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THIRD ANNUAL REPORT

OF THE

COMMISSIONER OF ANIMAL INDUSTRY.

1914.

FOR THE YEAR ENDING NOVEMBER 30, 1914.

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The Commonwealth of Massachusetts.

Department of Animal Industry,
Boston, Dec. 1, 1914.

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 third annual report of the work accomplished by this department for the fiscal year ending Nov. 30, 1914.

The Department of Animal Industry has in its life of less than three years grown to substantial proportions, and, from the viewpoints of completeness of organization and the loyalty and all-round efficiency of its field and office staffs, is regarded by those who have had experience and association with similar departments in other States, and are thereby competent to judge, to have reached an enviable standard of excellence. To the staff of agents above referred to there has during the past year been added two men, Dr. Edward A. Cahill and Dr. William H. Shannon, whose qualifications and fitness for special work cause them to rank among the best. Dr. Edward A. Cahill of Lowell, formerly associated with the Live Stock Sanitary Board of Pennsylvania, is, in my opinion, an especially valuable man, because his previous training in laboratory and field work in connection with hog-cholera control in Pennsylvania has fitted him to engage in that branch of work for this department. Dr. William H. Shannon of Boston, a graduate of the veterinary department of the University of Pennsylvania, although the youngest man in term of service, is displaying a highly enviable degree of energy and interest in the work, and gives great promise of becoming an extremely valuable man for the department.

I am confident that the department details are well grounded, and that the policy I sought to establish at the outset of my

administration is the correct one, viz., that the department's principal object is to improve the cattle industry of the State, not to injure or destroy it; to promote and safeguard the health of the domestic animals in the State; to establish a spirit of co-operation between the owners of stock and the department rather than a spirit of hostility; to educate rather than persecute the individual owner, and, while insisting upon law observance, to see that justice is meted out to every one. Under such a policy, with a continuance of the splendid loyalty now existent in the working force, Massachusetts must occupy a leading position in live-stock sanitary control work.

I wish to emphasize the fact that owners of stock, almost without exception, have met the representatives of this department in a spirit of co-operation, and the agents of the department are no longer avoided by them, but are sought for consultation and advice. The activity of owners of barns where neat cattle are housed, in the way of making sanitary changes as suggested by department inspectors, is a marked feature of improvement, and is most commendable. Every succeeding year of this policy of education, of persuasion rather than persecution, must bring results more and more satisfying.

The general work of the department has not differed in nature from that of the years immediately preceding. It has, however, been much more exhaustive in character and complete in detail, as the result of a more perfected organization and efficiency born of experience.

Rabies.

The following table shows the extent of rabies during the year ending Nov. 30, 1914: —

	Dogs.	Cattle.	Cats.	Horses.	Pigs.
Killed or died with rabies,	250	5	1	1	8
Killed by owners or died in quarantine, not rabid.	184	1	–	–	–
Released from quarantine,	277	3	1	1	428
Animals still in quarantine,	49	–	–	–	–
Totals,	760	9	2	2	436
Grand total,	1,209 animals.				

At the laboratory, the brains of 108 dogs and 1 cat were examined microscopically by Dr. Langdon Frothingham, and of these, 78 dogs were positive and 24 negative. The cat was also found to have had rabies. The heads of seven other dogs were received at this laboratory too badly decomposed to permit of an examination to determine whether or not the animals were rabid at the time of death.

It is regrettable that there is an increase in the number of cases of rabies in dogs over that of last year, and much to be deplored that animals manifesting strange symptoms are not more promptly placed in confinement and watched until either found to be free from disease, or symptoms of a suspicious character have developed.

At the expense of repeating my former advice along this line, I would say that the early recognition of the symptoms of rabies makes the prompt reporting to the proper authorities possible. Such early reports promptly acted upon tend to reduce greatly the number of outbreaks of the disease, and logically would lessen immensely the number of persons who annually find it necessary to take the Pasteur treatment because either bitten by or exposed to rabid animals. Over 100 people have been so exposed this year, of which by far the greater number were children.

The unknown or ownerless animal still plays a prominent part in this trouble, and this shows the necessity for the proper enforcement of the laws relating to the licensing of all dogs, and the humane destruction of such waifs of the canine world as are to be found in every community.

Some few owners from time to time complain of the irksomeness of the period of quarantine placed upon animals believed to have been exposed to a case of rabies, but the wisdom of the department's action is evident when it is pointed out that animals frequently develop rabies during the latter part of the period of quarantine, and in fact during the past year one animal did develop the disease after the ninety-day period had expired.

Glanders.

Not by any means the least important of the problems that confront this department is that of control of glanders. As a result of the more recently enacted laws and of a more completely adjusted and well-organized campaign against this disease, I have to report most flattering success in this branch of our control work during the past year, as the following figures and statements will emphasize.

Eighteen hundred and seventeen horses and mules have during the past year been reported as suspected of having glanders or farcy, including those dealt with in stable tests. Of this number, 846 were killed or died, and were found to be affected with glanders; 928 were released after examination, and 43 were held for further observation.

Of the 38 cases held over from last year, 5 were killed or died, 16 were released as free from disease, and 17 are still under observation, making a total of 851 cases of glanders during the year. Of this number, 352 were located in the city of Boston.

It will be noted that although 187 more suspected cases were reported and examined by agents of the department, the number of actual cases found was 255 less than in the previous year.

In the report submitted for the year ending Nov. 30, 1913, it was mentioned that as a means of further checking the spread of glanders it was deemed necessary to order the closing of the public drinking troughs in the city of Boston, as in that year 52 per cent. of the positive cases found in Massachusetts were discovered in the city of Boston. The report stated that on November 1 this order had been complied with.

The public works department of the city of Boston, by providing taps at convenient locations throughout the city, enabled drivers to obtain water without great inconvenience either to themselves or to the horses in their charge. Considerable pressure was brought to bear to have these troughs opened during the summer months, but, believing my stand on the matter to be right, I was able to overcome the objections raised, and kept the troughs closed. I have failed to find from reports received that any undue suffering was caused, and in fact the

closing of these public drinking places has not only been beneficial from the standpoint of glanders control, but I have been informed by a great many owners of horses and by several veterinarians that there had been fewer "colics" or cases of indigestion this past summer than ever before.

The wisdom of having taken this step is well proven by the fact that there were killed in Boston this year only 352 horses affected with glanders, against 576 horses killed in 1913, a falling off of 224, or 39 per cent., whereas in the balance of the State there were 497 horses killed in 1914, against 530 in 1913, a falling off of 33 cases, or 6 per cent., thereby showing that the greatly reduced number in the city of Boston must have been due to some cause other than a natural subsidence in the disease itself.

The watering troughs in the following cities were also ordered closed: —

Cambridge	Chelsea	Medford
Everett	Somerville	Malden
Quincy		

The advisability of requiring that all horses arriving from the States of New York, Rhode Island and Connecticut shall be accompanied by a permit issued from this department is shown by the fact that of 268 horses tested by agents of the department after having been admitted under such permits, 21 were found to be suffering from glanders, and were killed.

The ophthalmo-mallein test, material for which is obtained from the United States Bureau of Animal Industry, is proving to be of great value in conjunction with the complement-fixation test in the diagnosing of doubtful and nonclinical cases. It is also being employed in the making of stable tests, with highly satisfactory results.

The subcutaneous injection of mallein has been discontinued, as it has been found to detract from the value of other diagnostic tests.

During the year, 1,688 samples of blood have been taken from 1,274 horses. Of this number, 447 horses were killed, 777 released, 25 died, and 25 are held for further test.

Eight hundred and seventy-three ophthalmo-mallein tests were applied during the year, with the following results: 261 gave positive results, 533 were negative and 79 unsatisfactory.

A more thorough system of disinfection was adopted during the past year, an agent of the department inspecting the work done before compensation for a condemned animal is allowed. The blacksmith in whose shop the horse was last shod is obliged to disinfect the walls, chains, etc., in said shop.

Early in December a copy of the following letter was sent to every horseshoeing establishment in Boston: —

THE COMMONWEALTH OF MASSACHUSETTS,
DEPARTMENT OF ANIMAL INDUSTRY,
STATE HOUSE, BOSTON, Nov. 24, 1913.

DEAR SIR: — You will find enclosed copy of a recent order issued by me relative to the disinfection of blacksmith shops in the city of Boston; also copy of the rules and regulations of this department for disinfection.

It is not necessary for me to bring to your attention the grave condition that confronts the horse-owning interests of Boston and vicinity because of the prevalence of glanders. In order to control the further spread of this disease so far as we can, may I ask you to co-operate with me along the lines of the enclosed order? It applies to all premises where horses, asses or mules are shod, and an agent of this department will visit your place from time to time to see if its provisions have been complied with. Certificate of this department to that effect will be furnished on application.

Thanking you in advance for giving this matter immediate and constant attention, I am

Respectfully yours,
FRED FREELAND WALKER,
Commissioner of Animal Industry.

Enclosed with this letter was a copy of the following order: —

THE COMMONWEALTH OF MASSACHUSETTS,
DEPARTMENT OF ANIMAL INDUSTRY,
STATE HOUSE, BOSTON, Nov. 1, 1913.

To Owners and Tenants of Blacksmith Shops in the City of Boston: —

Whereas the disease of glanders among horses in the city of Boston has spread to such an alarming extent as to call for special effort for its prevention and control, and whereas blacksmith shops are, in my opinion, a factor in the spread of said disease,

I, therefore, acting under authority vested in me by law, and with the approval of the Governor and Council, as set forth in section 4 of Department Order No. 1, hereby order: —

All blacksmith shops within the limits of the city of Boston must be kept freshly whitewashed and disinfected.

Hitch ropes, chains, or other means of confining animals while in the shop must be sponged, sprayed with or dipped in a disinfectant solution, and walls faced by animals must be disinfected at least once a day. The floors whereon animals are allowed to stand must be disinfected at least once a week.

Fred Freeland Walker,
Commissioner of Animal Industry.

(Rules for disinfecting will be sent upon application.)

Following this letter a systematic inspection of all shops has been made, 142 having been visited during the year. Many of these shops have been frequently visited by agents of the department, as a result of which 99 shops are now being regularly disinfected, and are, in the opinion of our agents, satisfactorily safe establishments.

I still believe that the amount of compensation now allowed for condemned horses is inadequate if eradication of glanders is ever to be accomplished; it hinders rather than aids in the final disposition of horses which show no clinical symptoms but react to the glanders test made in stables where clinical cases have occurred, which horses I believe it highly necessary should be disposed of promptly.

Reports of rendering companies, as required by section 111 of chapter 75 of the Revised Laws, as amended by chapter 243 of the Acts of 1907, continue to be of much value in furnishing information of cases of glanders or farcy which would not otherwise be brought to the attention of the department, as the following table illustrates: —

Reports of Rendering Companies.

Rendering Companies.	Number of Reports.	Number of Cases.	Number not previously reported.
W. H. Abbott, Holyoke,	1	1	–
C. S. Bard, Haverhill,	3	3	–
Daudelin & Cotton, Ayer,	1	1	–
William S. Higgins, Saugus,	22	23	1
Home Soap Company, Millbury,	7	12	–
William Lavery, Amesbury,	3	4	–
Lowell Rendering Company, Lowell,	7	7	–
A. G. Markham & Co., Springfield,	1	2	–
James E. McGovern, Andover,	2	2	1
Muller Brothers, Cambridge,	38	130	–
William H. Nankervis, Marlborough,	6	6	1
New Bedford Extractor Company,	23	29	–
New England Rendering Company, Brighton,	36	79	15
Parmenter & Polsey Fertilizer Company, Peabody,	21	39	–
N. Roy, Jr., Fall River,	26	32	–
Sherborn Rendering Company,	4	5	–
N. Ward Company, South Boston,	49	304	6
Whitman & Pratt Rendering Company, North Chelmsford.	7	9	–
S. Winter Company, Brockton,	13	18	–
Worcester Rendering Company,	7	12	–
Totals,	277	718	24

Interstate Horses.

Under Department Order No. 8, which went into effect Oct. 29, 1913, prohibiting the shipment of horses, asses or mules from the States of New York, Connecticut or Rhode Island into Massachusetts without a permit issued from this department, the work performed is shown by the following statistics: —

Animals brought into State.

Mules,	27	
Asses,	5	
Donkeys,	3	
Horses,	5,064	
		5,099

Disposition of Above Animals.

Died soon after arrival,	3	
Condemned for glanders or farcy,	23	
Released as free from glanders upon examination or test by agents of the department,	5,073	
		5,099

Of the 23 interstate horses condemned by the State, 2 showed no lesions of glanders or farcy upon post-mortem examination, and in these cases the owners have been compensated for their loss by the Commonwealth. These 23 animals are included in the total number of horses condemned during the year for glanders or farcy.

Annual Inspection of Neat Cattle, Farm Animals and Premises upon which the Former are kept.

In January a copy of the following circular letter was sent to each inspector of animals in the cities and towns of the State, together with blank books in which to record the results of their work: —

The Commonwealth of Massachusetts,
Office of Department of Animal Industry,
State House, Boston, Jan. 1, 1914.

Directions to Inspectors of Animals.

In accordance with section 17, chapter 90 of the Revised Laws, inspectors of animals are hereby directed to make a general inspection of all neat cattle, sheep, swine and goats found within the limits of their several cities and towns, such inspection to commence January 15, and to be *completed on or before the first day of March, 1914.*

If upon examination the inspectors find such animals to be free from contagious disease, they will give the owner or person in charge thereof a certificate of health, as provided for in section 18 of chapter 90 of the Revised Laws; but if an inspector has reason to suspect the presence of any contagious disease among any species of domestic animals, he is to quarantine such animal or animals and send duplicate copy of such quarantine to the Commissioner of Animal Industry.

Contagious diseases under the provisions of section 28 of chapter 90 of the Revised Laws include glanders, farcy, mange, contagious pleuropneumonia, tuberculosis, Texas fever, foot-and-mouth disease, rinderpest, hog cholera, rabies, anthrax or anthracoid diseases, sheep scab and actinomycosis.

Inspectors of animals are hereby directed to inform owners of premises when in their opinion conditions are not up to the requirements, and to give instruction to have the same changed or improved.

Books will be forwarded (Form No. 1) for carrying out the provisions of sections 17 and 24 of chapter 90 of the Revised Laws. Ten questions may be answered by checking the word "Yes" or "No;" that is, if the answer to the question is "Yes," a check mark or cross is to be made on or through the word "Yes." Four questions may be answered by checking the proper word in the question; that is, question No. 9 reads: "Is stable clean, unclean, or filthy?" If stable is clean, the word "clean" is to be checked or crossed; if stable is unclean, the word "unclean" is to be checked or crossed, etc. Two questions, Nos. 10 and 16, require the answers to be written out in full; these refer to the disposal of manure and to the nature of improvements made in either the buildings or surroundings during the past year.

It is sincerely hoped that the inspection this spring will be a thorough one, and it is requested that the answers to the questions be carefully made.

The books necessary for this inspection will be forwarded at once. Form No. 1 is to be returned to this office by *prepaid* express as soon as inspection is completed.

FRED F. WALKER,
Commissioner.

In referring to this important feature of the department's work I feel that at this time it is entirely proper for me to state, with especial emphasis, that decidedly pronounced improvement has been made in the sanitary conditions of all farm buildings and their environments. A new plan has been adopted during the past year under which local inspectors of animals, acting under specific directions from the department's headquarters, become in a more complete sense of the word agents of the department. A new form for recording conditions found by local inspectors, on their annual visitation to the various farms in their individual localities, provided that by the use of carbon two copies of their record could be secured, one of which was left with the owner and the other retained by the inspector, and from the latter full record was made in the regular so-called blue book furnished for returning report to the office of the department.

At the time a copy of this record is left with the owner of the premises, such recommendations for improved conditions, if any, as are necessary, in the opinion of the inspector, are

brought to the attention of the owner by that inspector, and the owner is requested to make such improvements. A later visit is made by the local inspector, at which time, if conditions are found to have been decidedly improved, the report submitted to the department in the blue book above referred to credits the owner with the conditions found on the second visit. Inspired by the ambition to have their buildings reported in the most favorable class, owners frequently follow the recommendations made by the inspector. As a result, many of the cases that would formerly have been called to the attention of our district agents are satisfactorily disposed of locally, giving our district agents a greater opportunity to make general supervision of the areas under their charge. In consequence, many places not especially referred to by local representatives as unsatisfactory have been investigated by our district agents, who have thereby been able to confirm the earlier local report, or have had an opportunity, if finding conditions below the department's standard, to bring the same to the attention of the local inspector and instruct him intelligently in reference to his course of procedure in the future.

A continuance of this policy will, in my opinion, rapidly raise the standard of our Massachusetts dairy barns to a high order of excellence. In fact, a marked improvement is now apparent, and from many sections of the State we have received most decidedly flattering reports from citizens not at all associated with the department but who are interested in general sanitary work.

The following table embodies a condensed report of the doings of the inspectors of animals in making the annual inspection, which complies with the requirements of section 24, chapter 90, Revised Laws. For comparison, the corresponding figures for 1913 are also given: —

Net Results of Annual Inspection of Animals and Farm Premises.

	1913.	1914.
Number herds inspected,	30,655	29,543
Number neat cattle inspected,	224,951	218,786
Number cows inspected,	158,116	152,636
Number herds kept clean and in good condition,	27,227	28,474
Number sheep inspected,	24,847	19,319
Number swine inspected,	71,114	59,221
Number goats inspected,	1,249	1,086
Number stables inspected,	32,055	30,638
Number stables well located,	29,472	27,926
Number stables well drained,	30,776	30,258
Number stables well ventilated,	30,112	30,150
Number stables well lighted,	28,128	29,398
Number stables kept clean,	26,549	29,044
Number stables with good water supply,	31,683	30,470
Number stables improved since last inspection,	3,370	4,209

The following table embodies a condensed report of the work of the district agents in the matter of barn inspection, which complies with the requirements of chapter 381 of the Acts of 1911: —

Report of District Agents on Barn Inspection for Year ending Nov. 30, 1914.

	Mr. F. S. Bancroft.	Dr. G. W. Bickell.	Dr. E. A. Cahill.	Mr. C. J. Dailey.	Dr. E. L. Hannon.	Mr. F. C. Marion.	Dr. M. L. Miner.	Dr. H. E. Paige.	Dr. C. H. Paquin.	Dr. H. W. Peirce.	Dr. J. H. Roberts.	Dr. F. P. Sturges.	Dr. W. T. White.	Totals.
Stables reported as unsatisfactory,	838	62	94	248	215	684	439	230	1,062	74	893	263	75	5,177
Stables visited,	788	59	79	234	201	615	411	224	868	72	877	175	68	4,671
Stables not yet inspected,	50	3	15	14	14	69	28	6	194	2	16	88	7	506
Stables visited once, all necessary improvements made.	306	21	10	109	110	413	274	141	281	48	633	56	41	2,443
Stables visited more than once, all necessary improvements made.	46	9	-	21	-	25	29	20	274	6	10	14	1	455
Stables visited once, not all necessary improvements made.	379	12	69	52	80	149	83	39	164	11	225	90	26	1,388
Stables visited more than once, not all necessary improvements made.	57	17	-	52	2	28	25	24	149	7	9	15	-	385

Tuberculosis.

The war against tuberculosis in cattle is still conducted, in a general way, as described in earlier reports on this disease. It includes the examination and report by local inspectors; the taking up by an agent of the department, who finally disposes of the same, of the cases reported as suspicious; and the tuberculin testing of all cattle received from without the State.

This latter work is being done by approved veterinarians in the States from which the cattle come, or by agents of this department, either at the quarantine station or at the various receiving points throughout the State. The following figures show the number of cattle so tested and the results obtained: —

Cattle Tuberculin Tested.

Cattle tested at the quarantine station at Brighton,		17,411	
Cattle tested by veterinarians outside of the State: —			
Received at Brighton,	674		
Received at other points,	2,042		
		2,716	
Cattle tested by agents of the department at points other than the quarantine station,		3,518	
			23,645

Disposition of Above Cattle.

Cattle condemned on Brighton test,	587	
Cattle killed on "permit to kill," tested at Brighton,	13	
Cattle released from Brighton,	17,485	
Cattle condemned, tested at other points than Brighton,	86	
Released for slaughter, subject to inspection,	2	
Released on satisfactory test,	5,472	
		23,645

The foregoing shows that substantially the same number of cattle was received at Brighton as in the previous year, the shortage as recorded being occasioned by the closing of the market during the last three weeks of the official year on account of the existence of foot-and-mouth disease.

The work at the quarantine stations is, as formerly, under the direct supervision of Agent Frank C. Field. The general excellence of the work done by the efficient corps of assistants under his supervision is best instanced by the fact that not a single complaint has been filed at the office in reference to that

work that could be substantiated by fact when investigated; and especially by the further fact that of the 17,411 cattle received at Brighton and tested there, 587 or $3\frac{1}{3}$ per cent. reacted to the tuberculin test, and only one of such reactors failed to show lesions of tuberculosis on post-mortem examination.

The revenue received from testing cattle owned by non-residents of Massachusetts amounted during the year to $3,776.50, which sum largely offsets the cost of maintenance of quarantine stations.

The following figures show the number of neat cattle quarantined by local inspectors, the number for which warrants were issued and the disposition made of the animals: —

Total number of cattle quarantined or reported for examination during the year,			2,259
Massachusetts Cattle.			
Number released,	288		
Number condemned, killed and paid for,	880		
Number condemned and killed, in process of settlement,	141		
Number permit to kill, paid for,	63		
Number permit to kill, no award,	174		
Number died in quarantine, no award,	36		
		1,582	
Cattle from without the State.			
Number released,	12		
Number condemned and killed, no award,	654		
Number condemned and killed, no lesions found, paid for,	6		
Number still in process of settlement,	5		
		677	
Total,			2,259

Of the 677 interstate cattle, 575 were tested at Brighton; no lesions were found in 1, for which the State has reimbursed the owner. Of the remaining 101 cattle (which were tested at other points than Brighton) 5 were found to show no lesions, for which the State has reimbursed the owners, and 5 cases are still unsettled.

In addition to the 2,259 head of cattle disposed of as above, 133 cattle and 27 swine have been reported by butchers, ren-

derers and boards of health as having been found tuberculous at the time of slaughter, all of which were rendered.

The following statistics in connection with the maintenance of a quarantine against other States, to prevent the introduction of tuberculous cattle from outside sources into Massachusetts, show the number and kind of animals brought in from without the State to the several quarantine stations, the quarantine, however, being against neat cattle only: —

Receipts of Stock at the Watertown Stock Yards, from Dec. 1, 1913, to Nov. 30, 1914.

New Hampshire cattle,	9,657
Vermont cattle,	5,056
Massachusetts cattle,	3,683
Sheep,	2,618
Calves,	26,142
Swine,	4,116

Receipts of Stock at the New England Dressed Meat and Wool Company's Yards at Somerville, from Dec. 1, 1913, to Nov. 30, 1914.

Maine cattle,	1,731
New Hampshire cattle,	1,240
Vermont cattle,	8,155
Western cattle,	12,539
Canada cattle,	2,062
Sheep,	452,438
Calves,	47,798
Swine,	994,265

Receipts of Stock at Brighton, from Dec. 1, 1913, to Nov. 30, 1914.

Maine cattle,	12,857
New Hampshire cattle,	4,809
Vermont cattle,	5,591
Massachusetts cattle,	14,766
New York cattle,	18,079
Western cattle,	10,198
Canada cattle,	155
Sheep,	14,521
Calves,	55,240
Swine,	46,700

The cattle upon which a tuberculin test is required are mostly milch cows to be offered for sale at the Brighton market Wednesdays, besides a few bulls and working oxen. Those

animals that come to Watertown or Somerville are taken to Brighton, and all of the testing is done at the stock barn there.

During the year Department Orders 9, 10 and 11 were issued, printed on large placards and posted on the quarantine grounds. The purpose of these orders, similar to those issued in previous years, was to prevent the spread of contagion from any cattle which might be brought from districts infected with Texas fever or other contagious disease. Order No. 11 practically revokes orders 9 and 10, and is as follows: —

Order No. 11.

The Commonwealth of Massachusetts,
Department of Animal Industry,
State House, Boston, Oct. 28, 1914.

To All Persons whom it may concern: —

Whereas the diseases known as Texas fever and foot-and-mouth disease, which are contagious diseases and are so recognized under the laws of this Commonwealth, prevail among cattle in some of the States and territories of the United States, and whereas animals infected with or exposed to said diseases are likely to be brought upon the premises of the Butchers' Slaughtering and Melting Association at Brighton, the New England Dressed Meat and Wool Company at Somerville, or the premises of Sturtevant & Haley at Somerville, for slaughter,

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 addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

The premises of the Butchers' Slaughtering and Melting Association at Brighton, the slaughtering department on the premises of the New England Dressed Meat and Wool Company at Somerville, and the premises of Sturtevant & Haley at Somerville, are hereby quarantined. Neat cattle shall be brought upon them for immediate slaughter only. Cattle brought upon these premises shall not be removed alive, but shall be slaughtered.

This order shall be published by posting three or more copies upon the premises of the Butchers' Slaughtering and Melting Association at Brighton in the city of Boston, three or more copies upon the premises of the New England Dressed Meat and Wool Company in Somerville, and three or more copies upon the premises of Sturtevant & Haley in Somerville.

Fred Freeland Walker,
Commissioner of Animal Industry.

Approved in Council Nov. 4, 1914.

E. F. Hamlin,
Executive Secretary.

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

For dairy and breeding purposes, tested before shipment,	2,042	
For dairy and breeding purposes, tested after arrival,	3,518	
		5,560
Neat cattle on which no test was required, exclusive of cattle and calves for immediate slaughter,		1,587
The last item is made up as follows: —		
Returned from out-of-State pastures,	1,026	
Calves under six months old,	165	
Died before test could be made,	2	
For temporary stay on exhibition or at auctions,	391	
Remaining in State for brief periods only,	3	
Cattle for immediate slaughter,	4,069	
Calves for immediate slaughter,	6,140	
		10,209
Total for all purposes,		17,356

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 580 having been brought in without permits, which were reported to the department by railroad agents, local inspectors or others. Of these, 104 were tested before shipment, 87 were slaughtered at once for beef or veal, 37 were kept in the State only temporarily, 3 were calves under six months old, 126 were returned from pasture, and the remainder, 223 head, were tested by agents of the department.

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

Condemned on first test,	43
Condemned on second test,	41
Reacted, but died before retest could be made,	1
Failed to react on second test, but showed physical symptoms,	1
Released for slaughter on first test, subject to inspection,	2
	88

In five of the above cases in which warrants to kill have been issued, report of post-mortem examination has not yet

been received; in 1 case the result cannot now be known, although the animal was probably tuberculous; 2 head were in a herd affected with foot-and-mouth disease, and were killed because of that disease before warrants issued for their slaughter on account of tuberculosis could be executed; 2 head released for slaughter on first test were found to be diseased, as was the animal that failed to react on second test; the carcass of the animal that died before it could be retested showed indications of disease; in 9 head no lesions of tuberculosis were found upon post-mortem examination, and the animals either have been or will be paid for by the State; the remainder, 67 head, all proved to be tuberculous.

