Most careful and complete disinfection of infected buildings and yards in which diseased cattle have been kept should be employed to rid them of disease germs.

In doing this before sweeping sprinkle the floors and walls well with water to prevent dust rising, remove drinking troughs, feed boxes and stall divisions. The floors must be specially scrubbed, the walls, ceilings and partitions should be carefully washed, and all freely sprayed with a disinfectant solution such as carbolic acid, one pint of crude acid to four gallons of water, or better still, lime wash. It may be applied by a whitewash brush or a spraying pump, care being taken to see that every corner, crack and joint is thoroughly penetrated by it.



The cleansing and disinfection should extend to drinking troughs and fences of the barnyard to make disinfection complete.

Every stock owner should have his stock tested, and voluntarily eradicate the disease from it, because diseased animals are a constant source of danger to the balance of the herd. It is unlawful to sell animals or their products known to be suffering from a contagious disease as tuberculosis is well known to be. Buyers of breeding stock will not purchase from a herd suspected of disease.

Tuberculous cattle cannot be exported. They are a menace to your neighbor's cattle which may be infected by them, milk and other products of the dairy is dangerous to your own family as well as others using it when drawn from tuberculous cows. Once your herd and premises are free from the infection they can be kept so by following the suggestions above made. It is a duty you owe to yourself, your clients and country.

By co-operation of the breeders it is quite within the possibilities that this disease can in a few years be eradicated from Canadian herds. If the nature and manner of introduction and extension of tuberculosis is once thoroughly known, and preventive measures are enforced in both the human family and lower animals, this fell destroyer of human beings and the lower animals will disappear from the Dominion.

## REPORT ON THE METHODS OF PRESERVING AND STERILIZING MILK IN GERMANY AND DEN- MARK.

Believing that a short account of my observations of how the milk supplies of Berlin and Copenhagen are managed may prove interesting, and may be suggestive of much needed improvements in our system of handling city milk supplies—I am induced to curtail in some respects this report so as to enable me to include a brief description of what I witnessed when visiting milk establishments in those cities to which I have added a few details gleaned from published bulletins; for the translation of which I am indebted to Dr. C. F. Martin, McGill University, Montreal.

The indifference and want of method exhibited by those charged with public health in Canada, more especially in relation to that very important article of human food, milk, contrast very strikingly with European punctiliousness in every detail; the weekly inspection of the cattle, the giving of exact directions for feeding them, the drainage, ventilation and sanitary environment of the animals supplying the milk; the precautions enforced to prevent extraneous matters getting into it, such as the clipping of the quarters and udders, washing of the teats, the cleanliness of the dress (white linen) of the milkers and every one handling the milk, the low temperature at which the milk is kept, the weighing, tasting and testing in the laboratories, filtration, sterilization and care in bottling, all for the purpose of furnishing the consumers of milk with an absolutely pure article unadulterated, free from germs of disease and, so prepared for sale that it will keep for an indefinite period of time without deteriorating. These establishments not only sell milk to the general consumer, but prepare and furnish it ready for the immediate use of infants and invalids.

The whole system of such establishments displays a combination of philanthropy and shrewd business sense.

THE MILK INSTITUTION, VICTORIA PARK, BERLIN.

Presenting a letter of introduction from Professor Ostertag we were admitted to this splendid dairy establishment.

Before we were allowed to inspect the byres and cattle we had to give assurances that we had not been near any cattle affected by foot and mouth disease. Having given these assurances, we were permitted to enter the premises. First we visited the bottling room which is at one end of the byre, separated from it by a glass partition, through which a view of the whole of the ground flat (there being two flats) can be obtained. Usually it is only through this partition visitors are allowed to see the cattle. This is necessary as a precaution against intermediate infection, especially with foot-and-mouth disease, which exists somewhat extensively in Germany.

The bottles are white glass with porcelain stoppers and rubber washers, fastened by wire. They are washed and brushed in a soda solution. They are then inverted over a pipe with a strong stream of water, after which they are sterilized by heat and are ready for receiving the milk. The milk is strained through three very fine brass wire cloth sieves; thus freeing it from all extraneous matter. It is then allowed to cool and is bottled, and the stoppers loosely placed, it is then put into the sterilizer which is raised to the temperature of 190° F., it remains here for an hour, when it is cooled to 40° F. and the stoppers put tightly on, it is then labelled and boxed for export. We were informed that it has been sent around the world and brought back as sweet and good as when it was bottled. He attributes his success to heating and cooling. The sterilizer is simply an iron box with a close fitting iron door, fitted inside with shelves which slide to receive the bottles. It is heated by coils of steam pipes. Notwithstanding that other companies and scientific experts consider it unnecessary to keep the milk heated for more than a minute, the manager still continues his original plan of keeping it for an hour on the sterilizer, not wishing to change a system which he has found to be very successful.

One hundred and sixty cows are kept in the byres which are beautifully fitted up, the walls being covered by glazed white tiles, the feed boxes and hay benches are made of cement, the fittings of iron. The bedding is peat moss, and the whole place is kept scrupulously clean.

The cattle are large, well formed stock very much like grade shorthorns. They are all in fattening condition, being fed on chopped hay and meal, as much as they will eat so as to fatten them. They are kept as long as they are profitable for milking, when they stop milking they go to the butcher.

The institution also handles the milk from a large number of cows in the country which is brought in by train twice a day. The country byres are under veterinary inspection which is paid for by the company. If disease is found in a herd, the animals must be got rid of, or otherwise the institution refuses to handle the milk. This milk is sold by the institution at a cheaper rate than the milk from its own cows. It is all sterilized before being sent out.

The following is translated by Dr. C. F. Martin, from the pamphlet of this institution.

“The special object of this institution is to supply Berlin with a milk of such a character that its nutrient qualities, its taste and its durability will supply all the necessaries required for milk given to children and invalids. In the arrangements of this large institution, the most scrupulous care is taken to provide an institution which will in every respect be a model. In the selection of their animals the greatest care is taken not only in the quality of the cattle, but likewise in the constant attention to the food supplied them both as regards its source and quality. Experienced veterinarians are placed in responsible situations to control these important factors.

“So satisfactory has this milk supply been for children that it has been a constant experience to find children so fed, developing into healthy individuals in almost every case, and it is further noticed that where unsatisfactory results are found that the cause nearly always lies in carelessness in the households where the milk is employed—carelessness either in the keeping of the milk or its improper dilution. But not only is the milk of use for children, but most satisfactory results are attributed to it in the treatment of invalids and convalescents. The milk is borne

with astonishing ease by the stomach and even when taken for a long time rarely causes nausea.

“The fact too that the milk is used purely as such and that no further effort is made to produce other dairy products renders it possible almost to procure the best kind of article; this fact in itself being a guarantee for the quality of the milk. The milk is delivered according to order either as pure milk, unsterilized or sterilized in various sized bottles, and not only is it supplied to the city itself, but likewise to the suburbs. The advances which have been made in the sterilization of milk render it easy at the present time to supply a milk which will keep pure for a great length of time and can therefore be sent by railway or post to almost any distance. That the sending of this milk may be done without danger to the quality, is proven by the following interesting experiment made some time ago. Their sterilized milk was sent on a five months' journey to Australia and thence back to Hamburg, and on being examined, its quality was found to be excellent at the end of that period.”

#### THE BOLLE MILK COMPANY, BERLIN.

This is probably the largest creamery in Europe. It commenced on a small scale seventeen years ago, and has grown to be a mammoth institution having a town within its walls; its employees numbering 1,200 people. They require 230 horses and 160 wagons to deliver the dairy products to their customers in Berlin.

We were received by the general manager who first showed us the extensive offices—then conducted us to the magnificent church capable of seating 1,000 people. The organ is said to be a very good one; the stained glass windows and the appointments show every evidence of wealth and refined taste. From here we passed to the theatre immediately in rear of the church and about the same size, furnished with all necessary paraphernalia and in rear of this we were shown a lecture room, recreation hall and meeting room; we now passed into the large sterilizing room where among a crowd of operatives, men and women, the men dressed in white overalls, sleeves and caps, the women in white aprons, sleeves and caps, not unlike those of nurses, we were shown the milk flowing in a steady stream from

the receiving vats, passing on its way through the gravel filters, thence through the sterilizer and now before our eyes it poured over coils of pipes through which circulated ice water. By this process it is cooled and subsequently bottled by rows of neatly dressed women; the bottling process is similar to what is to be seen in any ginger ale or soda water factory.

It is not all bottled here; a large quantity is put into cans which are locked, placed in ice water vats which come at four o'clock in the morning ready for the delivery wagons; the cans are so constructed that while the driver can take milk out he can put nothing into them.

We were shown the rooms for sterilizing, bottling, bottle washing, etc. The bacteriological department is thoroughly equipped. Several experts are always at work here. They had a very large number of experimental animals, guinea pigs, rabbits, mice, rats, etc., etc. We looked in at the large school room where the more advanced children were at their lessons under competent teachers.

At the kindergarten we heard the juveniles sing.

A laundry, steam drying room, carpenters' shop, paint shop, blacksmiths' shop, harness makers' shop, etc., are all on the premises. The stable is large and a model in its way, the walls are of white tiles, the floors of cement covered by peat moss and straw; space, light and ventilation are all carefully provided for.

The following description extracted from a pamphlet with which we were presented on leaving will furnish details which will impress the reader with the magnitude of this institution.

The German measure litre is quoted, it is less than our quart—thus 1 quart=40 fluid ounces.

1 litre =35 “ and 2 drachms.

It may be roughly taken as a quart.

A kilogramme=about 2 pounds avoirdupois.

MILK INSTITUTION, BERLIN.

(Translated by Dr. C. F. Martin.)

“In 1881 the first steps were taken to provide Berlin with pure and cheap milk as well as good dairy produce and a small building was opened for that purpose with three sale wagons. In less than two years this was found quite inadequate, the

public sympathy being so fully offered to the enterprise that it became necessary to construct at once a central dairy on much larger dimensions. These buildings were gradually increased in size and the business done became so extensive that in 1897 instead of three sale wagons being employed as at first, there were 159.

“Regarding the distribution of milk itself at the end of the first year’s enterprise nearly two millions and a half litres were supplied to the city, and in 1896 nearly twenty-six million litres. At present the daily quantity, viz., 75,000 litres meets the needs of some 45,000 householders, and is obtained from dairies containing in all 14,000 cows.

“In connection with the production of this milk the following statistic may be of some interest. For the proper working of the apparatus necessary for the cleansing of the vessels containing the milk a daily quantity of from 12,000 to 14,000 kilograms of coal is employed. The place is lighted by 1,600 incandescent and fifty-two arc lamps, and the power required includes three dynamos of over 1,000 amperes.

“In connection with the institution, there are 1,200 workmen, many of them specially employed and retained in special houses, such for example as locksmiths, tinsmiths, saddlers, etc., and a special printing house has likewise been built. One hundred and eighty wagons and about 240 horses are required in order to carry on the work as at present.

“Not only do the wagons carry ordinary milk, but likewise whey; the best fresh milk for children, sterilized milk for children, cream, skimmed milk, buttermilk, butter and various kinds of cheese, and arrangements are made whereby various kinds of fresh fruit are carried about on the same wagons.

“Having collected the milk from about 130 different sources, there are daily brought to the dairy about 75,000 litres. This having been tested as to its good condition, it is then for the most part filtered through gravel, and in this way is freed from the presence of a large number of micro-organisms, and is then rapidly cooled and brought to the consumers in this form. The second portion is centrifuged, thoroughly cleansed and divided into cream and skimmed milk. In this way cream is reduced to two different qualities, or is used for the manu-

facture of butter (the yearly production of butter is 250,000 kilograms.) The skim milk produced is very much favored and is a cheap form of nutrition. About 10,000 litres of this are sent out daily. A third portion serves for the manufacture of cheese in which the soft cheese of the French variety occupies the most prominent place (Roquefort, Camembert, etc.) Two million litres of milk are employed in this way every year. This cheese is sent throughout Germany to all the larger cities of the Empire where it is in great demand.

