

SPECIAL REPORT

ON

BOVINE TUBERCULOSIS

FLORENCE HULL WATSON, M.D.,

NORRISTOWN:

HOSPITAL PRINTING OFFICE

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CLINICAL AND PATHOLOGICAL NOTES

ON THE HERD OF CATTLE BELONGING TO THE
STATE HOSPITAL FOR THE INSANE,
NORRISTOWN, PA.

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PATHOLOGIST OF THE INSTITUTION.

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STATE HOSPITAL FOR THE INSANE,
NORRISTOWN, PA., *February, 1895.*

TO THE BOARD OF TRUSTEES.

Gentlemen: I have the honor to present the following report of the examinations made during the past ten months on the cattle belonging to the Hospital. A short description of the stables and care of the animals is also included—which may be of some interest to those who are not fully cognizant of the attention the animals received while on the place.

The herd was a large one, and the results have been such as to confirm the belief held by many—in this country as well as in Europe—of the efficacy of tuberculin as a diagnostic agent for tuberculosis in cattle.

A synopsis of the results obtained was furnished Mr. Thomas J. Edge, Secretary of the State Board of Agriculture, for publication in the Annual Report of that Department for 1894. Papers have also been read on tuberculosis among the cattle of the Hospital at the Annual Meeting of the State Board of Agriculture, held in Harrisburg, January 23d and 24th, and at Sanatoga, January 4th, and Norristown, February 13th.

Very respectfully submitted,

FLORENCE HULL WATSON,

Pathologist.

SPECIAL REPORT ON BOVINE TUBERCULOSIS.

CLINICAL AND PATHOLOGICAL NOTES ON THE HERD OF CATTLE BELONGING TO THE STATE HOSPITAL FOR THE INSANE, NORRISTOWN, PA.

Early in May, 1894, the attention of the Trustees of the State Hospital for the Insane at Norristown was called to the frequent deaths occurring among the cattle furnishing the milk and occasionally the meat consumed by the inmates of the Institution, and thinking that there should be some definite cause for these, they directed that the Pathologist of the Hospital from that time on should be present and personally examine all animals either slaughtered or found dead. During the month nine were examined, and in all but one marked tubercular lesions were found and so reported. The autopsies having revealed such a large percentage of tubercular animals, it was deemed highly probable that there would be other diseased ones found among the herd if a careful examination were made.

That this should be done was desirable, not only to prevent the dissemination of the disease to the healthy animals, especially those recently purchased, but for many other important reasons, as the Hospital depended on the farm for its milk and occasionally for its meat supply. The amount of the former consumed is large, averaging 900 to 1,000 quarts daily. Milk being the chief dietary of many of the patients, it is important that this be furnished them in as pure a state as possible. The general health of the insane is, as a rule, poor, and the close relation between general diseases and insanity is recognized by all, their poorly-nourished tissues forming a favorable soil for the development of the germs of tuberculosis. When the large percentage of deaths from tuberculosis annually is considered, especially in institutions for the insane where the inmates are almost constantly confined and where overcrowding is the rule, every effort should be made to limit all possible sources of infection. All tubercular cases are not put down as such—statistics are approximate only—many die of intercurrent diseases and are so classified, or they are not diagnosed in life; this is frequently seen at autopsies, where lesions more or less

marked are demonstrable in cases that never manifested a symptom in life. To arrive at any reliable data, every case should be examined post-mortem, this at present is impossible; if it were, there is no doubt that the percentage of deaths due to tuberculosis would be markedly increased. Undoubtedly, one of the most important questions health authorities have to deal with at the present day is what shall be done to prevent the spread of this disease. Every source of infection must be examined into, and all measures taken to prevent the dissemination of the disease germs. The milk of tubercular animals has been considered a source of infection by many, and the consensus of opinion is that bacilli of tuberculosis are frequently present in the milk; a number of diseased animals in the dairy multiplies the danger.

At the time the health of the herd was questioned there were 206 animals on the place, and these were kept in two (2) stables. These stables are situated on a hill, at some distance from the Hospital buildings proper and known, respectively, as the *old* and *new* stables. These two buildings are separated by an enclosed yard, 188x84 feet, which is partly paved. The old stable consists of a main building, two stories high, and a wing, one story. The latter has been designated "box stalls." The upper floor of the main building is used as a hay loft, the lower floor for the animals, principally the common cows. The height of this floor varies from 9.6 feet on the north side, to 8.8 feet on the south side, due the gradual slope of the floor. The main building is 100 feet long and 65 feet wide.

There were seven (7) doors and as many windows on the south side, opening on the yard, but much of the light entering from this side is cut off by a shed which extends the entire length of the buildings. On the east and west sides there are (4) four windows, and on the north side 3 windows each end; the central portion is occupied by a door leading into a corridor communicating with silo. All the windows are small and deep set. When the weather permits the majority are opened. The doors are double in winter, and simple lattices in summer. The former are open, part way at least, when the weather permits. Besides this means of ventilating, there are 7 ventilating shafts extending through the upper floors as far as but not beyond the roof; the current of air being directed slantingly to the three large ventilators in the peak of the roof. There are two double rows of stalls, 34 in each row; one single row having 14 stalls and another 18, making a total of 100 stalls. No two rows are directly in contact, as there are aisles between each row varying from 3 to 7 feet in width, and excepting one of the single rows, none are directly in contact with wall. The floor of the double rows is of concrete, planked over; the two single rows and the aisles are cemented. The partitions of the stalls are 3 feet deep and 3 feet wide; there is a gradual slope of 3 inches from front to back of stall. There comes a drop of 3 inches to the drain, which is 6 to 8 inches