There were 1,044 permits issued, 156 of which were not used. Eleven permits were issued for pasturing herds in the State during the season; 2 were issued allowing cattle to be unloaded in transit through the State; and 11 special permits to persons living near the border line, allowing cattle to be kept in the State for brief periods without test.

During the spring and early summer agents of the department examined and tagged 1,816 Massachusetts cattle which were to be sent into New Hampshire and Vermont for pasture during the season. Some of these were returned in the fall on special permits, and many were brought to the quarantine station at Brighton, where they were identified and released by the agent in charge of that station.

After November 7 no cattle were allowed to be brought into the State except for immediate slaughter, and then only to establishments which were under federal inspection, because of the quarantine restrictions which went into force early in November on account of the discovery of foot-and-mouth disease; otherwise the total receipts of live stock from out of the State would probably have been considerably larger.

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 the port of Boston has been sent to Washington each month. The report is made to show weekly receipts. The following table shows the receipts, by months, for the past year: —

Receipts of Live Stock at Boston for Twelve Months ending Nov. 30, 1914.

For Month of —	Cattle.	Calves.	Sheep.	Swine.	Horses.
December,	13,793	10,422	53,509	163,781	1,859
January,	9,518	7,700	37,166	107,948	1,760
February,	7,590	8,102	28,000	81,168	1,816
March,	8,809	13,784	34,495	100,393	2,616
April,	6,638	10,298	20,682	69,728	2,288
May,	6,313	13,582	21,652	71,337	2,497
June,	8,738	14,909	35,399	113,926	3,076
July,	6,424	10,055	40,048	73,632	1,985
August,	10,790	12,768	45,836	71,300	2,487
September,	10,844	9,547	49,340	58,882	2,398
October,	11,564	11,488	55,707	68,623	2,605
November,	9,557	8,525	47,743	63,365	1,992
Totals,	110,578	131,180	469,577	1,044,083	27,379

Such owners of cattle as have voluntarily petitioned the department for the tuberculin testing of their herds by the State have been accorded this privilege where conditions seemed to justify it. Two persons made voluntary requests to have their herds so tested, — the herds comprising 28 head of cattle, 27 of which were found to be free from disease, and 1 was slaughtered on a permit to kill, no award allowed.

Hog Cholera.

In June of 1914 the department began an active campaign against hog cholera in this State. Such a campaign was found necessary because of the large number of deaths in swine, and the corresponding financial loss to farmers due to the disease. While Massachusetts is not considered a hog-raising State, it is known that we have more than our proportionate share of hog cholera as compared with the hog-raising western States, and because of this there is a great diminution in the number of swine in the State, as shown by the following statistics: —

Number of Swine in Massachusetts.

1912,	98,836
1913,	71,114
1914,	59,221

There is a visible decrease in these years of 39,615 animals, which indicates plainly the loss to both State and farmer. This decrease is known to be due principally to hog cholera. The majority of hog raisers have had their herds of swine so often and so completely destroyed by the disease that, in spite of the fact that there is more profit in swine to-day than ever before, it has become necessary for them to give up raising rather than to restock and risk another loss.

Inasmuch as the value of serum treatment for hog cholera has proven satisfactory, I decided to make this a branch of the departmental activity to aid the public, and consequently in June this branch of the work was actively begun. As a result of our demonstrational and educational work among the farmers and veterinarians, and judging from actual statistics given below, we feel that we have laid an excellent foundation for the immunization work which is to follow next year.

During the past year 100 outbreaks of cholera were reported. Of this number, 80 proved upon investigation to be positive cases; in the remaining 20 suspected outbreaks, no hog cholera was found. This gives only a slight idea of the amount of hog cholera which actually exists in the State. It has been customary for years for owners not to report the existence of hog cholera in their herds because so little could be done for it, and the farmer, until recently, would either slaughter the animals or allow them to die. As a result of our activity with serum as a preventive and curative, public interest has been aroused, more cases have been reported, and State aid has been requested.

As far as our records show, approximately 900 head of swine died last year without treatment, or previous to our using serum in control work. If all animals which actually died of hog cholera had been reported, I believe this number would have been tripled.

Previous to June 1 anti-hog-cholera serum was used on 315 animals in 10 herds. Of this number, 89, or $29\frac{1}{5}$ per cent., died following treatment. Up to this time the double treatment had not been used except experimentally. During the remainder of the year 591 animals in 18 herds received the simultaneous or double treatment. Of this number 12, or 2 per cent.,

died after the treatment. In the same length of time 428 animals in 31 infected herds received the single treatment, and 41, or 9.5 per cent., died. The usual mortality from hog cholera is from 90 to 100 per cent. of all animals on infected premises; consequently the above figures would indicate that to date we have saved by the use of the single and double treatments 1,264 animals, which have been vaccinated, have recovered and been released. This represents a saving to the farmers of approximately $12,000 since June 1.

In addition to the above there are still five herds which are under observation and treatment, in which our work has not been completed. In these five herds there are approximately 4,000 animals, of which number 3,000 have received the double treatment, and 1,000 the single treatment. Results in these cases will be ascertained later, inasmuch as sufficient time has not yet elapsed since treatment to determine them properly at this time. In all five of these herds a large percentage of animals has been lost each year from cholera for a period of from four to twenty years past. In each instance following vaccination, losses from the cholera, which was present at the time of vaccination, have ceased completely, at least temporarily.

One striking factor in this work is that all of the above herds have been badly infected ones. In two herds in which the animals have been inoculated and in which no infection existed, there has not been a single death. We have proven conclusively that the double treatment, properly administered by experts under proper conditions, is absolutely safe, and a sure preventive if used on noninfected farms. On the other hand, it has been proven in other States that the promiscuous or unscientific use of virus is the most dangerous factor connected with the spread of the disease of hog cholera.

Regarding the single treatment, as our results indicate, this has been used practically only on animals which were infected, and therefore may be regarded as a curative. While strictly speaking we do not advocate serum as a curative agent, we have had excellent results when using it in infected herds, the percentage of deaths, 9.5, being extremely low. In our work there has been a noticeable lack of deaths due to abscesses

and infections following vaccination. This has generally been the cause of many deaths which have followed vaccination, and it is gratifying to find that our percentage is practically nothing. This, of course, is due to the fact that our agents take all recognized antiseptic precautions, and insist on proper after-care of the animals.

The most objectionable feature of the work as at present carried on is the fact that we are necessarily obliged to depend entirely upon commercial virus and serum. This has resulted in our using virus, in at least two instances, which was impotent, and which, instead of causing a permanent immunity in the vaccinated animals, caused merely a temporary one, with embarrassing after results. While we use commercial virus, this complication is liable to arise at any time; and in my opinion it is absolutely imperative that, if the department is to do necessary work in connection with hog cholera, the State should have its own facilities for making virus at least, if not serum. At present the only cost to the farmer is that of the serum and virus used on his animals. This is now 2½ cents per cubic centimeter, or approximately 1 cent per pound of live weight, which deters a great many owners from having even the serum treatment alone used. If we were able to manufacture our own serum, we could reduce the cost to the farmer at least 1 cent per cubic centimeter. We should either furnish the highest grade serum and virus free, or make our own and sell it at cost, when used by agents of this department. This, of course, would require an appropriation.

The few following fundamental facts have been established by our work: —

1. That in noninfected herds we can confer a lasting immunity with practically no danger. As a result, we urge the double treatment in noninfected herds in infected neighborhoods. In noninfected herds in neighborhoods where no cholera exists, we do not advise treatment.

2. That the double treatment is of high value for well animals in infected herds, as it confers a lasting immunity.

3. That it pays to use the "serum only" treatment on swine showing symptoms of acute cholera.

4. That it does not pay to use serum on chronic cases.

In addition to the above, we are doing a large amount of experimental work. This is, of course, absolutely necessary. Among the most important requirements for carrying on this work, which we now lack, are a cheaper method of immunization of young pigs and a curative agent in chronic cases.

The situation is at present most encouraging. The public has awakened to the fact that it can receive State aid, and that this department is handling the serum treatment most advantageously. As a result, cases are being reported more promptly, quarantines are being better observed, and the demand for serum treatment even now taxes the resources of the department. We hope in the coming year to do very much more work along this line, particularly among herds of individual farmers. Thus far a large percentage of our work has been in herds owned by State and other institutions, but indications are that the coming year will see much more vaccination among the farmers' herds.

The statistics in connection with the work of hog cholera given above are also given below in tabular form.

Hog Cholera Statistics.

Number of outbreaks reported,	100
Number of outbreaks reported not cholera, upon examination,	20
Number of reported swine known to have died without treatment, approximate,	900
Number of herds known to be infected,	65
Number of herds given single treatment previous to June 1,	10
Number of animals in these herds released after completed treatment,	305
Number of animals in same herds which died after single treatment (29.2 per cent.),	89
Number of herds in which double treatment has been used since June 1,	18
Number of animals in these herds which received double treatment,	591
Number of animals which died following double treatment (2 per cent.),	12
Number of herds in which single treatment has been used since June 1,	31
Number of animals in these herds which received single treatment,	428
Number of animals which died following single treatment (9.5 per cent.),	41

Number of animals saved by single and double treatment, in which treatment has been completed,	1,264
Number of infected herds still under treatment, December 1,	5
Number of animals in these herds, approximate,	4,000
Number of animals given double treatment,	3,000
Number of animals given single treatment,	1,000
Number of noninfected herds,	2
Number of animals in these herds,	104
Number of single treatments,	–
Number of deaths following double treatment,	–

From the department's study of treatment of hogs infected with or exposed to hog cholera, and acting under the advice of agents of the department who had made the study of this disease a specialty, together with the advice of national and other State live-stock sanitary authorities, I recommended the adoption of an order prohibiting the sale, distribution and use of virulent blood from hog-cholera-infected hogs, or "virus," and anti-hog-cholera serum, in this State, except by permission of the Commissioner of Animal Industry. Before taking this step I had carefully considered the possibility of unduly interfering with the practice of regularly registered veterinarians. Since coming to the department, I have strenuously avoided any interference on the part of that department with the individual right or practice of such regularly registered veterinarians; and in urging the passage of the following order, I felt that the department could, through the operations of its specialists, who were qualified by special training to administer the remedies therein referred to, contribute not only to the ultimate success of the department and benefit to the individual farmer, but could eventually, through the educational work done by our specialists in this line, cause owners of hogs, as well as veterinarians, to become more familiar than they are at present with the possibilities of their use, to the end that eventually this method of treatment might be more generally adopted under the approval of both owners and professional men alike.

It has been my custom to instruct our specialists to invite observation of their operations, on the part of local veterinarians and owners who would take proper sanitary precautions to prevent spread of infection, to the end that all inter-

ested might become more familiar with the general subject and the possibilities of success through the intelligent use of the materials referred to in the following order: —

Order No. 12.

The Commonwealth of Massachusetts,
Department of Animal Industry,
State House, Boston, Oct. 28, 1914.

To All Persons whom it may concern: —

Whereas the disease known as hog cholera, which is a contagious disease and is so recognized under the laws of this Commonwealth, prevails extensively among swine 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 in amendment thereof and addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

No person, firm or corporation shall distribute, sell or use in the Commonwealth of Massachusetts virulent blood from hog-cholera-infected hogs, or "virus," or anti-hog-cholera serum, unless written permission has been obtained from the Commissioner of Animal Industry for such distribution, sale or use, which written permission will be granted persons deemed proper by 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 distribution to known breeders of swine, to commercial houses known to be dealing in the aforesaid commodity, and to veterinarians registered under the laws of the Commonwealth.

Fred Freeland Walker,
Commissioner of Animal Industry.

Approved in Council, Nov. 11, 1914.

E. F. Hamlin,
Executive Secretary.

Foot-and-Mouth Disease.

The regular routine work of the department was suddenly interrupted early in November (November 5, to be exact), when a telegram was received at department headquarters from Dr. Henry E. Paige of Amherst, announcing a probable case of foot-and-mouth disease in that town. The rapidity with which this disease spreads, its dangerous nature, a menace to beast

and man, and the possible loss of valuable income-producing property demanded instant attention and quick action. Believing that the department met the crisis promptly and effectively, I deem it wise to place before your honorable body a chronological story of the department's action, such action being based on and in harmony with the code established by the United States Bureau of Animal Industry.

My attention was first attracted by a newspaper paragraph to the effect that foot-and-mouth disease had been discovered in Niles, Mich., on October 15, and I was especially interested because of the added statement that the disease had been prevalent in Michigan and northern Indiana since early in August.

Prior to November 5, when I was notified of the probable presence of the disease in this State, I had ordered our agents to exercise extra care in ante-mortem examinations, especially in cattle coming from western areas. We had received no word from the United States Bureau of Animal Industry at the time of these early precautions, although that Bureau supervises all interstate shipments of cattle, and is considered to be especially active in guarding the several States along the line of shipment from live stock from infected areas. Hearing nothing in the way of warning from this official source, I naturally assumed that the disease was well in hand in the West, and that the probability of its reaching Massachusetts was more or less remote.

On October 21 Dr. William T. White, agent of this department, who had been attending, as a delegate, a meeting of the Eastern Live Stock Sanitary Association at Albany, N. Y., telegraphed me that Dr. Wills, chief veterinarian of New York, had referred to the existence of the disease in the Buffalo stockyards. I at once told Dr. James F. Ryder, in charge of the Boston station of the United States Bureau of Animal Industry, what I had heard, and asked him if he had cognizance of the disease being as far east as Buffalo. His reply was in the negative. I requested him to have the federal department notified, and that all cars bringing cattle to Massachusetts be disinfected before shipment. A few days later I asked again if he had heard of any cases in Buffalo, and again he answered he had not.

As a matter of precaution I established the most systematic and rigorous ante-mortem examinations of all cattle arriving from western points. The federal authorities co-operated with this department under Dr. Ryder's supervision, subjecting the stock to a double inspection. No evidence of disease was found in any shipment, and it was like lightning out of a clear sky when I received notice from Dr. Henry E. Paige, on November 5, of a probable case in Amherst, Mass. With Dr. Ryder I visited this herd November 6, and he confirmed the diagnosis made earlier by our Dr. Henry E. Paige and Prof. James B. Paige. We found the premises thoroughly policed and a substantial and strict quarantine was established.

On the afternoon of November 5 I heard of a case at Mendon, Mass., and Agent F. C. Field was sent out to investigate. His report, made at 6 P.M., confirmed the diagnosis, and the infected herd was quarantined, as well as three adjacent herds using the same brook for water supply. On my return from Amherst, November 6, active operations, including the closing of the Brighton stockyards, were begun, to prevent the spread of the disease. Agents of the department were equipped with rubber outfits, and sent to different parts of the State to make careful examination of cattle that were known to have gone from the Brighton stockyards during the previous fortnight. On the receipt of notice of the first evidence of the disease in the State, I had secured from the leading dealers at the Brighton stockyards a list of their sales for two weeks prior to the closing of the yards, and through the information so obtained we were speedily enabled to locate practically every animal that had been distributed from that point.

Realizing that the situation was decidedly grave, and that the pending embargo would involve the interests of many industries within the State, I called in consultation twenty-five leading farmers, representatives of slaughtering establishments, and veterinarians, for the purpose of acquainting them with my proposed plan of campaign, and benefiting from their advice. They met me at the State House November 7, and on the same day His Excellency the Governor called a special session of the Council to act on two orders recommended by me, which placed in absolute and unqualified quarantine every

farm in the State, and prohibited the movement of any live stock from one building to another, if such movement was to be over any highway or byway, and also prohibited the removal of any material from infected premises. So successful was the working of this quarantine that less than ten of the cases that have developed in Massachusetts trace their origin to any point other than the Brighton stockyards. The orders above referred to follow: —

Order No. 13.

The Commonwealth of Massachusetts,
Department of Animal Industry,
State House, Boston, Nov. 7, 1914.

To All Persons whom it may concern: —

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 additions thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

No hay, straw, forage, grain, utensils or other material shall be removed from premises upon which foot-and-mouth disease exists and for such period thereafter as in the opinion of the Commissioner of Animal Industry the public safety so demands, 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, to registered veterinarians within the Commonwealth, and by general distribution.

Fred Freeland Walker,
Commissioner of Animal Industry.

Approved in Council, Nov. 7, 1914.

E. F. Hamlin,
Executive Secretary.

Order No. 14.

The Commonwealth of Massachusetts,
Department of Animal Industry,
State House, Boston, Nov. 7, 1914.

To All Persons whom it may concern: —

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 additions thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

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 within the Commonwealth, except by permission of the Commissioner of Animal Industry.

All dogs or cats on quarantined premises must be securely restrained during the period of quarantine.

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, to registered veterinarians within the Commonwealth, and by general distribution.

FRED FREELAND WALKER,
Commissioner of Animal Industry.

Approved in Council, Nov. 7, 1914.

E. F. HAMLIN,
Executive Secretary.

On November 8 I went to Washington and consulted with Dr. A. D. Melvin of the federal bureau in order to perfect a plan of co-operation with the national government. During the conference the following day I was informed that the disease had spread to fourteen States. I was told by Dr. Melvin that the United States Department of Agriculture proposed to submit to the governments of infected States a plan of compensation under which one-half of the expense incident to control of the disease should be paid by the United States government, and one-half by the State. Dr. Melvin also furnished me the form used by his department to indicate the value of cattle appraised, with the suggestion that it be adopted in Massachusetts, which was later done. It was further agreed that the United States government and the State should each be represented by an appraiser, each to pay its representative. The advice of Dr. Melvin, the one man who has doubtless had greater experience along this line than any other in the country, was cheerfully given, and was most helpful.

On November 11, in order to more thoroughly restrict the spread of this disease, the following order was recommended and approved: —

Order No. 15.

The Commonwealth of Massachusetts,
Department of Animal Industry,
State House, Boston, Nov. 11, 1914.

To All Persons whom it may concern: —

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 addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

1. No poultry, pigeons or other farm birds are to be shipped or transported by railroad, boat or other conveyance, or moved in any manner upon the public highways or byways within this Commonwealth, except by permission of the Commissioner of Animal Industry.

2. The above referred to live stock is not to be conveyed by any transportation company from States under federal quarantine.

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, Nov. 11, 1914.

E. F. Hamlin,
Executive Secretary.

The work of appraisal began November 13 with the herd of L. H. Taylor of North Amherst, and has gone forward most satisfactorily as occasion required. The United States government was represented by Otis H. Forbush of Acton, and the State by Myron T. Carrigan of Concord, acknowledged experts as to the value of neat stock. The necessary slaughtering has been done under the direction of the department, and not a complaint has been filed at the office by owners of stock thus disposed of or agents of humane societies. The total appraisal of live stock killed up to and including November 30 is

$68,566.25, representing 891 cattle, 276 swine, 1,694 fowl, 2 sheep and 1 goat.

The relations between the Federal and State forces have been most harmonious, and, in so far as it was possible, the two organizations have worked as one. As evidence of the cordial relations existing between the nation and the State in this work, the following portion of a letter has a place here.

Dr. J. R. Mohler, acting chief of the Bureau of Animal Industry at Washington, in a letter addressed to the Commissioner of Animal Industry dated November 6, writes as follows: —

> The Bureau is glad that it has you to look after the work in Massachusetts, as your training and judgment are considered a valuable asset for success through efficient co-operation.

At the date of this report the disease is well in hand, and there is no doubt of its early eradication. The action of the State department was prompt and effective. Two days before notice from the United States department was received, and one day before the quarantine was established in the Chicago stockyards, the State of Massachusetts was under the strongest kind of quarantine restrictions. The work of eradication is being pushed with vigor. Each owner of appraised cattle has given a written acceptance of the appraised value of the stock killed in the form prescribed by the United States department, and owners will doubtless submit their several claims to the consideration of your honorable body during the session; and I recommend that your honorable body, in accordance with a plan submitted by the United States Bureau of Animal Industry and approved by the honorable Executive Council of this Commonwealth, make an appropriation sufficient to reimburse owners of cattle and property destroyed on account of foot-and-mouth disease, to the extent of 50 per cent. of the appraised value of the same.

Statistics in connection with the control and eradication of this disease, up to and including Nov. 30, 1914, are given below. They show the towns, in alphabetical order, in which the disease has been found, the number of herds in those

towns, the number of animals and fowl appraised, the amount of appraisal, the date on which positive cases of the disease were reported by agents of the department and the date of killing.

Statistics on Foot-and-mouth Disease for Year ending Nov. 30, 1914.

Town.	Date reported positive.	Date of Killing.	Cattle.	Swine.	Fowl.	Sheep.	Goats.	Appraisal.
Amherst,	Nov. 5	Nov. 14	19	6	89	–	–	$1,895 00
Amherst,	Nov. 5	Nov. 13	8	–	35	–	–	621 50
Ashland,	Nov. 13	Nov. 27	26	–	–	–	–	1,790 00
Attleboro,	Nov. 6	Nov. 18	21	2	107	–	–	1,550 00
Auburn,	Nov. 12	Nov. 25	22	2	–	–	–	1,600 00
Bellingham,	Nov. 10	Nov. 18	17	–	70	–	–	1,120 00
Bellingham,	Nov. 10	Nov. 17	8	3	100	–	–	715 00
Belmont,	Nov. 8	Nov. 19	8	–	4	–	–	402 00
Boston,	Nov. 12	Nov. 20	43	–	–	–	–	3,300 00
Brockton,	Nov. 12	Nov. 27	6	–	53	–	–	516 25
Chicopee,	Nov. 10	Nov. 16	2	–	60	–	–	226 00
Danvers,	Nov. 13	Nov. 28	8	–	33	–	–	495 00
Dracut,	Nov. 13	Nov. 26	87	130	34	–	–	8,364 00
Grafton,	Nov. 16	Nov. 23	12	8	36	–	–	820 00
Grafton,	Nov. 10	Nov. 22	18	–	70	–	–	1,300 00
Granby,	Nov. 8	Nov. 16	39	–	175	–	–	3,157 50
Granby,	Nov. 17	Dec. 3	26	–	50	–	–	1,890 00
Hingham,	Nov. 14	Nov. 30	142	6	11	–	–	10,361 00
Hingham,	Nov. 18	Nov. 30	9	16	–	–	–	691 00
Lynn,	Nov. 14	Nov. 28	16	2	–	–	–	921 00
Maynard,	Nov. 14	Nov. 27	11	–	50	–	–	650 00
Medford,	Nov. 20	Dec. 2	28	5	30	–	–	1,535 00
Mendon,	Nov. 5	Nov. 17	9	2	–	–	–	585 00
Mendon,	Nov. 18	Nov. 28	13	–	–	–	–	1,000 00
North Attleborough,	Nov. 21	Dec. 3	6	2	–	–	–	325 00
Shrewsbury,	Nov. 22	Nov. 25	10	3	–	–	–	705 00
Stoneham,	Nov. 19	Dec. 1	10	–	28	–	–	915 00
Sudbury,	Nov. 30	Dec. 5	20	5	38	–	–	1,225 00
Swansea,	Nov. 17	Nov. 22 Nov. 23	56	–	–	–	–	4,750 00
Swansea,	Nov. 11	Nov. 25	24	44	250	–	–	2,200 00
Swansea,	Nov. 17	Nov. 23	21	–	125	–	–	1,900 00
Watertown,	Nov. 21	Dec. 3	6	–	30	–	–	525 00

Statistics on Foot-and-mouth Disease for Year ending Nov. 30, 1914—Con.

Town.	Date reported positive.	Date of Killing.	Cattle.	Swine.	Fowl.	Sheep.	Goats.	Appraisal.
West Boylston,	Nov. 14	Nov. 24	6	–	–	–	–	$300 00
West Boylston,	Nov. 15	Dec. 2	23	1	2	–	–	1,670 00
Westport,	Nov. 11	Nov. 23	16	31	150	2	1	2,000 00
Worcester,	Nov. 27	Dec. 4	13	–	–	–	–	1,130 00
Worcester,	Nov. 11	Nov. 21 Nov. 22	65	8	–	–	–	3,900 00
Worcester,	Nov. 23	Dec. 2	17	–	64	–	–	1,516 00
Totals,[1]	–	–	891	276	1,694	2	1	$68,566 25

[1] From November 5 to November 30, inclusive, 600 herds were inspected by agents of the department.

Miscellaneous Diseases.

The Department of Animal Industry is called upon during the year to deal with other diseases of a contagious nature, in addition to rabies, glanders, bovine tuberculosis, hog cholera and foot-and-mouth disease. Among them are actinomycosis, mange, symptomatic anthrax or blackleg, anthrax, Texas fever, and tuberculosis in other animals than cattle.

Eleven cases of actinomycosis have been reported; 9 of these animals were slaughtered, and 2 were found not to have the disease.

There has been a further decrease in the number of animals reported as suffering from mange. Twenty places where mange was supposed to exist were reported, 3 of which were found to be free from it. At the remaining 17 places 303 head of cattle and 1 horse were found to be affected.

The application of a mixture of engine oil, phenol, kerosene and sulphur has apparently proved most efficacious in treating this trouble, and has been recommended, with excellent results, to owners of diseased animals.

The protective inoculation of young cattle where symptomatic anthrax or blackleg has occurred has been continued where owners requested, and has been done under the direction of Dr. James B. Paige of the Amherst Agricultural College, with the assistance of his brother, Dr. Henry E. Paige, an agent of this department. Reports have been received from 85 owners, and 633 head of cattle have been inoculated.

Outbreaks of anthrax have been reported at 10 farms, at 2 of which it was found upon investigation not to have occurred; at the 8 remaining farms, 46 sheep, 6 horses and 132 head of cattle were inoculated.

In addition to the above diseases outbreaks have been reported from various sections of the State from time to time, which upon investigation have proven to be foot-rot, distemper, food poisoning, etc., diseases not recognized under the law as contagious.

Financial Statement.

At the close of the last fiscal year, Nov. 30, 1913, there was on hand, as per the second annual report: —

Balance of appropriation for salaries and expenses for 1913,	$90 94	
Balance of appropriation for general work of the department for 1913,	35,946 37	
		$36,037 31
Appropriation for salaries and expenses of 1914, chapter 63, Acts of 1914,	$11,000 00	
Transferred by State Auditor from emergency fund,	200 18	
Appropriation for general work of the department, chapter 94, Acts of 1914,	160,000 00	
		171,200 18
Total to be accounted for,		$207,237 49
Expended during the year: —		
For 1,050 head of cattle condemned and killed during the years 1913 and 1914, paid for in 1914,	$33,404 30	
For killing and burial, quarantine claims and arbitration expenses,	1,046 19	
		$34,450 49
For services of agents (exclusive of glanders work), accounts of 1913 and 1914,	$26,373 88	
For expenses of agents (exclusive of glanders work), accounts of 1913 and 1914,	13,350 56	
For expenses of quarantine stations,	6,654 83	
For expenses of glanders work, including services and expenses of agents, laboratory work and killing and burial,	47,263 66 [1]	

[1] Of this amount, $36,936.50 has been paid for 695 horses condemned for glanders during the year.