“What is called children’s milk is that obtained from farms whose cattle have the whole year been fed on dry food. The strictness with which Berlin has thus provided for unadulterated milk has had most favorable results in the quality of the milk, and the improvement of the milk in general has been most marked, and has resulted in the diminution of the adulteration with water of from 14.1 per thousand in 1879 down to 3.6 per thousand in 1886, as testified to by the official inspection.

“There is undoubtedly, too, another evidence of this benefit in the diminution of mortality in children, whereas during the years of 1871 to 1880 thirty per cent of children died in the first year. In 1881 it was lowered to twenty-seven per cent, and in the present year down to 28.8 per cent.

“While of course, undoubtedly, other factors have played an important part in the improvement of mortality, such as improved dwelling places, sewers, etc., nevertheless the improvement of the milk, which is almost the only nourishment for children under one year, must be recognized as having the greatest influence in this respect.

“From the small developments mentioned above up to the great increase in milk supply and analogous products, there has been a further development as a result of this same enterprise. The by-products in the manufacture of cheese, etc., must be mentioned, such articles as lactic acid, salts of lactic acid, lactose and various preparations of casein, all of which find a market in various parts of the country, as well as being exported for use in pharmacy, dye factories, paper, textile industries, etc. So much has this become an essential feature of the dairy that special technical laboratories have been constructed.

“The bacteriological study of milk and its products has become so important in Berlin that it has been found necessary



to establish a special experimental station in which all the essential scientific questions concerning milk infection can be thoroughly worked out. Such, for example, is the effort to obtain in pure culture the various bacteria which render milk infectious, and in the same place inoculation experiments upon the smaller domestic animals, as well as feeding experiments upon both the small and the larger animals, can be thoroughly carried out.

"A special laboratory for the chemical analysis of milk has likewise been erected. In 1896, 26,480 analyses were made. In consideration of these various features the existing conditions of milk supply are the most favorable that can possibly be obtained; formerly the various suppliers of milk carried on a wholesale milk adulteration, at the present time as seen by analyses, this has been reduced to a minimum. To illustrate the importance of this analytical work it may be interesting to know that in 1881, 328 analyses were made; in 1891 over 16,000, and in 1896 nearly 27,000. All in all up to the end of the year 1896, there have been 202,533 analyses carried out. Such a quantity of material as this and such a multitude of analyses is unknown in any other institution in the world. In the various departments of this work which concerns the purity of the milk there are various officers in control. The superintending of the health of all the cows concerned in the milk supply is allotted to two veterinarians approved of by the state.

"In testimony of the excellence of this management, one sees medals of all kinds, the results of exhibitions both at home and abroad.

"Space will not permit to dilate here in this report on the special arrangements which the management makes for its employees. Suffice it to say, that for those engaged in the work every assurance is offered for their well-being.

"Special savings banks, restaurants and schools are arranged in connection with the institution, as well as smaller and larger societies of one kind or another, and every care is taken for the welfare of employees when taken sick and for the families of those who die during their term of service in this institution."

## THE MILK SUPPLY COMPANY OF COPENHAGEN.

In accordance with a suggestion made by Sir Charles Scott, when I visited him at the Embassy, I arranged with Professor Bang to accompany us to see the operations of the Milk Supply Company. The milk arrives about ten o'clock at night, so that was the hour at which we made our visit.

The company, while a private one, is operated on the philanthropic principles, not for profit—all earnings over five per cent are applied to reducing the price of milk, butter and cheese to poor people and supplying its patrons with absolutely pure sterilized milk at a slight advance, merely enough to cover the cost, as compared with other sources of supply. It is sold for six cents per litre. The following are the conditions which each farmer must not only agree to, but must carry out to the letter :

“(1.) The feed must be such that it does not affect the taste or character of the milk injuriously. The use of distillery slop and like substances for feed is absolutely prohibited, as well as the use of all feed that has been injured or is not well preserved. The use of turnips, kohlrabi, rutabagas, and the leaves of all kinds of root crops as food for the cattle is also prohibited. Carrots and mangels may be used to the extent of half a bushel per day for each cow, but only when the grain feed given amounts to seven pounds per day. Cows which supply milk for the use of children must not be fed mangels and carrots beyond the extent of one peck per day. Oil cake (rape-seed) may be fed to the extent of but one and one-half pounds per day, and this only in connection with at least five pounds of grain feed. Cows supplying milk for the use of children must not be fed oil cake of any kind. For other cows the grain mixture used shall receive the company's approval before delivery of milk can begin.

“(2.) In the summer time the cows must not be fed in the barn under any conditions. They must be pastured on clover and grass. Vetches must not be used for their food. When necessary, arrangements may be made with the company for the use of grain or green grain crops during the summer.

“(3.) The cows must be clipped on the udder, tail, and hind quarters in the fall before they are put in the barn.

“(4.) The time of calving of cows in the herd must be distributed as evenly as possible through the year, so that the amount of milk delivered, especially during September and October, shall not be less than two-thirds of the greatest amount delivered in any month.

“(5.) Fresh milk up to twelve days after calving must not be delivered, nor will the company receive milk from cows which give less than six pounds per day.

“(6.) The utmost cleanliness must be observed in milking, and the milk must be strained through a metal strainer covered with a clean woolen cloth.

“(7.) There must be at the disposal of the dairy at least thirty pounds of ice for every 100 pounds of milk produced on the farm.

“(8.) Every dairy must be supplied with a Lawrence milk-cooler. This may be rented from the company if desired.

“(9.) As soon as the milk is drawn from the cow, it must be cooled by the use of ice water on the milk-cooler, and this at all seasons of the year. This cooling should reduce the temperature of the milk to at least 4° Reaumur (41° F.) before it is shipped.

“(10.) The milk must be delivered at the railway station once or twice daily, as the company may desire, either as sweet milk or as half-skimmed milk and cream. It must not be sent from the dairy farm sooner than necessary to make the train, and in summer the delivery wagon must be covered so as to shade the cans.

“(11.) The company will supply the cans used for transportation, and they will be cleaned before they are shipped to the dairy farm.

“(12.) The cans must be rinsed in cold water immediately on their arrival at the dairy. They must be kept in an airy place, protected from all dirt, with the lids removed and opening downward, but so that the air has free access to the interior, until they are used.

“(13.) The can must under no circumstances be used for anything else than the transportation of milk.

“(14.) The dairy farmer must agree to answer all questions which the company may put to him concerning the milk.

“(15.) The dairy farmer must permit one of the company's veterinarians to examine his cattle whenever he chooses, and must carry out the directions which the latter may give him. He must also agree to furnish transportation for the veterinarian to and from the railroad station.

“(16.) Cows which the veterinarian finds have tuberculosis, must be removed from the herd at once and disposed of as soon as possible.

“(17.) Cows which are taken with any suspicious disease must be removed from the herd at once and the company informed of the fact, and, if necessary, the delivery of milk may be stopped until the veterinarian has had an opportunity to examine the case. But in such cases the company will pay for the milk at the same rate as though it were delivered.

“(18.) If any contagious disease occurs among the persons who live on the farm, or at the homes of the laborers who work on the farm, it shall be the duty of the dairyman to inform the company of the fact at once. The milk will, in such cases, be paid for at the usual rate.

“(19.) This contract may be terminated either by the company or the dairyman on the first day of any year, but with at least six months' notice.

“(20.) Should the milk be found to be of such an inferior quality as to be unfit for sale, the company reserves the right to stop its delivery without remuneration.

“(21.) If the sale of milk in Copenhagen should be stopped by reason of an epidemic or other non-preventable cause, the delivery must be stopped for a shorter or longer period without remuneration.”

(Anyone interested in the details of this most valuable establishment or the dairy industry in Denmark will find a most interesting report by Professor C. C. Georgeson, published by the Bureau of Animal Industry at Washington, 1893.)

They deliver milk in bottles at the houses and have shops for its sale. They sell pasteurized, non-pasteurized and infants' milk.

Infants' milk is obtained from cows specially fed—it is sterilized, diluted with water and sweetened with sugar, is sent out in Rhine wine shaped bottles ready to raise to the proper temperature, apply the nipple and give to the child—a great comfort

truly to many a poor mother to know that she is giving her baby milk pure, wholesome and sweet.

While waiting the arrival of the train conveying the milk, we were shown over the establishment. We were impressed with the absolute cleanliness of the whole place. Floors, walls, everything in fact about the place was absolutely clean. Water is freely used on floors and walls. The employees are mostly women. They do the bottling, bottle washing, and all the lighter details. They are neatly dressed in white aprons, sleeves and caps. The men, who do the heavier lifting, are dressed in white overalls, jackets and caps. The bottling is done by a special but simple machine; the corking by a corking machine; the tying is done by women, and each bottle is sealed with a leaden button which is stamped.

Everything used about the milk is sterilized after being washed first with a soda solution, then with hot water, then with steam.

On arrival of the train we witnessed the process from the initial stage. The milk cans are large, being made of block tin, with lids which are locked or sealed. Each is labelled with the name of the farmer who sends it, and in most instances the weight capacity is entered in a book. It is then weighed and the weight recorded. It must be reduced to 5° C. before leaving the farm and must not be over 10° C. when received.

A portion is now dipped out of the can, and part is poured into a vial which is labelled with the name of the farmer, and part into a tumbler; the latter is tasted by one or two women who are expert tasters, who look out for dilution, sourness, bad flavors, etc. If they discover anything amiss, the sample goes to the bacteriologist and it is examined and reported on, and the farmer is informed at once.

The accepted milk is poured into the receiving vat, and flows towards the sterilizer, in its course it rises up through gravel filters of three degrees of fineness, and through three piles of fine gauze. (The gravel is frequently washed and sterilized by heat.) The filtered stream then passes on to the sterilizer through pipes raised to 85° C. or 90° C. by steam or hot water, it merely passes through them and being raised to this temperature is at once cooled by passing through cold pipes to the bottling machines; or, if to be delivered in cans, to the canning

place. The sealed cans are then placed in large vats of iced water where they remain till early morning when they are placed in delivery wagons for distribution.

From the milk left unsold they make excellent butter on the premises which they put up neatly in crockery-ware jars and sell cheaply.

The farms are all under strict veterinary supervision, a sick animal is at once withdrawn, but the farmer is paid for the milk as if delivered, till the veterinarian makes his report. In addition to veterinarians there are a number of trained dairymen and men employed in travelling from farm to farm.

My attention was called to a very simple device in the construction of the delivery cans which ensures at least a fair distribution of the milk. The cans are long, consequently, if left standing, the cream rises to the top and those who are served from the tap near the bottom would receive almost skim milk; to obviate this, the pipe to which the tap is attached is perforated and reaches to the top so that in a sample drawn, the milk flows through the holes in the tube from the whole of the side of the can from top to bottom.

The following day we visited another large Milk Pasteurizing Company in Copenhagen under the guidance of Prof. Bang's assistant, the details of which, though different in some particulars, resemble the above described one. I cannot, however, close this report on dairying in Denmark without referring to an admirable institution which Prof. Bang showed us. It may be called a Permanent Butter and Cheese Exhibition. It is held in a large special building built and endowed by a wealthy citizen who took an active interest in promoting the dairy interests of his native country.

It contains laboratories and a museum of dairy utensils. The officers are experts in all matters connected with butter and cheese making. Weekly exhibitions are held of samples of butter and cheese sent in by farmers on receipt of a circular requesting them to do so, so that the samples are not selected, but are an average of what they produce. Three different sets of judges examine them and give them awards of merit independently. These judgments are then considered by the committee of experts, and prizes are awarded. The names of the successful competitors are published and their butter or

cheese receives the official approval of this college of dairying which helps them greatly in finding a market.

The unsuccessful exhibitors receive a report explaining the defects of their products and giving them directions how to prevent them and rectify errors—and as a result they may be prize winners at a subsequent exhibition. This butter is all made from sterilized milk, the cream is raised to 85° C., without in any way injuring it for butter-making or altering its taste. After the competition the butter is sold by the college and returns made to the maker.