deep, 20 inches wide, covered with planks, with small spaces between. All the drains enter a collecting pipe, which proceeds at once to a well under one end of the new stable. The stalls were cleaned every day and frequently twice a day; the manure placed in a pit near the new stable and this was emptied as soon as it was sufficient in quantity. The bedding was of straw, fresh every day, sometimes twice daily. At the head of each stall is a trough for feed and hay; this was cleaned thoroughly every day. The water trough extends the entire length of each row. It is of iron and kept filled by a pipe entering it at either end. This was swept out two or three times a week. There are no compartments in this trough, the water filling it from end to end. The animals were fed four times a day regularly, occasionally they received an extra feed of hay. Two (2) feedings consisted of ensilage; one of a mixture of bran, corn and oats, fed wet on cut hay or fodder, and the fourth of the same mixture, with the addition of brewer's grains. The amount of the latter averaged daily 4 to 5 pounds. Ensilage used being 16 to 18 pounds. The ensilage did not always hold out for the entire year; it consisted of green corn only (the Southern white corn raised on the farm; and it was packed in bins built back of the old stable, communicating with it by means of a large door and corridor. These bins are 6 in number, built of stone, 26 feet deep, (13 feet being beneath the ground,) and 12x16 feet square. They were opened one at a time, and sufficient quantity for one day's rations only removed. Some allowances in quantity and variety of food was made according to size and productivity of animals. The young ones were first fed by their mothers, later on skimmed milk, later they received a meal of bran and oats, and when they were a year old, a little ensilage was given twice daily. The animals were fastened in the stalls by means of chains. No effort was made to have them occupy the same stall at all times, as there were frequent changes made in the animals in the old barn. From May 1st to October 1st the animals were turned out into pastures surrounding the Hospital. Here they often remained all night. When they occupied a pasture having no stream in it, they were watered at the stable when brought there to be milked. In cold weather they never were turned into the pastures, but occasionally into the inclosed yard. The number of animals living in the old stable was considerably over a hundred, as the young animals were fastened there at the side or back of their mothers.

Adjoining the old stable is the building known as "the box stalls," containing eight (8) double stalls. The inside measures of this building are: length 65 feet, width $17\frac{1}{2}$ feet, height 9 feet 3 inches. The stalls are of wood 5 feet high; they are 12 feet long and 7 feet wide and each opens directly on the yard, having doors 4 feet wide with lattice tops. On the opposite side of the building are four (4) windows; on the east side a blank wall and on the west a door opening into the old

stable. The arrangements for feeding and watering are the same as in the old stable. With the exception of 2 Holstein bulls the animals remained in this stable for short periods only; either for calving or, in case of new animals, until there was room in the old stable.

The new stable, situated on the opposite side of the yard, is a comparatively new building. It is 2 stories high, 80 feet long and 65 feet wide, and the lower floor where the cows are kept is 11 feet high. The upper floor was used for hay and under the central part of the building is a large root cellar. There are windows and doors on all four sides, besides 2 ventilating shafts. The stable opens directly on the yard, having no shed. The doors are of two sizes: large, 8 feet 2 inches wide, and small, 3 feet 3 inches wide. The windows, some 20 in number, average 3½ feet wide. The stable is divided into a double and a single row of stalls and a row of box stalls on the east side. Wide, cemented aisles separate the rows from one another and from the wall, excepting one end of the single row and the box stalls. Of these latter there are 11, separated by wooden partitions, part solid and part composed of slats. The front is considerably lower than the sides and has a row of iron bars across the top. These stalls are 13½ feet deep and vary somewhat in width. They have doors opening directly on the side yard. The arrangements for watering and feeding animals as well as for cleaning and draining stalls is the same as that described for the balance of the stable.

The double row has 19 stalls on a side; the single one 22—a total of 60 stalls. The measurements of the partitions are the same as the stalls in the old stable. The floor is entirely cemented and there is a gradual slope of 3 inches to the uncovered drain, which is concave, varying in depth in centre from 1½ inches at one end to 3 inches at the other, where there is a trapped drain pipe leading to the well situated on the west side of the new stable. There are two (2) of these trapped drains for each row of stalls and three (3) for the box stalls. These drains are frequently flushed with water and always kept clean. The well which receives the drainage from both the old and the new stables is 12 feet long, 10 feet wide and 7 feet deep. It is entirely cemented and has no discharge pipe. It was emptied frequently, the contents being used by means of a sprinkler to irrigate some of the Hospital grounds.

The stalls were regularly cleaned, sometimes twice daily; the bedding being of straw, as in the old stable. There are drops at either end of the rows for the manure, also at one end of the box stalls. The manure from the stables was hauled each day to a place specially provided near the new stable, where it remained, at most, a few days at a time. It was used to fertilize the Hospital grounds.

At the head of each stall is a trough for feed and a special tank for water. They are 18 inches long, 12 inches wide, and are made of iron. There is a lid to each one which is connected, by means of a short

bar, with a long iron bar extending the entire length of each row. It is possible by turning the latter to open simultaneously all the water tanks in a row. The water enters at one side and the pipe is so arranged that the water enters all tanks at the same time, maintaining a constant level, and does away with the danger of an animal drinking the water contaminated by others—some of which may be diseased. These troughs are well scrubbed once a week and frequently flushed,

The food of the animals in this stable was the same in quantity and quality as that received by the animals in the old stable; the same differences were made also according to age and productivity of animal. The ensilage used came from the bins at the old stable. There are two (2) bins adjoining the new stable, but they have been used two seasons only, the ensilage stored in the larger silo usually being sufficient.