For laboratory expenses (exclusive of glanders work),	$3,509 94	
For implements, ear tags, thermometers, etc.,	4,415 91	
For salary of the head of the department,	3,500 00	
For salary of clerk,	1,279 84	
For salaries of assistant clerks and stenographers,	3,125 84	
For printing, postage, stationery, etc.,	2,919 20	
For expenses of the head of the department,	480 84	
		$112,874 50
Total expenditures,		$147,324 99
Balance from all accounts, Nov. 30, 1914,		59,912 50
Total as above,		$207,237 49

This balance is made up from the following items: —

Balance of appropriation for salaries and expenses, 1913,	$90 94
Balance of appropriation for general work of the department, 1913,	35,946 37
Balance of appropriation for general work of the department, available for unsettled accounts of 1914,	23,875 19
	$59,912 50

The average price paid for condemned cattle for the year was $31.81.

There has been received during the year from the sale of hides and carcasses of condemned animals, sale of ear tags, testing cattle for nonresident owners, etc., $7,738.37.

Claims for 141 head of cattle condemned and killed as tuberculous during the year remain unsettled, to be paid for on proof of claims, the appraised value of which amounts to $4,450.70.

Claims for 105 horses condemned and killed during the year because affected with glanders remain unsettled, to be paid for on proof of claims, the allowance for which under the law will amount to $5,041.50.

Respectfully submitted,

FRED FREELAND WALKER,
Commissioner of Animal Industry.

Public Document No. 98

FOURTH ANNUAL REPORT

OF THE

COMMISSIONER OF ANIMAL INDUSTRY.

1915.

FOR THE YEAR ENDING NOVEMBER 30, 1915.

BOSTON:
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1916.

Approved by
The State Board of Publication.

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,	192	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	362	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
	562

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: —

Animals brought into State.

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, Brockton,	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 of 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 upon the free movement of poultry. Therefore,

Department Order No. 16, approved by the Governor and Council Nov. 11, 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 three 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	$1,306 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
Rehoboth,	Dec. 4	Dec. 8	32	–	2,400 00
Rehoboth,	Dec. 4	Dec. 9, Dec. 10, Dec. 11	24	1,075	25,540.00 [1]
Rehoboth,	Dec. 6	Dec. 11	19	–	1,350 00
Rehoboth,	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,	$240,256 85
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 138, 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.

_____ 191____

Name _____

Address _____

Animals treated _____ (Date.)

Treated by _____

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.

_____ 191____

Name _____

Address _____

Animals treated _____ (Date.)

Treated by _____

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.

_____ 191____

Name _____

Address _____

Animals treated _____ (Date.)

Treated by _____

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 suipestifer* and *bacillus suisepticus*, 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	
	331	
		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	
		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	
		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 *en route* 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	
Cattle for immediate slaughter,		1,934
Calves for immediate slaughter,		3,992
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
	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
	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	30,352	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,	11,703	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,		$3,500 00
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	
Total expenditure,	$8,977 30	
Unexpended balance,	522 70	
		$9,500 00
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	
		$150,000 00
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	
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	
Total expenditure,	$135,439 76	
Unexpended balance,	60 24	
		$135,500 00

The average price paid for condemned cattle for the year was $32.26.

There has been received during the year from the sale of hides and carcasses of condemned animals, sale of tuberculin and serum, and for the testing of cattle for nonresident owners, $5,557.29.

Claims for 115 head of cattle condemned and killed as tuberculous during the year remain unsettled, to be paid for on proof of claims, the appraised value of which amounts to $3,414.

Claims for 34 horses condemned and killed during the year because affected with glanders remain unsettled, to be paid for on proof of claims, the allowance for which under the law will amount to $1,650.

The undersigned assumed the duties of the head of the department on Jan. 2, 1915.

Respectfully submitted,

LESTER H. HOWARD,
Commissioner of Animal Industry.

Public Document No. 98

FIFTH ANNUAL REPORT

OF THE

COMMISSIONER OF ANIMAL INDUSTRY.

1916.

FOR THE YEAR ENDING NOVEMBER 30, 1916.

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Supervisor of Administration.

The Commonwealth of Massachusetts.

Department of Animal Industry,
Boston, Dec. 1, 1916.

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 fifth annual report of the work accomplished by this Department during the fiscal year ending Nov. 30, 1916.

The Department of Animal Industry is charged with the duty of inspection and examination of animals within the Commonwealth, the quarantining and killing when necessary 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 contagion exists or has existed. It is also charged with the duty of tuberculin-testing all neat cattle shipped from other States to Massachusetts unless the same are intended for immediate slaughter or have been tested before shipment, and the record of test approved by the live-stock official of the State from which they are shipped, and accepted by this Department.

The control and eradication of contagious diseases among live stock constitute an important economic factor in the material prosperity of the citizens of the Commonwealth, and are also closely related to the maintenance and protection of the public health, for the reason that many diseases affecting animals are communicable to the human subject. The eradication of foot-and-mouth disease, the reduction of the number of cases of tuberculosis, the prevention of diseases among swine, the repression of glanders in horses, rabies in dogs, and various other diseases common to animals and man, make evident the importance of the work of this Department in these respects,

not alone through the conservation of food material, but through the decreased possiblity of infection from the consumption of infected animal products. Our dependence upon domestic animals available as food material makes apparent the importance of prevention of diseases among them and of increasing their numbers.

An epidemic of disease of any kind among animals whose carcasses are utilized as food causes a shortage in the supply, and increased prices immediately follow. When we consider that in the whole United States during the year 1915 the carcasses of 400,000 animals were condemned as unfit for human food, we may realize what a large part disease among live stock plays in making food expensive. 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 year just brought to a close has been one in which the Department has been called upon for a full exercise of its duties. Foot-and-mouth disease, a serious affection of cattle, sheep and swine which prevailed in many portions of the State and country during the year 1914 and a part of 1915, has not appeared during the past year, but it was not until June 5 of the present year that the United States Department of Agriculture declared that it had been entirely eradicated from the country, and removed all quarantine restrictions which had been imposed on account of it. Late in November an outbreak of this disease was reported among animals in the States of Kansas, Missouri and Nebraska, and consequently immediate steps were taken by this Department to prevent its introduction into Massachusetts in case the reported diagnosis should be confirmed. Fortunately, however, it proved to be not foot-and-mouth disease, but an affection closely resembling the same in certain of its symptoms, though of very much less danger to live-stock interests, and a few days sufficed to remove our apprehension that another visitation of this plague was imminent. Although a sufficient length of time has not yet elapsed to absolutely prove that this disease may not be lurking in some hidden locality, yet we feel sure that, on account of the constant care and

watchfulness on the part of all cattle owners, veterinarians and live-stock officials, a serious outbreak of this disease or its widespread prevalence in the near future need not be apprehended. Out of the recent visitation of this plague has come experience which should be of great value in case the State is ever again visited by this or any other highly infectious animal disease.

In case of an outbreak of foot-and-mouth disease it is necessary that prompt measures be taken for its suppression on account of the rapidity with which the contagion spreads. In the recent outbreak which occurred in Massachusetts (1914–15) some delay was occasioned on account of the fact that officials charged with the extermination of contagious diseases among domestic animals had not the authority to take the necessary immediate steps for a systematic control of the contagion. Although the Commissioner of Animal Industry has authority to quarantine and kill animals affected with contagious disease, if in his opinion the public good so requires, he has not authority to kill animals exposed to the disease, or to destroy property on infected premises which in his opinion may be a source of danger. In the extermination of foot-and-mouth disease it becomes necessary to destroy not only the animals affected with the disease, but all those which have been exposed to it, and in the process of complete disinfection of the premises on which the diseased or exposed animals are kept it becomes necessary to destroy other property, such as parts of buildings, hay, grain, fodder, utensils, clothing, etc. No authority is given by law to the Commissioner of Animal Industry to appoint persons who may appraise live stock and other property the destruction of which becomes necessary in the suppression of this disease. I therefore desire to recommend to your honorable body the passage of an act giving the Commissioner of Animal Industry authority to order the killing of neat cattle and other domestic animals affected with, or which have been exposed to, foot-and-mouth disease when in his opinion the public good so requires, and also giving him such authority as is necessary to provide for the disposal of carcasses and the disinfection of districts, buildings and places in which the disease has existed, and for the destruction of property which may be contained therein; also the authority to appoint appraisers of live stock and other

property the destruction of which may be considered necessary in the extermination of this disease.

Tuberculosis, hemorrhagic septicemia, anthrax and anthracoid diseases among bovine animals, glanders affecting horses, mules and asses, rabies affecting dogs and other animals, cholera and other diseases of swine, and various diseases of sheep have engaged the activities of the Department in many different sections of the State during the past year. Prompt investigation and effective control work, as circumstances required, have eradicated or satisfactorily limited the prevalence of these diseases.

The occurrence of diseased conditions known as "contagious or infectious abortion" in herds of cows kept for the production of milk and of pure-bred stock is of most serious importance to all cattle owners engaged in these ventures. This disease with its attendant conditions, which is estimated to be costing cattle owners of the United States $20,000,000 a year on account of non-production of animals and decrease in the amount of dairy products, is second in importance only to tuberculosis, and is rapidly being recognized as another very serious condition which the dairy industry of the country must combat. Reports from many sections of the State indicate that the disease is prevalent to a great extent among our herds. Officials of the Federal Bureau of Animal Industry, many men connected with State educational institutions, and private veterinary practitioners are studiously investigating this disease and its correlating conditions in both the field and the laboratory, with the hope that eventually some means may be developed of successfully combating and controlling this scourge. Thus far control has been in a measure obtained by isolation, antiseptic treatment of infected animals, disinfection and sanitation of barns and places where the infected animals are kept. Great emphasis, however, is to be placed on the adoption of preventive measures. The Unites States Bureau of Animal Industry has published bulletins on this particular phase of the subject, which may be had upon application to this Department or to the Bureau of Animal Industry at Washington. The Federal Bureau has also maintained at public stock shows an exhibit devoted to illustrating simple and preventive control methods which govern-

ment authorities have found to be effective and which may be put into practice by stock owners. Congress has made available an appropriation of $50,000 for the purpose of experimenting as to the cause, mode of dissemination and method of treatment of this disease. The co-operation of our State Department has been extended to the Federal authorities in this work, believing it to be a subject which vitally interests the cattle owners of our Commonwealth.

The United States Bureau of Animal Industry is at present engaged in an investigation regarding the prevalence of so-called influenza or shipping fever affecting horses throughout the country, and has made application to Congress for an appropriation to carry on the work of control and eradication of this disease, which annually causes the death of large numbers of valuable animals. The Bureau has requested our assistance and co-operation in this matter also, and has been assured not only of our co-operation but of the fact that undoubtedly when ready to commence work all parties interested will be glad to assist to the extent of following out and executing such regulations as may be promulgated for the control of this disease.

During the year it has been found necessary to prosecute only one person for infraction of the regulations of this Department. A few instances of interstate shipment of animals suspected of being affected with a contagious disease have been brought to the attention of the Federal authorities, who have promptly taken action on the same.

The holding of the National Dairy Show at Springfield in October of this year was considered by this Department as of great advantage to our live-stock interests, and therefore we early informed the management that we would be glad to render what assistance we could toward making the show a success. An agent of the Department was detailed to attend the exhibition and assist in the identification and examination of dairy animals shipped interstate to and from the show accompanied by certificates of tuberculin test. Eight hundred and seventy-three animals were on exhibition, all of which were examined by our agent for symptoms of contagious disease. Owing to the very complete regulations of the management,

whereby it was impossible to exhibit cattle which had not passed the tuberculin test, and owing to careful examination by the official veterinarian of the show and our own agents, no cases of contagious disease appeared. Eleven calves were born at the exhibition, and four deaths resulted from disease not of contagious character but due to exposure during shipment. Too much cannot be said as to the good effect of this exhibition of high-grade animals on the live-stock interests of the Commonwealth. Its educational value to all observers and its great convenience to intending purchasers of high-grade animals must be considered as of very great advantage to our agricultural and live-stock interests.

Rabies.

All species of warm-blooded animals are susceptible to rabies, cases of this disease having been reported in every species of domestic animals, in many species of wild animals and in man. Its prevalence requires special attention on the part of this Department, not only on account of its communicability to man, but for the reason that a certain amount of monetary loss is caused by it every year in the death of valuable dogs and a certain number of horses, cattle, sheep and hogs.

In the control of rabies only the dog need be considered as the means by which it is spread, and the dog without a home or an acknowledged owner is the one requiring special attention, as he is the one which is more often the spreader of the disease than is the animal which has proper care and a good home. No one being especially interested in the welfare of the ownerless dog, he may become affected with rabies and a spreader of the infection before he is observed to be in an abnormal condition, and even then it often happens that the attention of the proper official is not directed to him because no one is responsible for him.

If the dog-license laws were strictly enforced in all cities and towns in the State the ownerless and unlicensed dog would disappear, and a very great factor in the dissemination of this disease would be eliminated thereby. The matter of control and eradication of rabies is considerably less complicated than

that of most other infectious diseases of animals, for the reason that the traffic in dogs is very much less than in the domestic animals which are used for the production of food material, and also because their market value is on an average very much less. Furthermore, they endure restraint well and can be kept in confinement at a relatively low expense as compared with the larger animals. Because of the liability of rabies to spread rapidly, measures for control should be taken immediately upon its outbreak in any particular community, by both municipal and State authorities.

There has been a marked diminution in the number of positive cases of rabies which have been found to exist in the State during the year just closed, but its control is at all times a very important matter from the standpoint of the public health alone. In my opinion very much more might be accomplished toward the eradication of this disease, as well as in the control of other contagious diseases of animals, if the Federal government would inaugurate a campaign against them, and the several States could be induced to co-operate to the extent of adopting uniform regulations applying to the carrying on of the work locally. It sometimes happens that in the investigation of a reported case of rabies we find that the animal has disappeared across the line into another State, and our investigation ceases at what is perhaps a critical point in the control of the 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, even if it appears to be healthy, to have it restrained for a period of fourteen days for the purpose of observation. This regulation is deemed necessary for the reason that competent authorities have proven that in some instances the bite of a dog infected with rabies may communicate the infection fourteen days before the animal itself shows clinical symptoms. If at the end of this period 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 already being affected with rabies, this animal is immediately confined in strict quarantine. If it is subsequently killed or dies, its head is at once sent to the Department's office, and a laboratory examination of the brain is made for the purpose of confirming the diagnosis. Information as to the laboratory findings 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 reported to this office, whether the bite has been inflicted by an animal suspected of rabies or not. We also order the local inspector of animals to ascertain not only the names of all persons who have been bitten by dogs suspected of rabies, but to find out if animals have also been bitten, and if so to place the same 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 an unusual number of cases of rabies is found to exist in any town or city the selectmen or the mayor or board of aldermen are asked 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 only to muzzle the animals but not restrain them, as a muzzled animal let loose may in some way get the muzzle off and bite other animals or people. A muzzled dog at large may, therefore, 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. It has been found necessary to issue general restraining orders in only two towns of the Commonwealth during the past year. These orders were for periods of ninety days and have now expired.

Our force of district agents, most of whom are veterinarians

located in different parts of the State, together with the local inspectors of animals, of whom there is one or more in every city and town of the State, constitutes 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 also assisted at every point by the earnest co-operation on the part of private veterinarians and dog owners, and by the various societies now active in preventing abuse and relieving suffering of dumb animals.

During the year ending Nov. 30, 1916, 253 animals were reported to the Department for diagnosis, observation or quarantine on account of the prevalence of rabies. The records have been classified as follows: —

Animals suspected of rabies,	67
Animals exposed to rabies,	47
Animals which have inflicted bites upon persons,	139

Animals suspected of Rabies.

	Dogs.	Horses.	Cattle.	Cats.
Diagnosis positive,	39	2	1	2
Diagnosis negative,	11	–	2	1
Diagnosis questionable,	5	–	–	1
No diagnosis made,	2	–	–	1

Of the 6 cases on which the diagnosis was questionable, 2 animals were killed by the police, 2 were killed by owners, 1 was reported suspicious on laboratory examination, and in 1 case laboratory examination of brain was impossible on account of contamination.

Of the 3 animals on which no diagnosis was made 2 were reported as killed by the police, and 1 was reported by a newspaper.

The above table shows 44 cases of rabies, 37 of which were of the furious form and 7 of the dumb form.

Animals exposed to Rabies.

	Dogs.	Horses.	Cattle.	Cats.
Number released after a quarantine of ninety days,	21	2	-	-
Number killed, no symptoms having developed, .	9	-	-	-
Number killed, positive symptoms having developed,	7	-	-	-
Number still held under observation, . . .	7	-	1	-

Animals which have inflicted Bites upon Persons.

	Dogs.	Horses.	Cattle.	Cats.
Number killed immediately, no diagnosis, . .	7	-	-	-
Number killed during quarantine, no symptoms having developed,	24	-	-	-
Number released after fourteen days' quarantine, .	98	-	-	1
Number still held under observation, . . .	4	-	-	-
Number not located, ...	5	-	-	-

Of the 39 rabid dogs in the first classification, 16 had bitten persons, and of the 2 rabid cats, 1 had bitten persons. Of the 5 dogs on which the diagnosis was questionable, 1 had bitten persons.

Of the 21 dogs exposed to rabies, 2 had been bitten by cats. One case was brought forward from the record of 1915.

Of the 98 dogs which had bitten people, and which were released at the end of fourteen days' quarantine, 8 were killed at request of the owners.

Seventy-one animals which were under observation at the close of the year 1915 were disposed of during 1916, as follows: —

Dog proven to be positive case and killed, ...	1
Dogs killed at request of owners, not having shown symptoms of the disease, ...	13
Dogs released from observation, no symptoms having developed, .	54
Cattle released from observation, no symptoms having developed, .	2
Horse released from observation, no symptoms having developed, .	1

A study of the above table shows a decrease in the number of positive cases of rabies from 226 in 1915 to 51 in 1916. The number in 1916 equals the smallest number shown on the

Department's records during the past twelve years, the highest number recorded in those years being 662 in 1907, and the smallest being 51 in 1910, as shown below: —

1905,	98	1911,	121
1906,	293	1912,	90
1907,	662	1913,	205
1908,	454	1914,	250
1909,	126	1915,	226
1910,	51	1916,	51

There have been examined in the laboratory during the past year the brains of 52 dogs, 2 cows and 3 cats. Of this number, 22 dogs and 2 cats showed positive evidence of the infection. In the cases of 5 dogs and 1 cat the diagnosis was questionable, and in 30 dogs, 2 cows and 1 cat the diagnosis was negative. Of the 253 animals reported for observation, diagnosis or quarantine, 34 were, as far as the Department could determine, unlicensed and ownerless dogs, 11 of which proved to be positive cases of the disease.

The following table shows the number of positive cases of rabies by cities and towns: —

Attleboro,	1	Lynn,	2
Boston,	2	Malden,	1
Bridgewater,	1	Medford,	2
Cambridge,	1	Millbury,	1
Chelsea,	3	Needham,	2
Douglas,	1	Newton,	1
Everett,	1	Norwood,	2
Fitchburg,	2	Southbridge,	1
Great Barrington,	2	Spencer,	8
Greenwich,	1	Walpole,	1
Haverhill,	1	Waltham,	1
Hopedale,	1	Westhampton,	4
Hull,	1	Weston,	1
Ipswich,	1	Worcester,	1
Leicester,	3		
Lexington,	1	Total,	51

The history of one case of rabies in a horse, which is of considerable interest, may be detailed as follows: —

On Aug. 4, 1915, a dog disappeared from the city of Springfield, was found in the town of Greenwich affected with rabies,

and was killed. A quarter of a mile distant from the place where this dog was killed a mare and her colt were at pasture, and on August 27 the mare developed rabies and was killed. During the furious stage of the disease she inflicted a bite on her foal. This foal was kept under observation, but showed no symptoms of the disease until March 6, 1916, when it developed positive symptoms and was destroyed. This being five and one-half months after the bite had been inflicted makes the case of particular interest as showing the long period of incubation which sometimes exists in the disease when affecting the equine animal. A previous case in the records of the Department for the year 1911 showed similar interesting facts. In that year a rabid dog bit three horses in the town of Topsfield, one of which developed rabies at the end of six weeks, another at the end of three and one-half months, and the third animal at the end of ten months. These facts call attention to the necessity of keeping horses which have been bitten by rabid animals under observation for a long period of time.

Glanders.

The prevalence of glanders among horses, mules and asses owned in the Commonwealth is one of deep concern to the officials of this Department. The problems connected with its suppression are many and difficult of solution. Four hundred or more positive cases of the disease have been yearly recorded for the past eighteen years, and in 1913 the alarming number of 1,084 horses were killed on account of being affected. The average yearly record for this period is 752 cases. The yearly average monetary loss occasioned by the death of these animals, based on a low valuation of $100 per animal, is more than $75,000.

This fact calls attention to the importance of control and eradication of this disease as an economic question alone. From a public health standpoint it is also of great importance, for the reason that occasionally a human being becomes affected with the disease by transmission from an equine animal.

The Department's records for the year ending Nov. 30, 1916, show the following facts: —

At the end of 1915, 18 animals were under observation. Of this number, 5 have been killed as positive cases, 10 have been released as free from the disease, 1 died before final diagnosis was made, and 2 are still held under observation.

During the past year 1,307 animals have been reported as being suspected of having glanders. Of this number, 430 animals proved to be positive cases and were destroyed in accordance with the requirements of the law, 27 died or were killed by owners before diagnoses had been made, 811 were released as free from the disease, and 37 were still held under observation at the end of the year. Two animals were killed by order of the Department, post-mortem examination of which did not reveal the presence of the disease, and full appraised value of the same was paid to the owners.

Following is a table giving the number of cases of this disease covering a period of eighteen years. In this table cases which have occurred in the city of Boston are shown separately, on account of the fact that Boston has always been the storm

center of this disease. Special tabulation of the number of cases in that city is always 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.
1899,	159	384	543
1900,	192	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	362	676
1911,	387	565	952
1912,	395	446	841
1913,	556	528	1,084
1914,	355	495	850
1915,	152	250	402
1916,	157	278	435

As shown by the above table, there have been five more cases found in the city of Boston than during the previous year. A much larger increase was expected on account of the more general application of the different diagnostic tests to all the animals in stables from which glanders cases have been removed and, as a result of these tests, the destruction of all animals which in our opinion were affected with the disease, even though they were not showing clinical symptoms of the same. In these stables tests which have been made in the city of Boston 604 horses have been subjected to the test, and among them 48 cases of glanders have been found which otherwise would have escaped observation; so that although the records show an

increase of 3 per cent. in the number of animals killed in Boston during the year, we feel that much more progress has been made in the work of suppression of this disease than during any previous year. A larger percentage of increase in the number of animals killed is shown in cities and towns outside of Boston, such increase being 11 per cent., and the increase for the State as a whole being 8 per cent. Again, it may be said that the increase in the number of animals found to be diseased has been in a large measure due to the greater number tested during the past year, the number of samples of blood which have been examined having increased from 670 in 1915 to 1,327 during the year 1916.

Among 21 horses shipped from Canada in one carload early in the year, 12 were soon afterwards found to be affected with glanders and were destroyed. Canadian authorities were immediately notified of this outbreak, and they at once started investigation as to the probable source of the contagion. Their report was to the effect that no evidence of the disease was found at the point where the shipment originated, but that as the animals were some sixteen days making the journey, and were unloaded at seven different points on the way in yards which had been used for the collection of large numbers of export horses, in which yards animals affected with glanders had frequently been found, it was decided that undoubtedly the disease was contracted at some of these unloading stations. As the United States Bureau of Animal Industry maintains inspection service on the Canadian line, and all animals imported from that country are supposed to be subjected to careful examination before entering the United States, the Bureau was immediately notified of this occurrence and requested to carefully inspect all future shipments of Canadian horses to Massachusetts.

The Department has continued the policy of promptly killing all animals showing clinical symptoms of glanders, of disinfecting the premises where they have been stabled, the blacksmith shops in which they were shod, and the public watering troughs where they were 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 other portions of the stall as the animals had come in close contact with, or upon which might have been deposited any discharges from their respiratory passages. We have required that this disinfection be attended to by the owners of the premises before approving their claims for reimbursement.

Frequent inspection has been made of all animals on premises where the disease has been found to exist, so that its spread from the original case might be noted and prompt action taken to destroy any new centers of infection which might have become established. The result of such frequent inspection has been that many cases have been found and destroyed which otherwise would have escaped notice.

In my opinion constant work in the testing of equine animals by the different methods now applicable will finally result in gradually diminishing the prevalence of this disease.

In addition to the complement-fixation, or so-called "blood test," and the ophthalmic-mallein, or so-called "eye test," both of which have been continued during the past year, we have made arrangements to inaugurate the "agglutination" test. All of these tests are of great value for diagnostic purposes, and their application to suspected animals, especially those which do not show clinical symptoms, is of material aid in forming conclusions regarding the existence of the disease. By their use, also, earlier diagnoses of doubtful cases are possible, and the result is that many animals are destroyed earlier in the progress of the disease than would happen if diagnoses depended upon the exhibition of clinical symptoms alone. A careful record of post-mortem examinations of animals to which these tests have been applied has proven that they are accurate in a high percentage of cases.

Complement-fixation Test.

Of the 18 horses under observation at the end of the year 1915, 11 were subjected to the complement-fixation test, with result that 3 were condemned and killed, 6 were released as probably free from the disease, and 2 are still under observation.

Thirteen hundred and twenty-seven samples of blood were taken from 1,034 horses during the year 1916, and the following disposition of the animals was made: —

Animals held over from 1915, disposed of as above,	11
Animals released on first test,	689
Released on second test,	70
Released on third test,	28
Released on fourth test,	3
Died or killed by owner after first test,	11
Died or killed by owner after second test,	2
Condemned on first test,	123
Condemned on second test,	40
Condemned on third test,	19
Condemned on fourth test,	7
Condemned on fifth test,	1
Held for further observation,	30
	1,034

From 3 of the 30 horses still held under observation one sample of blood has been taken; from 14 others two samples have been taken; from 8 others three samples; and from the remaining 5, four samples.

Ophthalmic-mallein Test.

This test has been applied to 816 horses during the year, it happening in many instances that the test was repeated on the same animals, 1,004 such tests having been made with the following results: —

Tests giving positive reaction,	205
Tests giving no reaction,	689
Tests giving unsatisfactory results,	110
	1,004

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 in some instances been quarantined, frequently examined, and allowed to work under certain conditions. We have found in some instances that contact animals apparently in perfect health have temporarily reacted to one of the tests applied 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 only one of the tests above mentioned, did not also show clinical symptoms, if they appeared to be in a good condition of health. These so-called temporary reactors have, however, been carefully watched, subjected to frequent tests, and upon reacting persistently to either one or both of the tests have been destroyed. Autopsies have been made on condemned animals in every case where there has been any conflict 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 found advisable.

It is our opinion that an important factor in the control of glanders is the closing of public watering troughs. If any unusual number of cases has been found to exist in any town or city the authorities have been requested to immediately close all public drinking fountains. This action has invariably been followed by an early decrease in the number of cases reported, in some instances no additional cases being reported thereafter. At the present time, in 21 cities and towns of the Commonwealth, the public watering troughs have either been closed or entirely eliminated.