The subject of Dairy Bacteriology was so frequently brought before my notice in Germany, especially in Saxony and in Denmark, that I regretted very much my want of time to give it sufficient attention to enable me to report on it. I have, therefore, been obliged to append the following extract from the report of Prof. Georgeson already referred to, which I hope will serve to create an interest in this subject which is one of the essentials of successful dairying:

“It is only between two and three years since the use of pure cultures of bacteria were introduced into the creameries of Denmark, and as a means of improving the butter, but the results have been so uniformly successful that they are now used in all dairies whenever there is necessity for them. The honor of the introduction of this improvement in creamery methods does not belong to any one man, though perhaps Prof. V. Storch, director of the experimental laboratory at Copenhagen, deserves the ‘lion’s share’ of the credit. He has been at work on the problem for some six or eight years, and from time to time has published the results of his researches. Other bacteriologists took up the same line of work, and the result was that pure cultures of the beneficial bacteria were put upon the market by the three different laboratories at about the same time. Prof. Storch had already then isolated and cultivated several forms of these bacteria, but he has not put any of them on the market.

“As the several investigators worked independently of each other, each can be credited with an original discovery, especially since the bacteria employed are not the same in all cases. From the investigations by Prof. Storch, Prof. Fjord, and others, it soon became evident that the quality of butter depended, at least

in a large degree, on the presence or absence of certain minute organisms. It was found that in faulty butter certain forms were present which, when isolated and cultivated, produced the characteristics which were objectionable. In like manner it was found that in high-class butter certain other forms were present, which would similarly produce the characteristic aroma and flavour when cultivated by themselves. This led to the natural recognition of two general classes of bacteria, one of which was injurious to the interests of the dairy, and the other one beneficial. When this fact had been settled, the practical question before the investigators was how it would be possible to repress one class and encourage the other. Prof. Fjord had, in the meantime, perfected his pasteurizing apparatus, which has been figured and described elsewhere. This was invented chiefly with a view to improve the keeping qualities of skim milk so that it might reach the patrons and other consumers in a fresh and sweet condition. This was accomplished by heating it to a temperature of upwards of 150° F. It was found that this temperature destroyed enough of the bacteria which caused the milk to change to make it possible to keep it sweet from twelve to twenty-four hours longer than when it is not thus heated. The next step was to apply the same treatment to the cream, or to the sweet milk before it was separated, with the same results. Heated to a temperature of 160° F., it was found that the most active forms of the bacteria were killed, and that by again cooling the cream to about 75° or 80° F., at which bacterial life becomes active, the cream could be inoculated by any desirable form of bacteria if these could be obtained from pure cultures, and that the forms with which the cream was thus impregnated, meeting with no opposition from other forms, would develop rapidly in enormous numbers and give their peculiar characteristics to the butter. This is exactly what is now done in practice. The cream is not always pasteurized, because if there are no injurious bacteria present, or at least such numbers as to cause a deterioration of the product, there is no necessity for attempting to kill them, and the addition in sufficient quantity of a pure culture would at once give the latter the upper hand, and their peculiarities would become prominent. A rather more thorough sterilization would be effected if the milk were raised to the



boiling point; but a temperature of much over 160° F. gives the characteristic boiled taste to both milk and cream, which is objectionable and must be avoided. It is found in practice that this temperature destroys nearly all the organisms in active growth. The spores will survive this temperature, but it takes them longer to develop and by the time they become ready the pure culture has the mastery.

“As a higher degree of heat than that required for their normal development is destructive to the bacteria, so in like manner a reduction of the temperature retards their growth. It does not destroy them, if not below the freezing point, but it stops their development and renders them inactive. It is for this reason that pains should always be taken to reduce the temperature of the milk, by means of ice water, to a point as near the freezing point as practicable. Heat and cold, relatively speaking, are therefore effective means in controlling bacterial life in the creamery.”

PROFESSOR JAMES LAW, OF CORNELL UNIVERSITY, NEW YORK, SUMS UP THE QUESTION OF TUBERCULIN TESTS IN CATTLE, AS FOLLOWS:

THE TUBERCULIN TEST.

Much has been said and written against the tuberculin test by those who have never used it, and who are therefore utterly incompetent either to endorse or condemn it, but for those who aim at the prompt and thorough eradication of the infection from a herd, and at the securing at once of a guarantee of progeny, beef and dairy products, no resort can, as regards its efficacy, be at all compared with the tuberculin test.

*Tuberculin* is a sterile solution of the products of the artificial culture of the tubercle bacillus. In its preparation it has been treated to a boiling temperature which is as fatal to a tubercle bacillus in liquid medium as it is to a hen's egg. But this is not all, even the dead bacilli have been separated from the liquid by passing it through a porcelain filter. The remaining liquid (tuberculin) is absolutely sterile and can plant and propagate neither the tubercle bacillus nor any other living thing. It can poison if given in excessive doses, as alcohol can poison, but it can no more produce the germ of tubercle where that does not exist than can distilled alcohol plant the yeast germ and start a new vinous fermentation. "The insane fear of tuberculin is the fruit of an ignorance of its true nature and of a blind prejudice which withholds its victim from informing himself on the subject."

As we produce tuberculin in the bacteriological laboratory of the N. Y. S. Veterinary College, and distribute it free, for use by approved parties in this state, we can speak with confidence of the absolute harmlessness of the agent when intelligently employed. We aim at securing no profit in making this agent, but charge only for packing and shipping. We have therefore no interest in its manufacture, for on the contrary the greater

demand from residents of this state for tuberculin the more unremunerated labor is heaped upon us.

The value of the agent consists in this, that the hypodermic injection of an appropriate dose in a tuberculous animal, however lightly affected, produces in the course of the succeeding twenty-four hours a rise of body temperature and other indications of fever. The gradual rise and fall of the temperature in the absence of any other diseased or physiological condition which would bring this about is the most reliable of all symptoms of the presence of the disease. Upon the sound animal system such a dose of tuberculin produces no appreciable effect.

It is important, however, that I should not be misunderstood in this matter. The man who will use tuberculin without due caution and without due consideration as to the condition and environment of the animal, and who blindly condemns on any rise of temperature will almost certainly condemn non-tuberculous animals and bring the tuberculin test into discredit. The intelligent use of the test, demands an intimate knowledge of the kind of animals tested, both in the healthy and diseased condition, and a careful scrutiny before and during the test.

1st. *The subject must be in good general health.* If there is present in the system any concurrent disease it may undergo an aggravation within twenty-four hours and give a rise of temperature that will be mistakenly set down for tuberculosis. At the very start, therefore, it is important that the general health of the subject should be first assured by a critical professional examination. If some other disease is present the tuberculin test had best, as a rule, be delayed until that has subsided, while if tuberculosis is found the test will be superfluous.

2d. *The subject must not be within three weeks of parturition, nor about to abort.* In many cases, though not in all, as preparations are made for calving, the system becomes unduly susceptible to the presence of tuberculin and that agent will cause a rise of temperature, though no tuberculosis is present. Unless this source of error is carefully guarded against the most valuable cows in the herd may be condemned unjustly.

3d. *The cow must not be within three days of the period at which "heat" would naturally occur.* Under the excitement of œstrum the body temperature usually rises two or three degrees, and if tuberculin has been used this rise may be attributed to

tuberculosis and a sound animal may be condemned. Nor it is always enough that the animal is supposed to be pregnant. Abortions sometimes takes place unexpectedly and unknown to the owner. If, therefore, a cow under the test and which is not well advanced in pregnancy should show a rise of temperature it should be at once ascertained whether the animal is not in "heat." If symptoms of "heat" are found she should be set aside along with any calving cows to be tested again when such a source of error is no longer present.

4th. *The tested animal must not be exposed to a hot sun in a closed area.* In excess this will cause heat apoplexy, and the fever heat which ushers this in may easily be mistaken for the indications of tuberculosis.

5th. *Cattle taken from pastures must not be enclosed in a hot, stuffy stable.* While they must be tied up to allow of the temperatures being taken at short intervals, coolness and ventilation should be secured in summer by a sufficient air space and the requisite ventilating openings.

6th. *Exposure to cold draughts between open doors and windows, or to wet or chilly blasts out of doors should be carefully guarded against.* A chill proceeding from any source and alike in the presence or absence of tuberculin causes a rise of the internal body temperature.

7th. *Heavy cows unaccustomed to stand on hard boards may have a rise in temperature in connection with resulting tenderness of the feet.* One must avoid hard floors on the day of the test or make examination of the feet and allow for attendant fever.

8th. *Omission of the previous milking or a change of milker and consequent retention of part of the milk will raise the temperature of a nervous cow, and in careless hands secure an erroneous condemnation.*

9th. *Privation of water at the regular time will often cause rise of temperature especially when on the dry feeding of winter.* I have seen a general rise of two degrees and upward from the delay of watering for a single hour, while after watering the temperature went down to the normal and remained so. Water always tends to a temporary lowering of temperature but in the presence of tuberculosis it soon rises again.

10th. *Change of food is liable to produce a slight indigestion and rise of temperature.* This should be avoided as far as possible, and when a herd is taken up from pasture for the test it should have grass, ensilage or other succulent food.

These are examples of the sources of fallacy which attend on the reckless and unintelligent use of tuberculin. They only show that skill and training are necessary to its successful use, and that in the absence of these the apparent results are not to be too unhesitatingly accepted. In all cases, in the absence of the requisite education and experience it is desirable that the animals which have shown a rise of temperature should be separated from the herd and tested anew after the lapse of three or four weeks. In this way such errors may be almost entirely excluded.

11th. *An animal with advanced tuberculosis sometimes fails to react.* The subject is, however, usually emaciated and bloodless, breathes hard and has rapid pulse on exertion and shows unequivocal symptoms of tuberculosis to the skilled examiner. Such cases can, therefore, rarely escape a physical examination. They are noticed mainly to guard against the mistake of making the rise of temperature or its absence the sole test of tuberculosis.

12th. It is objected to tuberculin that it detects even the slightest and most latent cases of tuberculosis, some of which would recover and many would remain useful for years. This objection would be valid if our object were to obtain the greatest possible money return from the individual tuberculous cow at the expense of any risk to the sound herd. But tuberculin is, and should be used for the purpose of a complete eradication of the tubercle bacillus from the herd and the preservation of a sound stock which with its products will be above suspicion. If this is not aimed at; if the latent cases are to be retained in the herd and the advanced cases only removed then truly tuberculin should have no place in your system. Physical examination should be all sufficient for your purpose. But you could not place the herd at once above suspicion, you could not sell its members with a guarantee of soundness, and you could not assure the consumers that the uncooked dairy products were safe.

The animal with local tubercle may not at the present time be diffusing the poison, but where such animals are preserved one

will at intervals have the local tubercle extended so as to cause generalized tuberculosis; and as this extension necessarily takes place by the conveyance of the bacillus through the blood, and as such bacilli must be circulating in the blood before they can invade new tissues and form new tubercles, it follows that there is always a period between the entrance of such bacilli into the blood and the development of new tubercles in which the blood and all blood-containing organs are infecting, though no symptom nor lesion of new tubercles can be detected. At this stage the animal may convey tuberculosis through its flesh, or through its dairy products, while even a post-mortem examination would pronounce it free from generalized tuberculosis. It is also liable to distribute the germ to other members of the herd before any suspicion of immediate danger is entertained.

*Deduction.* It may be concluded from such considerations as the above that the tuberculin test is indispensable where one aims at a guarantee of the soundness of the progeny and dairy products of a herd, but that its use demands one of two conditions.

*A.* That the animals showing tuberculosis under the test shall be destroyed and the buildings where they have been shall be disinfected; or,

*B.* That such infected animals, as have the disease in a latent form, shall be formed into a separate herd and kept well apart from other stock, for breeding purposes only; or if their milk is used that it shall be first subjected to sterilization.

The stockowner who values the sound portion of his herd cannot afford to allow even the latent cases of tuberculosis to mingle with it.

