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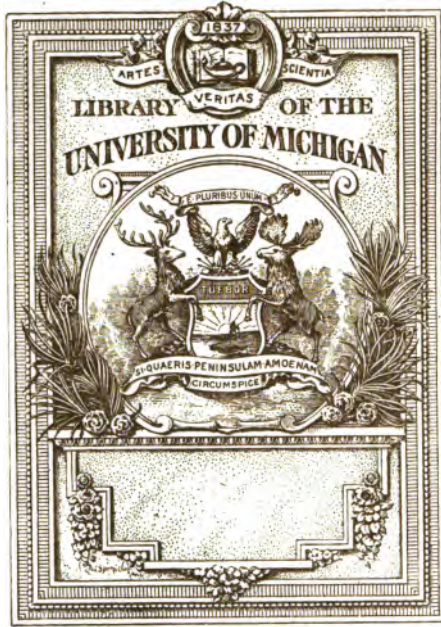
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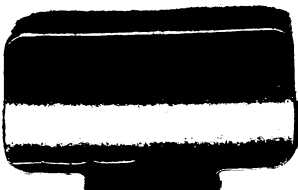
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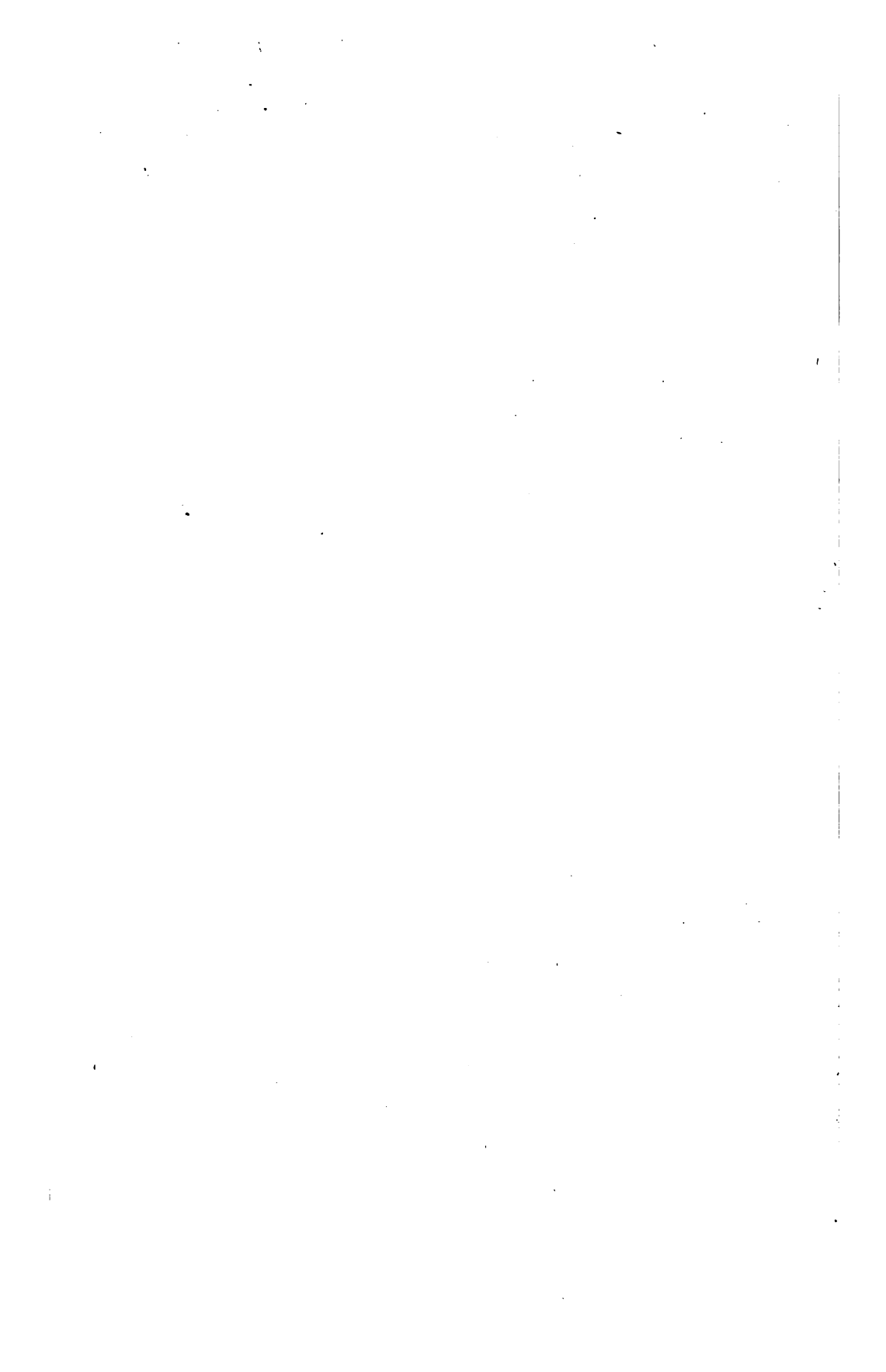
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THE GIFT OF
Mass. State Dept. of
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FOURTH ANNUAL REPORT

OF THE
Massachusetts Dept.
(COMMISSIONER) OF ANIMAL INDUSTRY.

1915.

FOR THE YEAR ENDING NOVEMBER 30, 1915.



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The Commonwealth of Massachusetts.

DEPARTMENT OF ANIMAL INDUSTRY,
BOSTON, Dec. 1, 1915.

To the Honorable Senate and House of Representatives: —

In accordance with the provisions of section 4, chapter 608, Acts of 1912, which act is entitled "An Act to abolish the Cattle Bureau of the State Board of Agriculture, and to create a Department of Animal Industry," I have the honor to present to the General Court the fourth annual report of the work accomplished by this department for the fiscal year ending Nov. 30, 1915.

The Department of Animal Industry is charged with the duty of inspection and examination of animals, the quarantine and killing of animals affected with, or which have been exposed to, contagious disease, the burial or other disposal of their carcasses, and the cleansing and disinfection of districts, buildings or places where such contagion exists or has existed. Proper attention to these duties requires constant activity on the part of a large number of persons who by proper education and training are specially fitted for this work.

The control and eradication of contagious diseases among live stock is an important economic factor in the prosperity of the Commonwealth. The basis of prosperity of the people of any country is its agriculture. Successful agriculture cannot be accomplished unless the live-stock interests are conserved in the highest degree. Conservation of live stock is dependent largely upon the prevention of disease, and therefore the functions of the Department of Animal Industry must be considered as intimately related to the prosperity of the whole people.

The year just brought to a close has been one in which this department has been called upon for a full exercise of its duties. Foot-and-mouth disease, a serious affection among cattle, sheep and swine, has prevailed in many portions of the State and country, and for a time, on account of its widespread distribution, threatened to be fastened upon our live stock as a permanent plague. Owing, however, to early recognition of the

threatened danger, and the prompt measures which were taken to avert it, we are now able to say that the prevalence of this great plague within our borders has been proven to be temporary only. Foot-and-mouth disease does not now exist in the State of Massachusetts, and has been eradicated from all portions of the country except a small part of the State of Illinois; and, in accordance with the history of former outbreaks of this disease, and also on account of the constant care and watchfulness of all owners, veterinarians and live-stock officials, a recurrence of it in the near future should not be apprehended.

The department has been actively engaged in the control and eradication of tuberculosis, hemorrhagic septicemia, anthrax and anthracoid diseases among bovine animals, glanders affecting horses, mules and asses, rabies affecting dogs and other animals, hog cholera among swine, and scabies affecting sheep. Prompt investigation and effective executive work as circumstances required have limited, controlled or eradicated these diseases in a satisfactory degree. The activities of the department must be continued, however, and increased in every direction if the value of its work as a factor in the prosperity and well-being of the people of the Commonwealth is to be maintained.

Preventable disease of live stock plays a large part in keeping up the high cost of living by limiting the food supply. If tuberculosis among cattle and cholera among swine (taking these diseases as examples) were entirely stamped out, all the carcasses now being destroyed would be added to the food supply, together with many others whose production the saving of these would make possible. The eradication of preventable animal diseases would not only add perceptibly to the food supply, but would probably save many human lives. Beyond all question progress can be steadily made in this direction, and the supply of wholesome food products in this country thereby increased, if proper means for safeguarding and husbanding our resources are organized.

Tuberculosis is the chief cause of the condemnation of food animals in the country, and hog cholera is responsible for the next largest loss. The Department of Animal Industry is

actively engaged in the elimination of tuberculous animals, within the limitations prescribed by law, and the prevention of hog cholera among swine is fast becoming one of the most important branches of its work.

Next to the control and eradication of preventable disease, the breeding and development of pure-blooded or "seed" animals, and their maintenance at a high standard of health and productivity, are very great factors in the conservation and increase of the live-stock interests of the Commonwealth, and are now receiving marked attention from all people interested in the progressive development of our agricultural resources.

A spirit of co-operation has been shown in nearly all instances by the live-stock owners with whom the department by its agents has had to come into intimate relation during the prosecution of its work. During the prevalence of foot-and-mouth disease it was necessary, as a measure for the control and eradication of that plague, to impose and enforce quarantine restrictions which in many instances caused great inconvenience and severe monetary loss to cattle owners and other citizens. These restrictions were very irksome, and by an unthinking person might be deemed unreasonable, but a remarkable spirit of reliance upon the authorities charged with the duty of suppression of this disease has been shown, and the public as a whole has been very willing to comply with all regulations imposed when once becoming fully informed as to their necessity.

RABIES.

Below is a full report of the work of this department in the control and eradication of rabies.

Rabies is essentially a disease of dogs, although all species of warm-blooded animals are susceptible, and cases have been reported in every species of domestic animals, in a large number of wild animals and in man. The disease causes a certain amount of monetary loss every year among horses, cattle, sheep and hogs. However, in the control of this disease we ordinarily need to consider but one source of its spread, — the dog, and a certain portion of the canine inhabitants requires the most specific consideration, namely, the homeless, ownerless dog. Because of the liability of rabies to become rapidly spread, no

community in which it exists can afford to relax for a moment such measures as it finds itself able to adopt for its control.

The control of rabies is essentially the control of rabid dogs. This fact alone renders the control and eradication of this disease relatively simple compared with that of most other infectious diseases of animals, for the reason that dogs enter less into commerce than horses or the food-producing animals, and their market value is on the average much less. Furthermore, they endure restraint well, and can be kept in confinement at a relatively low expense as compared with the larger animals.

We find that the ownerless, homeless dog is more often the spreader of this disease than is the animal which has a home and proper care and attention. The tramp animal may become affected with rabies and act as a spreader of the infection before he is observed to be diseased, and even then it often happens that, on account of no one being specially interested in his welfare, attention of the proper official is not directed to him. Were the laws requiring all dogs to be licensed strictly enforced this class of animals would not exist long, and thereby a very great factor in the dissemination of this disease would be eliminated.

Recent investigations have been pursued in the search of a means of eradication of rabies by the immunizing of dogs against the disease. It is too early to say whether or not this is practicable or even possible, but should further investigation substantiate some of the promises of preliminary work, it would bring to our aid additional means of control which might be valuable.

Although no unusual prevalence of rabies has existed during the year just closed, its control is at all times a very important matter from the standpoint of the public health. No doubt very much more might be accomplished in this direction, as well as in the control of other contagious diseases of animals, if the laws of the different States relating thereto were uniform, so that combined effort in the same line of action might be undertaken simultaneously by the different States. It very often happens that in the pursuit of a case of rabies the trail leads across the line into another State, and the jurisdiction of

our own State officials ceases at what is, perhaps, a *critical* point in control and eradication of this disease.

Following is a general outline of the department's methods in this work under the present regulations:—

Upon report being made to the Department of Animal Industry that a person has been bitten by a dog, the inspector of animals of the town or city in which it occurs is ordered to make an examination of the animal, and, if it appears to be healthy, to have it restrained for a period of ten days for the purpose of observation, at the end of which period, if no symptoms of rabies have developed, the animal may be released. In case a person is bitten by a dog which upon examination by the inspector of animals, or any other person, shows evidence of being affected with rabies, this animal is immediately placed in quarantine. If it is subsequently killed or dies in quarantine its head is immediately sent to the department's office and a laboratory examination of the brain is made. Information as to the laboratory diagnosis is promptly communicated to the person or persons who have been bitten. The State Department of Health is given the information received in every case of dog bite, whether the bite has been inflicted by an animal suspected of rabies or not. The Department of Animal Industry also orders the local inspector of animals to ascertain not only the names of all persons who have been bitten by dogs suspected of rabies, but also to find out if other dogs have been bitten, and if so to place the same in quarantine, and they are held in quarantine for a period of at least ninety days. All dogs which are known to have been in contact with a rabid animal, whether or not it appears that they have been bitten by it, are also placed in quarantine for the same period.