In my opinion the closing of the public drinking places for animals has operated to limit the spread of contagious diseases other than glanders, and the practice of watering animals from individual pails carried for the purpose is one to be encouraged, not only from the standpoint of the control of glanders, but also of many other diseases of a contagious character. We find that horse owners and team drivers are already acknowledging the beneficial results of this method of watering animals under their charge, and do not think it advisable to return to the former method of making use of the public troughs.

Another factor in the suppression of glanders is the disinfection of blacksmith shops. Following the condemnation of an animal affected with this disease the proprietor of the blacksmith shop in which this particular animal was shod has been directed to immediately disinfect the premises. Frequent inspection of blacksmith shops by agents of the Department has

undoubtedly been a factor in securing frequent disinfection by their owners or occupants, and without doubt this practice has limited the prevalence of this disease to a great degree. One hundred and thirty-one blacksmith shops have been visited by our agents during the year, and instructions given relative to disinfection.

The Massachusetts Society for the Prevention of Cruelty to Animals, the Boston Workhorse Relief Association, the Animal Rescue League, and the branches of these various associations in many cities and towns of the State, have through their agents been of material aid to the Department in the work of controlling this disease. Their close observation of working animals of all classes has brought to light many showing suspicious symptoms, which they have promptly reported to this Department, and many of the animals so reported have proved to be positive cases of the disease.

The constant activity of the humane societies in removing disabled animals from work, and destroying those which on account of extreme age or poor condition are no longer useful, is undoubtedly a factor in the suppression of glanders, as animals of the class referred to are very susceptible to this infection.

The maximum amount fixed by chapter 646 of the Acts of 1913 which may be paid for any one animal condemned and destroyed on account of being affected with glanders being $50, the appraised value of the animals destroyed is a subject of considerable interest. Of the 435 positive cases of glanders occurring during the year, 357 were appraised at a total valuation of $48,800, the average amount per animal being $136.69. On the remaining 78 animals affected with glanders no appraisal was made, for the following reasons: —

Twenty-five were reported by renderers, found on autopsy; 14 died, not having been condemned by order of the Department; 10 were killed by owners, and 29 had not been in the State twelve months, the period prescribed by law that a condemned animal must have been within the State for compensation to be allowed.

Of the 357 appraised animals payment has already been made on 273, the total appraisal of which was $39,865, an average of $146 per animal.

Interstate Horses.

Horses, asses and mules shipped to Massachusetts from the States of New York, Connecticut and Rhode Island must be accompanied by a permit from the Commissioner of Animal Industry. This regulation was established on account of the prevalence of glanders among the horses of the States mentioned, and in order that upon arrival the animals might be immediately located and examined by agents of this Department.

The number of horses, mules and asses shipped from these States has increased from 3,679 in the year 1915 to 4,500 in the year ending Nov. 30, 1916. This increase is partly due to the removal of restrictions on live-stock shipments which were in force during the previous year on account of foot-and-mouth disease. Among these animals very few cases of glanders have been found, as shown by the following statistics: —

Equine Animals from New York, Connecticut and Rhode Island.

Mules,	12	
Donkeys,	1	
Horses,	4,487	
		4,500

Disposition of Above Animals.

Died soon after arrival,	2	
Condemned as affected with glanders,	3	
Released upon physical examination,	4,412	
Released after test,	83	
		4,500

The small number of animals condemned, as shown by the above table, is worthy of notice. Most of the animals brought from the above-mentioned States are of the better class, many of them being highly bred horses used for carriage work and breeding purposes, a small percentage only being second-hand horses which are trafficked in and sent from the markets of one State to those of another for purpose of public sale. This latter class of animals has been specially watched on account of their being considered more liable to be subjects of contagious disease than the higher class animals.

Hog Cholera.

The proper method of controlling hog cholera has been a subject of discussion among live-stock sanitary authorities for several years. Since the discovery of anti-hog cholera serum and hog cholera virus it has been generally agreed that the simultaneous treatment and a comprehensive plan for disinfection of infected premises are absolute essentials. This combination offers the most promising method of controlling this disease. While it is generally conceded that the simultaneous treatment is one of the greatest immunization processes known to preventive medicine, we must at the same time bear in mind that it is the only known immunization process in which the unattenuated causative agent of the disease is used. The treatment properly used is not only possessed of many beneficial possibilities, but is a practical necessity in controlling the disease, at least under conditions existing in Massachusetts. When the treatment is improperly applied, or when either the serum or virus is not of a sufficiently high standard, the treatment may be, and frequently has been, the means of spreading rather than preventing the disease. Previous to 1915 practically all of the States had failed to take cognizance of this great danger, and had allowed this valuable immunization process to be subjected to abuse and become a failure, as well as permitting the spread of the disease by allowing the treatment to be used promiscuously by unqualified persons, or by the use of inferior serum or virus.

Believing that this was the weakest part of all control plans which had up to that time been proposed, and that in order to prevent the spread of the disease it must be handled exclusively by the State, the Department of Animal Industry in January, 1915, placed restrictions on the use of anti-hog cholera serum and hog cholera virus in Massachusetts, and formulated a control plan which briefly is as follows: —

1. All anti-hog cholera serum and hog cholera virus coming into the State of Massachusetts must be subjected to a test by this Department, regardless of all previous tests. This test is both physiological and bacteriological, and is made upon each lot as represented by a serial number.

2. Both the serum and the virus are kept under the care of the Department from the time of receipt.

3. Serum and virus can be used only by agents employed by and responsible to this Department.

4. Application for treatment must be made to the Department by the owner of swine, who agrees to our plans for quarantine, disinfection, proper care of the animals, etc.

5. The owner pays only for the serum and the virus, this Department defraying all other expenses.

When this plan was formulated its practicability was a matter of conjecture, inasmuch as it was radically different from any other that had previously been proposed. After two years of its application we feel that we are in a position to form conclusions and present comprehensive statistics as to its value. When these are studied and compared with the results obtained in other sections of the country, where the proper restrictions are not enforced, it must become apparent to all, as it is to us, that under New England conditions, at least, the general application of the simultaneous treatment is absolutely essential in both infected and non-infected herds. This cannot be safely carried on except under the most stringent State control, similar to the plan outlined above. The remarkable results shown in the following report can be obtained only where such proper control methods are adopted and enforced. Until this is done our neighboring States are bound to be fertile grounds for the spread of the disease, both because of the need of more universal application of the serum treatment, and on account of the improper application of much of the treatment which is being administered. After a control plan such as ours is established and enforced faulty technique becomes minimized, and serum and virus of inferior quality or containing large numbers of dangerous bacteria cannot be sold to an unsuspecting public with only the word of the manufacturer as to its reliability. Thus the spread of cholera and other diseases from these products becomes minimized, and the consumer is given the maximum protection at the minimum cost.

After the campaign in this State was started our services were called for, during the first few months, only in the badly infected "garbage-fed" piggeries where hog cholera had existed for

many years, and where large numbers of young animals had died annually. This was rapidly followed by requests for treatment from the majority of the State institutions. The results, as set forth in previous reports, were so uniformly good that the skepticism which was at first apparent on the part of the swine owners was soon replaced by their confidence and co-operation. This has continued during the past year to such a marked extent that at the present time there are only a very few of the large piggeries where all swine are not being immunized as rapidly as they reach the proper age.

The plan which is followed in these herds after the brood animals have been immunized is to give 20 c.c. (mils.) of serum to all pigs when they are weaned (age about six weeks). When they reach the age of three months, at which time garbage-fed pigs generally approximate 40 pounds in weight, they are given 30 c.c. (mils.) of serum and 1 c.c. (mil.) of virus, unless perchance they do not weigh 40 pounds, in which case they are again given the "serum only" treatment. This method has completely eliminated cholera losses in a large percentage of the piggeries in this State, where previously the annual losses of hundreds of young pigs were causing a rapid decrease in the total number of swine in the State.

From 1912 to 1914 the number of swine in this State decreased with alarming rapidity. This condition is now reversed, and the number of swine is rapidly increasing, in spite of the fact that garbage as a food is becoming increasingly harder to procure in large quantities, and that grain during the year has sold at an unprecedentedly high figure. The long-continued high price of pork has also been an inducement to many to sacrifice large numbers of animals which ordinarily would have been retained for brood purposes. Notwithstanding these conditions, swine are being kept in larger numbers to-day than for several years. The increases are mostly in the larger herds, where formerly only about 50 per cent. of the pigs born each year could be raised, the remainder dying with cholera. In the same herds it was the rule to purchase new animals only when absolutely necessary, because the owners had learned from experience that it was not possible to purchase new stock without enormous losses shortly after delivery. The same stock-

men are now able to purchase and add to their herds any number of swine without losses, providing all newcomers are immunized as they enter the infected piggery. This is the main reason for the increase, and we believe that it will result in doubling the number of swine in the State in the very near future.

It is rather difficult to estimate the saving to the owners, but undoubtedly the value of the animals treated during the past year could be estimated very closely to $500,000, at a cost to the owners for serum and virus of $21,698.41. The losses from cholera which have in past years been constant in practically all of the large State institutions have been completely eliminated in all the herds in which our services have been requested. Undoubtedly the saving represented by the elimination of the yearly loss from cholera in these State institution herds alone would more than offset the entire amount of money spent by this Department in its control work against hog cholera. Many of these institutions are now selling swine, whereas formerly they could not raise a sufficient number to consume all their garbage.

As in all forms of preventive medicine, the real value of this treatment is in its application before the animals become infected. During the first year of our work practically every herd to which we were called upon to administer treatment showed enormous numbers of animals dead and dying. It was but natural that as the result of our immunization work in these herds became apparent, together with our educational propaganda, the demand for the treatment in non-infected herds should increase. It is therefore most gratifying to study our statistics which follow, showing the increase in both infected and in non-infected herds in which the treatment is being carried on.

	1914.	1915.	1916.
Infected herds,	65	150	192
Non-infected herds,	2	95	113
Totals,	67	245	305

Both the above and the table which follows show a decided tendency among swine owners to immunize their swine before the animals become infected. This is a most encouraging sign, which is further manifested by the large decrease in actual outbreaks of cholera which have occurred during the past year, thus giving rise to the hope that eventually, by continuing the plan which we are now pursuing, the amount of hog cholera in the State will reach a minimum, due to the fact that available swine upon which hog cholera can propagate itself will reach a minimum, because of the large number of susceptible animals which will have been immunized.

The mortality following the administration of the serum treatment under our control plan is the lowest which has been obtained under field conditions in any extensive campaign to control this disease. In non-infected herds where the treatment has been applied as a preventive we have, during the three years, treated 8,624 animals in 210 herds, following which only 1 has died from hog cholera. During two of the three years there has been no mortality. In badly infected herds the number of animals treated has increased from 5,019 in 1914 to 28,388 treated in 1916. At the same time the total mortality in infected herds, following both "serum only" and the simultaneous treatment, has decreased from 11.5 per cent. in 1914 to 4.3 per cent. in 1916. During the same time the mortality following the simultaneous treatment in infected herds which has been applied to "apparently healthy" animals has decreased from 2 to .6 per cent. While this does not at first appear to be a decided decrease, it must be recalled that the original mortality of 2 per cent. is far lower than is obtained in most places where the simultaneous treatment has been applied, and therefore a further reduction of 1.4 per cent. is gratifying.

We know of no case where the treatment when applied by our agents has been the cause of spreading the disease either in infected or in non-infected herds. It proves conclusively to our minds that the danger commonly associated with the simultaneous treatment is eliminated when the treatment is properly applied under State control, and the serum and virus to be used have been properly tested. It further substantiates the belief

that the general application of the simultaneous treatment is absolutely necessary if hog cholera is to be controlled. Many of the herds which have been infected for years previous to our assuming control, and in which treatment is now being carried on, have not had a case of cholera in months, and during the coming year it will undoubtedly be possible to classify and consider them as "exposed" rather than "badly infected" herds.

The table on facing page shows that during 1916 the number of animals which we were called upon to treat increased more than 100 per cent. over the number treated in 1915. It is reasonable to suppose that we will be called upon to care for a corresponding increase in 1917. Undoubtedly more agents will be required to handle the increase of work.

In herds where a diagnosis negative to cholera has been made, and in some herds which have been immunized against hog cholera, and where at a later date animals died under suspicion of hog cholera, it was found by examination that in many cases the animals were affected with parasitic infections. In a few cases the bacillus *necrophorus*, causing the so-called "foot-rot," has been the cause of the deaths. The most common complication, however, has been that of hemorrhagic septicemia. This has been seen both in herds which have been immunized and in those which have not. It is extremely difficult and frequently impossible, under ordinary field conditions, to differentiate between hog cholera and hemorrhagic septicemia. It became necessary, therefore, to determine the presence of hemorrhagic septicemia by animal inoculations and laboratory filtrations through the Berkfeldt filter. It is perfectly evident that both this disease and that of necrobacillosis are on the increase in this State, and must in the near future receive considerable attention.

Tuberculosis.

The prevalence of tuberculosis among the animals owned in Massachusetts is of very great economic importance to its citizens. The immediate loss in cattle and hogs is considerable, and there is also great depreciation in the producing value of animals which are affected with this disease.

Comparative Statistics on Hog Cholera for 1914, 1915 and 1916.

	1914.	1915.	1916.
Number of herds reported as infected,	100	349	310
Negative diagnosis,	20	122	57
Number of known infected herds,	80	227	253
Infected Herds.			
Infected herds in which serum treatment was not administered,	–	77	43
Infected herds in which serum treatment was administered,	65	150	192
Number of swine known to have died in these herds previous to treatment,	900	3,080	1,777
"Serum only" treatment (infected herds), including infected animals and those too young for simultaneous treatment.	428	10,300	14,747
Mortality following "serum only" treatment (per cent.),	9.5	7	3.7
Simultaneous treatment, including "apparently healthy" animals in infected herds,	591	5,826	13,643
Mortality following simultaneous treatment (per cent.),	2	1.2	.6
Total number treated in infected herds,	1,019[1]	16,126	28,388
Total mortality following both "serum only" and simultaneous treatment in infected herds (per cent.),	11.5	8.2	4.3
Preventive Inoculation — Non-infected Herds.			
Animals inoculated,	104	863	7,657
Number of animals which died following inoculation,	–	1	–
Total number of animals treated,	5,123	16,989	36,045

[1] Plus 4,000 which were treated, and died or were killed before results could be ascertained. These deaths were due to the use of serum which was impotent and virus which was not virulent, before the present regulations were made.

During the past twenty-five years the study of tuberculosis has received widespread attention on the part of many investigators, and it is still a field in which apparently much work remains to be done before any satisfactory solution of the problem of control and eradication can be arrived at. As the records of this Department show a continued widespread prevalence of this disease among cattle of Massachusetts, constant application of all the methods at hand should be made in order to limit its spread as much as possible.

During the year just brought to a close 1,393 bovine animals from herds owned in Massachusetts have been condemned and killed on account of being affected with tuberculosis, and in addition there have been 512 animals affected with this disease killed upon their arrival from other States. These figures show an increase of nearly 29 per cent. in the number of Massachusetts cattle condemned, and at first glance might indicate that the prevalence of the disease was increasing to that extent. This increased number, however, may be largely accounted for by the somewhat different methods pursued in the examination of herds in which has been found a tubercular animal and the herds classified as infected.

Under our present method a physical examination of the entire herd is made when one member of it is found to be tubercular, whereas formerly the examination was limited to the one quarantined animal, and if other cases were present they escaped observation. Therefore, it cannot be maintained without question that tuberculosis among dairy cattle is increasing in the degree which the above figures would indicate. It means that the number of existing cases is being more accurately determined.

Whether or not the disease among our neat cattle is increasing at all or diminishing is a question, however, which cannot be positively answered. The total number of animals affected cannot be determined with any degree of accuracy except upon a careful physical examination of all neat cattle in the State, supplemented by the application of the tuberculin test. While realizing that this test has its limitations, it is generally recognized as being the most reliable means of diagnosis at our command. The law specifies, however, that except in certain

instances the test cannot be applied to cattle owned in Massachusetts except upon request of owners. We find that a largely increasing number of cattle owners are subjecting their herds to the test. This indicates an increased interest in the present situation, and from this fact alone it may be expected that great benefit will result in the solution of the problem of control.

We find that tuberculosis is more prevalent in certain herds and localities than in others, and it has been observed, in sections where the disease rarely occurs, not only that favorable climatic conditions and care in breeding and traffic contribute to the maintenance of health, but that the development and replenishment of herds in accordance with methods now recognized as most successful are specially favorable to the actual prevention of this particular disease.

The insidious nature of tuberculosis, its slow development to the point where its symptoms are apparent, prevents its recognition in the early stages. If the disease progressed more rapidly and produced recognizable symptoms or death within a few days, stock owners and others would undoubtedly take more active measures for its control.

Being limited in our condemnation of cases to those diagnosed by physical examination alone, we have endeavored to perfect and extend our inspection of infected herds as far as possible. On the occasion of the visit of an agent for the purpose of condemning or releasing an animal quarantined on account of suspected tuberculosis, if the quarantined animal is found to be affected with the disease the agent is directed to carefully and completely examine all other animals in the herd, and, if suspected cases are found, to notify the owner of that fact, have the suspected animals placed in quarantine, and then disposed of according to the methods followed in the original case. The history of tuberculosis in Massachusetts is that in certain herds and localities the Department has been called upon, at more or less regular intervals, to examine and condemn some one animal which has been quarantined by the inspector of animals on account of being suspected of having the disease. Believing that in many such instances other cases quite as dangerous as centers of infection may exist is our reason for inaugurating

the practice of examining all the animals in the same herd. In the short time in which this method has been in operation we have found and destroyed many additional cases which under former methods would have been unrecognized, allowed to exist and spread the disease.

We have deemed it advisable, also, to have subsequent examinations made of these infected herds in order that cases which did not show symptoms on the previous inspection might be recognized at as early a stage of the disease as possible. Careful physical examination by competent men at regular intervals of all animals which have been exposed to tuberculosis cannot but result in a reduction of the number of tuberculous animals in the State, although on the inauguration of this method results might indicate that the number was increasing.

The Legislature having made provision for compensation to Massachusetts cattle owners for animals condemned and killed on account of being affected with tuberculosis, it becomes an economic necessity to provide for the careful examination of all neat cattle brought to this State for dairy purposes, in the protection of our own herds. In order to be positively assured of the health of all these dairy cattle, the use of tuberculin for diagnostic purposes in this work has been wisely ordered. The tuberculin testing of all neat cattle over six months of age which are shipped to Massachusetts for dairy purposes is therefore one of the principal duties of this Department.

The number of these animals shipped to Massachusetts the past year has very largely increased. The number received in 1915 was 15,368, and the number received in 1916 was 23,443, an increase of more than 8,000 animals. Between 5,000 and 6,000 of these cattle were accepted on tests made in other States, but the remainder were tested by agents of the Department at many different points in the State, by far the larger portion having been tested at the quarantine station in Brighton, all animals at the Watertown and Somerville quarantine stations being taken to the Brighton Stockyards for the test. Animals may be shipped to any one of these three stations unaccompanied by a permit of the Department, and not subject to certain regulations which apply when shipped to other points.

During the year 1916 the number of cattle tested at the Brighton Stockyards alone has increased from 4,858 in 1915 to 14,173, an increase of 9,315 animals. This shows a large increase in the number of incoming cattle at the quarantine stations and a decrease in the number received at other places. The Brighton Stockyards being closed for a large portion of the year 1915 operated to reduce the receipts at that point to a low number, and therefore the 1916 figures show an increase which is much greater than would have occurred had it not been for the existence of foot-and-mouth disease during 1915. When the Brighton Stockyards are closed interstate cattle go to other points in the State in larger numbers than when the stockyards are open. Therefore, the comparative increase this year as between the Brighton Stockyards and other points in the State is affected in that way. Brighton Stockyards being a point from which animals are taken to very many different cities and towns within the Commonwealth, the possibility of the spreading of infection therefrom, if an outbreak of foot-and-mouth disease occurred, made it necessary that the restrictions against shipments to that point be maintained longer than at any other point.

The tuberculin testing of interstate cattle at the Brighton Stockyards is now maintained at greatly increased expense, inconvenience and disadvantage both to cattle shippers, sellers and buyers, as well as to agents of this Department who are charged with the administration of the work. The cattle barn at those premises was destroyed by fire early in April, 1916, together with a large number of cattle which it contained, some 400 animals losing their lives in the fire. Since that time no arrangements have been made for reconstruction of a suitable building for the purpose of housing the cattle during the time they are undergoing the tuberculin test. Temporary quarters have been fitted up by the lessees of the premises, and our work is being carried on to the best of our ability under the trying circumstances. No doubt the present conditions have more or less influence on the results obtained by the application of the test.

Cattle arriving from out of the State should be put into comfortable quarters where they may obtain needed rest from a tiresome and generally a protracted journey. It is necessary

that the test be applied very shortly after their arrival, in order that it may be completed before the public sale takes place the following day. Even though a comfortable barn were provided, where exposure to the severity of the weather might be avoided, the conditions are not particularly favorable to a proper test. Animals in quarters to which they are unused, handled by strange men, injected with tuberculin, roused up in order that their temperatures may be taken every two hours, thus being deprived of needed rest, are circumstances which very seriously interfere with the reliability of the test, and its application under these conditions is very unsatisfactory.

On this account it has been deemed necessary to make, a week later, a careful *retest* on such animals as appeared to be suspected as result of the first test. The method of this retest has been very much improved during the past year. On the day previous to its application the temperatures of all the animals held have been carefully recorded at exactly the same hours of the day at which they would be taken after the injection of the retest dose of tuberculin. This is for the purpose of comparing the temperatures of the animals on the two different days, and by that means judging just what effect has been produced by the tuberculin. This comparison has been of great aid in forming conclusions as to whether or not animals are diseased. We have made arrangements for the coming year for the application of the so-called ophthalmic test for tuberculosis, and consider that by the proper study of the result of the original test, the retest and the ophthalmic test, accurate conclusions can be arrived at in a large percentage of cases.

There is no test known to science which is absolutely infallible, but from the application of all the tests at hand, in addition to a careful physical examination, everything possible will be done to properly safeguard the interests of all concerned.

An accurate interpretation of the result of a tuberculin test is possible only if it has been conducted under favorable conditions; and as we have known this by our experience of the past few months, it is earnestly hoped that the conditions of stabling referred to will be improved in the near future, so that a most important branch of our work may be executed in a manner more satisfactory both to the shippers of cattle to this market

and to those charged with the protection of the interests of the cattle buyers, and through them the dairy cattle interests of Massachusetts.

This work at the Brighton Stockyards is under the supervision of a veterinarian who has wide experience and who has been in the service of the Department for many years.

Tuberculin testing at other points in the State is in all cases done by an accredited man of training and experience. As it is the custom to accept 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. At the present time these regulations call for an amount of work very much greater than that which has formerly been accepted as sufficient, and if it is found that the records submitted for approval and acceptance are not up to our present standard, the animals are retested by our own agents. In case any suspicion of dishonesty attaches to the work of an out-of-State veterinarian, he may be discredited and acceptance of tests made by him withheld in subsequent cases. It should be said that very seldom has the Department been called upon to discredit a test made by a qualified veterinarian either in this State or in any other State from which cattle are shipped to Massachusetts. Investigation has frequently revealed the fact that if dishonesty has been practiced the veterinarian is not the one to be accused of the same. 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 the interests of the Commonwealth are properly safeguarded in that direction.

According to section 11, chapter 90 of the Revised Laws, any person who has knowledge of or reason to suspect the existence of any contagious disease among any domestic animals in this Commonwealth, or that any domestic animal is affected with such contagious disease, whether such knowledge is obtained by personal examination or otherwise, shall immediately give notice thereof in writing to the Commissioner of Animal Industry, or to the inspector of animals for the city or town where the animal is kept, and a penalty is provided for failure

to do so. An increasing number of veterinarians throughout the State who, in the process of tuberculin testing of cattle for private owners, have found animals reacting thereto, have realized that under the section of law referred to their duty is to report said reactors to this Department. The result of this has been that many more reacting animals have been brought to our attention during the past year than ever before. Although by law Massachusetts animals cannot be condemned and killed by this Department except as a result of physical examination, information as to the location of the disease is desirable, and we are given the opportunity to take up with the owner of suspected animals the disposal of them, and to suggest a way by which they may not become spreaders of the infection to other animals.

During this year 44 herds in which 256 animals were found by private veterinarians to react to the tuberculin test have been reported to this Department. Of this number, 32 were condemned and killed; on 72 the so-called "permit to kill" warrant was issued, the conditions of which are that the animal shall be destroyed under Federal or municipal inspection, and, in case the carcass is found to be diseased with tuberculosis to such an extent that it cannot be passed as fit for food, the Commonwealth reimburses the owner according to the provisions of law applying thereto. In case the carcass is passed by the inspector of slaughtering as fit for food, the owner receives his reimbursement from the slaughterer. Sixty-five of the animals above mentioned were immediately slaughtered by the owners, and on 87 of them the method of their disposal has not been recorded.

For a number of years the Department has been at the service of cattle owners who desired to have their herds tuberculin tested, provided they were willing to sign the following agreement: —

Believing in the value of tuberculin as a diagnostic agent in cases of tuberculosis in cattle, and that the application of the tuberculin test does not cause any permanent injury to animals subjected to it, I hereby request that you apply the said test to my herd consisting of the following animals: —

.....

Of said animals,..... have been owned within the State six months continuously prior to this date.

In asking to have my herd tuberculin tested at the expense of the State, I hereby agree to the following conditions: —

That all animals reacting to the test shall be killed under Federal or municipal inspection; for any animal which passes such inspection as fit for food I agree to accept as reimbursement such amount as the butcher will allow for the carcass, and not claim reimbursement from the Commonwealth; for any animal which the Federal or municipal inspector of slaughtering declares unfit for food on account of the tubercular lesions found, I am to receive from the Commonwealth full appraised value, not exceeding $40 for any one animal, in accordance with the provisions of section 6, chapter 90 of the Revised Laws.

I furthermore agree to disinfect the buildings in which the reacting animals were kept, according to the rules which the Department of Animal Industry prescribes.

I also agree to add to my herd in the future only such animals as have satisfactorily passed the tuberculin test.

Early in the year a movement was started on the island of Nantucket having for its object the eradication of tuberculosis from its herds of cattle. It was realized that owing to the geographical situation of that town an opportunity was presented such as existed in no other portion of the Commonwealth, and if full advantage was taken of the same it might be possible to successfully accomplish this object.