#### TUBERCULIN IN MODERATE DOSE HARMLESS TO SOUND CATTLE.

The concurrent testimony of all veterinarians drawn from hundreds of thousands of tests is that the ordinary test dose is harmless to a nontuberculous animal. In 1894 I put this to a crucial test on five cows (Holstein, Jersey and grade) injecting the tuberculin on six successive occasions and found that it produced no appreciable change in the general health as evidenced by temperature, breathing, pulse, yield of milk or quality of milk. I feel accordingly that I can speak with the greatest con-

fidence as to the entire harmlessness of the tuberculin test on a sound animal.

That it rouses into a temporary activity the tuberculosis already existing in the unsound animal is true. Were it not so it would be useless as a diagnostic agent. But if the state stands ready to destroy and pay for the diseased, there can be no possible objection to the temporary aggravation which leads to the purification of the herd.

“EXTINCTION OF TUBERCULOSIS WITHOUT THE TUBERCULIN  
TEST.

As successful examples of this I may quote from my own personal experience.

1st. A herd of about 200 head belonging to the Willard Asylum had become badly affected with tuberculosis and on physical examination, without the use of tuberculin, I condemned about 50 per cent. These were accordingly destroyed and new barns and yards were constructed at some distance from the others and filled with cows selected from the most healthy herds available. These were bred to healthy bulls and a new herd gradually built up. Meanwhile the remaining 50 per cent of the original herd were gradually slaughtered, and like the original half of the herd were found to be tuberculous without a single exception. The original barn was thoroughly cleaned, repeatedly disinfected with chloride of zinc and with its cleansed and disinfected yards was left unoccupied for an entire year. The fields on which the original herd had pastured were used for other purposes than pasture for two full years. The new herd was carefully watched and any cow which contracted a cough or showed especially poor health was at once separated from the herd and disposed of. This treatment of the new herd was kept up for over twelve years, and in the middle of December, 1897, I subjected the mature animals of the herd to the tuberculin test, and found not a single case of tuberculosis. I have never before subjected an untested herd of this size to the action of tuberculin without finding a considerable percentage of cases of tuberculosis. The splendid showing is highly instructive as to the high value of intelligent management even without the aid of tuberculin. Here a large herd was maintained under the

same conditions of food, milking and housing (even in the same barns) as the former herd which became universally tuberculous, and, even under the crucial test of the tuberculin, furnished not a single case of tuberculosis. The only difference is that with the present herd intelligent measures were taken to exclude the germ of the tuberculosis. The case is all the more striking that some of the most important precautions against the spread of tuberculosis in a herd were not put in force. The cows were not taught to keep the same stall on all occasions, but went into any stall that was convenient. Then there were no partitions between the feeding places of adjacent stalls and one cow could lick up the food from the two stalls on the right and left as well as from her own. With an infecting cow in the herd, therefore, there was every opportunity for a speedy spread of the infection. In spite of such obvious opportunity for infection the careful selection of the first members of the present herd, the building up of the herd by home breeding only, and the weeding out of all suspicious animals succeeded in excluding any trace of tuberculosis.

The experiment, however, entailed the entire destruction of the original infected herd, and though the post-mortem examination showed that in this instance this step was necessary to a successful result yet in many other less universally diseased herds the larger part could have been saved by picking out the diseased with the aid of the tuberculin test.

2d. In Cornell University herd, which numbers about sixty cattle, old and young, tuberculosis led to the destruction of a number of individuals. The diseased, however, were disposed of as soon as objective symptoms showed the presence of tuberculosis, and after some years of this weeding out when I tested the whole herd with the newly discovered tuberculin I could find no trace of the disease except in a young bull which had recently been acquired from another herd. Since his destruction I have tested them repeatedly, but have found no trace of tuberculosis.

#### EXTINCTION OF TUBERCULOSIS WITH THE AID OF TUBERCULIN.

If a herd has been bred up from home stock without the introduction of any animal from without, and if for a number of years there have been no losses and no illness suggestive of any form of tuberculosis there is a fair presumption that it is free



from that disease. But in the average herd, and especially if sickness or death has occurred, even if such has been attributed to something else, it is a wise precaution to subject the whole to the tuberculin test. The measures to be adopted may be thus enumerated.

1st. Apply the tuberculin test to the entire herd.

2d. Remove all animals showing a rise of temperature which indicates tuberculosis.

3d. Destroy and burn, boil, or deeply bury all cases of the disease, unless it is decided to form an isolated herd of latent cases which are in good condition. (See above.)

4th. In case of doubt or disturbing influences which may have caused rise of temperature (nearness to calving, heat, exposure, concurrent disease, changes in management, etc.), keep the suspected animal apart for three or four weeks and test again. This will almost certainly correct any mistake of the first test.

5th. Repeat the test every three months and if two successive tests show no indication of tuberculosis the herd may be accounted safe.

6th. As soon as tuberculous animals have been removed from a stable let it be vacated and thoroughly disinfected with chloride of lime, 4 ounces to a gallon of water and enough quicklime to make a good whitewash, which will show if even a square inch has been missed. When chloride of lime is objectionable because of its tainting the milk, mercuric chloride may be used in the proportion of one drachm to a gallon of water, to which is added one drachm of sal ammoniac and 5 drachms of common salt. This is much more poisonous than the chloride of lime and must be cautiously handled during its application. The walls, roof, and especially the floor, gutter and feeding trough must be first thoroughly scraped, washed and cleaned, all rotten woodwork must be removed, and in case of double boarded walls, the boards must be removed on one side to permit of a thorough application.

7th. In making new purchases avoid any herd in which tuberculosis has appeared, or which has had sickness or deaths in recent years.

8th. Don't purchase from city, suburban nor swill stables.

9th. Don't take a cow which is in ill health or low condition, especially one with cough, nasal discharge, foul breath, hard nodules under the skin, diseased udder, swollen loins or joints or a tendency to scour or bloat.

10th. Test every fresh animal with tuberculin before admitting it to your herd, unless it has been recently tested and has not since been exposed to possible infection.

11th. Don't admit strange cattle to house, field or yard with your own. Keep them apart until tested with tuberculin.

12th. Keep each animal in your herd strictly to its own stall and manger.

13th. Board up the partitions of the stalls in front so that no two cows can feed from the same manger nor lick each other.

14th. Be especially observant of the older cows and on the slightest sign of ill health separate and subject to the tuberculin test.

15th. In case a herd of cattle is found to be tuberculous subject to the tuberculin test all the domestic animals that have mingled with them freely and fed from the same troughs. Remove those that show a reaction.

16th. Exterminate the vermin (rats, mice, sparrows) in a building where tuberculosis has prevailed.

17th. Let no consumptive person attend on cattle or other live stock, nor prepare their food."

The cattle commissioners of Vermont, as the result of their experience in dealing with tuberculosis, publish the following, as their conclusions of preventative treatment.

#### "8. PREVENTION.

Since the results of curative treatments are unsatisfactory, and prevention is the watchword, *how may the disease be most surely prevented? Both human and bovine tuberculosis are distinctly preventable.* The measures that may be taken to prevent its spread are, briefly :

1. *Rigid official inspection of cattle, meat and milk.*
2. *The immediate destruction or sterilization of human sputa and all tuberculous discharges.*
3. *The careful disinfection of rooms, hospital wards, barns, etc., occupied by tuberculous men or animals.*

Though thus briefly summed, the execution of these measures involve a mass of details. Sumptuary laws are always difficult to enforce and questions of possibility and expediency should enter into consideration before enactment. "The fountain cannot rise higher than its source," and until the people thoroughly appreciate the dangers and understand the cause and means of prevention of tuberculosis, its control will be difficult.

The following precautions will be found useful by the stock owner in weeding out or keeping out tuberculosis.

1. The cow stable should be light, well ventilated and dry, the water pure and fresh, the feed nutritious and plentiful, the breeding judicious, with due regard to constitution.

2. So far as possible cattle should be kept from licking each other, from eating from the same manger and from interchange of mangers.

3. Suspected animals should be isolated, should neither eat nor drink from a common manger or drinking trough, nor should their orts be fed to other cattle. Old cows, those having husky or rattling cough, wheezy breathing, nasal discharge, enlarged glands under the skin, diseased udder, garget (sometimes), diseased joints, etc., unthriftiness in general, cattle with weak constitutions and poor physical conformation (narrow chest, light barrel, long legs, pot bellies, etc.), are most open to suspicion. Such animals should be examined by a skillful veterinarian, and in case of doubt should be tested with tuberculin. If a single animal shows tuberculosis, the whole herd should thus be tested.

4. No new animal should be admitted from herds in which contagious disease has existed, from city or swill stables, or that show signs of disease or unthriftiness, unless tuberculin tested. It is almost equally desirable that unsuspected animals also be thus tested.

5. No consumptive person should work with live stock or prepare their food.

6. All tuberculous animals should be killed and their carcasses either burned or deeply buried in places where animals have no access.

7. Disinfection should be thorough and extend to all products of and articles used by the cattle. The means used at this Station were burning sulphur in the closed stable, washing or spraying every square inch of surface with a solution of one part corrosive sublimate in one thousand parts of water and the replacing of all the woodwork of the mangers. *Corrosive sublimate is a violent poison and should be used with care.*

The following directions for disinfection will be found useful in cases of animal disease :

1. Remove and burn all loose litter, hay, rubbish, etc.
2. Wash all mangers, hay racks and all woodwork with a dilute solution of corrosive sublimate as stated above.
3. Whitewash all the inside of the building, especially mangers, hay racks, etc., and all wooden utensils used in the barn with a white wash containing one pound of chloride of lime to four or five gallons of water.
4. Remove and burn all rotten woodwork, particularly about the mangers, drinking troughs, etc. It is advisable to replace these even if sound.

#### 9. RELATION OF THE STATE TO TUBERCULOSIS.

The relation of the State to contagious and infectious animal diseases is a question on which there is wide diversity of opinion and practice. The most effectual work in the suppression of animal disease is that done under governmental supervision since it is more apt to be done in a systematic, intelligent and thorough manner. The National government has recently stamped out contagious pleuro-pneumonia in cattle, but tuberculosis is wide spread, more insidious, more difficult to diagnose and cannot be thus easily handled. The experience of other states in this matter may prove instructive.

We have obtained this data by correspondence with the officials in charge of this work in the various states.

Maine, New Hampshire, Massachusetts, Maryland, Ohio, Indiana, Illinois, Michigan, Kansas, Colorado and Missouri have boards under various names, essentially cattle commissions. In Vermont, Rhode Island, Connecticut and Pennsylvania the boards of agriculture, or a committee of the same, act as cattle commissioners. In New York, New Jersey, Minnesota and

Tennessee the state boards of health attend to this matter. Most of the Southern states and some of the far Western states exercise no control whatever over animal disease. Some of the boards have veterinarian members, some do not. All, however, employ veterinarians.

Data was obtained from all the states having controlling boards east of the Mississippi, with the exception of Wisconsin."

## BOVINE TUBERCULIN TESTS AND THEIR RELATION TO OUR DAIRY PRODUCTS.

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Paper read before the Academy of Medicine and Science, Portland, Me., February 13, 1899, by Dr. George H. Bailey, State Veterinary Surgeon of Maine.

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My paper this evening may be fairly regarded as supplementary to the one read by me before this association in February, 1897, and while I may congratulate myself that there was nothing said upon that occasion I wish to retract, I can also congratulate you, gentlemen, upon the comparative brevity of my present thesis. If anything I shall say this evening, however, should challenge an explanation from any layman or professional present, I can only hope to comply. On March 24, 1892, Dr. Robert Koch of Berlin, Germany, read a paper before the Physiological Society of that city, in which he announced the discovery of the microbe causing this disease, and named the germ "bacillus-tuberculosis." Koch demonstrated the presence of the germ in the sputa or tubercle of over a hundred cases of consumption, and successfully inoculated nearly five hundred lower animals, producing in them the same disease. The concluding portion of his paper is yet to be disproved. "We can with good reason say that the tubercle-bacillus is not simply one cause of tuberculosis, but its sole cause, and that without tubercle bacilli you would have no tuberculosis."