If any unusual number of cases of rabies is found in any town or city, the selectmen or the mayor or boards of aldermen are asked or advised to issue a restraining order, under the provisions of section 158 of chapter 102 of the Revised Laws. Such an order obliges all dog owners to confine their animals to their own premises for a certain period, or take them therefrom only on leash. This restraining order is much more effective in the local control of an outbreak than is an order

which compels owners to only muzzle the animals but not restrain them, as a muzzled animal let loose may in some way get the muzzle off and then bite other animals or people. A muzzled dog at large, therefore, may become much more dangerous than an unmuzzled one which is at all times confined upon owner's premises or taken therefrom only on leash. Dogs found running at large while a restraining order issued by town or city authorities is in force may be killed on the issuance of a warrant for the same to a police officer. In thirteen cities and towns of the Commonwealth general restraining orders have been issued for periods varying from thirty to ninety days. The periods covered by all these orders have now expired.

The Department of Animal Industry has a force of district agents located in different parts of the State, at all times in the service and pay of the Commonwealth. These agents, most of whom are veterinarians, together with the local inspectors of animals, of whom there is one or more in every city and town of the State, completes an organization by which systematic local control of an outbreak of this disease can generally be accomplished within a reasonably short time. The department is assisted at every point by the earnest co-operation on the part of private veterinarians, and by the various societies now so active in preventing abuse and relieving suffering of dumb animals.

The following table shows the number of animals which have been under observation by the department on account of the prevalence of rabies during the year ending Nov. 30, 1915:—

	Dogs.	Cattle.	Cats.	Horses.	Swine.	Sheep.	Totals.
Killed or died with rabies (furious, 162; dumb, 52),	214	4	1	4	1	2	226
Killed or died with suspicious symptoms of rabies, but not positive cases.	27	-	-	-	-	-	27
Killed by owners or died in quarantine, not proven rabid, but exposed to the disease.	46	1	3	1	-	-	51
Killed or died with no suspicious symptoms, not, however, declared negative.	80	-	1	-	-	-	81
Released from quarantine,	325	-	5	-	9	5	344
Still in quarantine (ten days, 1; ninety days, 67),	68	2	-	1	-	-	71
Not located or escaped quarantine (suspicious of rabies, 4; not suspicious of rabies, 9).	13	-	1	-	-	-	14
Grand total of cases reported,	-	-	-	-	-	-	814

The brains of 120 dogs, 2 cows, 1 horse and 3 cats were examined at the laboratory of the Harvard Medical School during the year, and the results were as follows: —

	Dogs.	Cattle.	Horses.	Cats.
Positive,	84	1	—	1
Negative,	36	1	1	2

The brains of 5 dogs and 1 horse were received too decomposed to be examined.

During the year 139 persons have been bitten by rabid animals, and in each case the State Department of Health has been notified.

Out of the positive cases of rabies occurring during 1915, 42 animals were ownerless, or the owners were unknown.

For purposes of comparison the following figures are given showing the number of positive cases of rabies occurring each year for the past eleven years: —

1905,	98
1906,	293
1907,	662
1908,	454
1909,	126
1910,	51
1911,	121
1912,	90
1913,	205
1914,	250
1915,	226

GLANDERS.

For many years the prevalence of glanders among the horses of the Commonwealth has been widespread. In no year during the last seventeen have there been less than 400 cases recorded, and in the year 1913 there were 1,084 horses killed on account of being affected with this disease. The average yearly record of the past seventeen years being 748 cases, the monetary loss to citizens, based on a low valuation of \$100 per animal, approximates the amount of \$75,000 yearly. The control and eradication of this disease is therefore an economic question of no small importance. The problems connected with its suppression are many and difficult of solution, and necessarily the

subject of continual careful consideration, on the part of the head of the department. From our experience during the past year it is reasonable to assume that intelligent, systematic effort constantly made by trained men will effect still greater reduction in the number of cases.

The records for the year ending Nov. 30, 1915, show that during that year there has been a smaller number of cases of this disease than at any time since the year 1898. Following is a table giving the number of cases of this disease by separate years for the entire period mentioned. In this table the cases existing in the city of Boston are shown separately. Boston always having been the storm center of this disease, special tabulation of the number of cases in that city is made in order that its relative importance to other sections of the State may be studied.

Number of Cases.

YEAR.	CASES.		
	In Boston.	In Other Places.	Totals.
1898,	137	250	387
1899,	159	384	543
1900,	193	507	699
1901,	197	548	745
1902,	155	580	735
1903,	250	610	860
1904,	254	555	809
1905,	210	414	624
1906,	194	376	570
1907,	308	403	711
1908,	389	552	941
1909,	278	406	684
1910,	314	363	676
1911,	387	565	952
1912,	395	446	841
1913,	556	528	1,084
1914,	355	495	850
1915,	152	250	402

As shown by the above table, there has been during the year just closed a decrease of 57 per cent. from the previous year in the number of cases found in the city of Boston, and the

decrease in the number of cases in other portions of the State has been 49.4 per cent. Taken together, the decrease for the whole State has been 52.7 per cent.

From the showing of the figures for the past year it would seem as if it could reasonably be expected that this disease might in time be entirely eradicated, or at least so controlled that its existence would not be of such serious moment as formerly, and that by prompt destruction of animals showing clinical symptoms of the disease, followed by diagnostic examination of all animals associated with them in conditions of work or stabling, still further reduction in the number of cases must be possible.

A very important factor in the success of our method of control has been the prompt killing of animals showing clinical symptoms. This has been promptly followed by disinfection of premises where they were stabled, of the blacksmith shops where they were shod, and of the watering troughs where they had been in the habit of drinking.

To effectively aid in the complete disinfection of premises from which diseased animals have been removed owners have been requested to tear out mangers, loose boarding and such portions of the stalls as the animals have come in close contact with, or upon which may have been deposited any discharges from their respiratory passages. We have required that this disinfection be properly accomplished by the owners of premises before approving the claims for reimbursement presented by the owners of the animals.

Frequent inspection of the animals on premises where glanders has prevailed has been made, so that the spread of the infection from the original case might be noted in its early stages, and prompt action taken to destroy any new center of infection found. This inspection has been repeated from time to time with the result that many cases have been found and destroyed which otherwise might have escaped notice.

All animals suspected of being diseased, but which did not show clinical symptoms sufficiently well marked to be condemned as positive cases, have been subjected to one or more of the tests which are now available for purposes of diagnosis.

One of these tests is the complement-fixation, or so-called

“blood test,” made by laboratory experts, and another is the ophthalmic-mallein, or so-called “eye test,” made by agents of this department. Either one or both of these tests are applied in doubtful cases, and are of great value for diagnostic purposes. By their use early diagnoses of doubtful cases are possible in many instances, the result being that many animals are destroyed much earlier in the progress of the disease than would have happened if the diagnoses had depended upon the exhibition of clinical symptoms alone. It has been proven by postmortem examination that both of these tests are accurate in a high percentage of cases.

The ophthalmic test is made by applying a small portion of a reliable concentrated mallein within the lower lid of the eye, and noting the result at about the sixteenth hour afterwards. This test has the advantage of not interfering in any way with a blood test which it may be thought desirable to apply later.

Complement-fixation Test.

Of 50 horses from which samples of blood had been obtained during the years 1913 and 1914, 2 died, 3 have been condemned, 5 released and 3 held for further observation. Fifty-four samples of blood were taken from the remaining 37 horses, of which number 31 horses were released, 3 condemned and 3 were burned to death.

Six hundred and seventy samples of blood were taken from 562 horses reported during the year, with the following results: —

Animals released on first test,	317
Released on second test,	46
Released on third test,	6
Released on fourth test,	3
Killed by owner after first test,	3
Died after first test,	11
Died after second test,	2
Condemned on first test,	141
Condemned on second test,	20
Condemned on third test,	3
Condemned on fourth test,	2
Held for further observation,	8

From 3 of the 8 horses still held one sample of blood has been obtained; from 3 others two bloods have been obtained, and from the remaining 2 horses three bloods have been taken.

Ophthalmic-mallein Tests.

Number of tests made during the year,	340
Tests giving positive results,	150
Tests giving negative results,	147
Tests giving unsatisfactory results,	43
	340

Animals which for any reason have been suspected of being diseased either as a result of contact with other diseased animals or as a result of the different tests, but which have not shown sufficient clinical symptoms to warrant condemnation, have been quarantined, frequently examined, and in many instances allowed to work under certain conditions. We have found that in many instances contact animals which are apparently in a condition of perfect health have temporarily reacted to one of the tests mentioned, and at a later date have ceased to react to the same. It has, therefore, not been thought justifiable to kill valuable animals which having reacted to these tests did not also show clinical symptoms, if the animals appeared to be in a condition of health otherwise. These so-called temporary reactors have, however, been carefully watched, frequent tests have been applied, and in case they reacted persistently to either one or both of the tests, destruction of them has been advised. Autopsy has been made of condemned animals in every case where there has been any inconsistency in the results of the different tests, and in all other cases where practicable.

The use of subcutaneous mallein for the testing of suspected animals is not advised by the department, for the reason that it may interfere with the correctness of any blood test subsequently made.

Another factor in the control of glanders has been the closing or elimination of public watering troughs. On the outbreak of glanders in a town or city, if the number of cases was unusual, all public watering troughs in the vicinity have been ordered

closed. In every instance where this has been done it has been immediately followed by a decrease in the number of cases. At the present time public watering troughs are closed in twelve cities and towns of the Commonwealth, the additional places in which troughs were closed during the past year being Chicopee, Holyoke, Marlborough and Hudson.

The closing of the public drinking places for animals in different cities and towns in my opinion limits the spread of contagious diseases other than glanders, and the practice of drivers and teamsters carrying pails from which to water animals is one to be encouraged, not only from the standpoint of control of glanders, but also of many other diseases of a contagious character. It has been found that in many instances teamsters have been very much impressed by the result of this practice, and would not desire to go back to the old practice of watering at the public troughs, even if the same were again opened.

Another factor in the control of glanders has been the activity of the different humane societies engaged in the work of taking old and decrepit animals from the streets and humanely disposing of them. The Massachusetts Society for the Prevention of Cruelty to Animals, the Boston Workhorse Relief Association and the Animal Rescue League have by their agents been of material aid to this department in the effort to control this disease. Their particular observation of working animals of all classes has brought to light many showing suspicious symptoms. These have been promptly reported to the department, and in many cases found to be diseased. Overworked or disabled animals are predisposed to infection, and by removal of the same undoubtedly many cases of this disease have been prevented.

Another factor in the suppression of glanders has been the disinfection of blacksmith shops. Following the condemnation of an animal affected with this disease a visit is made by one of the agents of the department to the blacksmith shop in which this particular animal had been shod. Constant inspection of such premises by our agents has undoubtedly been a factor in securing weekly disinfection by their owners or occupants, and in all probability this practice has limited the prevalence of this disease to a large degree.

In the city of Boston 56 blacksmith shops where animals condemned on account of glanders were shod have been visited by our agents during the year, and instructions given relative to disinfection. Of this number, 51 shops have been put in a condition satisfactory to the department.

The statistics of the general work of the department in connection with the control and eradication of glanders follow:—

Cases of horses and mules reported as suspicious,	838	
Cases held over from previous years,	75	
		— 913
Animals killed or died, found affected with glanders,	402	
Animals killed, no lesions found, full value paid by State,	2	
Animals killed by owners or died before diagnosis,	33	
Animals released as free from glanders,	458	
Cases held for further observation,	18	
		— 913

Of the 402 positive cases of glanders, 152 cases were located in Boston.

Three hundred and eighty-nine horses condemned and killed on account of glanders and farcy during the past four years have been paid for during 1915, the total payments amounting to \$19,600.

Interstate Horses.

The department order which prohibits the importation of horses, asses and mules from the States of New York, Connecticut and Rhode Island, except upon permit, is still in force. The number of horses shipped from these States under permit has been very much less during the past year than in the previous year, due in part to the restrictions on live-stock shipments imposed on account of foot-and-mouth disease, and among the animals so shipped glanders has been very much less prevalent, only one horse having been condemned as affected with this disease. The statistics in connection with this branch of the service follow:—

<i>Animals brought into State.</i>		
Mules,		18
Donkeys,		7
Horses,		3,654
		— 3,679

Disposition of Above Animals.