The bulls did not receive as much feed as the other animals; they were seldom turned into pasture, but were confined in inclosures of sufficient size to give them exercise adjoining the new stable. The other animals were turned out in the pastures during the summer months; as a rule, however, they did not remain out all night. In winter they were turned into the cow-yard occasionally.

The animals in this stable received special attention. They were curried every day, their tails and legs being washed; they were fastened in the stalls by means of chains, and care was taken that each animal occupied the same stall at all times. Shortly before parturition the cows were placed in box stalls on the east side. The calves were allowed a certain portion of the milk of their mothers during the first two months, after which they were fed like the other calves. The majority of the young Holsteins were raised, also many of the Grade Holsteins; the balance being either sold or butchered. During the past few years there have been a number of abortions, both in the old and new stables, but whether out of proportion to usual number could not be definitely asserted.

The animals were milked twice daily, at the same hours summer and winter. Several patients of the Hospital, who were in good physical condition, assisted with the milking, and as far as can be ascertained all the persons having charge of the animals were in good health.

As to the best method of examination, Mr. Thomas J. Edge, Secretary of the State Board of Agriculture, was consulted. He advised that the entire herd be tested with tuberculin—the so-called “Koch’s Lymph.” This preparation was suggested as a diagnostic agent for tuberculosis in 1890–91, during the course of experiments made to test its efficacy as a cure for this disease. At that time it was thought that all having tubercular lesions would give a characteristic reaction,—viz., elevation in temperature following hypodermic injection of a small quantity of tuberculin. It was further thought that this

rise would not be perceptible in healthy subjects. Since this was claimed several modifications have been made, and at the present time *tuberculin* is considered a valuable but not infallible diagnostic agent. It is infinitely superior to any other method at the present day. It is possible by its means to detect incipient cases of tuberculosis, and much light has been thrown on the disease, its development, distribution, etc. Physical examination by the most careful and skillful veterinarians fails where the lesions are deeply seated or slight, though sufficient where they are very marked or superficial. As the majority of the cases belong to the former class, one can recognize the advance that has been made by the addition of the tuberculin test to the other methods employed in the diagnosis of this disease which yearly kills off a large percentage of cattle. The use of tuberculin was introduced into this country in 1891, by the Tuberculosis Commission of the Veterinary Department of the University of Pennsylvania, Dr. Leonard Pearson using it in diagnosing the disease in a herd of cattle at Villa Nova, Pa., belonging to the Hon. Joseph E. Gillingham. This was in March, 1892, and out of a herd of 76 animals injected, 30 reacted—all of which had tubercular lesions at autopsy.¹ In June, 1892, Dr. Pearson injected the herd of cattle at the Pennsylvania Agricultural Experiment Station, 2 animals reacting but tubercular. Since then this method has been employed extensively with very favorable results in this and many other States.

It being decided by the Trustees of the Hospital that this test be applied, the work of inoculating the animals was at once commenced and very carefully carried out at *seven* (7) different dates by Dr. Francis Bridge, State Veterinarian, assisted by Dr. Samuel Bickel, of Norristown, Pa.

The tuberculin used at all the examinations was that prepared at the Bio-chemical Laboratory at Washington, under the direction of the Bureau of Animal Industry. This differs from the imported tuberculin, prepared according to Prof. Koch's formula, in being more highly diluted and ready for immediate use. Tuberculin is the concentrated, sterilized liquid in which the bacillus tuberculosis has been grown, and contains the ptomaines and other toxic substances generated by the bacilli in their growth. It contains no living bacilli, all germs having been killed by exposure to a high temperature for a prolonged period, until the liquid is evaporated to one-tenth of its original volume. It is then filtered through a solid porcelain filter and the filtrate diluted with a weak carbolic-acid solution—this acts as a preservative. The condensation of the liquid kills the bacilli, and all possibility of the disease being acquired by injection of tuberculin is done away with. According to Koch and others, one must have tubercle bacilli in a living state to originate the disease. The ptomaines and toxines contained in the solution cannot of themselves originate tuberculosis.

I. For the purpose of injecting a veterinarian's hypodermic syringe was used, and the needles employed were carefully disinfected before and after each injecting, with cosmoline, prepared with the admixture of a 5 per cent. solution of creolin. The stall was entered at the right side of the animal, the left hand placed over the neck and the skin in front of shoulder after it had been thoroughly cleansed was pinched up and the needle of syringe inserted with the right hand and injection made. Care was taken that the needle plunged sufficiently deep so that all local irritation from failure of absorption might be obviated. Unless this rule is observed the animal may not get the full dose; the resulting temperature would in that case be inaccurate. It is possible that some of the failures in the tuberculin reaction may be ascribed to this cause.

II. Quantity of tuberculin injected varied in each case according to the size, age and general condition of the animal; the calves and young stock receiving a much smaller dose than the cows and bulls. The smallest quantity injected was ten (10) minims and the largest forty (40); the average dose was thirty (30) minims.

III. Animals in heat or parturition, or sick from any cause, should not be injected, as the rise of temperature, if any takes place, would not necessarily be indicative of tuberculosis. It is possible, in examining a number of animals, that an occasional one will escape observation and be injected; in such cases the animals should be set aside until cause is removed; they should then be re-tested. This should also be done where there is any doubt as to reaction, as it is better to err by over-carefulness than to condemn a sound animal.

IV. On the day appointed for test the animals were not allowed out of stables. The early evening was selected to make injections, as the normal temperature is higher at that time, and all mistakes as to actual amount of reaction would be eliminated—the rise occurring from 8 to 10 hours after injection, at a time when the temperature is at its lowest.

V. To obtain an average temperature by which to calculate the amount of reaction, if any occurred following the injection of tuberculin, the temperature was taken for a period of 3 to 4 hours before test was applied.