It may not be out of place to define bacteria, and describe briefly the present status of the germ theory of disease. All soil, air, water and living beings, vegetable and animal, is pervaded with many forms of minute vegetable life. They belong to several distinct classes or families, but on account of their microscopic size, they are generally grouped under one name as

micro-organisms. Bacteria, also called microbes and germs, are microscopic plants, consisting of single cells, containing protoplasm, the vital substance by which the process of nutrition, secretion, and tissue building are utilized; and they reproduce themselves by the divisions of the parent cell into two smaller cells, the process being constantly repeated. Under the more favorable conditions they multiply with great rapidity, and a bacterium may develop and be ready to reproduce itself in a few minutes. In milk, germs seem to find ideal conditions, over 200 distinct types of harmless and harmful bacteria having already been found in its products, old and new, up to the present time. They are at present provisionally divided into groups based mainly upon their form. The principal groups are the globe shaped bacteria (micrococcus) the rod-shaped bacteria (bacillus) and the spiral or cork-screw bacteria (spirillus), and each of these has many hundred of species. Warmth, moisture and organic matter favor bacterial growth, while sunlight, the best of all disinfectants, and low temperatures retard them. Some species are readily destroyed, others are very resistant, even to extreme degrees of heat and cold. Disease is often the result of the growth of bacteria in the bodily tissues, and the pathogenic (disease-producing) germs are mainly micrococci and bacilli; the product of their growth being poisonous; and a definite disease is due to the effects of the poisons (ptomains) produced by a definite species of germs. Thus diphtheria, typhoid fever, leprosy, cholera and tuberculosis have their separate germs recognizable and distinguishable, one from the other. The germ, (bacillus-tuberculosis) is a parasitic vegetable micro-organism, which when placed under that instrument which has conquered the world of minuteness for natural science, there is presented to the eye a minute rod,—usually slightly curved, and measuring upon an average about one ten-thousandth of an inch in length, and it is this little, infinitesimal “high-cock-a-lorum” that is accountable for the deaths of fourteen per cent of the population of the world. It has been computed that if an average sized man were proportionately magnified to a single tubercle bacilli, he would be sixty miles high, and if he were to lie upon that thread of steel that stretches from Portland to Augusta, his head might lie in Union station, with his feet at the Capitol.

It is the most minute of all recognizable germs, with perhaps the exception of that of bovine contagious pleuro-pneumonia, which pathologists have long sought for without success, their failure being due to the fact that this germ is so extremely small that even the perfect microscopes of the present day are not sufficient to enable the observer to make out its form and dimensions; and we must, therefore, accept the fact that there is a world of life that the microscope is powerless to reveal, just as we have long known of a world that our unaided vision could not detect.

The germ lives in the animal tissues and thrives best at a little above the normal temperature of the human body. It has great vitality, resisting heat at any temperature below 150° F., moisture, drought, decay, and often all the processes of digestion. The tubercle-bacilli has lived for many weeks in ice and found equally virulent on thawing, and the sputa of consumptives dried on glass and formed into dust will inoculate guinea pigs four to six months afterwards, and Koch has cultures three years old which have passed through forty generations and still retain their virulence.

That the disease is contagious has been recognized from the dawn of medicine to the 18th century, while the revelations of the post-mortem rooms connected with metropolitan hospitals in this and other countries have shown that sixty per cent of hospital patients who die have suffered at some time in their lives from infection, as evidenced by the characteristic lesions which have been left behind, and proving pulmonary consumption to be no more than a fragment of a great constitutional malady.

There are three methods of infection: By inhalation (breathing the germs into the lungs); by ingestion (swallowing the germs in meat or milk); and by inoculation (through a cut or wound), and while man gets his infection mostly from his fellowman, it must be distinctly understood that the breath of the tuberculous is not in itself infecting. It is the prevalent diffusion of millions of infected germs and their distribution in dust so that they can be easily inhaled that remains the great source of danger.

The bacillus-tuberculosis, from whatever animal derived, has a similar, apparently an almost identical morphology, and its



propagation through dust agree, no matter what the source from which it was obtained.

Late in November, 1890, Koch first published the results of experimental work upon tuberculous guinea pigs with a fluid of his own preparation. This fluid, which he called tuberculin, was stated at a later date to be highly concentrated, sterilized and filtered liquids in which pure cultures of the "bacillus-tuberculosis" had been grown; a pure culture consisting of the growth of one species of germ by itself, all others being excluded.

Tuberculin is prepared by growing the tubercle-bacilli in a pure culture until a large amount of ptomain is developed. Glycerine and carbolic acid are then added, and the mixture is filtered through a porcelain plate to remove the germs. The filtered product is then heated to 225° F. to destroy the vitality of any germs which may have passed the filtering process, and then evaporated at a low temperature until concentrated. Koch's newest method is an apparatus for crushing the bacilli; by its means micro-organisms are crushed and destroyed, while the spores and toxins that escape are largely destroyed by sterilization.

The test upon cattle is made by injecting the fluid under the skin of the neck or shoulder by means of a sterilized hypodermic syringe, two cubic-centimeters of a ten per cent solution being used. The normal temperature of cows may vary from 100° to 102° and is taken before or at the time of injection, and tuberculous animals respond by a rise in temperature, usually beginning from eight to ten hours after injection and continuing as late as the twenty-fourth hour. The great objection to the action of tuberculin in the human patient is that it acts as an excitant, arousing the germs to increased activity and tending to scatter the infection throughout the body, as shown by a rise of temperature of from 2° to 8° F., but the very features which prohibit its use as a cure, are those which have given it its great value and popularity as a diagnostic agent in determining the disease in cattle. When tuberculin is introduced into the body of an animal in the slightest degree affected by tuberculosis, the tolerance of the system which had been gradually acquired, is overcome, and the toxic effect is manifested in what is termed a reaction; while as proof of its harmless effects upon well

animals, among the first tests made in New England were those at the Vermont Experiment Station in the case of the cow "Rena Myrtle." This cow was tested every six months for four or five years, and then gave the largest milk and butter record ever got at the station from any cow, of any breed; when she produced 546 pounds of butter; and during the experiments at the Bureau of Animal Industry, Washington, D. C., over 3,000 cc.'s of tuberculin were injected into a cow at intervals, and the animal remained in perfect health at the close of the year. If the living bacilli are not in the system, the amount injected fails to make any impression whatever and is properly eliminated.

Among the objections which have been raised to its employment in cattle, but few of them will stand the test of scientific investigation, and as experience in its use has brought a greater measure of success, unfavorable reports are becoming rare, and many who considered tuberculin unreliable are now acknowledging the fault was their own, and that conclusions had been reached from far too restricted premises.

A survey of the whole field shows, that if at the time of testing, suitable aseptic precautions have been observed, the animal is not in heat, or near parturition, and there is at the time no concurrent disease, that not two per cent of cows will react upon the first test unless tuberculosis is present, while my convictions are daily being strengthened by practical work, that no animal reacting under such conditions should ever be released from quarantine, and again allowed to associate with sound animals. I have encountered in my practice a few well advanced cases of tuberculosis that absolutely refused to show any reaction to tuberculin, where the system of the animal was so thoroughly saturated with natural tuberculin that the slight addition injected had no apparent effect, but such animals have only been tested for experimental purpose, and could have all been safely condemned by physical examination, which until tuberculin was discovered was a "delusion and a snare" to all veterinarians.

It is a very important fact, however, that tubercles, when they affect the lungs, are not deposited at random, but in the upper lobes, and has a most important bearing upon the diagnosis, in cases that might otherwise be doubtful, that the favorite habitat of pulmonary tubercles is the upper part of the superior lobes of the lungs; while the converse of this is true of common

inflammations of the lungs. Pneumonia affects by preference the lower lobes, and when it occupies the superior lobes, it generally has arrived there by traveling upwards from the inferior. In physical examinations of bovines my profession encounters many difficulties medical men do not. We were always confronted with an unknown quantity, when an advanced case of chronic pneumonia, or interlobular pulmonary emphysema called for a deferential diagnosis in any anti-mortem examination, and always liable to overlook an animal sleek and fat, often giving large amounts of apparently normal milk, and yet be infecting other stock as well as those using her products, while attempting to separate diseased from healthy animals.

An experienced veterinarian may detect altered sounds on percussion and auscultation of the chest, but the heavy muscular development of the shoulder, the thick hide and hair, the rumbling and crepitating sounds from stomach and bowels, pressing forward upon the lung, all contribute toward a failure to recognize our case, and we find pathologically that with one entire lung and a considerable part of the other rendered functionless by diseased conditions, the respiratory exchange is still ample to sustain life, while in your subjects the sound resulting from the first gentle tap upon or beneath the clavicle, often rings in the physician's ear the death knell of his unfortunate patient.

The claim that in some cases cattle would react to tuberculin where no tuberculosis could be found upon post-mortem, is largely attributable to the crude and rough-shod manner of holding autopsies in barnyards or open fields where a thorough search was often impossible. Often a few small tubercles at the bifurcation of the trachea may be overlooked, or possibly in the joints or bone, and Nocard states that "There is a stage in the period of incubation when it was too early for the tubercle to have been formed yet the reaction showed the presence of the disease," but it is impossible to define that stage. Tuberculosis of the joints and bones is very common, familiar examples of which are hip-joint disease, white swelling and Pott's disease of the spine.

It has even been charged by some of our horny-handed sons of toil, that the extensive lesions often found in cattle condemned by the cattle commissioners, were caused by veterinarians, who injected poison into their cows with their "squirt-guns" to give

them the disease. Others objected that tuberculin was too *accurate*, because it condemned cattle so slightly diseased they ought not to be destroyed. A cow is tuberculous, however, if but one lymphatic gland be affected, and contains the specific germ of the disease, and if tuberculous at all, she may be infectious, and such mild or latent cases be liable to assume at any time an acute type under unusual conditions, and a cow may appear to be in ideal physical condition so far as the eye could read external symptoms, while "within they are like whited sepulchres full of dead men's bones."

In summarizing: Tuberculin may be said to be for the veterinarian what the X-Ray is to the medical practitioner, that it invariably *locates* the *presence* of the disease.

A good deal of discussion has been indulged in over Prof. Bang's method of eradicating tuberculosis from the herds of Denmark. He first caused all herds to be tested with tuberculin, and all animals reacting are isolated in a separate building—all showing clinical symptoms are killed—the others are bred from, and their calves as soon as born are removed before they suck the diseased mothers, or are licked by them. The calves are placed in uninfected buildings and fed either on milk from tested cows or sterilized milk and not exposed in any way to direct or immediate contagion. It is claimed that with few exceptions they grow up healthy. They are, however, tested twice a year, the reacting ones are removed, and the cows are killed off as they show clinical symptoms or become fat. I can hardly believe this system will ever prevail in Maine, or that milk pronounced unfit for calves will be prescribed for human beings, or that we will ever lose sight of the fact that it is just as important for animals to be born *right* as it is for mankind, and whether it be called diathesis or vulnerability, the predisposing cause can under no circumstances result in tuberculosis without action of the essential cause, and is most certain to produce its specific pathogenic effect in tissues debilitated by hereditary or acquired causes.

Sanitarians should insist that the great laws of physiology and heredity will never change, and I occasionally throw a "cold chill" down the backs of heredity unbelievers by citing to them the results of the inspections in the Danish abattoirs, where all such cases are specially looked for under government authority;

that while evidences of hereditary transmission are not often met with, yet in ten years they had discovered eighty-five calves born with tubercle; congenital tuberculosis. Great as is the influence of heredity in health and disease, it cannot be regarded an only or common cause of tuberculosis; under the most adverse circumstances a healthy progeny is sometimes seen, at other times where everything seems favorable, the opposite is seen, and in every case while heredity is a factor; and never an only one; it always takes the line of the least resistance. Professor McEachran of McGill College in a recent visit to Denmark, was shown two calves in the post-mortem room, which the inspectors had just sent in as affected at birth by tubercle. An examination at once disclosed in both small tubercles in the bronchial glands and liver, the disease being especially liable to attack the liver in which so much of the placental blood at once circulates. The foetus may also be infected through the semen of the sire, but the ovum thus early affected rarely attains to its full intrauterine development. It may also be affected from the tuberculous generative organs of the dam; but here again abortion is liable to cut short the existence of the embryo; although in spite of all drawbacks a certain small proportion of the offspring are affected with tuberculosis and come to the full period of gestation. And he explains that in a cow with advanced tuberculosis the bacilli could easily pass to the placenta, thence to the liver of the foetus and so into the general circulation. He states that he had on several occasions seen tuberculosis of the placenta, and often of the uterus. These were dangerous infective cases, the bacilli escaping in the uterine discharges.