Died soon after arrival,	1
Condemned as affected with glanders,	1
Tested by agents of the department and released,	20
Released on physical examination,	3,657
	3,679

Section 111 of chapter 75 of the Revised Laws, as amended by chapter 243 of the Acts of 1907, requires rendering companies to report to this department cases of glanders or farcy found by them, and the information thus furnished is of considerable value in bringing to the attention of the department cases of the disease which otherwise would not be known. A table of reports of rendering companies follows: —

Reports of Rendering Companies.

RENDERING COMPANIES.	Number of Reports.	Number of Cases.	Number not previously reported.
W. H. Abbott, Holyoke,	19	38	1
C. S. Bard, Haverhill,	1	1	—
William S. Higgins, Saugus,	4	5	—
Home Soap Company, Millbury,	12	18	—
William Lavery, Amesbury,	2	2	—
Lowell Rendering Company, Lowell,	1	1	—
A. G. Markham & Co., Springfield,	2	2	—
James E. McGovern, Andover,	1	1	—
Muller Brothers, Cambridge,	24	44	—
William H. Nankervis, Marlborough,	10	18	2
New Bedford Extractor Company,	9	11	—
New England Rendering Company, Brighton,	14	20	3
Parmenter & Polsey Fertilizer Company, Peabody,	5	7	—
N. Roy, Jr., Fall River,	21	29	3
Sherborn Rendering Company,	3	3	—
Springfield Rendering Company, Springfield,	2	2	—
N. Ward Company, South Boston,	48	136	1
Whitman & Pratt Rendering Company, North Chelmsford,	1	1	—
S. Winter Company, Brookton,	9	11	—
Worcester Rendering Company,	1	1	1
Totals,	189	351	11

FOOT-AND-MOUTH DISEASE.

Owing to its extremely infectious nature, foot-and-mouth disease when once started in a community spreads with great rapidity. Investigation as to the means by which this disease was spread during the recent outbreak in this Commonwealth disclosed the fact that in many instances herds were infected by germs carried by persons. There are many cases on record where the infection was taken from one farm to another by cattle owners or some members of their household who, from curiosity or for other reasons, visited infected premises, or where persons from infected premises visited other premises where animals were confined.

If this disease was allowed to spread promiscuously over the country, it is natural to assume that the majority or practically all the animals in the country would become affected, and, although the death rate is not large, animals attacked by the disease are injured to a greater or less extent, and as the disease continues to spread, strains of virus passing through successive herds sometimes result in a much more virulent form of the disease, and the death rate may reach as high as 40 or 50 per cent. of animals attacked. Therefore, if it should become generally prevalent, the loss sustained would aggregate an immense sum.

On account of permanent immunity not being conferred upon animals attacked by this disease, and the fact that such animals having recovered from one attack may again be attacked during future outbreaks, or may even reinfect themselves by means of germs carried upon their own bodies, it is necessary to adopt such methods as will insure complete eradication.

A superficial study of this question should convince the most skeptical of the necessity of eradicating the disease before it becomes established at the point where eradication is impossible, and the method destined to secure that result is quarantine, with slaughter of infected or exposed animals. This has been the method pursued not only in the State of Massachusetts, but in every other State where the disease has appeared, and is the one which has been used in all countries which have accomplished complete eradication.

The method of "quarantine followed by slaughter of infected or exposed animals" is the one which has been pursued in all previous outbreaks in this State and country, and the success which that method has attained heretofore was undoubtedly the chief reason for the pursuance of the same method by national and State governments during the recent outbreak.

Although one large herd of cattle in Chicago was saved from slaughter on account of conditions making possible such methods of quarantine as would prevent spread of the disease, such conditions would be absolutely impossible on an average farm, and far too costly to employ with ordinary cattle.

This case offers no criterion by which the effectiveness of this method may be judged. The experience of European countries with farm quarantines is that the disease invariably spreads and gains a lasting foothold. The herd referred to, which was held in close quarantine in Chicago for a period of seven months, consisted of over 700 valuable pure-bred cattle. Conditions for enforcing strict quarantine were such that there was no possible chance for the disease to be carried from the premises. These conditions would be difficult to duplicate, and probably impossible to maintain, on the average farm. In the case of the herd mentioned the expense per head amounted to several times the average value of an ordinary farm animal.

The beginning of the fiscal year, Dec. 1, 1914, found this department still engaged in a struggle for the control of foot-and-mouth disease. At that time the disease had appeared on 38 premises in 27 towns, and during the month of December, 12 more premises had become infected in 9 different towns. On assuming office on Jan. 2, 1915, I therefore found that since the beginning of the outbreak, namely, Nov. 6, 1914, and during the two months of its prevalence, the disease had appeared on 50 premises in 36 different towns of the Commonwealth. All of the diseased animals and those which had been exposed to the infection had been killed and buried, and disinfection of premises, under the immediate supervision of the United States Bureau of Animal Industry, was going on.

Much criticism had been expressed on the part of owners of diseased cattle to the effect that the department was not, apparently, prepared to dispose of diseased animals promptly

after positive diagnosis of the disease had been made, as, after condemnation, killing and burial had been delayed for periods varying from three days to, in some instances, seventeen days, the average elapsed time between positive diagnosis and killing and burial being nine and one-half days. In the meantime the animals remained active centers of infection from which the disease might be spread in various ways. Therefore special effort has since been made, on the occasion of an outbreak, to kill and bury the diseased and exposed animals as promptly as possible, and to disinfect premises on which the disease existed, with the result that, in cases that have occurred since Jan. 1, 1915, the average time which has elapsed between date of positive diagnosis and date of burial of animals has been less than five days.

Following two cases occurring on Jan. 1 and Jan. 4, 1915, a period of twenty-five days elapsed during which no new cases were found.

On Feb. 6, 1915, there started in the city of Waltham an outbreak which involved 15 premises in the towns of Waltham, Watertown, Weston, Lexington, Arlington and Everett before it was controlled.

The first premises infected in this district were those of J. W. Keenan in Waltham, and within a very few days after the outbreak of the disease at that point it was found to have spread to other premises in this district. Persons traveling from one farm to another for various purposes were found to be the means by which the disease was carried. In no instance had cattle, sheep or swine been the medium by which the disease had been transferred from one place to another.

A special investigation was made (as is done in all cases) of the source of this outbreak which had appeared on the farm of said J. W. Keenan. It was found that J. W. Keenan did not live at his farm in Waltham, but resided with his nephew, Thomas Keenan, in Brighton, and went back and forth daily from the Brighton premises to his farm in Waltham, using an automobile for conveyance. Further inquiry at the premises of the nephew, Thomas Keenan in Brighton, disclosed the fact that in his opinion foot-and-mouth disease had existed on his premises early in the outbreak in Massachusetts, and at which

time J. W. Keenan of Waltham was living thereon. Following this line of investigation still further, it was found that animals which Thomas Keenan had on his premises in Brighton at that time were part of a herd of animals originally owned by George L. Henry of Amherst, at whose farm the first cases of foot-and-mouth disease in Massachusetts were found. The connection is, therefore, quite closely established between the original outbreak in Massachusetts and the so-called secondary outbreak in Waltham, as follows:—

Mr. George L. Henry shipped cows to Brighton weekly, and what he did not sell on any particular market day he sent to the premises of Thomas Keenan in Brighton, to be kept until the following week. A portion of the animals originally exposed to the disease at Mr. Henry's farm, and which were shipped to the Brighton stock yards, were the identical animals stabled at Thomas Keenan's premises. J. W. Keenan of Waltham boarded at this place and went daily from there to his farm in Waltham, on which the so-called secondary outbreak occurred.

Further investigation disclosed the fact that the disease had not been recognized by the department as existing on Thomas Keenan's premises, and therefore the animals had not been killed, and the premises had not been disinfected.

Thomas Keenan says that in his opinion his animals had foot-and-mouth disease; that he reported them to the Commissioner of Animal Industry; that two of his animals were buried by himself on his own premises, and that the other four were removed for slaughter to the Brighton Abattoir on a permit of the Commissioner of Animal Industry.

J. W. Keenan of Waltham also used a cow-wagon kept on the Brighton premises to transport cattle to and from his farm in Waltham.

A record of these facts is on file with the United States Bureau of Animal Industry at Washington, D. C., investigation in this matter having been made by that department independently of that of the Massachusetts department.

As a result of this investigation by State and Federal departments it was deemed necessary to put the premises of Thomas Keenan, in Brighton, under quarantine, and disinfect

the same according to the regular method pursued in all such cases.

We are forced to the conclusion that had the disease been recognized when on the premises of Thomas Keenan in Brighton, the animals been promptly killed and buried and the premises completely disinfected, and the persons thereon restrained from going to other places until they had been properly fumigated and their clothing disinfected, this secondary outbreak in Waltham and vicinity would have been prevented. The value of animals killed and property destroyed in this section amounted to \$36,000.

A secondary infection in Worcester and vicinity also took place in the early part of February, also one in Southborough and Westborough. An isolated case also occurred in the city of Springfield, two animals there being affected, and a case in Chicopee. In the towns of Russell and Northampton isolated cases occurred, these being the only ones which have occurred west of the Connecticut River during this outbreak.

From one place in Worcester four calves were shipped to outside towns, and two days later foot-and-mouth disease was found on the premises from which these calves had been removed. In following up and inspecting the calves at their destination, it was found that in three instances they had carried the disease with them, although at the time of their leaving the premises where they had been raised the disease had not appeared and did not appear until two days after their departure.

This incident shows that foot-and-mouth disease may be carried or transmitted and animals become infected therewith before clinical symptoms appear in the animals originally diseased. Early in February the disease was found at two packing houses in animals shipped thereto for immediate slaughter. These premises were accordingly immediately disinfected, and no additional cases have since appeared at those points.

From March 18 no new cases were found until April 16, when the disease appeared in a mild form on a place where it had previously existed in December, 1914, and where premises were being restocked with trial animals. Although the premises had been disinfected and allowed to remain unoccupied

for four months, the disease was found in a mild form in the restocking animals. These animals were promptly disposed of in the regular manner, and no further appearance of the disease on those premises has resulted.

During the prevalence of foot-and-mouth disease in the Commonwealth farm-to-farm inspection has been systematically carried on by inspectors of the United States Bureau of Animal Industry in co-operation with agents of this department. This inspection is considered absolutely necessary in order that any unrecognized or hidden cases may be brought to light and promptly disposed of. Many suspected cases of infection have been reported from time to time by cattle owners and other interested persons, all of which cases have been promptly investigated. Careful disinfection of the inspectors engaged in the work of inspection has been insisted upon, and in no instance has it been found that the disease has been spread by agents of this department or by the Federal inspectors.

On October 10 the disease in typical form appeared on a farm in the town of Leicester. The animals were promptly killed and buried and the premises disinfected. It having been found that one of these cows had recently gone to a neighboring farm for breeding purposes, and probably after she was infected with the disease, the breeding animal at the second farm was promptly killed and buried, and those premises also were disinfected, the result being that the disease was confined to the original place where it broke out. Very thorough farm-to-farm inspection in this vicinity disclosed no additional cases, and it must therefore be classed as an isolated case, the source of which has not been positively determined. It would not be unreasonable to expect that occasionally an isolated case may yet be found, for with such an amount of infection spread broadcast throughout such a large portion of the State there is certainly some danger that it may yet exist and break out when circumstances are favorable thereto.

On Nov. 7, 1914, at the beginning of the outbreak, an order of the Commissioner of Animal Industry approved in Council on the same date prohibited the movement or transportation neat cattle, sheep, other ruminants and swine in all portions

of the State. This order, supplemented by certain notices, was in force until Jan. 13, 1915, when it was modified so as to apply only to cities and towns and certain areas adjacent thereto which lay within a three-mile radius of premises upon which foot-and-mouth disease had during the previous three months been known to exist, and to such other cities and towns and areas adjacent thereto in which foot-and-mouth disease might subsequently appear. There had been in force also during this period certain orders restricting the transportation of poultry and other small domestic animals.

On account of the extreme inconvenience, interference with business, and monetary loss which this general quarantine had imposed on the citizens of the Commonwealth, and also because it was deemed safe to begin to modify the restrictions necessary in the first instance to the control of this disease, the modification of Jan. 13, 1915, was deemed advisable, and thereafter from time to time, as the betterment of conditions became apparent, other approved orders and regulations were issued, until on July 1 notice was issued that no permits for the movement of cattle, sheep and swine would be required except to and from premises on which foot-and-mouth disease had existed, and in the Brighton district of Boston and the city of Watertown.