A number of public meetings were held at which agents of the Department offered to co-operate in every possible way in making the project a success. As a result of these meetings and conferences with agents of the Department, nearly 100 per cent. of the cattle owners of the island agreed to have a tuberculin test made of their animals under our auspices as a start in the work. The test was immediately applied, and 42 herds comprising 324 head of cattle were subjected to it; 36 animals were condemned and killed in accordance with the results obtained, and autopsies were made in every case. As a favorable start had been made, it was advised that subsequent tests be applied in accordance with an intelligent continuation of the plan. It was also advised that town officials formulate and put in force regulations providing that no bovine animals should be landed on the island unless the same had passed the tuberculin test. If, in addition to these regulations, the board of health would order that no milk be sold on the island unless the same had been produced from tuberculin-tested cows, it

was our prediction that at the end of a certain period of time the entire success of the project would be accomplished. This regulation and order were not made, however, and it has also happened that a certain small number of the owners have not been in perfect accord with the majority interested in this movement, have not been in complete sympathy with the necessity for its provisions, and therefore have not completely carried out all the requirements necessary in testing and disposing of reactors. In our opinion the possibility of full success of the project has therefore been jeopardized to a certain degree; but we feel confident that, a successful start having been made, a *unanimous* agreement will finally be entered into, with the promise of ultimately accomplishing the desired object. It should be realized by the citizens of Nantucket that an opportunity really exists for the establishment of perfect health conditions of their cattle as far as tuberculosis is concerned, and that it cannot fail to be attended by an increased reputation of the locality as a perfect health resort, largely on account of the possibility of the production of milk and other animal food uninfected with the germs of tuberculosis; also that, in case the disease is finally proven to be eradicated, a great business opportunity will exist in the raising of tuberculosis-free cattle to supply an increasing demand for dairy animals from non-infected localities, where the animals are not only free from this disease, but in addition are not *exposed* to the danger of infection on account of regulations in force preventing the possibility of the disease regaining a foothold.

Following are various tables showing the extent of the Department's work in connection with the control of tuberculosis in Massachusetts for the year ending Nov. 30, 1916: —

Massachusetts Cattle reported.

Reported as diseased by inspectors, veterinarians, department agents and owners,			1,885
Disposed of as follows: —			
Released,		284	
Condemned,		1,237	
Condemned on "permit to kill" warrant,		26	
Permit to kill, no lesions,		51	
Died or killed by owners,		51	
Held, action not yet taken,		29	
			1,678
Tested on voluntary request,	559		
Disposed of as follows: —			
Released,	(456)		
Condemned on "permit to kill" warrant,		63	
Permit to kill, no award,		40	
			103
Reactors reported on private test,	256		
Disposed of as follows: —			
Released,	(87)		
Killed by owners,	(65)		
Condemned,		32	
Condemned on "permit to kill,"		35	
Permit to kill, no award,		37	
			104
Total,			1,885

Massachusetts Cattle examined by Agents.

Physical examination (1,025 herds),	10,884
Tuberculin tested,	559
Total,	11,443
Number condemned on physical examination,	1,269
Number condemned on tuberculin test,	103
Total,	1,372
Percentage of tubercular animals in total number physically examined and tuberculin tested,	12

Interstate Cattle Tuberculin tested.

Cattle tested at the quarantine station at Brighton,	14,173	
Cattle tested by veterinarians outside the State: —		
Received at Brighton, 1,390		
Received at other points, 4,299		
	5,689	
Cattle tested by agents of the Department at points other than the quarantine station,	3,443	
Cattle awaiting test,	138	
		23,443

Disposition of Above Cattle.

Cattle condemned on Brighton test,	354	
Cattle killed on "permit to kill," Brighton test,	158	
Died during test,	1	
Cattle released from Brighton as free from tuberculosis,	15,050	
Cattle condemned on test at other points in State,	115	
Killed on "permit to kill" after first test,	9	
Awaiting test or retest,	145	
Released as free from tuberculosis,	7,611	
		23,443

The following statistics show in detail the record of interstate cattle shipped to points in the State outside of the quarantine stations: —

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

For dairy and breeding purposes, tested before shipment,	4,299	
For dairy and breeding purposes, tested after arrival,	3,443	
For dairy and breeding purposes, awaiting test,	138	
		7,880
Neat cattle on which no test was required, classified as follows: —		
Cattle for immediate slaughter,	2,017	
Calves for immediate slaughter,	4,435	
Dairy calves under six months old,	194	
Cattle returned from out-of-State pastures,	371	
Died before test could be made,	3	
Returned from breeding stables in other States,	2	
Remaining in State for brief periods only,	24	
Returned from sales in other States,	21	
For temporary stay at sales or exhibitions,	1,054	
		8,121
Total for all purposes,		16,001

The animals brought into the State for sale or exhibition purposes comprised 129 head at sale held by the Fasig-Tipton Company of New York City, 700 at the National Show at Springfield in October, and 225 at exhibitions or fairs at other places.

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 328 having been brought in unaccompanied by permits, reported to the Department by railroad agents, local inspectors or others.

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 the tuberculin test satisfactorily: —

Condemned on first test,	60
Condemned on second test,	54
Condemned on third test,	1
Killed on "permit to kill" after first test,	9
Awaiting second test,	3
Awaiting third test,	4
	131

Results in the Above Cases.

Found diseased on post-mortem examination,	118
Cases in which no lesions were found, paid for by State,	6
Animals awaiting second or third test,	7
	131

There were 1,494 permits issued during the year for the shipment of neat cattle to points in the State other than the three quarantine stations.

Eighty-six permits were issued allowing cattle to be brought into the State for exhibition purposes, and seven allowing cattle to be returned from exhibition in other States. Sixteen permits were issued allowing cattle to be pastured in the State during the summer season, four permits were issued to persons living near the border line for returning cattle from out-of-State pastures from time to time during the season without being tested or tagged, and two permits were issued allowing oxen to be worked on the border line temporarily without test.

Two hundred and sixty of the permits issued were not used, and ten on which no report had been received at the close of

the year were carried over and will be included in the report of the next succeeding year.

During the spring and early summer Massachusetts veterinarians tested with tuberculin 729 head of cattle that were to be sent into other States for pasture during the season, mostly into New Hampshire, and 84 animals were tagged for the same purpose, making a total of 813 head. Test charts and tag numbers are kept on the files of the Department, in order that these animals may be identified upon returning to their home State in the fall. Many of them were brought to the Brighton Stockyards and released there; others were returned to premises of owners in other parts of the State.

The above statistics show a comparatively small number of cattle and calves brought into the State on permits for purpose of immediate slaughter, this number being only those of which the office of the Department keeps record, and not representing the amount of business in slaughter animals, as under present regulations animals may be shipped to slaughtering establishments which are under United States government inspection unaccompanied by permit from this Department, there being several such establishments within the State.

Collecting the statistics from various sources, it is possible to give in a brief summary, with almost perfect accuracy, the total number of bovine animals received in Massachusetts from other States. These figures are shown below.

Bovine Animals shipped into State during the Year ending Nov. 30, 1916.

Dairy cattle requiring test,	23,443	
Dairy cattle requiring no test, mostly for temporary stay in the State,	1,081	
		24,524
Dairy calves under six months old,		194

Animals for Immediate Slaughter.

Cattle received at the quarantine stations,	102,750	
Cattle received at other points, under supervision of the Department,	2,017	
Cattle received at slaughtering establishments under Federal inspection, at Haverhill, West Newbury and Springfield,	496	
		105,263

Calves received at the quarantine stations,	168,635	
Calves received at other points, under supervision of the Department,	4,435	
Calves received at slaughtering establishments under Federal inspection, as above,	1,576	
		174,646
Total for all purposes,		304,627

The Department keeps records of all animals received at the several quarantine stations, also the States from which neat cattle are shipped, as shown by the following figures: —

Receipts of Stock at the Watertown Stockyards for the Year ending Nov. 30, 1916.

New Hampshire cattle,	5,346
Vermont cattle,	5,528
Massachusetts cattle,	771
Calves,	18,642
Sheep and lambs,	894
Swine,	5,527

Receipts of Stock at the New England Dressed Meat and Wool Company's Yards at Somerville for the Year ending Nov. 30, 1916.

Maine cattle,	2,726
New Hampshire cattle,	2,838
Vermont cattle,	10,757
Massachusetts cattle,	109
Western cattle,	5,320
Canada cattle,	1,822
Calves,	76,244
Sheep and lambs,	293,131
Swine (at Squire's, 613,630; at North's, 582,300),	1,195,930

Receipts of Stock at Brighton for the Year ending Nov. 30, 1916.

Maine cattle,	11,228
New Hampshire cattle,	9,990
Vermont cattle,	8,028
Massachusetts cattle,	13,535
New York cattle,	11,654
Western cattle,	27,627
Canada cattle,	1,034
Calves,	73,749
Sheep and lambs,	6,603
Swine,	63,516

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, farcy or tuberculosis found by them, and the information thus furnished is of considerable value in bringing to the attention of the Department cases of these diseases 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 of Glanders.	Number of Cases of Tuberculosis.	Number of Glanders Cases not previously reported.	Number of Tuberculosis Cases not previously reported.
W. H. Abbott, Holyoke,	2	3	–	1	–
Butchers' Rendering Company, Fall River,	3	2	1	–	–
William S. Higgins, Saugus,	4	–	4	–	–
Home Soap Company, Millbury,	17	11	18	–	–
Lowell Rendering Company,	16	–	27	–	1
James E. McGovern, Andover,	13	13	14	2	–
Muller Brothers, Cambridge,	25	43	3	–	1
William H. Nankervis, Marlborough,	4	5	1	–	–
New Bedford Extractor Company,	3	3	–	–	–
New England Rendering Company, Brighton.	13	22	1	2	–
Parmenter & Polsey Fertilizer Company, Peabody.	26	20	8	1	–
R. & B. Tallow Company, Saugus,	2	2	–	–	–
N. Roy, Jr., Fall River,	47	71	14	11	1
Sherborn Rendering Company,	6	3	14	–	–
Springfield Rendering Company,	3	3	–	–	–
N. Ward Company, Boston,	47	143	1	3	1
Whitman & Pratt Rendering Company, North Chelmsford.	9	2	10	–	9
S. Winter Company, Brockton,	10	13	–	–	–
Worcester Rendering Company,	10	9	2	1	1
Wunsch Manufacturing Company, Pawtucket, R. I.	3	–	4	–	–
Totals,	263	368	122	21	14

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, 1916.

For Month of —	Cattle.	Calves.	Sheep.	Swine.	Horses.
December,	12,463	11,001	21,161	164,657	1,900
January,	8,500	7,719	20,226	153,941	2,044
February,	10,164	11,927	18,309	178,621	2,488
March,	8,120	14,578	11,917	111,737	1,841
April,	7,085	16,098	9,442	77,948	2,250
May,	8,576	20,646	20,558	100,726	2,914
June,	7,567	15,666	28,909	66,373	2,194
July,	7,539	14,999	30,125	79,158	2,450
August,	9,774	11,932	37,206	61,306	1,822
September,	9,383	11,355	27,301	55,304	1,781
October,	13,833	17,316	40,337	92,364	2,358
November,	15,309	15,398	35,137	122,838	1,769
Totals,	118,313	168,635	300,628	1,264,973	25,811

Miscellaneous Diseases.

Anthrax. — This is a disease which is widely spread throughout the world, causing the death of many thousands of animals as well as a large number of human beings, especially those engaged in the handling of hides of animals infected with it. It therefore becomes necessary to prevent in every way possible the prevalence of this disease in this State, both on account of the economic loss of valuable live stock and the possibility of infection of human beings. The activities of the Department in this direction consist of preventive inoculation of all animals on premises where the disease has occurred, and on the notice of an outbreak at any point we require that all animals on the infected premises be immediately inoculated with anti-anthrax serum and spore vaccine as a measure of safety. This inoculation is in most cases effective in immunizing animals for a period of twelve months, thereby preventing further extension of the disease at that point. For the reason that 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 this preventive inoculation from year to year on farms where the disease has once appeared. As infected animals ordinarily die within a few hours of the onset of the disease, the first animals attacked in a particular locality have generally died before treatment could be applied. During the past year 12 cattle and 3 sheep have died, an increase of one case over the record of 1915. Our preventive inoculation work has, however, increased considerably, 83 animals having been inoculated in 1915, and 105 head of cattle and 39 sheep having been inoculated in 1916, on 13 different premises located as follows: in the town of Clinton 1, Dudley 1, Great Barrington 5, Northborough 1, Shrewsbury 1, Sheffield 3, Wendell 1. Our efforts have been directed toward saving the animals exposed to the same conditions of pasturage and feed as those which have died.

In December, 1915, a serious outbreak of this disease was reported from a number of farms situated along the course of the Johns River in the town of Dalton, N. H. The medium through which the animals became infected was subsequently found to be hay which had been cut on the meadows along the course of that river. A solution made from this hay proved fatal to small animals injected with it. As Massachusetts receives from that particular section large numbers of animals and frequent shipments of hay and other products, it was deemed advisable to place a restriction on shipments of cattle and fodder from towns along the course of the Johns River and the Connecticut River, into which the former stream flows. The following order was therefore formulated, approved by the Governor and Council, and promulgated under date of Dec. 29, 1915: —

ORDER NO. 24.

DEC. 29, 1915.

To Transportation Companies and All Persons whom it may concern:

Whereas the disease known as anthrax, which is a contagious disease and is so recognized under the laws of this Commonwealth, prevails among cattle in certain sections of the State of New Hampshire, whence animals and merchandise are shipped to Massachusetts, and whereas it is deemed necessary, for the protection of the live-stock interests of the Common-

wealth, to restrict shipments from the districts in which this disease is known to exist,

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 addition thereto and all other authority me hereto enabling, I do hereby make the following order and regulation: —

The provision of section 1 of Department Order No. 5, which allows the shipment of neat cattle from any State or territory of the United States to the Union Stockyards in the town of Watertown, the Brighton Stockyards in Brighton, or the premises of the New England Dressed Meat and Wool Company in the city of Somerville, unaccompanied by a permit from the Commissioner of Animal Industry, is hereby modified as follows: —

No horses, cattle, sheep, other ruminants, swine, hay, grain or fodder of any kind shall be shipped to *any point* in the State of Massachusetts from stations on the Boston & Maine and the Maine Central Railroad systems which lie between Lancaster, N. H., or Lunenburg, Vt., on the north, and Woodsville, N. H., or Wells River, Vt., on the south, unless accompanied by a permit from the Commmissioner of Animal Industry.

This order shall take effect upon its approval.

LESTER H. HOWARD,
Commissioner of Animal Industry.

Approved in Council, Dec. 29, 1915.

E. F. HAMLIN,
Executive Secretary.

This order was maintained in force until the close of the year, soon after which, it having been proved that anthrax no longer existed in that locality, it was revoked. During this period no case of the disease has appeared in Massachusetts the source of which could be traced to the localities above mentioned.

Blackleg, or symptomatic anthrax, is another disease which is very widespread throughout the world, and causes the death of large numbers of animals, especially such as have not reached adult age. The same necessity for yearly preventive treatment exists in the control of this disease as in that of anthrax. Preventive treatment is very successful, and although the number of fatal cases of this disease in Massachusetts is very small, only seven animals having died during the past year on five different premises, the preventive inoculation has been applied to 161 animals on 95 different premises in 35 towns, as follows: —

Adams,	1	Northampton,	1
Andover,	1	Orange,	1
Ashburnham,	4	Pittsfield,	1
Ashby,	11	Prescott,	10
Ashfield,	1	Princeton,	2
Becket,	2	Rowe,	1
Dalton,	1	Rutland,	1
Dana,	3	Savoy,	1
Granville,	1	Shelburne,	2
Great Barrington,	3	Southampton,	4
Greenwich,	2	Sterling,	2
Lee,	2	Tyringham,	2
Leicester,	1	Warwick,	5
Lenox,	2	Washington,	5
Littleton,	1	Westhampton,	1
Middlefield,	9	Williamstown,	3
Montague,	1	Winchendon,	1
New Marlborough,	6		

Wherever losses from this disease have at any time occurred owners have been very anxious to have preventive treatment applied, and many new applications for it are yearly received.

Another disease increasingly prevalent each year is *hemorrhagic septicemia,* which this past year has not only affected cattle but also goats and swine. Differential diagnosis is sometimes difficult in the field as between anthrax, blackleg and hemorrhagic septicemia, and a positive diagnosis is sometimes reached only as a result of laboratory examination of specimens from carcasses. Our records show that the disease has appeared in 15 head of cattle on six premises in the towns of Medfield, North Adams, Saugus, Shrewsbury, Waltham and Wendell, also in six goats on a farm in the town of Bridgewater. About 300 head of swine have also been affected on five different premises in the towns of Littleton, Richmond, Stoughton, Tewksbury and the city of Worcester. Previous records of the Department do not show that it has before appeared among swine in this State. Our attention has undoubtedly been directed to this disease in swine in many instances on account of our active work in the suppression of hog cholera, as we are frequently called to herds supposed to be affected with cholera where a careful diagnosis proves the infection to be hemorrhagic septicemia. Treatment by inoculation against this disease is being

actively investigated in our own laboratory under the direction of an agent of this Department.

Ten cases of *actinomycosis* have been reported from premises in the Brighton district of the city of Boston, in Bridgewater, Dudley, Leominster, Monterey, Stoneham, Dana and Tisbury, and one case reported late in 1915 has been killed during the past year in the town of Somerset. Of the 10 reported cases in 1916, 6 have been killed, 2 in the town of Dana have been released, 1 is still held under observation in the town of Tisbury and the 1 reported from Monterey was found to be a case of tuberculosis.

Cases of tuberculosis in swine are frequently reported to us by slaughtering establishments, and it generally happens that the source of the disease is to be found among the cattle on the farms where the swine have been kept, especially if they have been in close contact with the cattle.

Mange has been reported as affecting 449 head of cattle in 17 herds, 52 horses and 1 dog. The premises on which this disease has appeared are located in the city of Boston, the towns of Dracut, Lexington, Ludlow, Lincoln, Merrimac, Millis, Methuen, New Marlborough, Richmond, Whitman, Southbridge and also the city of Leominster. Treatment of this disease is ordinarily very successful if owners or attendants can be induced to faithfully carry out simple directions of local application and medicinal treatment, which are inexpensive but necessarily very inconvenient in application.

Foot-and-mouth disease was reported as existing in the cities of Brockton and Gloucester and in the town of Wellesley. Prompt investigation of these reports, however, proved that the affection was not foot-and-mouth disease.

A parasitic disease of sheep known as *nodular disease* seems to be more or less prevalent in Massachusetts, and has been reported to us as existing in the towns of Bedford, Danvers, Needham and in the cities of Taunton and Worcester. This disease is due to an intestinal parasite which causes serious loss through the death of many young animals, and also by the prevention of proper growth of others.

The Department has been frequently called upon to make diagnoses and suggest treatment of animals not affected with

disease of a contagious character. This service has been freely rendered upon application, although the Department is charged with the control of contagious diseases only. During the past year we have been called upon to make diagnosis and act in an advisory capacity in the following cases, the diseases not being listed in the law as contagious: anemia, acute indigestion, forage poisoning from which four animals were sick in the city of Taunton, one of which died, and five animals on four premises in the towns of Franklin, Hardwick, Plainfield and Montague. One case of glanders in a dog was reported in the town of Andover, which, however, was not investigated, the animal having been killed and buried.

Cerebrospinal meningitis was reported by a veterinarian as having caused the death of two pigs in the town of Bridgewater.

Two cases were reported as *anterior poliomyelitis* in horses, one in the city of Cambridge and one in the city of Quincy. Complete investigation, however, followed by post-mortem examination, proved that diagnosis to have been incorrect.

Annual Inspection of Farm Animals and Premises.

The inspection of neat cattle, other farm animals and premises upon which they are kept, which work was necessarily suspended during the year 1915 on account of the prevalence of foot-and-mouth disease, was resumed in 1916.

Inspectors of animals are nominated by selectmen of towns or mayors and aldermen of cities, and their nominations are subject to the approval of the Commissioner of Animal Industry. Their duties consist of examinations of barns, stables and other enclosures in which live stock is kept, with reference to their situation, cleanliness, light, ventilation and water supply, and the general condition and cleanliness of the live stock, a detailed report of which they make to the Department, with names and residences of owners. Upon receipt of the reports at the Department's office they are carefully inspected and tabulated, and if the inspectors of animals are not successful in having owners correct unsatisfactory conditions of live stock or premises, a district agent of the Department is detailed to consult with the owner and endeavor to have such conditions remedied.

Authority is given by chapter 381 of the Acts of 1911 to the Commissioner of Animal Industry and his agents to inspect all farms, stables, pastures, yards and other places where cattle, other ruminants or swine are kept. They are also authorized to enforce all regulations made respecting sanitary conditions of the live stock and premises.

During the few years in which this latter work has been done the combined efforts of the inspectors of animals and the agents of the Department of Animal Industry have made a very notable improvement in the conditions referred to.

Below is a table showing this work in detail for the year ending Nov. 30, 1916.

Number of herds inspected,	28,750
Number of neat cattle inspected,	228,783
Number of cows inspected,	152,076
Number of herds kept clean and in good condition,	28,224
Number of sheep inspected,	17,483
Number of swine inspected,	78,532
Number of goats inspected,	1,451
Number of stables inspected,	29,728
Number of stables well located,	27,331
Number of stables well drained,	29,471
Number of stables well ventilated,	29,320
Number of stables well lighted,	28,878
Number of stables kept clean,	28,058
Number of stables with good water supply,	29,589
Number of stables improved since last report,	3,402
Number of premises on which swine are kept,	10,642

The inspectors of animals of two towns have failed to render report of their duties.

Financial Statement.

Appropriation for the salary of the Commissioner, chapter 22, Special Acts of 1916,		$3,500 00
Total expenditure,		$3,500 00
Appropriation for clerical assistance and contingent expenses, chapter 22, Special Acts of 1916,		$9,600 00
Expended during the year for the following purposes: —		
Salaries of clerks and stenographers,	$4,860 41	
Books,	91 85	
Express and messenger service,	200 77	
Extra clerical service,	395 00	
Postage,	768 81	
Printing report,	162 17	
Other printing,	596 80	
Telephone and telegrams,	637 10	
Stationery and office supplies,	670 22	
Typewriters, adding and sealing machines,	536 20	
Other office devices,	197 40	
Expenses of the Commissioner,	329 25	
Sundries,	57 67	
Total expenditure,	$9,503 65	
Unexpended balance,	96 35	
		$9,600 00
Appropriation for the extermination of contagious diseases among domestic animals, chapter 286, Special Acts of 1916,		$152,000 00
Expended during the year for the following purposes: —		
1,455 head of cattle condemned and killed on account of tuberculosis in 1914, 1915 and 1916, paid for in 1916,	$50,080 33	
330 horses condemned and killed on account of glanders and farcy in 1914, 1915 and 1916, paid for in 1916,	16,435 00	
Services of regular agents,	29,591 15	
Services of *per diem* agents,	9,037 00	
Labor hired,	377 70	
Traveling and other expenses of agents,	15,909 62	
Veterinary supplies,	208 44	
Expenses of killing and burial,	172 00	
Ear-tags, punches, etc.,	2,348 45	
Laboratory and experimental expenses,	3,943 98	
Expense of travel allowed inspectors of animals,	541 37	
Quarantine claims,	9,200 37	
Sundries,	120 45	
Total expenditure,	$137,965 86	
Unexpended balance,	14,034 14	
		$152,000 00

The average price paid for condemned cattle for the year was $34.41.

There has been received during the year from the sale of hides and carcasses of condemned animals $1,506.43, and for the testing of cattle for non-resident owners $3,397, a total amount of $4,903.43.

Claims for 59 head of cattle condemned and killed as tuberculous during the year remain unsettled, to be paid for on proof of claims, the appraised value of which amounts to $1,897.

Claims for 52 horses condemned and killed during the year because affected with glanders remain unsettled, to be paid for on proof of claims, the allowance for which under the law will amount to $2,525.

Respectfully submitted,

LESTER H. HOWARD,
Commissioner of Animal Industry.

Public Document No. 98

SIXTH ANNUAL REPORT

OF THE

COMMISSIONER OF ANIMAL INDUSTRY.

1917.

FOR THE YEAR ENDING NOVEMBER 30, 1917.

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Supervisor of Administration.

The Commonwealth of Massachusetts.

Department of Animal Industry,
Boston, Dec. 1, 1917.

To the Honorable Senate and House of Representatives.

In accordance with the provisions of section 4, chapter 608, Acts of 1912, I have the honor, as Commissioner of Animal Industry, to present the report of the Department's work for the year ending Nov. 30, 1917.

The Department of Animal Industry is charged with the duty of inspection and examination of animals within the Commonwealth; the quarantining and killing when necessary of animals affected with, or which have been exposed to, contagious disease; the burial or other disposal of their carcasses; the cleansing and disinfection of districts, buildings or places where contagion exists or has existed. It is also charged with the duty of tuberculin testing all neat cattle shipped from other States to Massachusetts, unless the same are intended for immediate slaughter, or are accompanied by a record of test made by a veterinarian approved by the live-stock official of the State from which they are shipped, and the record is accepted by the Commissioner on arrival of the animals.

The control and eradication of contagious diseases among live stock constitute an important economic factor in the material prosperity of many citizens of the Commonwealth. They are also very necessary to successful agriculture, and are closely related to the maintenance and protection of the public health, for the reason that many diseases affecting animals are communicable to the human subject. Our dependence upon domestic animals for food material calls attention to the importance of the Department's work in reducing the number of cases of bovine tuberculosis, the prevention of diseases among swine, the repression of glanders in horses, of rabies in

dogs, and of various other diseases common to animal and man, and in the present emergency of war it has a special relation to the conservation of food.

The prevalence of contagious disease among animals whose carcasses if healthy would be utilized for food operates to reduce the available supply, and when we consider that the carcasses of half a million animals were condemned in the United States during the year 1916 as unfit for human food, we realize what a large part contagious disease among live stock plays in increasing its cost. If tuberculosis affecting cattle and cholera affecting swine (taking these diseases as examples) were entirely stamped out, half a million carcasses would be yearly added to the food supply, together with many others whose production the saving of that large number of animals would make possible.

Early in the present year the relation of our work to the successful prosecution of the great war was realized. It seemed that one great problem to be solved in this country was the production of food in sufficient quantities not only to maintain our own people at home and our armies to be sent abroad, but also the production of immense additional quantities for exportation to our allied countries, necessary to them in the maintenance of their armies and their civilian populations, which already were being restricted in their use of many different kinds of food, and especially of animal food.

Our conception of this Department's duties in this emergency was that of being especially watchful for the appearance of any condition operating against the continued propagation of food-producing animals in this Commonwealth, and also of doing everything possible to increase the amount of animal food products usually available under normal conditions. To this end, therefore, we considered that our activities should be specially employed in the carrying out of measures for the prevention of diseases in live stock, and in persistent control of such contagious diseases as were then prevalent.

Beef and pork being the kinds of animal food the conservation of which is especially necessary at this time, the Department has been striving to improve the conditions under which neat cattle and swine are kept, and to control and if

possible eradicate the diseases most prevalent among them, namely, tuberculosis affecting neat cattle and cholera affecting swine.