The bacilli of tuberculosis are non-motile, and cannot penetrate into the tissues without assistance, and the fact that the majority of our meats are thoroughly cooked also reduces to a minimum the comparative danger, even when from tuberculous animals, although experiments have been made which demonstrate that meat may be roasted and boiled and yet the center of large pieces remain infectious.

In Europe where the disease is rampant, and where the price of meat is almost beyond the reach of the poorer classes, the matter of the disposition of tubercular flesh becomes largely an economic question. Confiscation of all tuberculous carcasses

would raise the price of meat beyond the limit of the poorer classes, so that only the cases of general tuberculosis are condemned, the milder cases being allowed to go on the market as tuberculosis meat and sold at reduced prices.

A system of meat inspection should be inaugurated in this State so that the consumer can buy a piece of meat in any market in the country knowing that it has been inspected and that it did not originate from any animal diseased, or only fit to furnish meat that is suspiciously wholesome. "No embalmed beef for Maine."

The type of tuberculosis common among cattle is decidedly *chronic*, and rarely *acute*, and while mankind usually show the disease by failing health in much earlier stages than bovines, the latter fail to show external evidence of the disease until it is far advanced. Their appetite and function of digestion does not appear to be interfered with, and they readily take on flesh, and produce large quantities of milk, while extensive lesions of tuberculosis are present.

Among other domestic animals that readily contract tuberculosis are swine and poultry, while sheep, dogs, cats and rodents are more rarely affected. But the latter, one and all, take it easily when inoculated. Rats and mice also readily contract the disease from feeding in the mangers of tuberculous cattle and swine, and thus carry the disease from the barn to the house. In several instances in this State, I have discovered among dairy herds where the skim-milk was fed to swine, they all became affected with hardly an exception, the remedy for which would seem to be, to pasteurize all milk before being used or delivered to the creameries. Pasteurizing milk for ordinary use requires a heat of 158 to 160 degrees F., while if milk was to be completely sterilized, to destroy all spores before being given out to creameries, it would require to be raised to 185 or 190 degrees F., although heating above 160° coagulates the albumen and lessens its digestibility and nutritive qualities, for the use of infants and those convalescing from acute diseases.

The modern and accepted plan now in vogue in many dairies, in the absence of pasteurizing milk, is to employ one of the centrifugal machines that make from 65,000 to 75,000 revolutions per minute and while the use of the separator does not extract all the impurities and harmful bacteria from milk, it does remove a very

large quantity of both. Those who have had opportunities to examine what is commonly known as "separator slime" will have noticed after skimming, the inside of the bowl is covered with a grayish viscid matter that is very repulsive in appearance. This slime upon being analyzed is found to consist of the viscous portion of the milk, in which is entangled hair, particles of manure and filth of all kinds, and also fairly alive with injurious bacteria. It is becoming not unusual now in well regulated dairies who make it a point to sell absolutely pure and wholesome milk, to run the whole milk through the separator, and then add the cream to the milk again, when they find it much more wholesome, and that it will command a better price with all those who believe that "cleanliness is next to godliness," which is particularly true in all dairying operations; while no gravity process of separating cream is so complete as the centrifugal process.

As a higher degree of heat than that required for their normal development is destructive to the bacteria, so in like manner a reduction of the temperature retards their growth. Heat and cold, relatively speaking, are therefore effective means of controlling bacterial life in the creamery.

The importance of this precaution has received recent endorsement in the experiments instituted by the Imperial Health Office at Berlin, Germany, where 250 guinea pigs were inoculated by peritoneal injections with "butter bacilli," cultivated from butter made from the milk of tuberculous cows, without any knowledge as to the clinical condition of the cattle, with positive results in every one of them, while butter made from milk from cows known to have diseased udders, when fed to rabbits, produced intestinal tuberculosis. It has also been proved that bacilli would live in cheese for many months. There is a vast difference, however, between the danger of infection by ingestion and inoculation, and it is well known that large numbers of bacteria and their germs, within the intestinal track are prevented from gaining access to the system by the healthy resistance of the intestinal mucosa. There are, moreover, natural forces in the body which are antagonistic to germ life. Metschnikoff<sup>16</sup> claims that the tissue-cells of the body, particularly the white blood corpuscles, attack and destroy micro-organisms and that in them the animal body possesses a formidable means of resistance and defense

against these infectious agents. Buchner<sub>17</sub> and others consider that the blood serum and tissue juices have germicidal properties. On the other hand, Lister<sub>18</sub> claims for the bodily tissues a certain standard of vitality by which they are able to ward off the attack of disease-producing germs. While this standard is maintained the attack is in vain, but when the infection and reduced vitality occur together there is chance for disease. There are over a million and a half of hens in Maine, and the case already reported by me in York county, where a consumptive woman raised a flock of chickens which had free access to the sputa cups of the owner, is in evidence. After the woman at Springvale died, every one of the fowl was found to be affected with general tuberculosis and emphasizes the fact that the complete destruction of the infectious sputa of those suffering from pulmonary tuberculosis would, no doubt go a long way toward the extermination of this fatal disease. Some ingenious pathologist has stated that the consumptive cadava contains from ten to twelve million tubercle bacilli; and suggests from a prophylactic and sanitary position, that all tubercular dead should be cremated, and this would apply to animals as well as mankind.

Experiments made at the "Johns Hopkins University," show that over four thousand million tubercle bacilli may be found in the sputa of a consumptive patient, in a single day; while one-half dram, a single spit, contained more than sixty million of them, and during the past year at the University of Pennsylvania, many calves have been inoculated with the sputum of human beings and they contracted the disease quickly and every one of them died. Marcet inoculated eleven guinea pigs with the sputa of phthisical patients and in ten of them the experiment proved successful, and Sidney Martin fed three calves 70 c. c. sputum containing a large number of bacilli. They were killed after 4, 8 and 12 weeks and had 53, 63, and 13 nodules respectively in the small intestines mostly in Peyers patches.

There is no valid reason that young children or even adults are less susceptible to this virus than calves and pigs.

In South Africa tuberculosis is very common in chickens, but rare in cattle, in fact, until two tuberculous bulls were imported some years ago they knew nothing practically of the disease. The discovery by Dubard of tuberculosis in fish has also served



to broaden our views concerning this most interesting destructive panzootic disease. Salmon says, "From a study of the bacillus of mammalian tuberculosis, he learned that this microbe requires for its multiplication a temperature between 86° and 104° F. and concluded from this fact that this germ is an obligatory parasite, unable to multiply outside of the animal body except under the special conditions furnished in the laboratory." Later it was discovered that in the tuberculosis of birds, or avian tuberculosis, the bacillus had undergone a remarkable physiological modification and that it is able to grow all the way from 77° to 133° F., that is, instead of being confined to a temperature range of 18° F., as in the case with the mammalian bacillus, it has in the avian variety acquired the power to multiply through a temperature range of 36° F. Dubard's discovery of tuberculous carp, the bacillus from which is able to grow from 50° to 98-6° F., is still more astonishing, and opens a field of possibilities so extreme that it is safer to wait for the positive results of investigations than to speculate as to what may or may not be true. Dubard is of the opinion that the carp were infected by throwing into the stream in which they lived, the excreta and sputa of a human patient affected with pulmonary and intestinal tuberculosis. Wide, therefore, as is the gulf which separates the cold-blooded carp from the mammalia, or the latter from birds; remarkable as are the morphological and physiological differences shown by the bacilli from these different sources, we are forced to the conclusion that these differences are superficial, and that they vary with conditions of environment, and that the tuberculosis of the fish, the mammal and the bird is one and the same disease, while the identity of human and bovine consumption is universally conceded, and that this disease may be transferred from man to animal from animal to man; and this is the central proposition of the present discussion.

A war on tuberculosis has just started in England, and at a special meeting at Marlborough House, December 20, 1898, the Marquis of Salisbury, the Earl of Rosebery and a number of noted scientists and physicians spoke of the urgent necessity of educating the people in the means of preventing consumption and of checking the spread of tuberculosis among cattle.

The Prince of Wales, who promised his heartiest support to the movement, said that Great Britain ought to follow the good

example set her in the United States and Germany in the effort to stamp out disease. He mentioned the fact that the Queen had just ordered the destruction of 36 of her dairy cows, which had been found tuberculous. It was an example, he urged, such as the farmers ought to follow.

In passing to the consideration of the danger we are all more or less exposed to from milk, which is the great food product of the human race, I realize the impossibility of giving the subject even fair treatment in the time allotted to me this evening, in following the handling of milk from the time it leaves the udder of the cow until it reaches the consumer. Maine produces approximately 60,000,000 gallons of milk a year, about 33 per cent of which is appropriated by the creameries. Milk as it exists in the udder of a healthy cow is practically sterile, but when it reaches the consumer contains a large number of living germs, 10,000,000 of them having been found in a single teaspoonful. Dr. Freeman, pathologist to the Foundling Hospital, N. Y., states that upon a petri-plate, three and one-half inches in diameter, containing a sterile layer of nutrient gelatine, exposed for *two minutes* under a cow just in front of the pail while milking, was found to contain one thousand, eight hundred bacteria.

The great source of bacterial contamination of the milk is the cow herself, but the farmer rarely appears to feel it necessary for him to keep his cows as clean as he does his horses. The soiled clothing and unwashed hands of ordinary farm hands also largely contribute to introduce into the milk either during or after milking the pathogenic micro-organisms of typhoid fever, cholera, diphtheria or scarlet fever, if they have been exposed, or are recovering from either disease; while the water supply of many dairies used for washing milk cans and other utensils is often contaminated with the surface drainage of barnyards and cesspools, all tending to the same result; until bacteriologists have declared that milk is the most unclean product that enters the laboratories.

Milk is a splendid media for bacteria which multiply very rapidly, and a great part of the impurities found in milk get into it after it is drawn, and before it leaves the stable; and this may

well be regarded as the critical time in the history of dairy products; the milk pail becoming the connecting link between the disease and the consumer. I have frequently seen cans of milk sitting around the well-curbs, and in drinking troughs, to "cool off" and while it is said that when you mix water and whiskey, you spoil "two good drinks," I have often thought if any water had leaked into those cans, it would be the purest and safest part of their contents.

It may be asserted as a cardinal fact, that all cows with diseased udders are infective and dangerous, so are those with nasal, uterine or intestinal discharges, and Ernst of Harvard states emphatically that the milk from cows affected with tuberculosis in any part of the body may contain the virus of the disease; and he succeeded in infecting animals with the milk of tuberculous cows with apparently sound udders, where occasionally bacilli would find their way into the blood stream and thence into the milk in the udder and, I assert without fear of contradiction, that meat or milk from a tuberculous cow, in which not a single germ could be discovered, under the most exhaustive tests, microscopical or inoculative, would still be dangerous to human life, by the absorption of ptomaines or other toxic elements, and that all the soluble poisonous products of this bacillus were constantly circulating in the blood which passes through the muscles, and that they equally traversed the blood vessels of the mammary glands and escaped into the milk; and Prof. Law says, "Accepting, then, as undeniable the presence of the soluble chemical poisons in the blood, flesh and milk, it follows that those who eat this flesh or milk are continually taking in small doses of tuberculin, and that in case they are already the victims of tuberculosis, in however slight or indolent a form, this continuous accession of the poison will rouse the morbid process into greater activity and secure a dangerous extension."