On February 1 notice was issued so modifying restrictions which had been applied during the quarantine as to allow live stock from Maine and Vermont to enter Massachusetts; cattle for immediate slaughter could be consigned to establishments under Federal inspection without special permit, and to other points in the State accompanied by a permit; cattle not for immediate slaughter were allowed to be shipped on permit to any point except the quarantine stations at Brighton, Watertown and Somerville. On May 10 these privileges were made applicable also to the State of New Hampshire.

On May 17 the Brighton Stock Yards, which had remained closed to all kinds of traffic since early in November, 1914, were allowed to open for the receipt of neat cattle, sheep and swine if shipped in disinfected cars and intended for immediate slaughter. On July 1 this privilege was extended to the Union Stock Yards in Watertown.

On August 30 the quarantine stations at Somerville, Brighton and Watertown were first opened for the receipt of dairy cattle, under condition that the shipments originate in Massachusetts, Maine, New Hampshire or Vermont, and be subject to all regulations which were in force prior to the outbreak of foot-and-mouth disease. The order allowing this has been continually in force since that date up to the end of the year, with the exception of the period from Oct. 5 to Oct. 15, 1915. On October 5 a cow suspected of being affected with foot-and-mouth disease was received at the Brighton Stock Yards, and immediately all other animals on the premises were quarantined. For the protection of the cattle interests of the State, and in order that the infection of foot-and-mouth disease might not again be distributed to the many farms to which cattle go from this public market, it was deemed necessary to hold all the animals at that point until it could be positively determined whether or not the suspected animal was a case of this disease. After a period of ten days had elapsed from the receipt of this particular cow, and experiments made in the mean time to determine whether or not the disease was present had proved negative, the special quarantine was lifted and the animals that had been held were released.

Until foot-and-mouth disease disappears entirely from the country, and a period of time elapses sufficient to unmistakably prove that fact, certain precautions are necessary in order that the live-stock interests of the State shall not be jeopardized. The department accordingly at the present time requires that all cattle shipped from any State except the three New England States mentioned shall remain in quarantine for a period of at least fifteen days after arrival, so that if the infection has been picked up *en route* to this State clinical symptoms of it will be likely to be discovered before the animals are released and distributed to other farms.

The Legislature of 1915 having appropriated \$150,000 for the purpose of reimbursing owners of cattle killed and property destroyed, and ownership statements and claims having been filed in proper form, claims for reimbursement were accordingly approved, and payment was begun on May 6, 1915. All such claims have been settled and releases obtained from the owners.

It having been decided by the Attorney-General of the Commonwealth that quarantine expenses on account of animals being held in quarantine on their owner's premises for a longer period than ten days might be paid, such claims if filed in proper form and proven just will be forwarded for payment early in the coming year.

Following, in chronological order, are all the important orders and notices relating to the control and eradication of foot-and-mouth disease issued during the year ending Nov. 30, 1915: —

ORDER No. 16.

DEC. 2, 1914.

To All Persons whom it may concern: —

Order No. 15 is hereby revoked.

Whereas the disease known as foot-and-mouth disease, which is a contagious disease and is so recognized under the laws of this Commonwealth, exists among animals in this Commonwealth, and whereas it has become necessary to adopt measures for the prevention of the spread of said contagious disease,

Now, therefore, acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

No live poultry, pigeons or other farm birds are to be shipped or transported by railroad, boat or other conveyance, or moved in any manner from another State or territory of the United States into this Commonwealth except by permission of the Commissioner of Animal Industry.

This order shall take effect upon its approval.

This order shall be published by sending a copy to each inspector of animals in the Commonwealth, and by general distribution.

FRED FREELAND WALKER,
Commissioner of Animal Industry.

Approved in Council, Dec. 2, 1914.

E. F. HAMLIN,
Executive Secretary.

MODIFICATION OF ORDER No. 14.

JAN. 13, 1915.

To All Persons whom it may concern: —

Acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following regulation: —

Department Order No. 14, relating to the movement of cattle, sheep, other ruminants and swine within the Commonwealth, is hereby modified, and from this date will apply only to the cities and towns mentioned below, and to areas adjacent thereto that may lie within a three-mile radius of premises upon which foot-and-mouth disease has during the past three months been known to exist, and to such other cities and towns, and areas adjacent thereto, in which foot-and-mouth disease may subsequently appear.

Amherst.	Dracut.	Shrewsbury.
Ashland.	Grafton.	Stoneham.
Attleboro.	Granby.	Sudbury.
Auburn.	Hingham.	Swampscott.
Bellingham.	Lynn.	Swansea.
Belmont.	Maynard.	Warren.
Berkley.	Medford.	Watertown.
Boston.	Mendon.	West Boylston.
Brockton.	North Attleborough.	Westport.
Chicopee.	Rehoboth.	Worcester.
Danvers.	Seekonk.	

Transportation by railroad companies of cattle, sheep, other ruminants and swine, in *any portion* of the Commonwealth, is allowed only in disinfected cars.

This regulation shall be published by sending copies to inspectors of animals, registered veterinarians and transportation companies in the Commonwealth, and by general distribution.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Jan. 13, 1915.

E. F. HAMLIN,
Executive Secretary.

ORDER No. 17.

JAN. 20, 1915.

To All Persons whom it may concern: —

Acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, you are hereby notified that foot-and-mouth disease, which is a contagious disease and is so recognized under the laws of this Commonwealth, and which has recently prevailed within the limits thereof, is deemed by me to be sufficiently under control of this department to no longer require any restrictions to the free movement of poultry. Therefore, Department Order No. 16, approved by the Governor and Council January 14, 1914, is hereby revoked.

Poultry, pigeons and other farm birds may be transported into or moved within this Commonwealth unaccompanied by a permit from this department.

This order shall take effect upon its approval.

This order shall be published by sending copies to inspectors of animals and to representatives of transportation companies in the Commonwealth, and by general distribution.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Jan. 20, 1915.

E. F. HAMLIN,
Executive Secretary.

NOTICE.

FEB. 1, 1915.

Modification of Restrictions on Live Stock from Maine and Vermont.

Cattle for immediate slaughter may be brought from the above-named States into Massachusetts on permit issued from this department, but no permit will be required for shipment of such cattle to slaughtering establishments under Federal inspection.

Cattle not for immediate slaughter may be brought from the above-named States into Massachusetts on permit issued from this department, but no such cattle will be allowed to go into the "closed areas," or to the Brighton Stock Yards in Brighton, the Union Stock Yards in Watertown, or the premises of the New England Dressed Meat and Wool Company in Somerville.

Cattle not for immediate slaughter must be accompanied by a certificate that same have been continuously in State from which shipment is made since Sept. 1, 1914.

The requirements relating to the tuberculin testing of interstate dairy cattle are the same as those in force prior to the recent discovery of foot-and-mouth disease in this State, and may be found in Department Order No. 5, issued Oct. 29, 1913.

Application for permits should be made directly to the Commissioner of Animal Industry, who will grant them at his discretion.

No permit is required to ship sheep or swine from Maine or Vermont into Massachusetts.

Animals arriving within the "exposed areas" will be subject to the regulations of this department in force in those areas.

LESTER H. HOWARD,
Commissioner of Animal Industry.

"Closed areas," infected premises and territory within a radius of three miles of same.

"Exposed areas," that portion of town or city outside of the three-mile radius in which infected premises are located.

NOTICE.

FEB. 8, 1915.

To All Persons whom it may concern:—

According to the provisions of Department Order No. 14, and its modification as approved by the Governor and Council Jan. 13, 1915, the following cities and towns are made subject to the quarantine regulations of said Order No. 14 and its modification:—

Arlington.	Oakham.	Waltham.
Berlin.	Somerville.	Cambridge. ¹
Northborough.	Springfield.	New Braintree. ¹

Also areas adjacent thereto that may lie within a three-mile radius of premises upon which foot-and-mouth disease has during the past three months been known to exist.

This notice shall be published by sending a copy to each inspector of animals in the Commonwealth and by general distribution.

LESTER H. HOWARD,
Commissioner of Animal Industry.

ORDER No. 18.

FEB. 10, 1915.

To All Persons whom it may concern:—

Acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following regulations:—

All cattle and other domestic animals which are affected with, or have been exposed to, foot-and-mouth disease, which is a contagious disease and is so recognized under the laws of this Commonwealth, shall be destroyed when in the opinion of the Commissioner of Animal Industry the public good so requires, and their carcasses buried or otherwise disposed of.

Districts, buildings and places in which foot-and-mouth disease exists or has existed, and property which may be on or contained therein, such as hay, grain, fodder, utensils, etc., shall be cleansed and disinfected. Such property on infected premises as may be, in the opinion of the Commissioner of Animal Industry or that of his agents, a source of danger because of proximity to the contagion existing thereon shall be destroyed.

¹ Feb. 10, 1915.

The Commissioner of Animal Industry may appoint persons to make appraisals on live stock and other property the destruction of which may be ordered in accordance with these regulations.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Feb. 10, 1915.

E. F. HAMLIN,
Executive Secretary.

AMENDMENT TO ORDER NO. 14 AND ITS MODIFICATION.

MARCH 3, 1915.

To All Persons whom it may concern: —

Acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following regulation: —

Order No. 14, approved in Council Nov. 7, 1914, and the modification thereof, approved in Council Jan. 13, 1915, are hereby amended as follows: —

The movement of cattle, sheep, other ruminants and swine may at any time be restricted by order of the Commissioner of Animal Industry in such additional cities and towns of the Commonwealth as in his opinion the control and eradication of foot-and-mouth disease require.

The radius of quarantined areas surrounding premises on which foot-and-mouth disease exists or has existed since Nov. 5, 1914, may be extended or diminished at any time by order of the Commissioner of Animal Industry.

This regulation shall take effect upon its approval.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, March 3, 1915.

E. F. HAMLIN,
Executive Secretary.

NOTICE.

MARCH 9, 1915.

To All Persons whom it may concern: —

On account of the continued prevalence of foot-and-mouth disease in this and other States, and the danger that cattle shipped into Massachusetts even from noninfected areas may acquire the disease *en route*, it is deemed necessary to hold in quarantine, for a longer period than has heretofore been ordered, all animals shipped into Massachusetts under permit from this department.

All orders and regulations of this department governing such shipments prior to the recent appearance of foot-and-mouth disease in this

State are still in force. These having been complied with, noninfected animals will be released from quarantine at the expiration of such time as the Commissioner of Animal Industry may deem to have been sufficient for the development of clinical symptoms of foot-and-mouth disease, if the infection had been acquired in any way.

If foot-and-mouth disease is found to exist among these quarantined animals, they may be seized and destroyed without appraisal or payment on the part of the Commonwealth, as provided in section 10, chapter 90 of the Revised Laws. It is therefore incumbent upon owners and shippers, in the protection of their own interests, to see to it that disinfected cars are provided for all shipments, and that strict quarantine is maintained after arrival.

LESTER H. HOWARD,
Commissioner of Animal Industry.

NOTICE.

MAY 10, 1915.

Modification of Restrictions on Live Stock from Maine, Vermont and New Hampshire.

Cattle for immediate slaughter may be brought from the above-named States into Massachusetts on permit issued from this department, but no permit will be required for shipment of such cattle to slaughtering establishments under Federal inspection.

Cattle not for immediate slaughter may be brought from the above-named States into Massachusetts on permit issued by this department, but no such cattle will be allowed to go to the Brighton Stock Yards in Brighton, the Union Stock Yards in Watertown, the premises of the New England Dressed Meat and Wool Company in Somerville, or other premises to which the Commissioner of Animal Industry deems it unsafe to ship animals.

Cattle not for immediate slaughter must be accompanied by a certificate that same have been continuously in one of the above States since Sept. 1, 1914.

The requirements relating to the tuberculin testing of interstate dairy cattle are the same as those in force prior to the recent prevalence of foot-and-mouth disease in this State, as per Department Order No. 5, issued Oct. 29, 1913. At present, duration of quarantine on these animals is extended for fifteen days, on account of the danger of infection *en route*.

No permit is required to ship sheep or swine from Maine, Vermont or New Hampshire into Massachusetts, except into "exposed areas."

Animals arriving within the "exposed areas" will be subject to the regulations of this department in force in those areas.

LESTER H. HOWARD,
Commissioner of Animal Industry.

"Exposed areas," infected premises and territory within a radius of
miles of same.

NOTICE.

MAY 17, 1915.

To Transportation Companies and All Persons whom it may concern: —

On this date and until further notice the premises of the Brighton Stock Yards Company, Brighton, Mass., will be open for the receipt of neat cattle, sheep and swine shipped by rail in disinfected cars marked "for immediate slaughter only," which shipments may be made without permit; also for the receipt of the same class of animals which may arrive by vehicle accompanied by permit issued by the Commissioner of Animal Industry.