The prevalence of contagious or infectious abortion in Massachusetts herds is of very great concern to owners of cattle which are kept for the production of milk and for the raising of pure-bred stock. It is estimated by the Bureau of Animal Industry of the United States Department of Agriculture that this disease with its attendant conditions is costing the cattle owners of the country more than $20,000,000 a year by decrease in the amount of dairy products and the non-production of animals. In economic importance it is second only to tuberculosis, and investigation as to its prevalence in Massachusetts discloses the fact that we are suffering in common with other sections of the country. I think considerable progress is, however, being made in the study of the cause and development of this disease, and of the many correlating physical conditions affecting or influencing its development. Effective measures in prevention seem at the present time to be limited to regular and thorough disinfection of barns and places where susceptible animals are kept; antiseptic treatment of pregnant animals approaching, during and following parturition; destruction of all material which might carry infection; and prophylactic treatment of all male and female animals at the time of breeding. This Department is prepared at the present time to make laboratory examinations of material submitted for the purpose of diagnosis, and is experimenting in a small way in the production of a vaccine for use in preventive treatment. Our work in this direction, however, has not yet been sufficiently extensive to warrant an unqualified opinion as to the effectiveness of the product. The United States Bureau of Animal Industry is continuing its investigation as to the cause, mode of dissemination and proper treatment of this condition, and we have reason to believe that its continued work in this direction will finally result in finding additional practical methods of combating this menace to the dairy industry of the country.

The importance and necessity of a laboratory organized and equipped for the special work of this Department has very

plainly presented itself during the past year. The development of the Department's work in connection with contagious diseases of animals has led us into many different kinds of special work which can only be done in a laboratory. Many conditions arise with which we are unfamiliar, prompt diagnoses of which are important in order that plans to be followed in disease control may be properly formulated. The services of a trained bacteriologist and pathologist under direct supervision of the Commissioner should be promptly available in such cases. We are fortunate in having among our agents one who has had special training along this line, and who, although having direct supervision of an important branch of the work of the Department, has nevertheless been able to serve us efficiently in the capacity mentioned. A wide experience has made him perfectly familiar with field conditions, and on this account he is especially valuable in this work. A room has been kindly furnished us by the Harvard Medical School, rent free, in which more or less work has been accomplished during the past few months. We have been able not only to examine many specimens submitted for diagnosis by agents of the Department and private veterinarians, but also to prepare special biological products, such as tuberculin and mallein, for use in special emergency cases, and to do more or less experimental work looking to the increased value of the Department's efforts in the control and eradication of disease. It seems to me that the time is at hand when the importance and value of this particular branch of our service must be recognized and its development provided for.

The routine laboratory work of the Department in connection with diagnosis of rabies in dogs and glanders in horses is now being done for us by the State Department of Health. That department, however, while rendering valuable service in our routine work, is not equipped to render the special emergency service referred to above.

As it frequently happens that no person is acting as inspector of animals in a certain city or town, owing to death, resignation, or failure on the part of town officials to nominate, and during such period an outbreak of contagious disease occurs, an emergency thereby arises which requires the serv-

ices of a quarantining officer. I therefore recommend that the authority, powers and duties of the Commissioner, his agents and assistants, be enlarged to include the authority, powers and duties of an inspector of animals, in order that the public health and live-stock interests of the Commonwealth may be at all times protected.

An amendment of the section of the law relating to the quarantining of animals is recommended, particularly referring to the requarantining of animals which have been released on order of the Commissioner. An animal is released from quarantine only after careful examination by one of the Department's veterinarians, whose report is that in his opinion it is not affected with the disease for which it was quarantined. In order that owners of animals which have been so released may not be soon again subjected to the inconvenience and expense of quarantine restrictions, my recommendation is that the amendment shall provide that an animal so released shall not be requarantined during a period of thirty days immediately following such release, except upon order of the Commissioner.

Section 28 of chapter 90 of the Revised Laws, as amended, defines what diseases shall be considered contagious. Owing to the rapid progress in medical and sanitary science, in my opinion "contagious diseases," instead of being listed by common names applied thereto, should be defined as any contagious, infectious or communicable disease. If scientific investigation should suggest a change in the present nomenclature of communicable diseases, no act would then necessarily have to be passed in order that the wording of the law might be in strict accordance with the best usage of scientific terms.

The regulation of the transportation of interstate cattle to Massachusetts is one requiring constant attention by agents of the Department in order that violation of such regulations by unscrupulous persons may be prevented. In the majority of cases interstate shipments are made strictly in accordance with the provisions of the Department's orders relating thereto, the greater portion of the people engaged in cattle traffic being at the present time very well informed as to the requirements. Occasionally, however, we find persons engaged in the business

of trading cattle and driving them over the State line who have persistently violated our regulations, although well informed regarding them, and it then becomes necessary to take legal action against the offenders. During the past year we have adopted at certain border points severe restrictive measures applying to this traffic, on account of information received regarding violations, and in two instances it was found advisable to prosecute suspected individuals. In these two instances convictions of the guilty parties were readily obtained and substantial fines were imposed by the court, the result in both cases being an immediate and strict compliance with the orders and regulations of the Department.

The holding of the Eastern States Exposition in Springfield in October of this year was considered as of great advantage to our live-stock interests, and the management was early informed that this Department would render every assistance possible in making the exposition a success. Two agents of the Department were detailed for duty at the exposition grounds to assist in the identification and examination of horses and cattle shipped interstate to and from the exposition. The same service has been rendered at other large exhibitions of live stock, notably at Brockton and Worcester. Too much cannot be said as to the good effect of these exhibitions of high-grade animals. They are of great educational value to all observers, of great convenience to intending purchasers of pure-bred cattle, sheep and hogs, and must be considered a very great aid to the progressive development of our agricultural and live-stock interests. No cases of contagious disease appeared at these exhibitions, and the care of the animals and the sanitary conditions maintained were in every instance found to be above criticism, indicating very efficient management of these enterprises.

Tuberculosis.

The prevalence of tuberculosis in Massachusetts cattle has been extensive and widespread for many years, and until recently efforts to reduce its yearly toll have been somewhat discouraging. The finding of large numbers of tubercular animals every succeeding year, notwithstanding the killing of

many cases the year previous, proved that the general situation was not improving; that no substantial progress was being made in eradication of the disease.

The law provides that tuberculin cannot be used as a diagnostic agent on Massachusetts cattle except at request of owner. It therefore seemed necessary to advance to a higher efficiency the methods available for the purpose of diagnosis, to improve if possible the annual inspection of bovine animals which is made by town and city inspectors, and to make a more general application of the rule of the Department requiring physical examination by competent men of cattle exposed to tuberculosis.

Accordingly, in 1915 all agents of the Department engaged in the examination of quarantined animals were instructed, in the event of their finding tubercular animals in a herd, to immediately make a thorough physical examination of all the animals in the herd, and if any were found which could be suspected of disease to have them placed in quarantine and disposed of in accordance with our customary procedure. By these herd examinations additional cases have frequently been found which by former methods would not have been discovered, but would have remained as active centers of infection and continued to spread the disease. We have frequently found that a continuous prevalence of this infection has been maintained on certain premises for a long time. Tuberculous animals would be found at every successive visit to these premises, and eradication of disease at that point was not being accomplished.

As a result, however, of our improved methods, especially the examination of every animal in herds from which a tubercular member had been removed, we already find a distinct improvement in the situation. This result could not reasonably have been expected to appear until the changed methods had been in operation for a somewhat extended period, for the reason that the first effect would undoubtedly be an increase in the number of animals quarantined, as well as in the number finally disposed of as tubercular.

Physical examinations have been made by Department agents this year of 14,027 bovine animals, an increase of 2,584 over

the record of 1916, and notwithstanding the larger number examined a much *smaller* number were found suspected of disease. One thousand three hundred and eighty-two animals were put in quarantine this year, which, compared with 1,678 quarantined in 1916, shows a decrease of 17 per cent. The record of suspected animals reported (not all of them quarantined) from all sources, namely, by owners, inspectors of animals, veterinarians and agents of the Department, shows also a marked decrease, 1,885 having been reported in 1916 and 1,719 during 1917, a decrease of 8.8 per cent.

Post-mortem examinations are held on all animals condemned and killed on account of being suspected of tuberculosis, and the record of such post-mortem examinations of Massachusetts cattle during 1917 shows a reduction of 10 per cent. in the number of positive cases found. Another study of our statistics shows that whereas 12 per cent. of all cattle examined by Department agents during the year 1916 were found to be tubercular, that percentage this year has been reduced from 12 to 8, which certainly shows a rapid diminution in the prevalence of tuberculosis in the course of a single year among animals the majority of which have been examined physically.

Considering the decrease in one year of 8.8 per cent. in the number of cases reported from all sources, the decrease of 17 per cent. in the number of suspected animals quarantined, the decrease of approximately 10 per cent. in the number of cases found positive on post-mortem examination, and a reduction from 12 to 8 per cent. of cases found in the thousands of bovine animals examined by Department agents, I think it should be recognized that a marked improvement in the general situation is already taking place. At the same time, these records lead us to believe that our methods of control within the limitations imposed by law have been distinctly improved, and that the prevalence of bovine tuberculosis is susceptible of a certain degree of limitation if careful and repeated physical examination is made by competent men of all cattle exposed to the disease.

It is generally recognized by all scientific authorities that the tuberculin test carefully applied by competent veterinarians is the most accurate method of determining whether or not an animal is affected with tuberculosis; that it will dis-

close many cases not found by physical examination, and will reveal the existence of the disease in many animals not even suspected. The advantages of the tuberculin-test method of diagnosis are made use of by the Department in its work of eradication of tuberculosis, although its use on Massachusetts cattle is limited by law to animals whose owners consent to its application, and to such as have been reported as tuberculous on physical examination by a competent veterinarian. We find an increasing number of Massachusetts cattle owners requesting the application of the test to their herds by the Department, this service being rendered without charge. We find, also, that many more veterinarians than formerly are reporting results of tests made by them in a private capacity, and referring the cases of reacting animals to the Department for disposal. The Department tests all cattle arriving from other States at Brighton and all other points, which are not accompanied by a properly approved and satisfactory test record made in the State from which the animals are shipped, the testing of such interstate cattle being one of the important activities of the Department.

In July of this year the United States Department of Agriculture offered its assistance in the testing of pure-bred herds, in co-operation with agents detailed by our Department for the same service. This work, now being done by the United States Bureau of Animal Industry in co-operation with this Department, is directed toward the eradication of tuberculosis from the herds which supply breeding stock, and upon its successful accomplishment there is contemplated the establishment of a register or list of accredited herds of tuberculosis-free animals from which buyers may procure foundation stock without test at time of purchase, depending on certification by Federal authorities to the effect that the herd in question is not infected.

All of the different agencies mentioned — namely, thorough annual inspection by local town and city inspectors, followed by quarantine of suspected cases; careful successive physical examinations by competent men of infected herds, followed by slaughter of clinical cases; tuberculin testing by Department agents and by private veterinarians, followed by slaughter of the animals reacting to the test, or by complete isolation or

segregation; testing of all interstate cattle arriving at whatever points, followed by the killing of those not passing the test; eradication of disease from pure-bred herds by Federal authorities working in co-operation with this Department — contribute to a record of decrease in the prevalence of tuberculosis in Massachusetts herds. It is reasonable to predict that if these agencies are continued in force, and are efficiently and persistently applied, they will continue to lower the yearly toll of this insidious destroyer of animal life.

Following are various tables showing the extent of the work of the Department in connection with the control of tuberculosis in Massachusetts for the year ending Nov. 30, 1917: —

Massachusetts Cattle.

Cattle reported as diseased in 1916 disposed of in 1917,	27	
Cattle reported as diseased during the year ending Nov. 30, 1917,	1,719	
		1,746

Disposition.

Quarantined.

Reported by inspectors, Department agents, veterinarians, owners, etc. (20 reported in 1916, 1,382 in 1917),	1,402	
Condemned on physical examination (11 reported in 1916, 994 in 1917),	1,005	
Condemned on physical examination, no lesions,	10	
Permit to kill, lesions of tuberculosis found (3 reported in 1916, 36 in 1917),	39	
Permit to kill, no lesions,	41	
Died before action could be taken (1 reported in 1916, 30 in 1917),	31	
Released, not tubercular (5 reported in 1916, 266 in 1917),	271	
Awaiting action,	5	

Private Test.

Reactors reported on private tests (2 reported in 1916, 200 in 1917),	202	
Condemned on physical examination,	12	
Permit to kill, lesions found (2 reported in 1916, 133 in 1917),	135	
Permit to kill, no lesions found,	22	
Died before action could be taken,	1	
Released showing no clinical symptoms,	32	

Voluntary Request.

Reacting to so-called "voluntary request" tests (5 tested in 1916, 111 in 1917),		116
Permit to kill, lesions found (5 of 1916 test, 104 of 1917),	109	
Permit to kill, no lesions found,	5	
Died before action taken,	1	
Awaiting action,	1	

United States Test.

Reacting to test made under supervision of United States,		26
Permit to kill, lesions found,	26	
		1,746

The preceding table is a record of the actual disposition of cattle reported under the three headings of "quarantined animals," "reactors reported on private test," and "reactors found on so-called voluntary-request tests," while following is a tabulation of work actually accomplished under the voluntary-request test and reacting animals actually reported during the year 1917 by private veterinarians. The difference in the two tables referring to private tests is due to the fact that some of the cattle recorded in the 1916 report as being released were killed during 1917 on "permit to kill" form of warrants by request of the owners of the cattle, the cattle showing no clinical symptoms of disease.

Voluntary Request.

Premises on which tests were made,	28
Number of animals tested,	561
Number of animals tested more than once,	179
Number of reactors,	151

Disposition of Reactors.

Killed, lesions found,	109
Killed, no lesions found,	5
Died, no post-mortem examination made,	1
Killing order issued, not yet killed,	1
Awaiting action,	35
	151

Reactors reported on Private Tests.

Number of herds in which animals were reported,	92
Number of animals tested,	1,660
Number of reactors,	382

Disposition of Reactors.

Disposed of by owner, no record of post-mortem findings,	109
Condemned on physical examination,	12
Died, no post-mortem examination made,	1
Killed, lesions found,	125
Killed, no lesions found,	7
Showing no physical symptoms of tuberculosis, no record of disposition,	128
	382

The following figures show the total number of cattle owned in Massachusetts examined or tested by agents of the Department, and the disposition of those found suspected of disease.

Massachusetts Cattle examined by Agents.

Physical examination (1,065 herds),	13,466
Tuberculin tested,	561
	14,027
Number killed on physical examination,	1,044
Number killed on tuberculin test,	109
	1,153
Percentage of tubercular animals in total number physically examined and tuberculin tested,	8

Attention is called to the fact that a larger number of animals have been examined than in 1916, and that the percentage of tubercular animals found among them has been reduced from 12 to 8. This reduction in one year is especially noticeable, and shows that tuberculosis among bovine animals in Massachusetts is probably decreasing rapidly.

Interstate Cattle.

There were ten permits issued in 1916 for bringing cattle from out of the State which were not reported upon till 1917, and in addition there were 20 instances where animals brought in on permits were held and tested in 1917; the total number on these permits comprised 26 head tested before shipment, 139 tested after arrival, 1 beef animal, 3 calves, and 2 Massachusetts animals that had been out of the State temporarily. These figures are included in the total given below.

Cattle held from 1916 at Brighton, retested in 1917,		34	
Cattle tested at the quarantine station at Brighton,		12,215	
Cattle accepted on approved test made in other States:—			
Received at Brighton,	1,164		
Received at other points,	4,045		
		5,209	
Cattle tested by agents of the Department at points other than the quarantine station,		4,224	
Cattle awaiting test,		93	
			21,775

Disposition of Above Cattle.

Brighton.

Cattle reacting and killed, lesions found,	210	
Cattle reacting and killed, no lesions found,	34	
Permit to kill, lesions found,	35	
Permit to kill, no lesions found,	22	
Cattle released as free from tuberculosis,	13,107	
Awaiting retest,	5	
		13,413

At Other Points.

Cattle reacting and killed, lesions found,	91	
Cattle reacting and killed, no lesions found,	8	
Permit to kill, lesions found,	11	
Permit to kill, no lesions found,	5	
Condemned, awaiting report of post-mortem examination,	7	
Cattle released as free from tuberculosis,	8,130	
Awaiting test or retest,	110	
		8,362
		21,775

There were 556 cattle at Brighton held for a second test, 255 of which were later released.

Of the dairy cattle received at Brighton and accepted on tests made in other States, 972 came from New Hampshire, 10 from Maine, 47 from Vermont and 135 from New York.

The following statistics show in detail the record of interstate cattle received at points in the State other than the quarantine stations: —

Report of Cattle brought into State during the Year to Points Other than the Quarantine Stations.

For dairy and breeding purposes, tested before shipment,	4,045	
For dairy and breeding purposes, tested after arrival,	4,224	
For dairy and breeding purposes, awaiting test,	93	
		8,362
Neat cattle on which no test was required, classified as follows: —		
Cattle for immediate slaughter,	2,364	
Calves for immediate slaughter,	3,471	
Dairy calves under six months old,	247	
Cattle returned from out-of-State pastures,	535	
Died before test could be made,	5	
Returned from sales or exhibitions in other States,	76	
Returned from temporary stay in other States for other purposes,	18	
Remaining in State for brief periods only, for breeding purposes, etc.,	34	
For temporary stay at sales or exhibitions (at Springfield 368, at other places 268),	636	
		7,386
Total for all purposes,		15,748

There are large slaughtering establishments at Haverhill, West Newbury and Springfield where Federal inspection of slaughtered animals is maintained, to which points cattle and calves for immediate slaughter can be shipped without special permit, record of which is not kept by this Department. There are on an average several thousand animals shipped to these points during the year.

Of the animals brought into State for purpose of sale or exhibition, 368 went to the Eastern States Exposition at

Springfield, which took place in October. There were also at this exposition 175 head of valuable cattle belonging to Massachusetts owners. All of the New England States were represented at the exposition, and there were cattle from New York, Maryland, Pennsylvania, Ohio and Iowa. The following breeds of cattle were represented: Milking Shorthorn, Holstein, Guernsey, Jersey, Ayrshire, Brown Swiss, Shorthorn, Hereford, Angus and Fat Cattle.

Nearly all of the total number of animals coming to points other than the quarantine stations came in on permits issued by the head of the Department; 528 head were brought in unaccompanied by permits, having been reported to the Department by railroad agents, local inspectors and others. Of this number, 216 were accompanied by acceptable records of test, 179 were tested by agents of the Department, and the remainder were for immediate slaughter or other purpose not requiring test.

There were 1,403 permits issued during the year for bringing cattle from other States to points outside of the quarantine stations.

Forty-eight permits were issued allowing cattle to be brought into the State for exhibition purposes, and four allowing cattle to be returned from exhibition in other States. Nine permits were issued allowing cattle to be pastured in the State during the summer season; five permits were issued to persons living near the border line for returning cattle from out-of-State pastures from time to time during the season without being tested or tagged; and two permits were issued allowing oxen to be worked on the border line temporarily without test.

One hundred and eighty-nine of the permits were not used, and eighteen on which no report had been received at the close of the year were carried over and will be included in the report of the next succeeding year.

During the spring and early summer Massachusetts veterinarians or agents of the Department tagged 871 head of cattle that were to be sent into other States for pasture during the season, mostly into New Hampshire. Tag numbers are kept on the files of the Department in order that these animals may be identified upon returning to their home State in the

fall. Many of them were brought to the Brighton Stockyards and released there; others were returned to premises of owners in other parts of the State.

The Department keeps records of all animals received at the several quarantine stations; also the States from which neat cattle are shipped, as shown by the following figures: —

Receipts of Stock at the Watertown Stockyards for the Year ending Nov. 30, 1917.

New Hampshire cattle,	3,839
Vermont cattle,	5,476
Massachusetts cattle,	664
Calves,	21,752
Sheep and lambs,	1,557
Swine,	3,903

Receipts of Stock at the New England Dressed Meat and Wool Company's Yards at Somerville for the Year ending Nov. 30, 1917.

Maine cattle,	1,795
New Hampshire cattle,	2,605
Vermont cattle,	8,875
Massachusetts cattle,	92
Western cattle,	4,145
Canada cattle,	2,390
Calves,	78,228
Sheep and lambs,	217,103
Swine (at Squire's, 589,103; at North's, 545,000),	1,134,103

Receipts of Stock at Brighton for the Year ending Nov. 30, 1917.

Maine cattle,	9,810
New Hampshire cattle,	8,074
Vermont cattle,	5,562
Massachusetts cattle,	13,480
New York cattle,	13,261
Western cattle,	26,126
Canada cattle,	148
Calves,	89,706
Sheep and lambs,	7,932
Swine,	42,313

Section 111 of chapter 75 of the Revised Laws, as amended by chapter 243 of the Acts of 1907, requires rendering com-

panies to report to this Department cases of glanders, farcy or tuberculosis found by them, and the information thus furnished is of considerable value in bringing to the attention of the Department cases of these diseases 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 of Glanders.	Number of Cases of Tuberculosis.	Number of cases of Glanders not previously reported.	Number of cases of Tuberculosis not previously reported.
W. H. Abbott, Holyoke,	7	7	–	–	–
Ayer Rendering Company,	1	1	–	–	–
C. S. Bard, Haverhill,	2	1	–	1	–
Butchers' Rendering Company, Fall River,	4	1	3	–	–
Home Soap Company, Millbury,	25	14	37	–	1
Lowell Rendering Company,	10	2	13	–	–
A. G. Markham, Springfield,	2	2	–	–	–
James E. McGovern, Andover,	26	52	15	–	–
Muller Brothers, Cambridge,	17	27	–	1	–
William H. Nankervis, Marlborough,	1	1	–	–	–
New Bedford Extractor Company,	5	5	–	–	–
New England Rendering Company, Brighton.	12	20	1	–	–
P. J. O'Donnell & Son, Woonsocket, R. I.,	1	1	–	–	–
Parmenter & Polsey Fertilizer Company, Peabody.	15	5	12	–	–
R. & B. Tallow Company, Saugus,	1	1	–	–	–
Rand & Byam, Charlestown,	1	1	–	–	–
N. Roy & Son, South Attleborough,	10	1	5	3	1
N. Roy, Jr., Fall River,	25	21	28	1	–
Sherborn Rendering Company,	2	1	3	–	–
Springfield Rendering Company,	4	8	–	–	–
N. Ward Company, Boston,	34	81	3	3	–
Whitman & Pratt Rendering Company, North Chelmsford.	20	5	12	–	3
S. Winter Company, Brockton,	3	4	–	–	–
Worcester Rendering Company,	5	6	–	–	–
Wunsch Manufacturing Company, Pawtucket, R. I.	2	2	–	–	–
Totals,	235	270	132	9	5

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 the Stockyards in Boston and Vicinity for Twelve Months ending Nov. 30, 1917.

For Month of —	Cattle.	Calves.	Sheep.	Swine.	Horses.
December,	10,137	9,893	18,320	147,641	1,567
January,	9,876	11,773	16,035	208,018	2,142
February,	7,343	9,195	12,039	122,527	2,000
March,	6,999	18,338	9,181	92,054	2,128
April,	6,993	35,116	21,935	103,337	2,654
May,	6,279	22,564	9,764	83,527	2,407
June,	4,707	16,809	18,966	80,522	2,552
July,	7,315	14,263	14,312	94,247	2,273
August,	6,916	10,555	13,161	53,705	1,665
September,	8,347	10,195	27,740	33,662	1,810
October,	17,979	19,067	37,970	51,582	2,015
November,	13,451	11,913	27,169	109,497	1,763
Totals,	106,342	189,681	226,592	1,180,319	24,976

Glanders.

The control of glanders among horses and mules in Massachusetts is a branch of the Department's work requiring constant attention. On account of the money loss it causes, and its danger to human life, the prevalence of this disease must be limited by every means at our command, and ultimate extermination accomplished if possible.

The Department's records for the eighteen years previous to 1917 show that glanders caused an average yearly loss of 731 animals in that period, and that in one year (1913) 1,084 were killed on account of being affected.

These records show the economic necessity for control and eradication, and although the number of deaths of persons infected with this disease by horses is a small one, it is nevertheless regrettable that even one human life should be lost by this means.

We are glad to be able to show by our records for this year that the prevalence of glanders in Massachusetts is being rapidly limited, there having been a reduction of 34 per cent. from the record of 1916 in the number of positive cases found, which number also shows that fewer horses or mules have this year been condemned on account of the disease than in any one of the nineteen constituting the tabulated record.

The Department's records for the year ending Nov. 30, 1917, show the following facts: —

At the end of 1916, 39 animals were under observation. Of this number, 16 have been killed as positive cases, 11 have been released as free from the disease, 4 died or were killed before final diagnosis was made, and 8 are still held under observation.

During the past year 1,384 animals have been reported as being suspected of having glanders. Of this number, 270 animals proved to be positive cases, and were destroyed in accordance with the requirements of the law; 21 died or were killed by owners before diagnosis had been made; 1,067 were released as free from the disease; and 23 were still held under observation at the end of the year. Three animals were killed by order of the Department, post-mortem examination of which did not reveal the presence of the disease, and full appraised value of the same ($490) was paid to the owners.

Horses reported as Suspected.

Brought forward from year 1916,	39	
Arriving from outside of State and condemned,	20	
Reported by renderers,	9	
Reported by inspectors, Department agents, veterinarians, owners, etc.,	1,355	
		1,423

Disposition of Above Horses.

Appraised and killed, positive,	266		
Killed, of no market value, positive,	1		
Reported by renderers, positive,	9		
Killed by owners, no award, positive,	7		
Died, positive,	3		
		286	
Appraised and killed, no lesions,		3	
Killed by owners or died, no lesions,		25	
Released as not affected with glanders,		1,078	
Awaiting disposition,		31	
			1,423

Following is a table giving the number of cases of this disease covering a period of nineteen years. In this table cases which have occurred in the city of Boston are shown separately, on account of the fact that Boston was for many years the storm center of this disease. Special tabulation of the number of cases in that city has always been 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.
1899,	159	384	543
1900,	192	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	362	676
1911,	387	565	952
1912,	395	446	841
1913,	556	528	1,084
1914,	355	495	850
1915,	152	250	402
1916,	157	278	435
1917,	80	206	286

As shown by the above table, there has been a marked decrease in the number of cases this year. Several factors contribute to this decrease, the most potent ones undoubtedly being, first, the limitation of spread of the disease from one animal to another, which has been accomplished in many instances, probably, by the closing of all public watering troughs

in sections where outbreaks have occurred; and second, the more general application to all exposed animals of the different diagnostic tests now available, followed by the prompt killing of such as are deemed to be positive cases.

If an unusual prevalence of glanders occurs in any one stable it is our present practice to apply one or both of the tests now in use to all other horses kept on those premises. In this way we frequently disclose hidden or occult cases which would have escaped detection on ordinary physical examination, and which, not being observed, would not have been destroyed and would have continued to spread the infection.