VI. Temperature taken hourly for a period of 8 hours or more, according to case; beginning 9 to 10 hours after injection of tuberculin. If the rise occur early and the temperature commences to go down it is not necessary to keep on taking it, as no further rise of temperature need be expected.

VII. Immediately following each test the condemned animals were separated from the others, until such time as they were to be killed.

The dates of various testings and the number of animals injected each time is tabulated as follows :

TABLE I.
DATES OF EXAMINATION AND NUMBER INJECTED.

Number of Test.	Date of Examination.	Total Number Injected.
I.	June 1st, 1894.	41.
II.	" 11th, "	6.
III.	" 13th, "	54.
IV.	" 15th, "	46.
V.	" 21st, "	40.
VI.	July 10th, "	6.
VII.	Oct. 30th, "	40.
Total Number of Injections.....		233

TABLE II.—NUMBER CONDEMNED AND SOUND AT EACH TEST.

Number of Test.	Date of Test.	Total Number Infected.	New Stable.				Old Stable.				Box Stalls.			Young Stock.		
			Total Number.	Sound.	Condemned.	To be Re-tested.	Total Number.	Sound.	Condemned.	To be Re-tested.	Total Number.	Sound.	Condemned.	Total Number.	Sound.	Condemned.
I.	5, 1894.	41	1	.....	.....	.....	7	32	2	.....	.....	.....	.....	.....	.....
II.	6, 11, "	6	.....	1	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....
III.	6, 13, "	54	39	9	.....	26	4	11	.....	.....	.....	.....	.....	.....	.....
IV.	6, 15, "	46	3	.....	3	.....	8	27	2	.....	.....	.....	.....	.....	.....
V.	6, 21, "	40	19	9	.....	8	2	4	.....	.....	.....	.....	.....	.....	.....
VI.	7, 10, "	6	5	4	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....
		193	67	22	39	6	23	76	4	6	4	2	17	16	1	

Altogether, there were 233 injections of tuberculin, representing 183 individual animals. The last testing, October 30th, will be omitted at present, as at that time there were no new animals injected. During the first six (6) tests 193 injections were made on the 183 animals, with the result that 118 were condemned as being tubercular and 65 declared apparently sound. There were 10 marked for re-testing—these were not included in the total number condemned and sound until this had been done.

The animals were classified according to the stables they occupied, except in the case of the young animals 17 in number; these were given a separate division, from the fact that they had lived in all the stables at different periods and it was impossible to obtain accurate information regarding length of time in each. The "box stalls" contained 2 Mixed Jerseys, just purchased; 2 Holstein bulls that had been kept there a long time, and 2 cows that had just calved. The 2 animals condemned were the Holstein bulls, the others being apparently sound.

The six (6) animals injected June 11th, 1894, were selected by physical diagnosis as being positively tubercular, and were injected simply for uniformity in examinations and to compare the two methods in a general way. The animals injected July 10th, with two exceptions, were some of those noted in the column to be re-tested.

TABLE III.
BREED.

Breed.	Total Number.	New Stable.			Old Stable.			Box Stalls.		
		Total.	Sound.	Condemned.	Total.	Sound.	Condemned.	Total.	Sound.	Condemned.
Common	73	.....	.....	.....	72	18	54	1	1	.....
Holstein	36	32	15	17	2	.....	2	2	.....	2
Grade Holstein.....	25	23	5	18	1	.....	1	1	1	.....
Jersey.....	10	5	1	4	5	.....	5	.....	.....	.....
Mixed Jersey.....	14	1	1	.....	11	4	7	2	2	.....
Mixed Durham.....	8	.....	.....	.....	8	1	7	.....	.....	.....
	166	61	22	39	99	23	76	6	4	2

The greatest number of any one breed were common cows. These were kept in the old stable, and of 73 animals 54 were condemned. The Holsteins, 36 in number, were kept in the new stable chiefly—the 4 in the old stable and "box stalls" being Holstein bulls; and these latter were condemned at first testing.

The Grade Holsteins were kept in new stable also, with one exception, as the animal marked in the "box stalls" belonged really in the new

stable. Jerseys, 10 in number, chiefly young animals, were divided between the two stables, whereas the majority of the Mixed Jerseys and all the Durhams belonged to the herd in the old stable.

TABLE IV
RESIDENCE ON PLACE.

Breed.	Stables.	Old Herd.		1893.		1894.		Raised.		Total Number.
		Condemned.	Sound.	Condemned.	Sound.	Condemned.	Sound.	Condemned.	Sound.	
I. Common	Old Stable.	32	4	20	9	2	5	.....	.....	72
	Box Stalls.	.....	1	.....	.....	.....	.....	.....	.....	1
	New Stable.	9	8	1	.....	.....	.....	7	7	32
II. Holstein	Old " .....	.....	.....	.....	.....	.....	.....	2	.....	2
	Box Stalls.	.....	.....	1	.....	.....	.....	1	.....	2
	New Stable.	1	.....	2	1	.....	.....	15	4	23
III. Grade Holstein.....	Old "	1	.....	.....	.....	.....	.....	.....	.....	1
	Box Stalls.	.....	.....	.....	.....	.....	.....	.....	1	1
	New Stable.	.....	.....	2	.....	.....	.....	2	1	5
IV. Jersey	Old "	5	.....	.....	.....	.....	.....	.....	.....	5
	New " .....	.....	.....	.....	1	.....	.....	.....	.....	1
	Old "	2	.....	5	3	.....	1	.....	.....	11
V. Mixed Jersey	Box Stalls.	.....	.....	.....	.....	.....	2	.....	.....	2
	Old Stable.	5	1	2	.....	.....	.....	.....	.....	8
VI. Mixed Durham	Old Stable.	5	1	2	.....	.....	.....	.....	.....	8
		55	14	33	14	2	8	27	13	166

TABLE V
AGE OF ANIMALS INJECTED.