The premises will remain under quarantine, and subject to regulations of the United States Department of Agriculture, the Massachusetts Department of Animal Industry and their inspectors and agents.

Animals will leave the premises only under the following regulations: —

1. *By rail*, under seal of a Federal inspector and consigned to slaughtering establishments under Federal inspection.
2. *By public highway*, under permit of the Massachusetts Department of Animal Industry, and consigned to slaughtering establishments under Federal inspection.

No exception will be made to these regulations, therefore the attention of shippers should be called to them.

LESTER H. HOWARD,
Commissioner of Animal Industry.

NOTICE.

JULY 1, 1915.

To Transportation Companies and All Persons whom it may concern: —

On this date and until further notice the premises known as the Union Stock Yards, Watertown, Mass., will be open for the receipt of neat cattle, sheep and swine shipped by rail in disinfected cars marked "for immediate slaughter only," which shipments may be made without permit from any point within the Commonwealth, and from the States of Vermont, Maine and New Hampshire; also for the receipt of the same class of animals which may arrive by vehicle accompanied by a permit issued by the Commissioner of Animal Industry.

The premises will remain under quarantine and subject to the regulations of the United States Department of Agriculture, the Massachusetts Department of Animal Industry and their inspectors and agents.

Animals will be allowed to *leave* these premises only under the following regulations: —

1. *By rail*, under seal of a Federal inspector and consigned to slaughtering establishments under Federal inspection.
2. *By public highway*, under permit of the Massachusetts Depart-

ment of Animal Industry and consigned to slaughtering establishments under Federal inspection.

No exceptions will be made to these regulations, therefore the attention of shippers should be called to them.

LESTER H. HOWARD,
Commissioner of Animal Industry.

ORDER No. 19.

AUG. 24, 1915.

To Transportation Companies, the Brighton Stock Yards Company, the New England Dressed Meat and Wool Company, and All Persons whom it may concern:—

Whereas foot-and-mouth disease has apparently been eradicated from all portions of the Commonwealth of Massachusetts and from the State of New Hampshire, and at no time during the prevalence of the recent epidemic has been known to exist in the States of Maine or Vermont, and

Whereas, in the opinion of the Commissioner of Animal Industry, it is safe to modify somewhat the quarantine regulations now in force affecting the Brighton market,

Now, therefore, acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts in amendment thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation:—

SECTION 1. On and after Aug. 30, 1915, the premises of the Brighton Stock Yards Company in Brighton, within the city of Boston, the premises of the New England Dressed Meat and Wool Company in the city of Somerville, and the Union Stock Yards in the town of Watertown, will be open for the receipt of neat cattle, sheep, other ruminants and swine from any part of Massachusetts and from the States of Maine, New Hampshire and Vermont; *provided*, that all such animals have been within the area of the said four states continuously since Sept. 1, 1914, and have not been, at any time since that date, on premises where foot-and-mouth disease has existed.

SECTION 2. All consignments of neat cattle to the premises mentioned in section 1 hereof will be subject to the regulations applying to said premises and animals therein in force prior to the recent outbreak of foot-and-mouth disease, which regulations are contained in Department Order No. 5, approved in Council July 31, 1912, and Oct. 29, 1913.

This order shall be published by furnishing copies to transportation companies and by mailing a copy to each inspector of animals in the Commonwealth.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Aug. 25, 1915.

E. F. HAMLIN,
Executive Secretary.

ORDER No. 21.

Oct. 6, 1915.

To All Persons whom it may concern: —

Whereas foot-and-mouth disease now prevails extensively among cattle, sheep and swine in the State of Illinois, and restriction of the shipment of animals therefrom seems necessary as a measure of prevention of an outbreak of that disease in this Commonwealth,

Now, therefore, acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts in amendment thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

SECTION 1. The bringing of cattle, sheep, other ruminants and swine into the Commonwealth of Massachusetts from the State of Illinois for any purpose whatever is hereby prohibited, except on written permission of the Commissioner of Animal Industry.

This order shall not apply to animals in transit from some other State through the State of Illinois; *provided*, the same are intended for immediate slaughter, and consigned to slaughtering establishments under Federal inspection; and *provided, further*, that the animals are not unloaded in said State from the cars or vehicles in which they were originally shipped.

SECTION 2. This order shall be published by sending copies to railroad companies engaged in the transportation of animals to Massachusetts, and to persons, firms or corporations which receive interstate shipments of animals intended for slaughter.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Oct. 6, 1915.

E. F. HAMLIN,
Executive Secretary.

ORDER No. 22.

Oct. 5, 1915.

To All Persons whom it may concern: —

Acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following regulation: —

Owing to the receipt this day at the premises of the Brighton Stock Yards Company in Brighton within the city of Boston, Mass., of an animal suspected of being affected with foot-and-mouth disease, said premises and all neat cattle, sheep, other ruminants and swine now contained in the barns or yards of said premises are hereby placed in special

quarantine until released therefrom by the Commissioner of Animal Industry.

During the existence of this special quarantine all persons entering or leaving said premises shall be subject to such regulations as the Commissioner of Animal Industry may deem necessary in order to properly enforce and maintain said special quarantine.

The Union Market Stock Yards at Watertown are hereby declared closed until further notice.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Oct. 6, 1915.

E. F. HAMLIN,
Executive Secretary.

NOTICE.

Oct. 11, 1915.

To the Inspector of Animals, and to All Others whom it may concern:—

Foot-and-mouth disease has been found to exist in the town of Leicester.

Therefore, acting under authority given me under Order No. 14, approved in Council November 7, and amendment to Order No. 14, approved in Council March 3, I do hereby order that no neat cattle, sheep, other ruminants or swine are to be shipped or transported by railroad, boat or other conveyance, or to be driven on any public highway or byway in any city or town within Worcester County, Commonwealth of Massachusetts, except by permission of the Commissioner of Animal Industry.

LESTER H. HOWARD,
Commissioner of Animal Industry.

NOTICE.

Oct. 15, 1915.

To Transportation Companies and All Others whom it may concern:—

DEAR SIR:— Farm-to-farm inspection in the town of Leicester and its vicinity having failed to disclose the existence of any additional cases of foot-and-mouth disease, it is deemed safe to modify the quarantine placed upon Worcester County.

Therefore, on this date and until further notice, the movement of cattle, sheep, other ruminants and swine is not restricted except within a radius of five miles of premises of John P. Stevens of Leicester.

Very truly yours,

LESTER H. HOWARD,
Commissioner.

LETTER SENT TO CATTLE OWNERS AND TRANSPORTATION COMPANIES.

Oct. 23, 1915.

DEAR SIR:— On this date, and until further notice, the Brighton Stock Yards at Brighton, Mass., will be open for traffic in dairy and slaughter animals under the regulations of this department applying thereto.

A regulation of the United States government now in force specifies that cattle, sheep or swine must not be shipped *interstate* either to or from any portion of Worcester County, Mass. Therefore, animals passing through the Brighton Stock Yards for purposes of sale should be consigned *therefrom* in accordance with this regulation.

The *State* regulation now in force does not allow cattle, sheep or swine to move to or from territory within a radius of five miles of infected premises in the town of Leicester.

Very truly yours,

LESTER H. HOWARD,
Commissioner.

Statistics in connection with the control and eradication of foot-and-mouth disease follow. They show the towns, in alphabetical order, in which the disease has been found, the number of affected herds in those towns, the date on which positive cases of the disease were found, the date of killing of the animals, and the amount for which they were appraised.

Statistics on Foot-and-Mouth Disease for Year ending Nov. 30, 1915.

CITY OR TOWN.	Date reported Positive.	Date of Killing.	Cattle.	Swine.	Appraisal.
Arlington,	Feb. 8	Feb. 11	9	3	\$515 00
Attleboro,	Dec. 3	Dec. 11	4	16	365 00
Attleboro,	Feb. 15	{ Dec. 18 } { Feb. 19 }	-	271	3,050 00
Berkley,	Jan. 4	Jan. 7	17	-	950 00
Boston,	{ Mar. 22 } { Apr. 13 } { Apr. 27 }	{ Mar. 22 } { Apr. 15 } { May 3 }	3	-	-
Boston,	-	{ Jan. 28 } { Feb. 1 }	-	-	- ¹
Chicopee,	Feb. 7	Feb. 11	10	7	565 00
Dracut,	Dec. 6	Dec. 12	39	25	3,086 50
Everett,	Feb. 21	Feb. 25	11	-	900 00
Everett,	Mar. 1	Mar. 2	15	-	1,160 00

¹ Found on postmortem at the Brighton Abattoir.

Statistics on Foot-and-Mouth Disease — Continued.

CITY OR TOWN.	Date reported Positive.	Date of Killing.	Cattle.	Swine.	Appraisal.
Fall River,	Feb. 27	Mar. 2	22	1	\$1,206 00
Fall River,	Feb. 28	Mar. 2	1	-	65 00
Grafton,	Dec. 1	Dec. 8	17	-	930 00
Grafton,	Mar. 3	Mar. 10	30	12	1,810 00
Granby,	Dec. 4	Dec. 14	36	10	2,143 00
Hingham,	Apr. 15	Apr. 15	7	-	525 00
Holden,	Feb. 13	Feb. 20	4	-	180 00
Leicester,	Oct. 11	Oct. 15	12	-	750 00
Lexington,	Feb. 18	Feb. 21	12	253	3,525 00
Lexington,	Mar. 1	Mar. 3	12	-	840 00
Marlborough,	Mar. 8	Mar. 11	35	-	3,300 00
Marlborough,	Mar. 9	Mar. 11	20	-	1,100 00
New Braintree,	Feb. 9	Feb. 13	25	11	1,734 00
Northampton,	Mar. 11	Mar. 15	2	17	347 00
Northborough,	Feb. 6	Feb. 15	3	2	220 00
Oakham,	Feb. 5	Feb. 12	24	1	1,250 00
Rahoboth,	Dec. 4	Dec. 8	32	-	2,400 00
Rahoboth,	Dec. 4	{ Dec. 9 Dec. 10 Dec. 11 }	24	1,075	25,540.00 ¹
Rahoboth,	Dec. 6	Dec. 11	19	-	1,350 00
Rahoboth,	Jan. 1	{ Dec. 4 Jan. 5 }	30	-	1,359 00
Russell,	Feb. 22	Mar. 1	3	4	216 00
Seekonk,	Dec. 4	{ Dec. 9 Dec. 10 Dec. 11 }	-	958	-
Seekonk,	Dec. 19	{ Dec. 22 Dec. 23 }	1	1,109	10,255 25
Seekonk,	Mar. 6	Mar. 9	60	-	4,600 00
Seekonk,	Mar. 15	Mar. 17	51	3	4,060 00
Somerville,	Feb. 8	-	-	-	- ²
Southborough,	Feb. 11	Feb. 13	16	-	1,095 00
Southborough,	Feb. 15	Feb. 17	4	-	280 00 ²
Southborough,	Feb. 15	-	-	-	-
Southborough,	Feb. 19	Feb. 24	109	-	7,000 00
Springfield,	Feb. 3	Feb. 8	2	-	160 00
Swampscott,	Dec. 2	Dec. 5	39	-	2,400 00

¹ Includes appraisal on 958 head of swine given below.² Found on postmortem at slaughtering establishment.

Statistics on Foot-and-Mouth Disease — Concluded.

CITY OR TOWN.	Date reported Positive.	Date of Killing.	Cattle.	Swine.	Appraisal.
Swansea,	Dec. 15	Dec. 17	3	2	\$280 00
Swansea,	Mar. 5	Mar. 13	-	429	3,943 50
Swansea,	Mar. 10	Mar. 11	7	-	410 00
Waltham,	Feb. 6	Feb. 12	64	31	5,000 00
Waltham,	Feb. 8	Feb. 12	9	-	500 00
Waltham,	Feb. 11	Feb. 15	22	-	1,100 00
Waltham,	Feb. 17	Feb. 20	25	-	1,200 00
Waltham,	Feb. 18	Feb. 20	12	-	875 00
Waltham,	Feb. 22	Feb. 26	95	-	8,150 00
Waltham,	Feb. 26	Feb. 28	22	-	1,650 00
Waltham,	Feb. 28	Mar. 3	34	8	2,764 00
Warren,	Dec. 1	Dec. 4	4	-	225 00
Watertown,	Feb. 14	Feb. 17	32	-	1,900 00
Watertown,	Mar. 6	Mar. 8	10	-	750 00
Westborough,	Mar. 13	Mar. 16	-	60	877 00
Weston,	Feb. 17	Feb. 20	49	3	4,300 00
Westport,	Mar. 18	Mar. 19	6	-	475 00
Worcester,	Jan. 30	Feb. 19	81	-	13,650 00
Worcester,	Feb. 20	{ Feb. 24 Mar. 9 Mar. 17 Mar. 19 Mar. 25 Mar. 31 }	-	1,529	23,746 88 ¹
Totals,	-	-	1,235	5,840	\$163,128 13

¹ Of these animals, 413 were sold for pork on the market before affected. They were appraised at \$8,203.50; salvage was \$4,406.62. The difference only, which it was agreed should be paid, — namely, \$3,796.88, — is included in the total appraisal above.