The average composition of milk should be eighty-seven per cent water and thirteen per cent solids, which contain fat and casein, partly or wholly, in suspension, and albumen, milk sugar and ash in solution. A quart of milk, three-quarters of a pound of sirloin steak, and five ounces of wheat flour, all contain about the same amount of nutritive material, but the milk comes nearest to being a perfect food, as it contains all of the different

kinds of nutritive materials that the body needs; and while the protein of vegetable foods is much less completely digested than that of animal foods, our ordinary meats, fish, and milk is very rapidly and completely digested.

We live not upon what we eat, but upon what we digest; and blood and muscle, bone and tendon, brain and nerve—are built from the nutritive ingredients of food, and milk contains all the classes of nutrients—protein, fats, carbohydrates and mineral matters in more nearly the proper proportion to serve as a complete food than any other food material.

Practically the danger from the ingestion of raw milk, only exists for persons who use it as their sole or principal food; invalids and young children who should receive proper nourishment at the start of life to enable them to develop into a perfect maturity. Dr. Gordon has recently said, "Give acute diseases a pail of water, a pail of milk and time, and in nine cases out of ten they will get well themselves." How important then it becomes to have pure milk at a time when it is the routine practice of many physicians to place patients upon milk diet, during convalescence from nearly all acute diseases, when by reason of lowered vitality, they present the most favorable conditions for the implantation of pathogenic germs.

The Massachusetts State Board of Health report, "that during the five years from 1892 to 1896 fully 25 per cent of all deaths occurring to children under one year of age were due to intestinal disease, and eight per cent of the whole number are due to tuberculosis of the bowels. We may safely say that the majority of those deaths are directly or indirectly due to the bacteria introduced into the body in the milk."

Dr. Demme of the Children's Hospital, records the case of four infants, the offspring of sound parents, with no hereditary taint of tubercle, which died of intestinal and mesenteric tuberculosis, after feeding upon the milk of tuberculous cows. Among 2,000 tuberculous patients treated by Dr. Demme in twenty years, these were the only ones in which he could absolutely exclude the possibility of hereditary taint and other causes.

For adults who have abandoned their "baby bottles" for those with longer necks, that contain no microbes, that cannot be plainly seen through the bottom of a glass tumbler, and whose food rations are largely cooked, the danger is reduced to a minimum.

The prime conditions, then, to secure pure milk are to demand the product of sound cows, and that those cows are kept clean, the milk as soon as drawn to be reduced to a temperature below 50° F. until pasteurized or consumed. I know that these conditions are much more easily demanded than enforced, but the "cold facts" which are in possession of our State and local "Boards of Health" as well as the Cattle Commission, in regard to the unsanitary conditions of many of our farms and dairies, should be known and recognized by our Representatives at Augusta, as furnishing abundant proof for the need of more accurate information upon this subject, until the hygienic conditions of milk production are thoroughly well known and accepted by those responsible for the promotion and protection of the public health. A system of dairy inspection should be developed; which will guard against filth, as well as all pathogenic germs; that will enable us to drink a glass of milk with as little misgiving as we do a glass of Poland water, in all well regulated households. The State Dairymen's Association just organized by the live dairymen of the State, has for its specific work this inspection to protect the consumer from evils which may creep in between the udder and the consumer, and "such measures are justified by the existence of a series of conditions which menace the healthfulness of the product from source to its distribution. By the fact that it is the most important article of human dietary from infancy to age under all conditions; that from properties peculiar to it, it is the most susceptible to contaminating influences, including bacterial growth; and, finally, by the fact that notwithstanding its relationship to certain diseases, and especially tuberculosis, the state authorities are woefully apathetic or negligent in their attitude toward it." If the commendable move made by the Portland "Board of Health" last season, to purify the milk supply of this city, had been reversed, and if instead of attempting the enforcement of tuberculin tests or physical examinations, among the dairy herds, they had commissioned their assistants to cleanse the Augean stables, and ordered a rigid inspection of the hygienic condition of the stables, utensils and environments of the cattle, much more satisfactory results would have been reached. The Cattle Commission had canvassed the matter the

previous year, and while we did not find a single diseased animal that was furnishing milk to this city, we did find some very aggravated cases of uncleanness in which the inoculation or contamination of the milk, only varied in proportion to the amount of filth. The "State Board of Health" of Indianapolis have recently made an expert examination of their milk supply, samples being secured from every possible source. The complaint was that nearly every consumer had noticed little black flecks in their milk. These flecks were simply dirt from the udders and flanks of the cows, and showed a general lack of cleanliness. Each 100 pounds of milk examined contained on an average 32 grains of dirt, mostly fine manure. The report shows that 10,000 gallons of milk are daily consumed in their city, and in one year the milkmen distribute for food, 1,314 pounds, a big wagon load of manure.

Every cow should have one thousand cubic feet of air, and this is too little unless there is abundance of ventilation. Abundance of air means abundance of oxygen; it also means the scattering and dissipation of germs, and volatile excretions from the body. No animal can long remain healthy without reasonable physical exercise and sunshine, and the modern idea, that the cow gets all the exercise she needs "chewing her cud," is not in accord with the great law of animal life that use begets strength, and idleness disease.

I have inspected a large herd of milch cows in this State; where the entire droppings of the cattle freezing and thawing throughout the winter months, had been allowed to accumulate under them, until the cattle stood two or three feet higher behind than in front; and when I asked the owner what advantage he thought he gained by allowing such a condition to exist, he deliberately told me "he could milk them easier that way than if they stood on a level."

The moral is "Keep your own cow; not to save money, but to save lives;" and I am reminded of the remark of ex-Senator Evarts, while entertaining some guests at his Windsor farm "that they could drink either champagne or milk at their pleasure, as both cost just the same."

The public law of Maine demands that milk shall contain three per cent of butter fat, and twelve per cent of solids, but some

milk from one of our suburban dairies was exhibited at the recent dairy meeting in City Hall, which contained five and five-tenths per cent of fat and seventeen and eight-tenths per cent of solids, and quite a number of such "up-to-date" dairies are now supplying Portland with milk and cream, that are models of their kind. Tested Jersey cattle are kept in clean and well-ventilated stables, under the best of hygienic conditions, with attractive surroundings and attractive milk-maids; although now that we understand that microbes can be exchanged and absorbed by kissing the girls, even if it is "Hobson's choice," many of us may become deprived of a very delightful experience.

In comparing the practical work of the allied professions, the veterinarians have much to contend with that your profession do not, in that all suggestions looking towards Sanitary Reform that involve more or less expense, the owners often "count the cost" as paramount to all other considerations, even when only more thorough ventilation, drainage and disinfecting of buildings is suggested, and are apt to consider a demanding of either as an interference with their property rights; the chief reason of this being that up to a certain point, a man is at liberty to do what he likes with his own property, the law, excepting in the case of certain diseases, cannot interfere, and it possesses no power of enforcing hygiene. But I believe it to be no interference with public liberty to prevent a man from under-feeding, or shutting up in dark, damp or filthy hovels, animals which unfortunately happen to be his property.

Sanitarians are not quarreling with breeders or dairymen but with tuberculosis, and there is safety when we see and danger when we do not. When you come to the treatment of animals, either surgically or medicinally, I know of many men who when sick themselves summon all the medical talent available, who if they have a disabled horse or a sick cow resort to "natural gas and red liniment" in about equal proportions, to the exclusion of several educated veterinarians in practice in this city.

The value of the animal in dollars and cents is about always taken into consideration, while you gentlemen more often relieve yourselves of all contention with your clients, by sending in your bill to their estate. Among the exceptions to this rule, I recall the case of a veterinary surgeon in this county who made num-

erous visits to a cow, and rendered a bill for services of \$30. But, says the owner, the cow is not worth over half of that amount now that she is cured; but rather than have any trouble, I will give you fifteen dollars and the cow to settle. An analogous case in the medical profession is that of a man who had been operated upon for appendicitis. A friend asked him if he took ether during the operation. "No," was the reply of the sufferer, "I am waiting to take the ether when my doctor sends in his bill."

The watchword of our present Legislature should be, "No backward step." The homes of prosperous farmers and dairy-men are dotted all over the hills and valleys of our State, and the men who produce food products which sustain life may as well understand that during the twentieth century they will be assisted and required to furnish us with their dairy products, not only in a clean and attractive form, but also to guarantee that all sanitary and legal requirements have been complied with to furnish their patrons milk as pure (if not as costly) as the wine that Cleopatra offered unto Anthony, in which she had first dissolved her pearls.

DEERING, January 1, 1899.



## NOTICE OF QUARANTINE.

TO WHOM IT MAY CONCERN.

Public notice is hereby given, that in consequence of the prevalence of tuberculosis among Massachusetts cattle, as disclosed by the official reports of their authorities, supplemented by post-mortems held in Maine of cattle purchased in that state for dairying and breeding purposes, the Cattle Commissioners of the State of Maine believe that the public health of its citizens and the welfare of this commonwealth demand that a rigid quarantine (against all cows whether in milk or dry, and all bulls for breeding purposes) be maintained on and after January 1, 1892, until further notice, and all such cattle entering the State of Maine thereafter will be subject to quarantine at the owner's expense; provided, however, that the above regulations shall not apply to Western cattle coming through Massachusetts into Maine for the purpose of slaughter.

The attention of all persons is directed to sections 2, 3, 4, 5 and 7, of chapter 138, of the Public Laws of Maine, 1887, applying to cattle affected with contagious diseases, and which will hereafter be rigidly enforced.

[Signed] JOHN W. DEERING, Saco, *President*.  
F. O. BEAL, Bangor, *Treasurer*.  
GEO. H. BAILEY, Deering, *D. V. S.*

A quarantine station will be provided near Morrill's Corner, Deering, where all cattle brought into Maine in violation of the above notice will be kept until discharged, at the expense of the owner or owners; and particular attention is called to the full reprint of the law relating to contagious diseases upon the following pages of this circular-letter, which will be rigidly enforced after this date.

PORTLAND, January 1, 1892.

## NOTICE OF QUARANTINE.

The Cattle Commissioners of the State of Maine, having found from recent experience that it has become absolutely necessary to supplement our former notice of quarantine issued January 1, 1892, so that it shall include not only Massachusetts, but all other states, order that no cattle for dairy or breeding purposes shall be brought into this State either by road, water, railroad or other conveyance until further notice; and all such cattle entering our State, without a permit signed by some member of our Board will be subject to quarantine at the owner's expense, and the attention of all persons is directed to chapters 177 and 194 of the Public Laws of Maine, which will hereafter be rigidly enforced.

JOHN W. DEERING, Saco, *President.*

F. O. BEAL, Bangor, *Treasurer.*

GEO. H. BAILEY, Deering, *D. V. S.*

*State Veterinary Surgeon.*

LAW RELATING TO CONTAGIOUS CATTLE  
DISEASES AS AMENDED IN 1889.

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CHAPTER 177.

An Act to Extirpate Contagious Diseases Among Cattle.

*Be it enacted by the Senate and House of Representatives in  
Legislature assembled, as follows:*

Sect. 1. That for the purpose of facilitating and encouraging the live stock interests of the State of Maine, and for extirpating all insidious, infectious and contagious diseases, now or that may be among cattle and other live stock, and especially tuberculosis, the governor of the State is hereby authorized and required, immediately after the passage of this act, to appoint a board of cattle commissioners consisting of three persons of known executive ability, who shall be charged with the execution of the provisions of this act, and who shall be known and designated as the State of Maine Cattle Commission and whose powers and duties shall be those provided for in this act, and whose tenure of office shall be at the option of the governor. The compensation of said commissioners shall be at a rate of three dollars per day during the time they are actually engaged in the discharge of their duties as commissioners. The said commissioners shall respectively take an oath to faithfully perform the duties of their office, and shall immediately organize as such commission by the election of one of their number as president thereof, and proceed forthwith to the discharge of the duties devolved upon them by the provisions of this act.