Our post-mortem examinations of these occult cases reveal the existence of the disease in such a large percentage of cases as to seemingly establish the reliability of the tests and warrant their continued use as diagnostic aids. The tests now used are the ophthalmic mallein, or so-called "eye test," and the laboratory examination of samples of blood drawn from the animal's jugular vein, or the so-called "blood test." This year the laboratory examination of samples of blood has included the agglutination test in addition to the complement-fixation test, with the object of checking each test by the other and studying any differences which may be noted, thereby enabling us to make a more satisfactory decision in cases which for any reason are doubtful.

In the so-called "stable tests," or tests of all animals in stables where glanders has been found, 1,112 horses have been tested in 64 stables, and among them 79 cases of glanders have been found which would have escaped detection by the ordinary physical examination, as they showed no clinical symptoms of the disease. These figures show that we have increased "stable testing" 84 per cent. during the past year.

The Department has continued the policy of promptly killing all animals showing clinical symptoms of glanders, of disinfecting the premises where they have been stabled, the blacksmith shops in which they were shod, and the public watering troughs where they were 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

other portions of the stall as the animals had come in close contact with, or upon which might have been deposited any discharges from their respiratory passages. We have required that this disinfection be attended to by the owners of the premises before approving their claims for reimbursement.

Animals which for any reason have been suspected of being diseased, either because of having been in 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 in some instances been quarantined, frequently examined, and allowed to work under certain restrictions. We have found in some instances that contact animals apparently in perfect health have temporarily reacted to one of the tests applied, 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 only one of the tests above mentioned, did not also show clinical symptoms and appeared to be in a good condition of health. These so-called temporary reactors have, however, been carefully watched, subjected to frequent tests, and, upon reacting persistently to either one or both of the tests, have been destroyed. Autopsies have been made on condemned animals in every case where there has been any conflict 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 thought advisable.

At the present time, in 31 cities and towns of the Commonwealth, the public watering troughs have either been closed or entirely eliminated, as an aid in preventing spread of the disease.

In my opinion the closing of the public drinking places for animals has operated to limit the spread of contagious diseases other than glanders, and the practice of watering animals from individual pails is one to be encouraged from the standpoint of the control, not only of glanders, but also of many other diseases of a contagious character. We find that horse owners and team drivers are already acknowledging the beneficial re-

sults of this method of watering animals under their charge, and do not think it advisable to return to the former method of making use of the public troughs.

Another factor in the suppression of glanders is the disinfection of blacksmith shops. Following the condemnation of an animal affected with this disease the proprietor of the blacksmith shop in which this particular animal was shod has been directed to immediately disinfect the premises. Frequent inspection of blacksmith shops by agents of the Department has undoubtedly been a factor in securing repeated disinfection by their owners or occupants, and without doubt this practice has limited the prevalence of this disease to a great degree. Ninety-six inspections of blacksmith shops have been made during the year, and instructions given relative to disinfection.

The Massachusetts Society for the Prevention of Cruelty to Animals, the Boston Workhorse Relief Association, the Animal Rescue League, and the branches of these various associations in many cities and towns of the State, have through their agents been of material aid to the Department in the work of controlling this disease. Their close observation of working animals of all classes has brought to light many showing suspicious symptoms, which they have promptly reported to this Department, and many of the animals so reported have proved to be positive cases of the disease.

The constant activity of the humane societies in removing disabled animals from work, and destroying those which on account of extreme age or poor condition are no longer useful, is undoubtedly a factor in the suppression of glanders, as such animals are very susceptible to this infection.

The maximum amount, fixed by chapter 646 of the Acts of 1913, which may be paid for any one animal condemned and destroyed on account of being affected with glanders being $50, the appraised value of the animals condemned is a subject of considerable interest. Of the 286 positive cases of glanders occurring during the year, 266 were appraised at a total valuation of $40,063, the average amount per animal being $150.61. On the remaining 20 animals affected with glanders no appraisal was made for the following reasons:

9 of them were reported by renderers, the disease having been found on autopsy; 10 died or were killed by owners before appraisal could be made; and 1 animal killed was of no market value.

Of the 266 horses appraised no award was allowed on 28, 16 of them being interstate, 5 arriving in Massachusetts with Federal troops, 4 not having been in the Commonwealth the required twelve months prior to condemnation, 1 having been killed by owner after appraisal, and 2 having died while awaiting result of test. Of the remaining 238 horses which were appraised, 206 have been paid for, the amount paid being $10,222, and 32 are awaiting the filing of claims for payment.

Complement-fixation Test.

Of the 32 horses under observation at the end of the year 1916, 1 was condemned, 4 were released and 2 died, and 25 were subjected to the complement-fixation test, with result that 11 of them were condemned and killed, 1 died, 7 were released as probably free from the disease, and 6 are still under observation.

Twelve hundred and six samples of blood were taken from 864 horses during the year 1917, and the following disposition of the animals was made: —

Animals held over from 1915, disposed of as above,	1
Animals held over from 1916, disposed of as above,	24
Animals released on first test,	502
Released on second test,	96
Released on third test,	23
Released on fourth test,	12
Released on fifth test,	2
Died or killed by owner after first test,	18
Died or killed by owner after second test,	3
Died or killed by owner after third test,	1
Condemned on first test,	106
Condemned on second test,	36
Condemned on third test,	14
Condemned on fourth test,	2
Held for further observation,	24
	864

Ophthalmic-mallein Test.

This test has been applied to 1,191 horses during the year. It happens that the test in some instances was repeated on the same animals, and 1,446 such tests have been made. The results are as follows: —

Tests giving positive reaction,	239
Tests giving no reaction,	1,061
Tests giving unsatisfactory results,	146
	1,446

Agglutination Test.

Seven hundred and forty of the samples of blood examined in the laboratory during the past year have been subjected to the agglutination test in addition to the complement-fixation test.

Interstate Horses.

Horses, asses and mules shipped to Massachusetts from the States of New York, Connecticut and Rhode Island must be accompanied by a permit from the Commissioner of Animal Industry. This regulation was established on account of the prevalence of glanders among the horses of the States mentioned, and in order that upon arrival the animals might be immediately located and examined by agents of this Department.

The number of horses, mules and asses shipped from these States has increased from 4,500 in the year 1916 to 4,764 in the year ending Nov. 30, 1917. Among these animals very few cases of glanders have been found, as shown by the following statistics: —

Equine Animals from New York, Connecticut and Rhode Island.

Mules,	9	
Donkeys,	2	
Horses,	4,753	
		4,764

Disposition of Above Animals.

Died soon after arrival,	2	
Condemned as affected with glanders,	16	
Released upon physical examination,	3,126	
Released after test,	1,620	
		4,764

The small number of animals condemned, as shown by the above table, is worthy of notice. Many of the animals brought from the above-mentioned States are of the better class, being highly bred horses used for carriage work and breeding purposes. The second-hand horses, which are trafficked in and sent from the markets of one State to those of another for purpose of public sale, have been specially watched on account of their being considered more liable to be subjects of contagious disease than the higher class animals, and if not accompanied by a satisfactory certificate of test have been tested on arrival by agents of the Department.

Rabies.

The control and eradication of rabies in dogs is a matter requiring special attention by this Department, not only on account of the monetary loss which the disease causes every year by the death of valuable dogs, but as a public health measure on account of the communicability of rabies to man. Every species of domestic animals, many species of wild animals, and the human subject are susceptible to infection with this disease, although its general prevalence is among dogs.

In considering the means by which this disease is spread the dog only need be mentioned, and the ownerless or stray dog is the one requiring special attention, as he is much more often a spreader of the disease than is the dog which has proper care and a good home. The ownerless dog may become affected with rabies and spread the infection before he is observed to be in an abnormal condition, and, no one being especially interested in his welfare, it happens that the attention of the proper authorities is not promptly directed to him. Unfortunately the dog license laws are not strictly enforced in all cities and towns, and therefore one great factor in the control and eradication of this disease is not operative. In our opinion, if the present laws are more strictly enforced than they have been hitherto, and the projected dog laws for the protection of the sheep industry are passed and enforced, a marked reduction in the number of cases of rabies will result.

Many complications in the control and eradication of infectious diseases among other kinds of animals do not enter

into the control of rabies, for the reason that there is much less traffic in dogs than in those animals which are used for production of food material or for business purposes, and also because their market value is on an average very much less. It is possible, also, to confine them at much less expense than larger animals, and they generally endure the restraint without danger to their health. For these reasons, although an outbreak of rabies causes much inconvenience and trouble to dog owners, and often subjects public officials to unjust criticism on account of quarantine restrictions necessarily imposed, nevertheless its control can generally be accomplished by the prompt co-operation of town and city officials with this Department in the measures directed toward such control.

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, even if it appears to be healthy, to have it restrained for a period of fourteen days for the purpose of observation. This regulation is deemed necessary for the reason that competent authorities have proven that in some instances the bite of a dog infected with rabies may communicate the infection fourteen days before the animal itself shows clinical symptoms. If at the end of this period 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 already being affected with rabies, this animal is immediately confined in strict quarantine. If it is subsequently killed or dies, its head is at once sent to the Department's office, and a laboratory examination of the brain is made for the purpose of confirming the diagnosis. Information as to the laboratory findings 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 reported to this office, whether the bite has been inflicted by an animal suspected of rabies or not. We also order the local inspector of animals to ascertain not

only the names of all persons who have been bitten by dogs suspected of rabies, but to find out if animals have also been bitten, and if so to place the same 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 an unusual number of cases of rabies is found to exist in any town or city, the selectmen or the mayor or board of aldermen are asked 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 only to muzzle the animals but not restrain them, as a muzzled animal let loose may in some way get the muzzle off and bite other animals or people. A muzzled dog at large may, therefore, 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. It has been found necessary to issue general restraining orders in five towns of the Commonwealth during the past year. These orders were for periods of ninety days.

Our force of district agents, most of whom are veterinarians located in different parts of the State, together with the local inspectors of animals, of whom there is one or more in every city and town of the State, constitutes an organization by which systematic local control of an outbreak of this disease can generally be accomplished within a reasonably short time.

During the present year we have been in constant fear of local outbreaks of this disease on account of its unusual prevalence in the neighboring State of Connecticut. In that State during the past year rabies has prevailed extensively in many towns west of the Connecticut River, and during the last months of the year has extended to the northeastern portion

of the State and to many towns contiguous to the Massachusetts line. At the present time dogs in 123 towns of that State are officially quarantined or restrained on account of the prevalence of this disease, and a spread of the contagion across the line to Massachusetts could reasonably be expected. We find that in the last few months of the present year quite a few additional cases have been reported in Massachusetts, the source of which has in many instances been traced to Connecticut.

On Nov. 16, 1917, the following letter was addressed to the 372 inspectors of animals in the various cities and towns of the Commonwealth: —

A serious situation confronts us at the present time on account of a threatened invasion of rabies. For a period of more than a year this disease has prevailed very extensively in our neighboring States of Connecticut and Rhode Island. In Connecticut at the present time there are more than 100 towns in which the dogs are muzzled, restrained or quarantined, and the contagion seems not yet to be under control.

Owing to the ease by which this disease is spread by stray dogs, it is reasonable to expect that Massachusetts will experience a more or less serious outbreak in the near future, and it may be said that already an unusual prevalence of it is reported from several different towns and cities.

I deem it advisable at this time to call this matter to your especial attention, so that, having the danger in mind, you may be prepared to put into execution such methods towards its prevention as may be in your power. I advise that on every possible occasion you acquaint dog owners with the situation, and ask them to immediately report to you any ownerless or stray dogs, and also any which are showing unusual symptoms of any kind. Such animals should be immediately confined and securely chained, so that if rabies develops they cannot further spread the contagion by biting other animals or persons.

If you receive reports of strange dogs having gone through your town which have been in contact with any others, it would be a measure of prevention to immediately confine the contact dogs for observation.

Please report promptly any facts in connection with this matter that may come to your attention, and request advice from this Department at any time.

It is my opinion that, being forewarned of this threatened outbreak, inspectors of animals should be ready to take prompt action when the invasion immediately threatens, and thereby very materially limit its prevalence.

I have found inspectors of animals specially alert to their duties in towns where a case of rabies has appeared, and by prompt action they have undoubtedly limited the extent of a local outbreak of this disease. We are receiving, also, the earnest co-operation of dog owners, private veterinarians and agents of the various humane societies.

During the year ending Nov. 30, 1917, 335 animals were reported to the Department for diagnosis, observation or quarantine on account of the prevalence of rabies, and 12 were brought forward from the year 1916. The records have been classified as follows: —

Animals suspected of rabies, ... 95
Animals exposed to rabies (7 reported in 1916, 107 in 1917), . . 114
Animals which have inflicted bites upon persons (5 reported in 1916, 133 in 1917), ... 138

Animals suspected of Rabies.

	Dogs.	Cattle.	Pigs.
Diagnosis positive, ...	51	9	–
Diagnosis negative, ...	22	1	1
Diagnosis questionable, ...	10	–	–
No diagnosis made, ...	1	–	–

Referring to the 10 cases in the above table on which the diagnosis is given as questionable, 6 of these animals disappeared, but on account of their having bitten other dogs or cattle which later developed rabies they have been recorded as cases.

One animal said to have died of indigestion is recorded as rabies, diagnosis questionable, as another dog which it had bitten and which had not been in contact with any other animal developed rabies.

One animal was reported in a newspaper article as having been affected with the disease. The animal disappeared, and, positive diagnosis not being possible, it was recorded as a case of rabies, diagnosis questionable.

In one instance a dog was killed supposed to have been suffering from rabies, but the body having been destroyed, laboratory examination could not be made.

In another instance the brain of a dog was sent to this office in such a mutilated condition that examination was impossible. The clinical symptoms of this case not having been typical of rabies, it also was recorded as questionable.

Regarding the one animal recorded as "no diagnosis made," it was reported by a veterinarian as a suspicious case. The animal was killed and the body disposed of without examination.

Animals exposed to Rabies.

	Dogs.	Horses.	Cats.
Number released after a quarantine of ninety days,	35	1	–
Number killed, no symptoms having developed,	23	–	1
Number killed, positive symptoms having developed,	2	–	–
Number still held under observation,	51	–	1

Animals which have inflicted Bites upon Persons.

	Dogs.	Cattle.
Number killed immediately, no diagnosis,	3	–
Number killed during quarantine, no symptoms having developed,	31	–
Number released after fourteen days' quarantine,	97	1
Number still held under observation,	6	–

Of the 51 rabid dogs in the first classification, 13 had bitten persons. Of the 10 dogs on which the diagnosis was questionable, 3 had bitten persons.

Twelve animals which were under observation at the close of the year 1916 were disposed of during 1917, as follows: —

Dogs killed at request of owners, not having shown symptoms of the disease, ... 3
Dogs released from observation, no symptoms having developed, . 8
Cattle released from observation, no symptoms having developed, . 1

There have been examined in the laboratory during the past year the brains of 64 dogs, 3 cows and 1 pig. Of this number, 26 dogs and 2 cows showed positive evidence of the disease. In the case of 1 dog the diagnosis was questionable, and in 35 dogs, 1 cow and 1 pig the diagnosis was negative, and the heads of 2 dogs were so decomposed at time of examination that no diagnosis could be made. Of the 335 animals reported for observation, diagnosis or quarantine 32 were, as far as the Department could determine, unlicensed and ownerless dogs, 10 of which proved to be positive cases of the disease.

The following table shows the number of positive cases of rabies by cities and towns: —

City or Town.	Dogs.	Cows.	City or Town.	Dogs.	Cows.
Amherst,	1	3	Lakeville,	1	–
Attleboro,	1	–	Lowell,	1	–
Berkley,	1	–	Mansfield,	1	–
Beverly,	2	–	Marion,	1	–
Boston (10): —			Marshfield,	1	–
Dorchester,	5	–	New Braintree,	–	3
Brighton,	3	–	Newton,	1	–
Charlestown,	1	–	North Attleborough,	2	–
Roxbury,	1	–	Revere,	1	–
Boylston,	1	–	Sandisfield,	1	–
Brookline,	1	–	Scituate,	1	–
Canton,	2	–	Somerville,	1	–
Charlton,	1	3	Southbridge,	1	–
Chelsea,	1	–	Sunderland,	1	–
Dighton,	1	–	Wareham,	1	–
Dudley,	1	–	Webster,	1	–
Easton,	1	–	West Boylston,	1	–
Falmouth,	3	–	West Brookfield,	1	–
Framingham,	1	–	Worcester,	1	–
Franklin,	3	–			
Holliston,	3	–	Totals,	53	9

Hog Cholera.

Our activities in attempting to control and eradicate hog cholera have increased during the year. Notwithstanding the fact that we have added three agents to our staff (one of whom, however, has since joined the Colors and is now in service in France) the demand for treatment has continued to grow so rapidly that it has at times taxed our ability to attend to the applications for treatment as promptly as is our custom. The work has continued along the same general line which has been in effect since 1914. Slight improvements in our methods have been made in accordance with the valuable experience

gained in the execution of the work, but in general it has not been found necessary during the past year to make any radical departure from our policy. During the year the serum treatment was administered to 51,222 animals. These animals represent 753 herds evenly proportioned throughout the State in 190 cities and towns. The following list shows the cities and towns in which immunization work has been carried on, the number of herds, and animals treated in each town: —

City or Town.	Herds.	Animals treated.	City or Town.	Herds.	Animals treated.
Abington,	7	33	Gloucester,	3	194
Acton,	2	18	Goshen,	1	1
Acushnet,	1	6	Grafton,	14	545
Adams,	3	61	Granby,	3	52
Agawam,	17	372	Granville,	1	8
Amesbury,	2	85	Great Barrington,	1	5
Amherst,	5	74	Greenfield,	4	485
Andover,	2	50	Hadley,	1	17
Arlington,	2	50	Hamilton,	1	25
Ashburnham,	1	2	Hampden,	1	10
Ashby,	1	7	Hanover,	1	35
Attleboro,	3	26	Hatfield,	1	2
Auburn,	4	180	Haverhill,	4	67
Ayer,	2	497	Hingham,	2	11
Barnstable,	2	94	Holden,	7	63
Bedford,	2	54	Holland,	1	8
Belchertown,	2	119	Holliston,	1	17
Belmont,	9	1,377	Holyoke,	11	604
Berlin,	1	8	Hudson,	2	60
Bernardston,	1	9	Hull,	3	775
Beverly,	3	484	Ipswich,	2	163
Boston,	3	901	Kingston,	1	4
Bourne,	2	45	Lakeville,	2	139
Boylston,	2	47	Lancaster,	3	3
Bridgewater,	3	508	Lanesborough,	5	113
Brockton,	2	940	Lenox,	8	47
Brookfield,	1	1	Leominster,	6	178
Brookline,	1	13	Lexington,	17	2,712
Burlington,	1	760	Lincoln,	6	715
Chelmsford,	1	1	Littleton,	1	134
Chelsea,	1	9	Longmeadow,	5	65
Chester,	1	1	Lowell,	8	344
Chicopee,	8	179	Ludlow,	10	499
Colrain,	1	6	Lunenburg,	1	22
Concord,	4	259	Lynn,	2	46
Dalton,	5	9	Manchester,	2	121
Danvers,	4	1,289	Marlborough,	1	84
Dedham,	4	81	Marblehead,	6	230
Deerfield,	2	8	Marion,	1	46
Dennis,	1	13	Marshfield,	1	4
Dighton,	1	3	Medfield,	1	536
Dover,	4	210	Middleborough,	1	8
Dracut,	4	63	Middleton,	1	1
East Bridgewater,	1	7	Milford,	2	167
East Longmeadow,	19	182	Millbury,	8	274
Easthampton,	15	139	Millis,	2	148
Easton,	3	140	Milton,	1	187
Egremont,	2	12	Monson,	2	219
Erving,	3	31	Montague,	1	18
Essex,	3	23	Natick,	2	137
Everett,	1	35	Needham,	8	495
Fitchburg,	17	765	New Bedford,	2	81
Foxborough,	3	94	Newbury,	2	19
Framingham,	4	323	Newburyport,	5	61
Freetown,	1	24	Newton,	7	505
Gardner,	10	284	Norfolk,	3	276
Gill,	2	266	North Adams,	10	407

City or Town.	Herds.	Animals treated.	City or Town.	Herds.	Animals treated.
North Attleborough,	2	61	Sterling,	4	98
North Reading,	3	120	Stoneham,	1	13
Northampton,	11	880	Stoughton,	1	584
Northborough,	1	1	Sudbury,	3	111
Northfield,	3	124	Sunderland,	3	36
Norton,	1	2	Swansea,	2	333
Norwell,	1	15	Templeton,	2	19
Norwood,	2	19	Tewksbury,	2	850
Oxford,	1	1	Townsend,	1	7
Palmer,	1	7	Tyngsborough,	6	213
Paxton,	1	84	Wakefield,	1	10
Peabody,	7	454	Walpole,	3	41
Pepperell,	1	18	Waltham,	15	4,252
Phillipston,	1	3	Watertown,	3	359
Pittsfield,	43	1021	Webster,	1	25
Plymouth,	4	197	Wellesley,	2	68
Quincy,	2	5	Wendell,	2	16
Raynham,	1	5	West Boylston,	1	43
Revere,	7	2,864	West Bridgewater,	1	17
Richmond,	1	15	West Newbury,	1	55
Rockland,	1	61	West Springfield,	4	42
Rockport,	1	22	Westborough,	1	151
Rowley,	1	16	Westfield,	21	561
Rutland,	2	277	Westford,	2	16
Salem,	3	2,016	Westminster,	3	49
Saugus,	3	183	Weston,	4	78
Scituate,	17	54	Westport,	1	27
Seekonk,	6	1,025	Westwood,	3	142
Sharon,	1	3	Weymouth,	4	93
Shelburne,	1	2	Whitman,	2	34
Sherborn,	7	136	Wilbraham,	5	144
Shirley,	3	78	Williamsburg,	1	18
Somerville,	1	37	Williamstown,	13	133
South Hadley,	3	75	Wilmington,	5	202
Southampton,	1	41	Winchester,	2	51
Southborough,	2	16	Woburn,	4	100
Southbridge,	1	9	Worcester,	10	5,929
Springfield,	42	2,790	Wrentham,	2	97

Since the inception of this work we have repeatedly called the attention of the public to the fact that the true value of this process of immunization against hog cholera, as in any other form of preventive medicine, lies in its application while the animals are in a healthy condition, rather than after a herd becomes infected. When this is done there are no losses from natural infection, the cost of the treatment is minimized, and, as shown by our statistics, there are practically no losses following immunization; whereas when the work is postponed the financial loss entailed by the death of animals which have not been immunized, together with the cost of the extra amount of serum necessarily used when infection is present, is considerable. We have anticipated that as these facts became more apparent to swine owners a smaller proportion would postpone immunization until infection occurred; and it is extremely gratifying to be able to show a decided increase in the number of herds immunized with no infection apparent at the time the work was done.

The following table covering four years is offered in illustration: —

	1914.	1915.	1916.	1917.
Herds infected at time of treatment, . . .	65	150	192	282
Herds apparently healthy at time of treatment,	2	95	113	470
Totals, ...	67	245	305	752

It will be seen from the preceding table that the number of herds infected at the time of treatment, as well as the apparently healthy herds, in which the immunization process has been carried out, has increased. On first reading this table it might seem that there had been more infected herds each succeeding year. As a matter of fact, however, although more are reported, there are actually fewer outbreaks of the disease. The increase in the number of known infected herds is due to this fact: a larger number of owners are becoming aware that immunization will save a large proportion of their animals, and they therefore report the outbreaks and call for our assistance, whereas formerly this was not done. In this connection it must be remembered that inasmuch as a large proportion of Massachusetts swine are garbage-fed, the premises on which they are kept must be considered as permanently infected, and that in the larger piggeries hog cholera has been a constant factor since the inception of the business, which in many cases extends over a period of twenty-five years.

Recently the owner of one large herd where the swine are now being immunized, cholera controlled, and losses entirely prevented informed us that a conservative estimate of his losses in young pigs from hog cholera for the past twenty-five years would be at the rate of 2,000 animals per year, or 50,000 animals. Previous to this year he never considered it worth while to report his outbreaks to the live-stock authorities. This is given as one of several examples which might be cited of the practical value of immunization.

The control of hog cholera simply by disinfection and the "serum only" treatment, under Massachusetts conditions, is practically impossible. Garbage containing pork scraps is a

means of reinfecting premises almost as soon as disinfection can be accomplished. The only way to prevent losses from hog cholera in these garbage-fed herds is, therefore, to keep all susceptible animals immunized against the disease by the simultaneous method. In this connection it is interesting to note that there is every evidence of these herds being infected at all times, as the following facts will show: —

It is our custom to immunize all the mature stock by the simultaneous method. Pigs born of sows so immunized are given the "serum only" treatment when they are six weeks of age. When these animals are twelve weeks old and weigh 40 pounds or over they are given the simultaneous treatment. There has been a tendency on the part of some swine owners — who had always experienced yearly losses from hog cholera, but who, on account of our immunization work, have had no losses for a year or two — to believe the disease to be eradicated from their herds, and on that account they do not have their young pigs promptly immunized at the proper time. We find in almost every instance of this kind, if young pigs from immune sows are not given the "serum only" treatment at six weeks of age, that cholera develops among them; and in other cases pigs which have been given the "serum only" treatment at six weeks of age, but which do not receive the simultaneous treatment when they weigh 40 pounds (at twelve weeks), promptly develop hog cholera. In these same herds, where the work is promptly attended to as advised, generation after generation is raised without having an outbreak of the disease.

In this connection a comparison regarding the length of time during which passive immunity exists following the "serum only" treatment will be of interest. We find in Massachusetts that this passive immunity will generally last for six weeks, only two exceptions to this rule having been so far found. We are informed that through the middle west, however, such immunity lasts as a rule only four weeks, and in the extreme west it lasts approximately eight weeks.

During the year outbreaks of hog cholera developed in three herds under circumstances which again illustrate the wisdom of our policy as adopted three years ago of not administering

the simultaneous treatment to pigs under 40 pounds. At the time this policy was adopted it had been found, in almost every instance where garbage-fed pigs were immunized when weighing under 40 pounds, that these animals failed to develop an active immunity, but did develop a passive immunity lasting seldom more than six to twelve months. There were three herds, however, in which such "breaks" did not occur, and apparently the animals were permanently immune. During the past year in each of these three herds all the mature stock which had been immunized when weighing less than 40 pounds developed hog cholera, whereas all of the animals immunized when weighing 40 pounds or more, although in contact with the affected animals, failed to develop the disease.

The following table, giving comparative statistics for the four years in which we have been engaged in this work, presents the results more concisely than can be done in any other way: —

Comparative Statistics on Hog Cholera for 1914, 1915, 1916 and 1917.