In addition to the above animals there were 75 sheep, 10 goats and 3 fowl appraised, killed and paid for, the appraisal, a small amount, being included in the above total.

The number of herds examined by agents of the department one or more times during the past year was 648.

In every branch of the control work the hearty coöperation of officials of the United States Department of Agriculture has been given this department. Without the Federal aid so promptly rendered and systematically carried out to the final completion of the work, the problem of eradication of foot-and-mouth disease in Massachusetts would have been a much more serious one, both in the extent of the infection and in reimburse-

ment of the owners of cattle and other property destroyed, and in the necessarily large expense incurred in the execution of the work.

The following statistics covering the entire outbreak of foot-and-mouth disease, which began on Nov. 5, 1914, may be interesting:—

Infected premises,	98
Towns in which the disease was found,	50
Places visited and herds examined by agents at least once, and many of them two or more times,	1,248
Cattle killed,	2,126
Swine killed,	6,116
Sheep killed,	77
Goats killed,	11
Fowl killed,	1,697
Appraisal of animals killed,	\$231,694 38
Appraisal of property destroyed,	8,562 47
Total,	<u>\$240,256 85</u>
Amount of special appropriation,	\$150,000 00
Paid by the Commonwealth to date, being 50 per cent. of the appraised value,	\$113,195 12
Total number of claims paid to date,	104

HOG CHOLERA.

The decrease of 39,615 head of swine in Massachusetts from 1912 to 1914 proved upon investigation to be due largely to the ravages of hog cholera, either directly or because many stockmen had discontinued keeping swine on account of the prevalence of the disease. This condition was rapidly ruining the swine industry of Massachusetts, and it is because of this condition and the necessity of controlling this contagious disease that the Department of Animal Industry is engaged in treating or immunizing swine against hog cholera. The usual mortality after hog cholera gains access to a herd, if serum treatment is not given, is from 85 to 100 per cent. Our statistics show that, by prompt application of this treatment after cholera gains access to a herd, we have been successful in saving 92 per cent. of the animals so treated. They further show that animals

when properly immunized will not contract cholera, regardless of how prevalent the disease may be in the neighborhood.

In this treatment anti-hog cholera serum and virus are used. Anti-hog cholera serum is the blood from an animal which is hyper-immune (many times immune), and which contains enormous numbers of anti-bodies which resemble anti-toxin. This serum or blood has the faculty of temporarily protecting other swine into which it may be injected. This protection is called temporary immunity, and lasts for a period varying from three to twelve weeks, after which the swine are again susceptible. This treatment is commonly called "serum only" treatment, and is used in swine which show clinical symptoms of hog cholera or which are carrying a high temperature, also in pigs which are not old enough for the simultaneous treatment (under 40 pounds), in pregnant sows, in sows nursing pigs, and in animals which need protection for only a very short time, as in the case of animals which are to be slaughtered within a few weeks.

Hog cholera "virus" is virulent blood which is drawn from a pig during the height of an attack of hog cholera. This blood or virus used in small quantities, in combination with a large amount of serum, is what is spoken of as "simultaneous" treatment, and this treatment when properly administered gives the animal a permanent immunity. This is accomplished in the following manner: —

The serum, which is injected as before explained, temporarily protects the animal. The virus, on the other hand, which is simultaneously injected, stimulates the cells of the body to produce their own anti-bodies, and once this production is started it continues indefinitely, therefore giving a permanent immunity.

The department is using both the "serum only" and the "simultaneous" treatments. The simultaneous treatment is administered to all swine on infected premises or in noninfected herds upon application of the owners, where the animals are to be kept longer than a few weeks, providing that they are over 40 pounds' weight and are not under the classification for which we use the "serum only" treatment.

Every case of hog cholera reported is investigated by one of

our agents and serum treatment advised if conditions warrant the same. In all cases the treatment is carried out by agents of the department, and the only expense to the owner is for the serum and virus which are used, the Commonwealth defraying all other expenses.

The campaign of the Department of Animal Industry against hog cholera has been vigorously conducted throughout the year, notwithstanding the fact that it has been badly handicapped because practically all of the agents who are ordinarily doing hog cholera work were engaged for fully two months in an effort to exterminate foot-and-mouth disease, which left the cholera work practically at a standstill during that time. In spite of this fact the amount of work which has been done is most satisfactory.

One might assume, in comparing our statistics for 1915 with those of 1914, that hog cholera was on the increase in Massachusetts. Such, however, is not the case. Until this year we had no method of determining the amount of cholera which existed in this State, or the number of animals which died from the disease and the resultant financial loss. This was due largely to the fact that stock-men were not aware of the fact that the disease could be prevented or possibly cured. As they learned that this could be done, and that it was not necessary for swine to die from the disease or to be slaughtered as formerly, there has been a large increase in the demand for this work and in the number of cases reported, consequently we have a much better idea of the amount of cholera which actually exists. Undoubtedly this increase will continue during the coming year, notwithstanding the fact that in many herds which heretofore have annually lost hundreds of swine from cholera we now, by immunization, have the disease under control.

In 1915 we investigated on account of cholera 349 herds of swine as against 100 reported in 1914. We immunized against cholera, at the request of the owners, the swine in 95 non-infected herds, as against one herd in 1914. In 1914, because of limited investigations, we knew of only 900 head of swine which died from cholera without being treated. In 1915, because of our more extended investigations and field work,

we know of 3,080 head of swine which have died from hog cholera without treatment.

The table on pages 47 and 48 gives some idea of the amount of work which has been done, together with the results obtained. From these figures it will be seen that 16,983 head of swine have been treated during the year. Of this number, 10,300 animals have received the "serum only" treatment, either because they were already infected, or because they were not in the proper condition to receive the simultaneous treatment. Out of this number 718 animals, or approximately 7 per cent., have died. In infected herds 5,826 animals have received the simultaneous treatment. Of this number 70, or 1.2 per cent., have died. It is well to note at this time that at least 99 per cent. of the animals before mentioned were garbage fed, and under these conditions the mortality must be considered extremely low.

Probably no portion of our statistics will be more interesting than that regarding the noninfected herds. In 95 herds 863 animals were immunized. Of this number only one died from hog cholera. This one animal could undoubtedly have been saved by reinforcing with serum had the owner not objected to such a procedure. Three pigs in noninfected herds gave a strong reaction to the treatment and were off feed for a few days, but fully recovered. This shows clearly that the amount of vaccination cholera which follows our work is negligible.

A word regarding recrudescence (return of the disease) will be of interest. We are frequently asked regarding the danger of using the simultaneous treatment and later discontinuing the same. On general principles we do not advocate this policy: In the few noninfected herds where this has been done we have not had a single case where the disease has occurred at a later time, although many young, susceptible pigs have been and still are on the premises. It frequently happens that many pigs from immune sows, which are of course immune while nursing, do not receive serum until several weeks after they are weaned, because we are unable to answer all applications for immunization as promptly as we desire. During this time they are, of course, susceptible and would undoubtedly contract cholera if infection existed on the premises. The other extreme,

however, is noticed in infected herds. In the majority of these herds, just as soon as the immunity conferred by the serum wears off, the animals contract cholera. This has happened in a large majority of the infected herds where treatment has been carried on, and consequently it is our policy, as far as possible, to either give more serum in six weeks after the "serum only" treatment has been given, or to permanently immunize by the simultaneous treatment. In these cases there is every reason to blame the return or continuation of the trouble, not upon the use of virus in administering the simultaneous treatment, but upon the fact that the premises are badly infected, and that a proper scheme of disinfection has not been carried out.

Early in the year the policy was adopted of not giving the simultaneous treatment to swine until five or six weeks had elapsed after serum administration. Previous to that time it frequently happened that animals were given the simultaneous treatment within a shorter space of time, and invariably we found where this was done that the animals were given an immunity longer than that conferred by serum only, but that they did not receive a permanent immunity. We are strongly of the opinion, notwithstanding that some authorities do not agree with us, that it is impossible to give a permanent immunity while an animal is harboring a temporary immunity. The length of the temporary immunity being uncertain, in field work we have adopted six weeks as a minimum length of time which must elapse before the simultaneous treatment can follow the administration of serum only. With this same purpose in view we are now using larger amounts of virus than heretofore. Whereas formerly one-half cubic centimeter of virus was used on pigs of from 40 to 60 pounds, we are now using one cubic centimeter, which has overcome some of our difficulties regarding a partial immunity.

An interesting deduction may be drawn from animals in infected herds which have temperatures ranging from 103.5 to 106. It will be noted that 944 of these animals received simultaneous treatment. This was done in specially selected herds, and in these cases the average dose of virus was administered with more than the ordinary dose of serum. In every case the operator was an expert man and used this

method only when he was reasonably sure that the temperature was ascending rather than descending. Our statistics show that the results from this method have been equally as good as in animals with a temperature below 103.5, but extreme caution and good judgment are required when this is done.

The record of deaths following our treatment we believe to be unusually accurate, due to the method which we pursue in obtaining these figures. Report blanks are sent to the owner of the swine after the animals have been treated. A copy of this report blank follows: —

THE COMMONWEALTH OF MASSACHUSETTS, DEPARTMENT OF ANIMAL INDUSTRY.

To fulfill your agreement in your voluntary request for treatment against hog cholera, please fill in the following reports, detach and return to Room 132, State House, Boston, Mass. Your quarantine will not be revoked until these reports have been received.

FILL IN, DETACH AND RETURN 2 WEEKS AFTER TREATMENT.

Name191.....
 Address.....
 Animals treated
 Treated by (Date.)
 If any have died since treatment give tag numbers.

 How many are visibly sick at this time?
 Is general condition of herd better than at time of treatment?.....

FILL IN, DETACH AND RETURN 4 WEEKS AFTER TREATMENT.

Name191.....
 Address.....
 Animals treated
 Treated by (Date.)
 If any have died since last report give tag numbers.

 How many are visibly sick at this time?
 Is general condition of herd better than at time of last report?

FILL IN, DETACH AND RETURN 6 WEEKS AFTER TREATMENT.

Name191.....
 Address.....
 Animals treated
 Treated by (Date.)
 If any have died since last report give tag numbers.

 Are any animals sick now?
 Do you think that any cholera exists in your herd at this time?

It will be seen that the owner makes a report once in every two weeks for six weeks. In the meantime his herd is under quarantine, said quarantine remaining on the herd until his reports have been received; and from our experience we know that if there is anything to criticize regarding results the owner is far more apt to report these conditions than the operator might be. There are, however, some difficulties with this method because occasionally animals die from causes other than cholera, and the owner, not being able to diagnose the case, ascribes the death to the treatment. If we were able to pick out these cases the number of deaths following treatment would be even lower.

During the past year a widespread prevalence of foot-and-mouth disease in three states of the middle west originated in the use of anti-hog cholera serum which had been contaminated with the virus of foot-and-mouth disease. While our Order No. 12 protected us to a certain degree against this condition, it was not deemed quite sufficient. Consequently, Department Order No. 20 was promulgated and approved by the Governor and Council. A copy of this order follows: —

ORDER No. 20.

SEPT. 15, 1915.

To All Persons whom it may concern: —

Whereas the Department of Animal Industry is now actively engaged in the control and eradication of hog cholera, which is a contagious disease, and is so recognized under the laws of this Commonwealth,

And whereas successful control of this disease has been accomplished only in those States which have regulated and restricted the sale, distribution, possession and administration of various commercial products known as anti-hog cholera serum, and virulent blood or virus, which products, while designed to prevent or cure hog cholera, in the hands of untrained men tend to create and cause an epidemic of this disease,

Now, therefore, acting under and by virtue of the authority vested in me by the provisions of chapter 90 of the Revised Laws and chapter 608 of the Acts of 1912 and all acts and amendments thereof and in addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

No person, firm or corporation shall directly or indirectly administer, or procure or cause to be administered, or have in possession with intent to have administered directly or indirectly, within the Commonwealth of Massachusetts, anti-hog cholera serum, virulent blood or visius, or any

other preparation of a similar composition under whatever name, and administered in a similar way for the prevention and cure of hog cholera, unless written permission has been obtained from the Commissioner of Animal Industry for such administration or possession.