	1 Year and Under.	2 Years.	2½ Years.	3 Years.	4 Years.	5 Years.	6 Years.	7 Years.	8 Years.	9 Years.	10 Years.	11 Years.	12 Years.	14 Years.
Condemned	7	11	7	7	1	7	20	10	21	7	13	4	2	1
Sound	23	4	2	1	3	6	4	3	5	5	5	2	2	.....
Total	30	15	9	8	4	13	24	13	26	12	18	6	4	1

TABLE VI.
SEX.

Date.	Bulls.			Cows.			Heifers.			Yearlings.			Calves.		
	Condemned.	Sound.	Total.	Condemned.	Sound.	Total.	Condemned.	Sound.	Total.	Condemned.	Sound.	Total.	Condemned.	Sound.	Total.
June 5th, 1894.....	.....	.....	.....	33	8	41	.....	.....	.....	.....	.....	.....	.....	.....	.....
“ 12th, “	1	.....	1	5	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
“ 13th, “	4	1	5	21	13	34	12	3	15	.....	.....	.....	.....	.....	.....
“ 15th, “	6	.....	6	26	13	39	.....	1	1	.....	.....	.....	.....	.....	.....
“ 21st, “ .....	.....	.....	.....	.....	2	2	2	2	4	6	5	11	1	16	17
July 10th, “ .....	.....	.....	.....	.....	.....	.....	1	1	2	.....	.....	.....	.....	.....	.....
Total	11	1	12	85	36	121	15	7	22	6	5	11	1	16	17

TABLE IV.—There were 72 common cows in the old stable, of these 54 were condemned; 32 of which belonged to the “old herd”—that is they had been on the place over a year and a half. They were so designated, as it was difficult to obtain accurate data in many of the cases owing to change of herdsman. 20 were bought at different times during 1893 and 2 during 1894. Among those pronounced sound there were but 4 of the “old herd” and 9 of those added in 1893, whereas of those purchased in 1894, 5 escaped. This would seem to indicate that the majority of these animals became infected on the place. Many of them probably had tubercular lesions when purchased—either active or latent—and that these increased rapidly when animals were confined in stables some time, would seem probable from the large number condemned of those bought in 1893 compared with those of 1894. It will also be noticed in the autopsy records that, as a rule, the animals on the place a short time had very few deposits, or else that these were in a beginning stage. The common cow occupying a “box stall” belonged to the “old herd” and was usually kept in the old stable, but was changed for the purpose of calving.

Of the 36 Holsteins, 21 were condemned—among these were the 2 bulls in the old stable and 2 in the “box stalls”—the 2 in the old stable and 1 of those in the “box stalls” were raised on the place; the fourth was bought in 1893. Of the 14 young Holsteins raised on the place 7 were condemned and 7 were pronounced sound.

Grade Holsteins, 25 in number, 1 belonging to the “old herd” lived in the old stable, and 1 raised occupied a stall in the side stable for the purpose of calving. Of the other 23, 19 were raised, 1 belonged to “old herd” and 3 were bought in 1893, 2 of these latter being condemned, 1 pronounced sound. Of the Grades raised 15 were condemned. This is a large percentage, but is in keeping with the fact

that the young animals, especially those raised on the place, had the greatest number diseased. When the 3 Jerseys are added that were also raised, 2 of which were condemned, it will be seen that 27 out of 40 animals were condemned—67½ per cent. These were all born and brought up on the place and spent the greater part of their time in the new stable where the hygienic surroundings are good. It will be seen later that among these were some of the most marked tubercular cases. The remaining 7 condemned all lived in the old stable, 2 belonging to the “old herd,” and the other 5 purchased in 1893.

But one of the Mixed Durhams escaped condemnation. This one was an animal belonging to the old herd. Of those condemned 5 belonged to the old herd and 2 were purchased in 1893.

Taking entire number—166—there were 70.48 per cent. condemned. Of these 33.13 per cent. belonged to old herd, 19.87 per cent. of animals purchased in 1893, 1.27 per cent. of those bought in 1894, and 16.20 per cent. of those raised.

Breed.—It is impossible to draw any conclusions as to susceptibility of various breeds in this herd from the fact that the disease was so widely disseminated, and the majority of cases belonged to the common class. Dividing them, however, into two sets it will be seen that the common cows, Mixed Jerseys and Mixed Durhams had about one-third more animals condemned than the Holstein, Grade Holstein and Jerseys. In the first place 40.96 per cent. and in the second 29.51 per cent. being condemned, making a total of 70.47 + per cent. condemned in the 166 animals.

TABLE V.—It will be seen that the greatest number of any one age was 30—this averaged from 6 months to 1 year—and that the smallest number was 1 animal aged 14 years; also that the greatest number condemned of any one year was 21 at 8 years of age, and the smallest number condemned was 1 animal each for 4 and 14 years. The following are the average percentages condemned of the 118 animals, 6 and 8 years having the largest numbers :

17.79	per cent.,	8 years.
16.94	“	6 “
11.01	“	10 “
9.32	“	2 “
8.47	“	7 “
5.93	“	1, 2½, 3, 5 and 7 years.
3.39	“	11 years.
1.65	“	12 “
.84	“	4 and 14 years.

Taking the animals from 1 year and under to 7 years inclusive there were 116 in number and 59.32 per cent. of the 118 condemned belonged to this class, while 40.67+ per cent. belonged to the 67 animals

from 7 to 14 years, showing that the disease was not quite equal in its distribution in the two classes.