	1914.	1915.	1916.	1917.
Outbreaks reported in which a negative diagnosis was made,	20	122	57	42
Number of herds known to be infected,	80	227	253	359
Number of herds known to be infected in which serum treatment was not administered,	–	77	43	77
Number of infected herds in which serum treatment was administered,	65	150	192	283
Herds Infected at the Time Treatment was administered.				
Number of animals receiving "serum only" treatment, including infected animals and those too young for simultaneous treatment.	428	10,300	14,747	24,828
Mortality from hog cholera following "serum only" treatment (per cent.),[1]	9.5	7	3.7	1.75
Number of animals receiving the simultaneous treatment. These are "apparently healthy" animals in herds infected at time of treatment.	591	5,826	13,643	15,524
Mortality from hog cholera following the simultaneous treatment in infected herds (per cent.),[1]	2	1.2	.6	.44
Total number of animals treated in infected herds,	1,019[2]	16,126	28,390	40,352
Total mortality following both "serum only" and simultaneous treatment in infected herds (per cent.).[1]	5.2	4.9	2.21	1.24[3]

Preventive Inoculation in Herds in which no Infection was Apparent.				
Number of herds immunized,	2	95	113 [4]	470 [4]
Number of animals immunized,	104	863	7,657	10,870
Number of animals which died from hog cholera following immunization,	0	1	0	3
Total number of animals treated,	5,123	16,989	36,047	51,222

[1] These figures show percentages, not animals.

[2] Plus 4,000 which were treated, and died or were killed before results could be ascertained. These deaths were due to the use of serum which was impotent and virus which was not virulent, before the present regulations were made.

[3] This does not include approximately 50 animals which died on one farm, on which a final diagnosis has not been made. Clinically, and by autopsies, it was impossible to determine whether the disease was hog cholera or hemorrhagic septicemia. Laboratory examinations indicate the latter, but before the work could be completed the losses stopped, and more material which was needed for a final diagnosis was not available.

[4] The large majority under this classification are herds which in previous years were classified as infected herds and which had yearly sustained heavy losses from hog cholera. The majority of them are garbage-fed, and experience shows that should immunization be stopped an outbreak of hog cholera would follow very closely. They are therefore classified as herds in which no infection was apparent at the time of treatment, whereas in reality they are infected herds in which the disease is kept completely under control while immunization is continued.

The number of herds treated in most instances represents more than one visit on the part of our agents. Thus, although the total number of herds in which immunization was carried out was 753, this represents 1,541 visits at which animals were immunized, and approximately 400 visits at which it was necessary to postpone work on account of unsanitary surroundings or other conditions which would make it inadvisable to immunize. In addition to the above, approximately 250 visits were made to herds which were reported as infected and where no treatment was administered.

During the year our co-operation was requested by the leaders of the different pig clubs throughout the State. Although the majority of the boys and girls belonging to the pig clubs feed their animals grain rather than garbage, these animals are in close proximity to garbage-fed herds and to known infected herds. It was therefore considered wise to advise the immunization of as many of these pigs as possible. Unfortunately the work was undertaken rather late in the year, and consequently was not carried through as thoroughly as might otherwise have been the case. Notwithstanding this fact a considerable number of animals of this class were immunized, and inasmuch as in the majority of cases the owner had only one pig, it can readily be seen that this called for a tremendous amount of work and travel on the part of our agents, it frequently being necessary to travel several miles to immunize one pig. Undoubtedly this work will be even greater in the coming year.

Attention to the prevalence of secondary infection associated with hog cholera is becoming increasingly important in our work. We have less of the acute true septicemic form of hog cholera and more of the less acute type combined with secondary infection than is seen in the west. While this has always been true it is more apparent at present than at any time since our work started. This prevalence is due largely to the fact that garbage-fed swine are as a rule in poorer condition this year than usual. The entire year just passed has been a hard one on swine on account of weather conditions, and their already weakened vitality has been further lowered by the rapid decrease in the quality of garbage. This renders

them more susceptible to secondary infection caused by *Bacillus suisepticus, Bacillus suipestifer* and *Bacillus necrophorus,* as well as to parasitic infestation. This makes our work increasingly difficult, and indicates the necessity of our agents being able to diagnose secondary infection clinically. Under such conditions a decided decrease in the mortality following our work in infected herds is especially worthy of notice.

A perusal of our records for four years' work in herds in which no infection was apparent at time of treatment should prove conclusively that there is little or no danger following the simultaneous treatment in non-infected herds. Attention should here be called to the fact that in our work as recorded we have used only serum and virus of the highest standard possible, and which has passed a thorough bacteriological and physiological test, and that our technique of administration has been carefully executed.

The long-continued high price of pork during the latter part of 1916 gave us every reason to believe that there would be a decided increase in the number of swine in Massachusetts during 1917. As anticipated, the demand for young pigs during the spring months of 1917 was undoubtedly greater than any which has ever been experienced in this State. The demand for six weeks' old pigs, at prices varying from $10 to $14 per animal, greatly exceeded the supply, and it was at first believed that this condition would result in a decided increase in the permanent swine population of the State. As time progressed, however, and the price of pork was continuously placed higher until it reached the unprecedented figure of 24 cents per pound, the movement reached the other extreme, and resulted in the slaughter of thousands of animals which should have been kept for brood purposes. This has, however, had a tendency to maintain the unusual market for young pigs, so that the swine population of this State is at the present time not far from normal.

With the increased number of persons desiring to keep swine came an increased demand on their part for garbage to be utilized in the feeding of these animals. This demand was principally in the neighborhoods or districts where garbage had previously been disposed of in some other manner. During

the summer the office of the Department was besieged with letters from all parts of the country requesting information regarding garbage feeding. Large numbers of persons who were in many cases without previous experience in this respect started piggeries, using garbage for feed. It was thought that this movement would be beneficial in two ways, — first, in the better utilization of a waste product; and second, by a large increase in the amount of native pork available in the local markets. Most persons undertaking this new venture have been successful, some extremely so. On the other hand, some individuals have been unsuccessful, generally due to the fact that they did not have proper sanitary surroundings or necessary equipment for sheltering their animals. The matter is very completely summarized in the following quotation from a circular issued by the United States Department of Agriculture on the subject, entitled "Disposal of City Garbage in Feeding Hogs:" —

> If garbage in good condition is fed with proper surroundings, there is no reason why pork from this source should not compare favorably with pork from grain-fed hogs.

During the latter part of the year an unlooked-for complication in the swine industry arose. Both the quantity and the quality of garbage has decreased very rapidly since August, — an effect due to the high price of food and the efforts toward food conservation. This situation is to-day of serious concern to those who depend largely or entirely on this product as food for their swine. It is estimated that in many cities the quantity of garbage now being received is from 30 to 40 per cent. less than the average amount previously obtained. The quality of garbage, when considered from a food point of view, is approximately 40 per cent. lower than it was previous to conservation efforts. It has been found necessary in almost all garbage-fed herds to very materially reduce the number of animals kept. In some instances it has been found necessary to either sell the herd or to discontinue the feeding of garbage, inasmuch as its nutritive value does not offset the cost of procuring it. Notwithstanding this, the fact must not be over-

looked that garbage is extremely valuable as a food for swine, being probably nearer a balanced ration than any other one food product.

It can be estimated for those who are not familiar with this method of feeding that ordinary city garbage, if in good condition and maintained so until fed, will cause an increase of 1 pound live weight for every $37\frac{1}{2}$ pounds fed, or 1 pound of dressed weight for every 50 pounds fed. It is stated by those who are authorities on the subject that pork from prime garbage-fed swine is of equally good food value, texture and color as pork from grain-fed animals. On the Boston market, at least, garbage-fed swine are paid for at the same price per pound as those which are grain-fed. It is estimated that under normal conditions 1 ton of garbage per day will care for 100 shoats. The fact should not be overlooked, however, that as the nutritive value of garbage decreases, the number of animals which 1 ton would accommodate must correspondingly decrease. In consideration of the above facts, the utilization of garbage by feeding to swine should become more general in many sections of the country where heretofore it has not been thought practicable.

There are certain factors which should be taken into consideration by the garbage feeder. It should be remembered that it is practically impossible to feed garbage without the swine becoming infected with hog cholera, unless these animals have been immunized against the disease. For this purpose the following suggestions are made regarding disease control, all of which have been obtained from our experience in the execution of our four years' work.

1. The simultaneous treatment is always preferable to the "serum only" treatment.

2. Swine under 40 pounds should never be given the simultaneous treatment.

3. The virus which is used in immunizing garbage-fed swine must be the most virulent which can be procured, and larger doses are advisable than for grain-fed swine.

4. The fundamental principles of immunology must never be lost sight of, and it should be remembered always that in herds where garbage has been fed for several years, a highly developed

resistance to the disease has been developed among the mature stock, and that as a result of this a greater amount of inherited immunity is transmitted to the offspring from these mature animals. In this connection the immunization of garbage-fed swine is radically different from that of swine fed on grain.

5. Because of the different nature of the food and the less sanitary surroundings, *Bacillus suisepticus*, causing hemorrhagic septicemia or swine plague, and *Bacillus necrophorus*, causing the foot-and-mouth forms of this disease, are ever present, and are an added menace to the health of these animals.

Miscellaneous Diseases.

Anthrax. — This is a disease existing in many different parts of the world, causing the death of many thousands of animals and occurring secondarily in man. The infection is found in horses and also in cattle, sheep and other cloven-hoofed animals. The most common method of transmission to the human subject is by the handling of hides taken from animals which have been infected with the disease.

On an occurrence of an outbreak at any point in the State it immediately becomes necessary to prevent the spread of the infection in every way possible, and our work in this direction consists of a preventive inoculation of all animals on the premises where a case of the disease is found, and of particular attention to the destruction of the carcasses of animals which have died. As the spores of the causative agent of this disease remain lodged in the soil in an active state for a long time, we require that entire carcasses be deeply buried and covered with quicklime, and the surrounding soil burned over and thoroughly fenced, so that other animals may not graze at that particular point. Inoculation of the remaining animals is in a majority of cases effective in immunizing them for a period of twelve months at least, and therefore this preventive inoculation is continued from year to year on many farms where the disease has once appeared. As infected animals ordinarily die within a few hours of the onset of the disease, the first animals attacked in a particular locality all generally die before treatment can be applied.

During the past year there has been a decrease in the prevalence of this disease, only 6 cattle on three different premises having been found to be affected. Of these 6 animals 1 was in the town of Berlin, 3 were in Bolton and 2 in Shrewsbury. The preventive inoculation has been applied to 78 head of cattle and 9 horses located on five different premises, and from the fact that our records show such a marked decrease in the number of cases from previous years we believe that our efforts in prevention have probably saved quite a few animals which have been exposed to the same conditions, pasturage and feed as those which have died.

Reports of the existence of anthrax in four different towns proved upon investigation to be unfounded. In one case the cause of death was found to be a digestive disturbance. In another case the cause of death was malnutrition. On the cases reported from one of the four towns laboratory diagnosis was negative, and the specimens submitted from another town were too decomposed for a proper examination.

Some of the symptoms of this disease so resemble those of hemorrhagic septicemia that a positive diagnosis can only be made by laboratory examination. It is therefore our custom in all cases reported to have such laboratory examination immediately made.

No unusual prevalence of this disease has been known to exist this year in surrounding States, so that the quarantine order restricting shipments to Massachusetts has not been necessary.

Blackleg, or symptomatic anthrax, also called *quarter ill,* is another disease which causes the death of large numbers of animals in different parts of the world, especially such as have not reached adult age. Young cattle are the animals generally attacked, but the disease has been found in some instances in sheep and goats. It is characterized by swelling, œdema, and emphysema of the muscles and subcutaneous tissues of the infected parts. Infection appears most commonly in the shoulder or hind quarter, and presents certain characteristic symptoms that are seldom mistaken for those of any other disease. The same necessity for yearly preventive treatment exists in the control of this disease as in that of anthrax.

Preventive treatment is very successful, and although the number of fatal cases of the disease in Massachusetts is very small compared with the mortality records of other sections of the country, we nevertheless are anxious to save as many animals as possible from its ravages.

During the past year 17 animals have died from this disease on 13 different premises, and the preventive inoculation has been applied to 764 animals on 103 different premises in 36 towns, as follows: —

	Premises.		Premises.
Adams,	1	Northampton,	2
Ashburnham,	4	Orange,	6
Ashby,	10	Pittsfield,	1
Ashfield,	1	Prescott,	5
Athol,	3	Princeton,	1
Becket,	3	Rowe,	5
Colrain,	1	Savoy,	1
Granville,	1	Shelburne,	5
Great Barrington,	5	Southampton,	2
Harvard,	2	Sterling,	2
Hardwick,	1	Townsend,	1
Holyoke,	3	Tyringham,	2
Lee,	2	Warwick,	3
Leicester,	3	Washington,	1
Lenox,	1	Westhampton,	1
Littleton,	9	Williamstown,	3
Montague,	5	Winchendon,	2
New Marlborough,	4	Windsor,	1

Our records show that whereas the increase in the number of deaths from this disease in Massachusetts during the past year has been 10 animals, we have applied preventive inoculation to 603 more animals than were inoculated last year. This particular branch of the Department's work seems to be increasing more or less rapidly as cattle owners become more generally informed that their animals can be successfully protected against the disease without interfering with their health or development.

Hemorrhagic Septicemia. — This is a disease which seems to be increasingly prevalent each year, and has been diagnosed not only in Massachusetts cattle but also in swine, large numbers of which have been found to be affected this year. Dif-

ferential diagnosis is sometimes difficult in the field as between anthrax, blackleg and hemorrhagic septicemia, and a positive diagnosis in such cases can only be reached as the result of laboratory examination of specimens from the carcasses.

Our records show that the disease has appeared in 16 head of cattle on premises in 6 different towns, — Ashby, Harvard, Lowell, Orange, Southbridge and Sturbridge. We have found the disease this year causing considerable loss among swine, and our attention has been directed in many instances to this class of animals on account of our active work in the suppression of hog cholera, as we are frequently called to herds supposed to be affected with cholera where a careful diagnosis proves the infection to be hemorrhagic septicemia. Treatment against this disease by inoculation is being applied at several different points, and a further reference to our work in this direction is made later in this report under the heading "Laboratory." This may be found on page 51.

Actinomycosis is another disease classified in the law as contagious, a few cases of which are yearly brought to our attention. Whether or not this disease is contagious according to the strict scientific meaning of the term is a question, but it is certainly transmissible from one animal to another if conditions are favorable, and therefore the Department deems it necessary to quarantine animals affected with it. In some instances it is allowable for the animals to be kept for the purpose of fattening and then released for slaughter only.

Nine cases of actinomycosis have been reported to the Department during the year, 1 each in the city of Attleboro and the towns of Dudley, Lanesborough, Lee, Richmond, Wareham, West Brookfield, and 2 cases in the town of Plymouth. One case reported in 1916 has been killed during the past year in the town of Tisbury. Of the 9 cases reported in 1917, 7 have already been killed and 2 have been released as having been cured. One case was found at the Brighton Stockyards in a cow brought in from the State of Maine, and the animal was immediately slaughtered.

Tuberculosis in Swine. — Cases of tuberculosis in swine are occasionally reported to us by slaughtering establishments, all the larger slaughtering concerns having been requested to re-

port cases of this disease found at time of slaughter, as it generally happens that its source can be found among cattle on the premises where the swine have been kept, especially if they have been in close contact with the cattle, or have been fed on unpasteurized milk from tuberculous cattle. It is our custom upon receipt of report of this sort to cause an examination to be made of the cattle on the premises where the swine have been kept. Fourteen such cases have been reported this year.

Mange. — This very troublesome disease seems to have been much less prevalent in Massachusetts during the past year. In 1916, 449 head of cattle in 17 different herds were reported to this Department, whereas in 1917 only 157 head of cattle have been reported as affected with the disease, found on 18 different premises, and a few horses on 3 different premises. The premises on which this disease in cattle has appeared are in Abington, Dartmouth, Duxbury, Grafton, Hanover, Hingham, Lexington, Lincoln, New Marlborough, Phillipston, West Newbury, Whitman and Williamstown, and the horses were found in the cities of Boston, Chelsea and Newton.

Treatment of this disease is generally successful if the owner or attendant can be induced to faithfully carry out simple directions for local application and medicinal treatment, which treatment is inexpensive but somewhat inconvenient to apply.

Foot-and-mouth disease has not appeared in Massachusetts during the past year, although we have had reports of its existence in the towns of Merrimac, Princeton and Westwood. Prompt investigation of these reports, however, proved that they were unfounded.

Diseases of Sheep. — As there has evidently been quite an increase in the number of sheep kept in Massachusetts the past year, we have found that there has been a corresponding increase in reported cases of disease among them. Sheep are especially susceptible to diseases of a parasitic nature, and the one which seems to be the most prevalent is what is known as *nodular disease.* Cases of this disease have been reported from the towns of Auburn, Bedford, Blandford, Granville, Lincoln and Norwood. This disease is due to an intestinal parasite which causes serious loss through the death of many

young animals, and also in the prevention of proper growth of others.

The Department has frequently been called upon to make examination of animals supposed to be affected with disease of a contagious character, which upon thorough investigation has been found not to be the case. As we are anxious at all times, however, to be thoroughly informed as to an outbreak of contagious disease, we frequently make investigation in cases where the services of a private veterinarian should have been obtained, because of the non-contagious character of the disease. This investigation work has been frequently rendered upon application of citizens.

Among the non-contagious diseases to which our attention has been called during the past year may be mentioned the following: acute indigestion, fistula, foot-rot, forage poisoning, lice, lung worm, neck ail, rheumatism, stomatitis, stomach worm, ulcerative vaginitis and sheep scab.

Particular attention may be called to a case of tuberculosis in a horse in the town of Reading, diagnosis of which was made on post-mortem examination and subsequently confirmed in the laboratory. Tuberculosis in the horse is of such rare occurrence that it is worthy of particular record.

The Laboratory.

During the year 71 specimens were submitted to the laboratory for examination and diagnosis. The majority of these were sent in during the latter part of the year, which would indicate that there will be an increase in this work during the coming year. Specimens were submitted from horses, cattle, sheep, swine, goats and rabbits; and in order to make diagnoses, bacteriological examinations, pathological examinations and animal inoculations have been resorted to.

Inasmuch as commercial ophthalmic tuberculin which the Department had been using was not giving dependable results, it was decided that it would be advisable for the laboratory to do experimental work along this line, and at the same time to investigate the possibility of producing a tuberculin to be used for retests which would give more accurate results than the one which was being used. In August, therefore, the

laboratory started the production of tuberculin for departmental use. Since that time 413 doses of special retest tuberculin, 383 doses of ophthalmic tuberculin, and 260 doses of tuberculin as regularly used in the original test, have been furnished. It has been found that with this special retest tuberculin for subcutaneous use the results are much more accurate than with any previously used. The results as checked by post-mortem examinations are accurate in a larger percentage of cases, and if a reaction occurs it is much more decisive and sharply defined than with other tuberculins. The ophthalmic tuberculin has given us considerably better results than commercial ophthalmic tuberculin, but we cannot depend upon it to the same degree as upon the subcutaneous retest tuberculin. However, with a combination of the two, accurate results are being obtained in nearly all cases.

For some time past it has been apparent that hemorrhagic septicemia is increasing in frequency and is causing considerable loss, particularly in swine. It is a rather common impression among live-stock sanitary authorities that this disease rarely or never exists in swine as an independent disease, but is always associated with hog cholera. To arrive at any conclusion regarding this disease it first became necessary to determine whether or not outbreaks of it do occur when not associated with hog cholera. In this respect we were extremely fortunate, inasmuch as we had by the simultaneous method immunized the swine against hog cholera in the majority of the larger piggeries in the State, and we were thus in a position to study the disease when outbreaks occurred in such immune herds. During the past year nine such outbreaks have occurred. In 8 of the 9 hog cholera could be positively excluded, as was proven by animal inoculation, cultures and filtration experiments. After being convinced that the disease did exist independently our next duty was to endeavor to control it. For this purpose we have used both living and killed cultures of *Bacillus suisepticus*. In all instances we have had better results with the use of living cultures than with killed. In 8 of the 9 outbreaks the losses were stopped and the outbreak controlled almost immediately after the inoculation of the animals with the living culture. In all of these

cases the entire herd had been immunized against hog cholera by the simultaneous method, at periods varying from six months to two years previously. In the ninth outbreak the animals which were infected had received the "serum only" treatment, but not the simultaneous, inasmuch as they were too young for that. The case was not diagnosed by the laboratory, but by clinical symptoms and autopsy. Further investigation when results were not satisfactory proved that the animals were very badly infested with lung worms, which rendered this case of very little value for the purpose of judging results. During the year we have produced a bacterial vaccine for more than 400 swine and 150 head of cattle.

The following interesting points have arisen in our study of this disease: —

1. We have never been able to reproduce the disease in cattle or swine with the blood from animals suffering from it, notwithstanding the fact that the same blood has given us pure cultures of the causative agent, and microscopic smears have shown the organism present in the blood in large numbers.

2. In some cases we have been able to reproduce the disease by rabbit or guinea pig inoculations with this same blood, and in other cases this has not been possible.

3. Pure cultures of *Bacillus suisepticus* and *bovisepticus* are extremely difficult to keep, and vary greatly in their pathogenicity. In some cases the cultures die out in five or six days, while in some others we have been able to make transfers as late as three months, and have found pathogenicity unattenuated.

Considerable work has been done in attempting to make an immune serum for *Bacillus suisepticus* infection by hyperimmunizing cattle. To date, the results have been varied and not satisfactory. In some cases it has protected rabbits and guinea pigs, and in others it has failed to do so. Inasmuch as the results of the inoculation of these animals with pure cultures also vary, it is difficult to determine to what extent the immune serum should be discredited, and how far the cultures fail to reproduce the disease. Used on swine sick with hemorrhagic septicemia, the results have not been satisfactory.

Necrobacillosis has been diagnosed by the laboratory in 11 herds of swine and in 1 case of calves. In the case of calves it is found to form abscesses on the inner side of the cheek along the lower maxillary bone. In these abscesses *Bacillus necrophorus* was present in large numbers, and the animals showed symptoms of calf diphtheria. In swine the disease is practically never seen in the intestinal form, as reported in the west. When found in our garbage-fed herds it manifests itself by a necrotic condition of the feet or mouth or both, and does not cause a very heavy mortality. It is difficult to obtain pure cultures of this organism by culture, and it is usually necessary to resort to animal inoculation, making it difficult to carry stock cultures of this organism. Considerable work remains to be done along this line.

Annual Inspection of Farm Animals and Premises.

In compliance with a direct order of the Commissioner, issued in January of each year to the inspectors of animals of all towns and cities, a systematic inspection of all cattle, sheep, swine and goats, and of the conditions under which they are kept, is made. A date is set for the completion of this work, following which detailed reports must be submitted on blanks provided for the purpose. These reports when tabulated furnish a comprehensive survey of the health and sanitation of animals in Massachusetts kept for the production of food for human consumption. They form an important basis on which to formulate regulations for the control and eradication of contagious diseases among live stock, and are of direct interest in the study of certain public health problems. In addition to much information of importance which the Department derives from the tabulated report of the inspectors of animals, and uses in numberless ways in its work of control and eradication of contagious disease, it furnishes the only correct "census" of animals in Massachusetts that is made. This information is made use of by other State departments, and also by different associations and individuals interested either in dairying or the marketing of beef, pork or mutton, and by persons engaged in general agricultural operations.

The following table is made up from the reports of the inspectors of animals: —

Total number of herds of cattle inspected,	28,582
Number of herds containing not over 5 dairy cows,	23,100
Number of neat cattle inspected,	228,962
Number of dairy cows inspected,	152,141
Number of herds found clean and in good condition,	28,132
Number of stables inspected,	29,450
Number of stables properly drained,	29,299
Number of stables well ventilated,	29,009
Number of stables sufficiently lighted,	28,711
Number of stables found clean,	28,608
Number of stables in which improvements were recommended,	1,303
Number of herds of swine inspected,	10,573
Number of swine inspected,	81,351
Number of herds of swine garbage-fed,	2,140
Number of swine garbage-fed,	47,628
Number of sheep inspected,	13,875
Number of goats inspected,	1,307

Generally speaking, the work of inspection is efficiently attended to, and has the practical result of rapidly correcting unsatisfactory conditions of stabling and of eliminating diseased animals.

The service rendered by local inspectors of animals in the many directions where they are available is of very great aid in the Department's work. They are in many instances the first officials notified of outbreak or existence of contagious disease, and much depends upon their alertness and prompt attention to the duty of quarantine and early report to the Department. Were it not for efficient service by them, much valuable time would be lost in many instances. Their service in reporting arrival, and in subsequently identifying interstate animals in accordance with our regulations, enables us to more promptly attend to the necessary duties in connection with such cases.

From time to time additional inspections are ordered at places where contagious disease has been found, and where the original recommendations for improvement of sanitation have not been carried out. These additional inspections are made by Department agents when the inspectors of animals for any reason have not been able to bring about the improvements necessary.

Financial Statement.

Appropriation for the salary of the Commissioner, chapter 40, Special Acts of 1917,		$3,500 00
Total expenditure,		3,500 00
Appropriation for clerical assistance and contingent expenses, chapter 40, Special Acts of 1917,	$9,650 00	
Brought forward from 1916 appropriation,	6 82	
Credit on account of temporary increase,	146 50	
Amount forwarded from extraordinary expenses,	894 00	
Total amount appropriated,		$10,697 32
Expended during the year for the following purposes: —		
Salaries of clerks and stenographers,	$5,829 96	
Books,	128 64	
Express and messenger service,	241 73	
Extra clerical service,	252 70	
Postage,	788 72	
Printing report,	139 03	
Other printing,	1,137 77	
Telephone and telegrams,	783 15	
Stationery and office supplies,	631 55	
Typewriters,	163 00	
Expenses of the Commissioner,	377 53	
Sundries,	69 45	
Total expenditure,	$10,543 23	
Unexpended balance,	154 09	
		$10,697 32
Appropriation for the extermination of contagious diseases among domestic animals, chapter 40, Special Acts of 1917,		$146,000 00
Expended during the year for the following purposes: —		
1,168 head of cattle condemned and killed on account of tuberculosis in 1914, 1915, 1916 and 1917, paid for in 1917,	$42,816 39	
254 horses condemned and killed on account of glanders and farcy in 1913, 1914, 1915, 1916 and 1917, paid for in 1917,	12,962 00	
Services of regular agents,	31,410 89	
Services of *per diem* agents,	10,875 60	
Labor hired,	395 75	
Traveling and other expenses of agents,	17,964 70	
Veterinary supplies,	112 23	
Expenses of killing and burial,	152 00	
Ear-tags, punches, etc.,	1,218 87	
Laboratory and experimental expenses,	2,952 49	
Expense of travel allowed inspectors of animals,	475 29	
Quarantine expenses,	4 00	
Sundries,	195 46	
Total expenditure,	$121,535 67	
Unexpended balance,	24,464 33	
		$146,000 00

The average price paid for condemned cattle for the year was $36.65.

There has been received during the year from the sale of hides and carcasses of condemned animals $1,209.87, and for the testing of cattle for non-resident owners $3,002.26, a total amount of $4,212.13.

Claims for 85 head of cattle condemned and killed as tuberculous during the year remain unsettled, to be paid for on proof of claims, the appraised value of which amounts to $3,014.

Claims for 32 horses condemned and killed during the year because affected with glanders remain unsettled, to be paid for on proof of claims, the allowance for which under the law will amount to $1,571.

Respectfully submitted,

LESTER H. HOWARD,
Commissioner of Animal Industry.