This order shall take effect upon its approval.

This order shall be published by sending a copy to each inspector of animals in the Commonwealth, and by distribution to known breeders of swine, to commercial houses known to be dealing in the aforesaid products, and to veterinarians registered under the laws of the Commonwealth.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Sept. 15, 1915.

E. F. HAMLIN,
Executive Secretary.

Since January of 1915 we have tested all anti-hog cholera serum and virus which have been used by our agents. These products are tested not only against foot-and-mouth disease, but also to ascertain whether or not the serum is potent and the virus virulent. This is done because it is known that to obtain good results in immunizing against hog cholera two things are absolutely necessary, — first, the work must be properly carried out, and secondly, the operator must use serum which is known to be potent and virus which is virulent. There is no certainty that anti-hog cholera serum and virus, as ordinarily sold, meet these requirements. Our testing of these products, therefore, affords the owners of swine a large degree of security which could not possibly be enjoyed in any other manner. A comparison of the results obtained in different sections of the country verifies this statement. Unfavorable results from the simultaneous treatment have been experienced in States where the use of virus is not restricted to trained men responsible to the State, or where the most stringent tests of serum and virus are not carried out. The results obtained in any locality may be judged by this standard.

During the year we have had considerable trouble from a secondary infection from *bacillus suispestifer* and *bacillus suissepticus*, and we are at present working along lines which we trust will prevent this complication.

We have every reason to believe that the work in connection with the prevention and treatment of hog cholera will increase

very rapidly. The swine problem in Massachusetts differs from that in many other States. The closeness of piggeries to each other, the fact that approximately 90 per cent. of all swine are garbage fed, and the unusually heavy intrastate traffic make practically every herd an exposed one. Under these conditions the only feasible way to control hog cholera seems to be in permanently immunizing all susceptible swine by the simultaneous method. The swine owners with whom we are familiar have no desire for the "serum only" treatment, inasmuch as its cost is practically as great as for the simultaneous treatment, and the immunity conferred by the former is only temporary, whereas the latter gives a permanent immunity.

Our most serious handicap in the work at the present time is the fact that we have not a sufficient number of trained men to handle it properly, as the demand for preventive treatment is increasing rapidly. This results in some unavoidable delay in the administration of the treatment after applications for same are received. This condition, however, we hope to be able to overcome in the coming year.

Statistics on Hog Cholera for the Year ending Nov. 30, 1915.

Number of herds investigated,	349
Number of herds in which hog cholera was diagnosed,	227
Number of infected herds quarantined and treatment administered,	150
Number of infected herds quarantined but not treated,	77
Number of swine reported as having died from hog cholera without treatment,	3,080
Approximate value of these animals,	\$11,052
Number of swine reported slaughtered because of hog cholera,	909

"Serum only" treatment: —

Number of pigs too young for simultaneous treatment,	4,185
Number of sows pregnant,	69
Number of sows nursing pigs,	103
Number of animals in above classes which died following treatment,	91
Number of animals showing clinical symptoms or temperatures over 104,	5,953
Number of infected animals which treatment failed to save,	627

Total number receiving "serum only" treatment,	10,300
Total number which treatment failed to save,	718
Percentage of animals saved by "serum only" treatment,	93

Simultaneous treatment in infected herds:—

Number immunized with temperatures below 103.5,	4,876
Number of animals which died following immunization,	39
Number immunized with temperatures above 103.5,	944
Number of these animals which died following immunization,	31
Total number receiving simultaneous treatment in infected herds,	5,826
Total number which treatment failed to save,	70
Percentage of animals saved by simultaneous treatment in infected herds,	98.8

Simultaneous treatment in noninfected herds:—

Number of herds,	95
Number of animals immunized,	863
Number of animals which died following immunization,	1

Approximate value of animals treated,	\$200,000
Approximate value of animals which treatment failed to save,	4,182
Cost of serum and virus to the owners,	11,838
Approximate amount of money saved owners,	183,980

Total number of animals treated,	16,983
Total number of infected animals which treatment did not save,	789

TUBERCULOSIS.

The study of tuberculosis both in man and animals is one to which much attention has been given for many years, and the problem of its control among animals is so important at the present day as to command the attention of many investigators. Individuals, commissions, government investigators and State experiment station workers have made many contributions to the knowledge of this subject.

As the department records show a continued widespread prevalence of this disease in Massachusetts for many years, constant activity is necessary in order that its spread may be limited as far as possible, both on account of the sanitary significance of its existence as well as the great economic

importance of the same, which is shown by the fact that 1,079 Massachusetts cattle have during the past year been condemned and killed on account of being affected with tuberculosis, for which the State has paid to the owners approximately \$35,000.

Whether or not the disease is increasing or diminishing among our neat cattle is a question that cannot be accurately answered. The number of animals infected cannot be determined, as but a small percentage of them are subjected to the tuberculin test, which test is the most reliable diagnostic method at our command. It has been clearly established that there are certain herds and certain localities in which the disease is much more prevalent than in others. It has also been shown that there are many premises and localities where tuberculosis is rarely found, conditions of climate, breeding, traffic in animals, development and replenishment of the herds being especially favorable to maintenance of health.

Considering the economic importance of tuberculosis among cattle, facts relating to its distribution must be kept in mind when efforts are being made to control its spread. When once introduced into a herd it is liable to spread from infected to well animals with more or less rapidity. It causes a large number of animals to be condemned and killed, and it reduces very largely the market value of such animals as may be infected but have not been recognized as diseased. It reduces the breeding value of animals. It causes a waste from the fact that tuberculous animals do not give adequate returns for the food supplied them, and in many cases its development destroys the interest of a breeder in the maintenance of his herd at a high standard of health.

Our State laws relating to the control of this disease impose the following condition: that tuberculin as a diagnostic agent for the detection of this disease shall be used only upon cattle which are brought into the Commonwealth from other States, and upon such animals within the State as their owners request be tuberculin tested. Therefore, condemnation of a Massachusetts animal as tuberculous can be made only as the result of a physical examination. The result of this limitation in methods of diagnosis undoubtedly is that many cases of tuberculosis exist because the disease cannot be positively diagnosed.

Being limited in our condemnation of cases to those diagnosed by physical examination alone, it is important that there be developed and applied all possible skill and efficiency in this method of diagnosis, and also that it be used as extensively as is practicable in order that existing cases may be found.

It has been the practice heretofore in the department, on the occasion of an animal being quarantined on account of being suspected of this disease, for an agent to visit the premises and physically examine the animal, condemning or releasing the same according to his opinion as to whether or not it was diseased. His action in each instance has been limited to the particular animal on which a quarantine had been placed.

In my opinion, in order that the spread of the disease on the particular premises visited may be limited in so far as is possible, it becomes necessary to carefully and completely examine all other animals in the herd in which the tuberculous animal has been found. Otherwise, it seems to me we are simply temporizing with a very serious condition, and that no real progress can be made in the elimination of disease by simply examining and taking certain diseased animals from a herd without making sure that no others on the same premises are also diseased.

The history of the control of this disease in certain herds and localities shows that at more or less regular intervals the department is called upon to examine and condemn one animal only in a herd. Believing that in many instances other cases quite as dangerous as centers of infection may exist on the same premises, I have accordingly ordered that hereafter when an agent of the department finds one tuberculous animal he shall immediately carefully examine all other animals in the herd, and if suspected cases are found he shall notify the owner of existing conditions, have the suspected animals placed in quarantine, and disposed of according to the methods followed in the original case. In the short time in which this method has been in operation we have found that in many instances two centers of infection have been destroyed where formerly the second one was left to do its deadly work, unrecognized but none the less effective.

With a disease which is ordinarily slow in development of

symptoms, subsequent examinations of a herd which has been exposed must necessarily result in bringing to light cases which under the former custom would probably not have been recognized until a much later date, and during that time might have caused much damage by spread of the infection. Therefore, in my opinion, there should be added to the regulation requiring herd examinations one requiring that the same premises be visited within a period of three months and the animals again examined, in order that cases which may have developed clinically since the first visit may be found and disposed of.

Careful physical examination by trained men at regular intervals of all animals which have been exposed to tuberculosis should, in the course of time, have a marked effect in reducing the number of tuberculous animals in the State.

Owing to the prevalence of foot-and-mouth disease shipment of cattle into Massachusetts from other States was prohibited during a large portion of the year, and the Brighton Stock Yards, the public market through which the greater number of cattle coming from other States are distributed to Massachusetts farms, was closed for a period of nine months. The number of cattle brought into the State was therefore very much reduced. This was unavoidable, however, as in protection of the cattle interests of the entire State it was necessary to use every precaution against the further introduction of this infection. Therefore our records of the tuberculin testing of interstate cattle during the past year show the number to have been very much reduced from previous years. At the present time restrictions against the shipment of cattle from Maine, New Hampshire and Vermont, imposed on account of the prevalence of foot-and-mouth disease, have been removed. From these States comes the greater portion of cattle shipped to Massachusetts interstate, and the cattle owners of the State are therefore again able to replenish their herds by importations from the States mentioned.

As having an important bearing on the existence and spread of tuberculosis in Massachusetts, attention may be called to the character of the work done by the department in testing interstate animals with tuberculin in order to disclose whether or

not they are diseased. For the purpose of properly protecting the health of the animals of the State it is necessary that the application of the tuberculin test on interstate cattle should be surrounded with every condition looking to the proper interpretation of the result. In the first place, the animals should be in proper condition to receive the subcutaneous injection of the material used in the test, and secondly, regulations should be carefully formulated for the conduct of the test from that point forward, and should be strictly adhered to. The tests should be made by men of training and experience, and the results determined by intelligent study of the records made. A particular effort has been made the past year by the department to enforce regulations the observance of which will comply with the conditions above mentioned.

The department's tuberculin testing which is done at the Brighton Stock Yards, and is applied to all dairy cattle shipped interstate to the quarantine stations at Brighton, Watertown and Somerville, is now under the charge of a veterinarian who has had wide experience in this work and has been in the service of the department for many years. Tuberculin testing done at other points in the State under the auspices of the department is in all cases done by an accredited man of training and experience.

As the department is in the habit of accepting and approving records of tuberculin tests made by veterinarians of other States on cattle which are shipped to Massachusetts, every effort has been made to insure the proper performance of this work in accordance with our own regulations. If for any reason discredit attaches to the work of any veterinarian making a test, the animals are retested by our own agents, and approval of tests made by the discredited man withheld in all subsequent cases. It should be said that very seldom has the department been called upon to discredit any test made by a qualified veterinarian, either in this State or in other States from which cattle are shipped to Massachusetts. As we require the approval of the live-stock authorities of every State whose veterinarians make tests on animals to be shipped to Massachusetts, it is our opinion that Massachusetts interests are entirely safeguarded in this matter.

Below are various tables showing the extent of the department's work in connection with the control of tuberculosis in the State for the year ending Nov. 30, 1915.

Cattle Tuberculin tested.

Cattle tested at the quarantine station at Brighton,	4,858	
Cattle tested by veterinarians outside the State: —		
Received at Brighton,	338	
Received at other points,	4,912	
		5,250
Cattle tested by agents of the department at points other than the quarantine station,	5,258	
Cattle awaiting test,	2	
		15,368

Disposition of Above Cattle.

Cattle condemned on Brighton test,	135	
Cattle killed on "permit to kill," Brighton test,	43	
Cattle released from Brighton as free from tuberculosis,	5,018	
Cattle condemned on test at other points in State,	173	
Killed on physical examination,	1	
Killed on "permit to kill" after first test,	1	
Disposed of for beef after first test,	4	
Awaiting test or retest,	8	
Released as free from tuberculosis,	9,985	
		15,368
Total number of cattle quarantined or reported for examination during the year,		1,787

Massachusetts Cattle.

Number released,	194	
Number condemned, killed and paid for,	941	
Number condemned and killed, in process of settlement,	107	
Number condemned, no award,	4	
Number permit to kill, paid for,	23	
Number permit to kill, in process of settlement,	8	
Number permit to kill, no award,	121	
Number killed by owner or died in quarantine, no award,	58	
		1,456

Cattle from without the State.

Number released,	9	
Number condemned and killed, no award,	264	
Number condemned and killed, no lesions found, paid for,	14	
Number died in quarantine, no award,	1	
Number permit to kill, no award,	43	
	<hr/>	331
		<hr/> 1,787

Of the 331 interstate cattle, 154 were tested at Brighton; no lesions were found in 8, for which the State has reimbursed the owner. Of the remaining 177 cattle (which were tested at other points than Brighton) 6 were found to show no lesions, for which the State has reimbursed the owners.