TABLE VI.—There were 12 bulls on the place, not counting several among the young stock. Of these 11 were condemned at first testing, the youngest, a Holstein aged one year, escaping. With the exception of 3 Jerseys they were all Holsteins; 9 bulls were either raised or belonged to the old herd, and 3 were purchased in 1893.

The percentage of the bulls condemned is high compared with the number on the place, but then one must take into consideration that with the exception of 2 in the "box stalls" they all lived in stables where there were a number of tubercular animals, and also that the majority were on the place some time—that they were not changing constantly as in the case of some of the common animals. Comparing the number with the 118 condemned animals it will be seen that 9.32 per cent. were bulls.

Cows.—72.03 per cent. of those condemned were cows, Table VI giving the number condemned and sound at each test.

Heifers.—12.71 per cent. of total number condemned at first testing and yearlings 5.08 per cent. The balance, 0.84 per cent., being the number of calves condemned.

TABLE VII.—ANIMALS CONDEMNED FOLLOWING SINGLE INJECTION OF TUBERCULIN.

Case Number.	Breed.	Age.	Period of Resistance.	Average Temperature before Injection.	Number of hours after Injection when temperature first exceeded maximum of previous day.	Number of hours after Injection during which temperature was higher than on the previous day.	Maximum Temperature after Injection.	Number of hours to maximum temperature after Injection.	Amplitude of Reaction above average.	Amplitude of Reaction above maximum of previous day.	Date of Injection.	Date of Autopsy.
1	Common.	8 years	2 years	101	10	17	106.2	13	5.2	5.1	6, 5, 1894.	6, 7, 1894.
2	Mixed Jersey.	6 "	1 year	101.1	9	16	106.3	13	5.2	4.3	6, 5, "	6, 21, "
3	Jersey.	6 "	2 years	102.2	8	14	106.1	10	3.4	3.2	6, 5, "	6, 19, "
4	Common.	8 "	2 years	101.4	10	16	106	11	4.1	4	6, 5, "	6, 25, "
5	Mixed Jersey.	5 "	1 year	101.1	10	15	107	13	5.4	5.1	6, 5, "	6, 22, "
6	Do.	6 "	1 year	101.4	10	16	107	13	5.1	5	6, 5, "	7, 24, "
7	Common.	9 "	2 years	102	10	16	107.2	13	5.2	5	6, 5, "	7, 20, "
8	Do.	9 "	2 years	101.4	10	16	106.1	16	4.2	3.4	6, 5, "	7, 20, "
9	Durham.	8 "	2 years	102.4	10	16	107	13	4.1	4	6, 5, "	7, 20, "
10	Common.	6 "	1 year	101	12	17	105	16	4	3.3	6, 5, "	6, 8, "
11	Do.	10 "	2 years	102.3	10	16	106.3	10	4	3.3	6, 5, "	7, 20, "
12	Do.	8 "	1 year	101	10	17	105.4	17	4.4	4.2	6, 5, "	7, 24, "
13	Do.	6 "	1 year	102.3	10	14	107	11	4.2	4	6, 5, "	7, 19, "
14	Do.	8 "	2 years	102	10	16	107.4	12	5.4	5.3	6, 5, "	7, 9, "
15	Common.	7 "	1 year	101.4	10	16	107.2	13	5.3	5.2	6, 5, "	7, 20, "
16	Do.	6 "	2 years	101	10	16	106.3	14	5.3	5.2	6, 5, "	7, 24, "
17	Jersey.	8 "	1 year	101.2	10	17	105.3	13	4.1	4	6, 5, "	6, 22, "
18	Common.	6 "	2 years	101.3	10	16	105.2	11	3.4	3.2	6, 5, "	6, 8, "
19	Do.	8 "	2 years	101.4	10	17	106	14	4.1	4	6, 5, "	6, 9, "
20	Jersey.	10 "	2 years	102	11	16	106	13	4	3.3	6, 5, "	6, 8, "
21	Common.	10 "	2 years	102	10	16	106.1	12	4.1	4.1	6, 5, "	6, 26, "
22	Do.	12 "	1 year	101	10	16	105.4	14	4.4	4.2	6, 5, "	6, 25, "
23	Do.	6 "	2 years	101.2	10	16	105.1	14	3.4	3.1	6, 5, "	6, 9, "
24	Do.	8 "	2 years	101	12	16	105.1	13	4.1	3.4	6, 5, "	6, 8, "
25	Do.	6 "	1 year	101.4	10	16	106.4	12	5	4.4	6, 5, "	6, 26, "
26	Do.	5 "	1 year	101.1	10	16	106.3	12	5.2	5	6, 5, "	6, 12, "
27	Do.	6 "	1 year	101.2	10	16	108	12	6.3	6.2	6, 5, "	6, 7, "
28	Do.	10 "	2 years	100.4	13	17	105.1	16	4.2	3.4	6, 5, "	6, 9, "
29	Do.	7 "	2 years	101.1	10	16	107	13	5.4	5.3	6, 5, "	6, 26, "
30	Do.	8 "	2 years	100.3	10	16	106.3	16	6	5	6, 5, "	6, 12, "

TABLE VII.—CONTINUED.