Sect. 2. That it shall be the duties of the said commissioners to cause investigation to be made as to the existence of tuberculosis, pleuro-pneumonia, foot and mouth disease, and any other infectious or contagious diseases. And such commis-

sioners or their duly constituted agent are hereby authorized to enter any premises or places, including stock yards, cars and vessels within any county or part of the State in or at which they have reason to believe there exists any such diseases, and to make search, investigation and inquiry in regard to the existence thereof. Upon the discovery of the existence of any of the said diseases, the said commissioners are hereby authorized to give notice, by publication, of the existence of such disease, and the locality thereof, in such newspapers as they may select, and to notify in writing the officials or agents of any railroad, steamboat or other transportation company, doing business in or through such infected locality, of the existence of such disease; and are hereby authorized and required to establish and maintain such quarantine of animals, places, premises or localities as they may deem necessary to prevent the spread of any such disease, and also to cause the appraisal of the animal or animals affected with the said disease, in accordance with such rules and regulations by them as hereinafter authorized and provided, and also to cause the same to be destroyed, and to pay the owner or owners thereof one-half of their value, as determined upon the basis of health before infection, out of any moneys appropriated by the legislature for that purpose; provided, however, that no appraised value shall be more than two hundred dollars for an animal with pedigree recorded or recordable in the recognized herd-books of the breed in which the animal destroyed may belong, nor more than one hundred dollars for an animal which has no recordable pedigree; provided, further, that in no case shall compensation be allowed for an animal destroyed under the provisions of this act, which may have contracted or been exposed to such disease in a foreign country, or on the high seas, or that may have been brought into this State within one year previous to such animals showing evidence of such disease; nor shall compensation be allowed to any owner who in person, or by agent, knowingly or wilfully conceals the existence of such disease, or the fact of exposure thereto in animals of which the person making such concealment, by himself or agent, is in whole or part owner.

Sect. 3. That the said commissioners are hereby authorized and required to make record, and publish rules and regulations

providing for and regulating the agencies, methods and manners of conducting, and the investigations aforesaid, regarding the existence of said contagious diseases; for ascertaining, entering and searching places where such diseased animals are supposed to exist; for ascertaining what animals are so diseased, or have been exposed to contagious diseases; for making, reporting and recording descriptions of the said animals so diseased or exposed and destroyed, and for appraising the same, and for making payment therefor; and to make all other needful rules and regulations which may, in the judgment of the commissioners, be deemed requisite to the full and due execution of the provisions of this act. All such rules and regulations, before they shall become operative, shall be approved by the governor of Maine and thereafter published in such manner as may be provided for in such regulations; and after such publication said rules and regulations shall have the force and effect of law, so far as the same are not inconsistent with this act and other laws of the State, or United States.

Sect. 4. That any person or persons who shall knowingly and wilfully refuse permission to said commissioners, or either of them, or their duly constituted agent to make, or who knowingly and wilfully obstructs said commissioners, or either of them, or their duly constituted agent in making all necessary examinations of, and as to animals supposed by said commissioners to be diseased as aforesaid, or in destroying the same, or who knowingly attempts to prevent said commissioners, or either of them, or their duly constituted agent from entering upon the premises and other places hereinbefore specified where any of said diseases are by said commissioners supposed to exist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, or of either of the acts in this section prohibited, shall be punished by fine not exceeding one hundred dollars, or by imprisonment, not exceeding ninety days, or by both fine and imprisonment, at the discretion of the court.

Sect. 5. That any person who is the owner of, or who is possessed of any interest in any animals affected with any of the diseases named in section two of this act, or any person who is agent, common carrier, consignee, or otherwise is charged with any duty in regard to any animal so diseased, or exposed to the contagion of such disease, or any officer or agent

charged with any duties under the provisions of this act, who shall knowingly conceal the existence of such contagious disease, or the fact of such exposure to said contagion, and who shall knowingly and wilfully fail, within a reasonable time, to report to the said commissioners their knowledge or their information in regard to the existence and location of said disease, or of such exposure thereto, shall be deemed guilty of a misdemeanor, and shall be punishable as provided in section four of this act.

Sect. 6. That when the owner of animals, decided under the provisions of this act, by the proper authority, to be diseased, or to have been exposed to contagion, refuses to accept the sum authorized to be paid under the appraisal provided for in this act, it shall be the duty of the commissioners to declare and maintain a rigid quarantine as to the animals decided, as aforesaid, to be diseased or to have been exposed to any contagious or infectious disease, and of the premises or places where said cattle may be found, according to the rules and regulations to be prescribed by said commissioners, approved by the governor, and published as provided in the third section of this act.

Sect. 7. That no person or persons owning or operating any railroad, nor the owner or owners, or masters, of any steam, sailing, or other vessels, within the state, shall receive for transportation, or transport from one part of the state to another part of the state, or to bring from any other state or foreign country any animals affected with any of the diseases named in section two of this act, or that have been exposed to such diseases, especially the disease known as tuberculosis, knowing such animals to be affected, or to have been so exposed nor shall any person or persons, company or corporation, deliver for such transportation to any railroad company, or to the master or owner of any vessel, any animals, knowing them to be affected with, or to have been exposed to, any of said diseases; nor shall any person or persons, company or corporation, drive on foot, or transport in private conveyance, from one part of the state to another part of the state, any animal, knowing the same to be affected with, or to have been exposed to, any of said diseases. Any person or persons violating the provisions of this section, shall be deemed guilty of a misdemeanor, and upon conviction

thereof shall be punished by fine not exceeding the sum of two hundred dollars, or by imprisonment not exceeding six months, or by both fine and imprisonment.

Sect. 8. That it shall be the duty of the several county attorneys to prosecute all violations of this act, which shall be brought to their notice or knowledge by any person making the complaint under oath; and the same shall be heard in any supreme judicial court having jurisdiction in the county in which the violation of this act has been committed.

Sect. 9. That the said commissioners are hereby authorized to appoint or elect one of their number as secretary of said board, who shall receive a reasonable compensation for his services during the time in which, under the provisions of this act, the services of the said commissioners shall be required. The said commissioners shall make and preserve a full record of all rules and regulations promulgated under the provisions of this act, of all payments and expenses hereunder incurred, and all other transactions performed by said commissioners in the discharge of their duties as herein provided; and the said commissioners shall, on or before the first Wednesday in January of each year, during their continuance in service, and at other times as they may deem conducive to the public interests, or as they may be required so to by the governor of state, report to said governor full and accurate accounts of their expenditures, and other proceedings under the provisions of this act, and of the condition of said diseases, if any, in the state, to be communicated by him to the legislature. Whenever the functions of said commission shall be suspended or terminated, it shall turn over to the secretary of state, all its books, papers, records, and other effects, taking his receipt therefor, and he shall remain the custodian of the same until such time as the functions of said commission may be restored.

Sect. 10. That the commissioners shall have power, and are hereby authorized to employ skilled veterinarians, and such other agents and employes as they may deem necessary to carry into effect the provisions of this act, and to fix the compensation of the person or persons so employed, and to terminate such employment at their discretion; and they are authorized out of the moneys by this act appropriated, to make such expenditures as may be needed for the actual and necessary travelling

expenses of themselves and their said employes, stationery, expense of disinfecting premises, cars and other places, destroying diseased and exposed animals, and paying for the same, and such other expenses and expenditures as they may find to be actually necessary to properly carry into effect the provisions of this act.

Sect. 11. That the moneys appropriated by this act shall be paid over to the secretary of said commission, from time to time, as the same may be found to be needed, upon requisition made by the said commissioners, and shall be disbursed by the said secretary of said commission only upon vouchers approved by said commissioners or a majority of them. The said secretary shall before entering upon the duties of his office, take an oath to faithfully discharge the duties thereof, and shall enter into a bond to the State of Maine, with sureties to be approved by the treasurer of State, in such sum as he may designate, for the faithful accounting of all moneys received by the said secretary of the commission, under the provisions of this act.

Sect. 12. That for the purpose of carrying into effect the provisions of this act, the sum of five thousand dollars, or so much thereof as may be necessary, is hereby appropriated out of any moneys in the treasury not otherwise appropriated.

Sect. 13. That all acts and parts of acts inconsistent or in conflict with the provisions of this act, be, and the same are hereby repealed.

Approved February 14, 1889.



LAW RELATING TO CONTAGIOUS CATTLE DIS-  
EASES AS AMENDED IN 1893.

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CHAPTER 194.

An Act to amend an act entitled "An act to extirpate Con-  
tagious Diseases Among Cattle."

*Be it enacted by the Senate and House of Representatives in  
Legislature assembled, as follows:*

Section 1. Section one of chapter one hundred and seventy-  
seven of public laws of eighteen hundred and eighty-nine, is  
hereby amended by striking out the words, "and other live  
stock" in the fourth line, and inserting instead the words 'horses  
and sheep,' so that said section as amended, shall read as  
follows:

'Sect. 1. That for the purpose of facilitating and encourag-  
ing the live stock interests of Maine, and for extirpating all  
insidious, infectious and contagious diseases, now or that may  
be among cattle, horses and sheep, and especially tuberculosis,  
the governor of the state is hereby authorized and required,  
immediately after the passage of this act, to appoint a board of  
cattle commissioners consisting of three persons of known  
executive ability, who shall be charged with the execution of  
the provisions of this act, and who shall be known and desig-  
nated as the State of Maine Cattle Commission, and whose  
powers and duties shall be those provided for in this act, and  
whose tenure of office shall be at the option of the governor.  
The compensation of said commissioners shall be at the rate of  
three dollars per day during the time they are actually engaged  
in the discharge of their duties as commissioners. The said  
commissioners shall respectively take an oath to faithfully per-  
form the duties of their office, and shall immediately organize

as such commission by the election of one of their number as president thereof, and proceed forthwith to the discharge of the duties devolved upon them by the provisions of this act.'

Sect. 2. Section two of said act is hereby amended by striking out the word "two" in the twenty-ninth line and inserting instead thereof the word 'one;' and by striking out the words "one hundred" in the thirtieth and thirty-first lines and inserting instead thereof the word 'fifty;' also by striking out the word "one" in the thirty-sixth line, and inserting instead thereof the word 'three;' also by inserting after the word "disease" in the thirty-seventh line the words 'and the owner or owners shall furnish satisfactory evidence as to the time such animal or animals shall have been owned in the state,' so that said section two as amended, shall read as follows:

'Sect. 2. That it shall be the duties of the said commissioners to cause investigation to be made as to the existence of tuberculosis, pleuro-pneumonia, foot and mouth disease, and any other infectious or contagious diseases. And such commissioners or their duly constituted agent, are hereby authorized to enter any premises or places, including stock yards, cars and vessels within any county or part of the State in or at which they have reason to believe there exists any such diseases, and to make search, investigation and inquiry in regard to the existence thereof. Upon the discovery of the existence of any of the said diseases, the said commissioners are hereby authorized to give notice, by publication, of the existence of such disease, and the locality thereof, in such newspapers as they may select, and to notify in writing the officials or agents of any railroad, steamboat or other transportation company, doing business in or through such infected locality, of the existence of such disease; and are hereby authorized and required to establish and maintain such quarantine of animals, places, premises or localities as they may deem necessary to prevent the spread of any such disease, and also to cause the appraisal of the animal or animals affected with the said disease, in accordance with such rules and regulations by them as hereinafter authorized and provided, and also to cause the same to be destroyed, and to pay the owner or owners thereof one-half of their value, as determined upon the basis of health before infection, out of any moneys appropriated by the legislature for that pur-

pose; provided, however, that no appraised value shall be more than one hundred dollars for an animal with pedigree recorded or recordable in the recognized herd-books of the breed in which the animal destroyed may belong, nor more than fifty dollars for an animal which has no recordable pedigree; provided, further, that in no case shall compensation be allowed for an animal destroyed under the provisions of this act, which may have contracted or been exposed to such disease in a foreign country, or on the high seas, or that may have been brought into this State within three years previous to such animals showing evidence of such disease, and the owner or owners shall furnish satisfactory evidence as to the time such animal or animals shall have been owned in the State; nor shall compensation be allowed to any owner who in person, or by agent, knowingly and wilfully conceals the existence of such disease, or the fact of exposure thereto in animals of which the person making such concealment, by himself or agent, is in whole or part owner.'

Approved March 10, 1893.