In addition to the 1,787 head of cattle disposed of as above, 189 cattle and 12 swine have been reported by butchers, renderers and boards of health as having been found tuberculous at the time of slaughter, all of which were rendered.

During the year a number of cattle owners made voluntary request for the tuberculin testing of their herds by agents of the department. The figures which follow show the work which was done in response to these requests: —

Number of cattle tested,	124
Number released as healthy,	105
Number killed on "permit to kill," no award,	10
Number condemned, killed and paid for,	5
Number condemned and killed, no award,	4
	<hr/> 124

Forty-nine head of cattle reported as reacting to tests made by private veterinarians were released, as they could not be condemned on physical examination.

Receipts of Stock at the Watertown Stock Yards for the Year ending Nov. 30, 1915.

New Hampshire cattle,	1,595
Vermont cattle,	1,610
Massachusetts cattle,	614
Sheep and lambs,	646
Calves,	5,219
Swine,	990

*Receipts of Stock at the New England Dressed Meat and Wool Company's
Yards at Somerville for the Year ending Nov. 30, 1915.*

Maine cattle,	3,391
New Hampshire cattle,	2,751
Vermont cattle,	8,099
Massachusetts cattle,	120
Western cattle,	5,155
Canada cattle,	3,564
Sheep and lambs,	310,518
Calves,	75,331
Swine,	1,033,100

Receipts of Stock at Brighton for the Year ending Nov. 30, 1915.

Maine cattle,	4,648
New Hampshire cattle,	5,944
Vermont cattle,	7,151
Massachusetts cattle,	13,819
New York cattle,	2,901
Western cattle,	18,037
Canada cattle,	1,202
Sheep and lambs,	5,964
Calves,	46,365
Swine,	51,737

*Report of Cattle brought into State during the Year to Points outside of the
Quarantine Stations.*

For dairy and breeding purposes, tested before shipment,	4,912
For dairy and breeding purposes, tested after arrival,	5,258
For dairy and breeding purposes, awaiting test,	2
	<hr/>
	10,172

Neat cattle on which no test was required, exclusive of
cattle and calves for immediate slaughter, 748

The last item is made up as follows:—

Returned from out-of-State pastures,	480
Calves under six months old,	145
Died before test could be made,	3
Lost <i>en route</i> or in pasture,	2
Injured and killed before test,	1
For temporary stay at exhibition or at auctions,	60
Shipped to another State soon after arrival,	53
Remaining in State for brief periods only,	4
	<hr/>

Cattle for immediate slaughter,	1,934
Calves for immediate slaughter,	3,992
	<hr/>
Total for all purposes,	16,846

Nearly all of the total number of animals given above were brought into the State on permits issued by the head of the department, only 341 having been brought in without permits, which were reported to the department by railroad agents, local inspectors or others. Of these, 43 were tested before shipment, 23 were slaughtered at once for beef or veal, 2 were calves under six months old, 171 were returned from pasture, and the remainder, 102 head, were tested by agents of the department.

The following figures show the disposition of animals that were brought into the State to points outside the quarantine stations at Brighton, Watertown and Somerville, which failed to pass a satisfactory tuberculin test: —

Condemned on first test.	74
Condemned on second test,	94
Condemned on third test,	5
Killed on physical examination,	1
Killed on "permit to kill" after first test,	1
Killed for beef by owner after first test,	2
Disposed of for beef before retest could be made,	2
Awaiting retest.	4
Isolated and awaiting third test,	2
	<hr/>
	185

Results in the Above Cases.

Found diseased on postmortem examination,	163
No lesions found, paid for by State,	11
No report of postmortem examination obtainable,	4
Awaiting report of result,	1
Cases of animals still awaiting retest,	4
Animals isolated and awaiting third test,	2
	<hr/>
	185

There were 1,406 permits issued during the year, 281 of which were not used. One permit was issued allowing animals to return from exhibition in another State, 11 allowing cattle to be unloaded *en route* through the State, and 11 allowing cattle to be pastured in the State during the season.

During the spring and early summer agents of the department tested with tuberculin 427 head of cattle that were to be sent

into other States for pasture during the summer, mostly into New Hampshire, and 57 animals were tagged for the same purpose, making a total of 484 head.

On account of the outbreak of foot-and-mouth disease during the final month of the previous year no permits for shipment of dairy cattle into the State were issued during the months of December, 1914, and January, 1915. On Feb. 1, 1915, cattle from Maine and Vermont were allowed, and on May 10 this permission was extended to the State of New Hampshire. On July 1 cattle were allowed in from other States, but only under certain restrictions. Notwithstanding these restrictions there was a large increase in the number of dairy cattle brought to points outside the several quarantine stations, which is accounted for by the fact that Brighton market was closed to such shipments until August 30, and dealers who usually ship to that station were obliged to ship elsewhere.

The record of cattle and calves brought into the State on permits for purposes of immediate slaughter is small, being only those of which the office of the department has report, and does not represent the amount of business in slaughter animals, as much of the time during the year such animals were allowed to be shipped, without special permit, to slaughtering establishments which were under United States government inspection.

For several years, at the request of the United States Department of Commerce and Labor, a report of the receipts of all live stock at Boston has been sent to Washington each month. The following table shows the receipts by months for the past year: —

Receipts of Live Stock at Boston for Twelve Months ending Nov. 30, 1915.

FOR MONTH OF —	Cattle.	Calves.	Sheep.	Swine.	Horses.
December,	8,244	8,792	29,051	137,860	2,485
January,	5,614	7,523	14,945	142,175	1,499
February,	4,168	5,827	16,356	129,031	1,861
March,	5,260	10,418	10,210	109,669	2,077
April,	3,701	13,074	19,298	66,969	2,065
May,	3,960	11,816	20,105	73,202	1,560
June,	5,041	13,322	26,335	112,282	2,152
July,	6,771	10,391	30,362	103,533	2,144
August,	7,803	8,031	32,185	55,874	1,628
September,	8,290	10,881	34,177	44,233	1,430
October,	10,046	12,400	40,488	40,056	1,336
November,	11,708	14,440	43,736	70,943	1,583
Totals,	80,601	126,915	317,238	1,085,827	21,820

MISCELLANEOUS DISEASES.

Anthrax is a disease which is widely spread throughout the world, and is the cause of serious loss to Massachusetts cattle owners. As animals ordinarily succumb within a few hours of the onset of the disease, the first animals attacked on a particular farm have generally died before treatment could be applied.

On the notice of an outbreak of this disease all animals on the infected premises are immediately inoculated with anthrax serum and spore vaccine as a matter of safety. This inoculation is in most cases effective in immunizing the animals for a certain length of time, thereby preventing further extension of the disease at that point.

As the spores of the causative agent of this disease remain lodged in the soil in an active state for many years in infected localities, it is necessary to continue preventive inoculation from year to year on premises where the disease has once appeared.

Thirteen neat cattle and 1 sheep have died from this disease during the past year, and 72 neat cattle, 1 sheep and 10 horses have been given preventive inoculation.

In quite a few instances the disease has appeared during the past year on premises where it has never been known before, and our efforts have been directed toward saving the animals exposed to the same conditions of pasturage and feed as those which have died. These efforts will be continued by preventive inoculation during the next season of all animals on premises where the disease has been known to exist.

Blackleg, or symptomatic anthrax, has been the cause of death of 32 head of cattle, and 440 head have been given preventive inoculation. The same necessity for yearly preventive treatment exists in control of this disease as in that of anthrax.

Another disease which has been quite prevalent during the past year is hemorrhagic septicemia, from which 54 deaths have occurred. Differential diagnosis is sometimes difficult as between blackleg, anthrax and hemorrhagic septicemia, and a positive conclusion is reached only as a result of laboratory examination of specimens. All these diseases are characterized

by sudden inception and early death, and therefore require very prompt investigation upon the occasion of outbreak. Investigation now being made by the Federal government as to all conditions relating to source of infection, course of the disease, and prophylactic treatment has already been of great aid to this department, and promises to be of still further advantage in control work.

The attention of the department having been called to the existence of scabies in sheep on the Island of Nantucket, an investigation of the same was made, which disclosed the fact that this disease had existed on the island for a long period of years, and that although the island was naturally adapted to sheep raising, many people had been deterred from engaging in that enterprise on account of the existence of this contagious disease.

An agent of this department, in company with an inspector of the United States Bureau of Animal Industry, made a thorough investigation. They were able to make a positive diagnosis of scabies affecting practically all the sheep on one farm, and were satisfied that it existed nowhere else on the island. Details of plans for eradication were taken up with the owner, and treatment was finally applied according to methods recognized as effective. The result is that the animals have been cured and the disease entirely eradicated from the island. Additional precautionary treatment of these animals will be insisted upon during the coming summer, in order that another outbreak may not occur, and that persons wishing to engage in sheep raising may do so without fear of losing their animals from this scourge which has been present on the island for so many years.

Actinomycosis has been reported on 10 farms. Seven animals have been slaughtered, 2 have recovered, 1 proved not to be a case of this disease, and there is 1 animal still under observation.

Mange has been reported as existing on 11 farms. It was found in one instance, however, that it did not exist, and on the remaining 10 places 9 head of cattle, 2 dogs, 1 horse and 35 swine were affected. Treatment was accordingly advised with the result that no extension of the disease has been reported.

Suspicious symptoms of contagious disease have been reported in twenty instances where upon investigation no disease of a contagious nature was found.

ANNUAL INSPECTION OF FARM ANIMALS AND PREMISES.

The inspection of neat cattle, other farm animals and premises upon which they are kept, which for a number of years has been made annually by the inspectors of animals of the different cities and towns, by order of the commissioner of this department, was the past year omitted on account of the prevalence of foot-and-mouth disease. An order directing this inspection to be made was sent from the office of the department on Jan. 22, 1915, when it seemed as if the prevalence of foot-and-mouth disease was at an end; but a secondary outbreak of this disease occurring a few days later the order was revoked, it being deemed unwise to take the chance of spreading the infection by means of the inspectors traveling from farm to farm, as it had been found by experience that the most common means by which this infection had been spread was by people carrying the same on their clothing from one farm to another. Furthermore, cattle owners who were making individual efforts to maintain a quarantine of their own premises were very much averse to having people enter their barns unless it seemed to be absolutely necessary.

Barn inspection by the different agents of the department has for the same reason been limited to instances where contagious disease has been known to exist, and to farm-to-farm inspection necessary to determine the extent of any outbreak of foot-and-mouth disease in any particular locality.

FINANCIAL STATEMENT.

Appropriation for the salary of the commissioner, chapter 126, Acts of 1915,		\$3,500 00
Total expenditure,		<u>\$3,500 00</u>
Appropriation for clerical assistance and contingent expenses, chapters 126 and 369, Acts of 1915,		\$9,500 00
Expended during the year: —		
For expenses of the commissioner,	\$278 58	
For salaries of clerks and stenographers,	3,607 61	
For printing, postage, stationery, etc.,	5,091 11	
		<u> </u>
Total expenditure,	\$8,977 30	
Unexpended balance,	522 70	
		<u> </u>
		<u>\$9,500 00</u>
Appropriation for compensating owners of animals killed and property destroyed during epidemic of foot-and-mouth disease, chapter 277, Special Acts of 1915,		\$150,000 00
Total expenditure,	\$113,195 12	
Unexpended balance,	36,804 88	
		<u> </u>
		<u>\$150,000 00</u>
Appropriation for the extermination of contagious diseases among domestic animals, chapter 125, Acts of 1915,	\$133,000 00	
Transferred by State Auditor from appropriation for extraordinary expenses,	2,500 00	
		<u> </u>
Total amount appropriated,		\$135,500 00
Expended during the year: —		
For 1,094 head of cattle condemned and killed on account of tuberculosis in 1913, 1914 and 1915, paid for in 1915,	\$35,295 72	
For 389 horses condemned and killed on account of glanders and farcy in 1912, 1913, 1914 and 1915, paid for in 1915,	19,600 00	
For expenses of killing and burial and disinfection of premises,	8,776 32	
For quarantine claims,	564 25	
For laboratory and experimental station expenses,	3,405 33	
For implements, ear tags, thermometers, etc.,	1,308 27	
For quarantine station expenses,	6,106 03	
For services of agents,	38,679 34	
For expenses of agents,	21,704 50	
		<u> </u>
Total expenditure,	\$135,439 76	
Unexpended balance,	60 24	
		<u> </u>
		<u>\$135,500 00</u>