Case Number.	Breed.	Age.	Period of Resistance.	Average Temperature before Injection.	Number of hours after Injection when temperature first exceeded maximum of previous day.	Number of hours after Injection during which temperature was higher than on the previous day.	Maximum Temperature after Injection.	Number of hours to maximum temperature after Injection.	Amplitude of Reaction above average.	Amplitude of Reaction above maximum of previous day.	Date of Injection.	Date of Autopsy.
31	Jersey.	6 years.	2 years	102.3	10	16	106.1	13	3.3	3.1	5, 1894.	7, 24, 1894.
32	Common.	14 "	2 years	101	12	17+	104.4	14	4.4	4.4	5, "	"
33	Mixed Jersey.	7 "	2 years	101	11	18+	106.2	13	5.2	5.2	6, 11, "	6, 13, "
34	Common.	8 "	2 years	103	10	18	105	14	1.4	1.4	6, 21, "	6, 21, "
35	Do.	10 "	2 years	101.2	10	18	104	11	2.3	2.1	6, 11, "	6, 13, "
36	Holstein.	10 "	2 years	101.4	10	18	105.3	13	3.4	3.3	6, 11, "	6, 13, "
37	Common.	9 "	2 years	101.2	10	18+	106.3	14	5.1	5.1	6, 11, "	6, 21, "
38	Jersey.	3 "	2 years	103	10	18	105.2	14	2.2	2.2	6, 11, "	6, 21, "
39	Holstein.	9 "	2 years	101	10	14+	107	13	6	5.3	6, 13, "	6, 28, "
40	Do.	11 "	2 years	101	10	14	106.3	12	5.3	5.3	6, 13, "	6, 28, "
41	Do.	8 "	2 years	101.2	10	14+	106.4	14	5.2	4.4	6, 13, "	6, 28, "
42	Do.	6 "	2 years	101.2	10	14+	106.3	14	5.1	4.3	6, 13, "	6, 28, "
43	Do.	2½ "	2 years	101.3	10	14+	106.3	14	5.1	4.3	6, 13, "	6, 28, "
44	Do.	6 "	2½ yrs.	102.1	10	14	106.1	14	4.3	4.2	6, 13, "	6, 21, "
45	Do.	5 "	2 years	101	10	14	105.2	10	3.1	3	6, 13, "	6, 28, "
46	Do.	11 "	2 years	100	10	14	107	12	6	5.3	6, 13, "	6, 15, "
47	Do.	6 "	2 years	101	10	14	106.2	12	6.2	6.2	6, 13, "	6, 28, "
48	Do.	6 "	2 years	102	10	14+	106.3	14	5.3	5.1	6, 13, "	6, 15, "
49	Grade.	2½ "	2½ yrs.	102	10	14+	107	12	5	4.4	6, 13, "	6, 15, "
50	Do.	4 "	1 year	101	10	14	106	12	5	5	6, 13, "	6, 15, "
51	Do.	10 "	2 years	101	12	14+	105	14	4	3.3	6, 13, "	6, 26, "
52	Do.	2½ "	2½ yrs.	101.3	10	14+	106.2	12	4.4	4.2	6, 13, "	6, 25, "
53	Do.	6 "	1 year	101	10	14+	107	12	6	6	6, 13, "	6, 25, "
54	Holstein.	2 "	2 years	103	12	14+	106.3	14	3.3	3.3	6, 13, "	6, 22, "
55	Do.	2 "	2 years	103.2	10	14+	106.2	11	3	2.1	6, 13, "	6, 22, "
56	Do.	2 "	2 years	102.2	10	14	106.3	11	4.1	3.3	6, 13, "	6, 22, "
57	Grade.	2 "	2 years	102.2	10	14+	107.1	13	4.4	4.2	6, 13, "	7, 20, "
58	Do.	2 "	2 years	101.3	10	14+	105.2	12	3.4	3.2	6, 13, "	6, 26, "
59	Do.	2 "	2 years	101.1	10	14+	107	13	5.4	5.3	6, 13, "	6, 21, "
60	Do.	2 "	2 years	101.3	12	14+	106	14	4.2	4	6, 13, "	6, 25, "
			2 years	102.2	10	14	106.3	14	4.1	4	6, 13, "	6, 26, "

TABLE VII.—CONTINUED.

Case Number.	Breed.	Age.	Period of Resistance.	Average Temperature before Injection.	Number of hours after Injection when Temperature first exceeded maximum of previous day.	Number of hours after Injection during which Temperature was higher than on the previous day.	Maximum Temperature after Injection.	Number of hours to maximum Temperature after Injection.	Amplitude of Reaction above average.	Amplitude of Reaction above maximum of previous day.	Date of Injection.	Date of Autopsy.
61	Grade.	2 years.	2 years	102	10	14	106.1	13	4.1	4.1	6, 13, 1894.	6, 25, 1894.
62	Do.	2½ "	2½ years	102	10	17	105.3	13	3.3	3.3	6, 13, " "	7, 19, " "
63	Do.	2½ "	2½ years	102	10	14	106.2	13	4.2	4.1	6, 13, " "	7, 20, " "
64	Do.	2½ "	2½ years	102.2	10	15	108.2	12½	6	6	6, 13, " "	6, 21, " "
65	Holstein.	2½ "	2½ years	102.3	10	14	106.1	11	3.3	3.1	6, 13, " "	6, 29, " "
66	Common.	2½ "	2½ years	101	10	14	107	13	6	5.3	6, 13, " "	6, 26, " "
67	Do.	8 "	2 years	101.2	10	14	107.1	12	5.4	5.3	6, 13, " "	6, 22, " "
68	Do.	9 "	2 years	101.2	10	14	107	12	5.3	5.3	6, 13, " "	6, 26, " "
69	Do.	5 "	1 year	101.3	10	14	106.3	11	5	4.3	6, 13, " "	6, 27, " "
70	Do.	7 "	1 year	101.2	10	14	107.2	14	6	6	6, 13, " "	6, 28, " "
71	Do.	6 "	1 year	101.2	10	14	108	14	6.3	6.3	6, 13, " "	6, 28, " "
72	Do.	7 "	1 year	101.2	13	17	105.4	17	4.2	4.1	6, 13, " "	6, 25, " "
73	Do.	11 "	1 year	101.2	10	14	107.2	14	5.1	5.1	6, 13, " "	7, 19, " "
74	Grade.	7 "	2 years	101	10	14	105.1	14	4.1	4	6, 13, " "	6, 27, " "
75	Common.	9 "	2 years	101	10	14	107.2	14	6.2	6	6, 13, " "	6, 28, " "
76	Do.	11 "	2 years	101	10	14	107.2	12	4.4	4.4	6, 13, " "	6, 22, " "
77	Holstein.	3 "	3 years	101.3	10	14	106.2	12	4.4	4.4	6, 15, " "	6, 20, " "
78	Common.	6 "	2 years	101	10	14	106.2	12	5.2	4.4	6, 15, " "	6, 20, " "
79	Do.	10 "	2 years	101.3	12	14	106	13	4.2	4	6, 15, " "	6, 29, " "
80	Do.	9 "	2 years	101.1	10	14	106.2	13	5.1	5	6, 15, " "	6, 27, " "
81	Do.	7 "	2 years	101.2	10	14	105.2	13	4	3.4	6, 15, " "	6, 18, " "
82	Do.	10 "	2 years	102	10	14	107	12	5	4.2	6, 15, " "	6, 20, " "
83	Mixed Jersey.	7 "	2 years	101.2	11	14	105.4	13	4.2	4.2	6, 15, " "	6, 27, " "
84	Common.	10 "	2 years	102	10	14	106.2	13	4.2	4.1	6, 15, " "	6, 20, " "
85	Do.	8 "	2 years	101.2	10	13	106.2	13	5	4.2	6, 15, " "	6, 20, " "
86	Mixed Jersey.	6 "	1 year	101.2	10	14	106	13	4.3	4	6, 15, " "	6, 27, " "
87	Common.	7 "	1 year	101.3	10	14	106.1	13	4.3	4.1	6, 15, " "	6, 27, " "
88	Do.	7 "	1 year	101.2	10	18	104.2	17	3	2.4	6, 15, " "	6, 20, " "
89	Durham.	5 "	2 years	101.2	10	14	107.1	12	5.4	5.3	6, 15, " "	6, 25, " "
90	Common.	8 "	2 years	101.2	10	14	105.4	13	4.2	4.1	6, 15, " "	6, 27, " "
	Durham.	8 "	2 years	102	12	17	105	16	3	1.2	6, 15, " "	6, 26, " "

TABLE VII.—CONTINUED.

Case Number.	Breed.	Age.	Period of Resistance.	Average Temperature before Injection.	Number of hours after Injection when temperature first exceeded maximum of previous day.	Number of hours after Injection during which temperature was higher than on the previous day.	Maximum Temperature after Injection.	Number of hours to maximum temperature after Injection.	Amplitude of Reaction above average.	Amplitude of Reaction above maximum of previous day.	Date of Injection.	Date of Autopsy.
91	Common.	12 years.	2 years	101.3	12	17	106	16	4.2	3.4	6, 15, 1894.	6, 18, 1894.
92	Do.	8 "	2 years	101.2	12	15	105	15	3.3	2.3	6, 20, "	6, 20, "
93	Do.	8 "	4 months	101.2	13	15	105	15	3.3	3.1	6, 25, "	6, 25, "
94	Do.	8 "	4 months	101.3	10	13	106.3	12	5	4.3	6, 15, "	6, 18, "
95	Durham.	9 "	2 years	102	10	13	105.3	13	3.3	3.2	6, 15, "	6, 20, "
96	Common.	8 "	2 years	102.2	10	14	107	13	4.3	4.2	6, 20, "	6, 20, "
97	Do.	10 "	2 years	102.3	10	13	107.1	13	4.3	4.1	6, 20, "	6, 20, "
98	Durham.	5 "	1 year	102.3	10	13	105.2	13	2.4	2.2	6, 15, "	6, 25, "
99	Common.	5 "	1 year	102.3	10	15	107.1	12	6.1	5.3	6, 15, "	6, 26, "
100	Do.	10 "	1 year	101	10	13	107.1	12	3	2.4	6, 15, "	6, 26, "
101	Do.	8 "	1 year	102	12	18	105	18	4.1	3.4	6, 15, "	6, 21, "
102	Mixed Jersey.	8 "	2 years	101.2	13	15	105.3	15	5.1	5	6, 15, "	7, 24, "
103	Holstein.	10 "	1 year	102.1	10	14	106.2	13	5.3	5.3	6, 15, "	6, 29, "
104	Holstein.	2 "	2 years	101.2	10	14	107	10	5.3	3	6, 15, "	6, 29, "
105	Do.	3 "	1 year	101.3	12	18	105	17	3.2	3	6, 15, "	6, 29, "
106	Jersey.	1 1/4 "	1 year	101.1	10	14	106.2	12	5.1	5	6, 15, "	6, 22, "
107	Holstein.	3 "	1 year	101.1	10	14	107	12	5.4	5.3	6, 15, "	6, 22, "
108	Jersey.	6 "	2 years	101.1	10	14	105	13	3.3	3.2	6, 15, "	6, 22, "
109	Holstein.	6 "	1 year	101.2	11	14	105	13	2.3	2.3	6, 21, "	6, 23, "
110	Grade.	1 "	1 year	103	13	16	105.3	15	2.3	2.3	6, 21, "	6, 23, "
111	Holstein.	1 "	1 year	102.3	10	14	106.2	13	3.4	3.2	6, 21, "	6, 23, "
112	Do.	11 mos.	1 year	103	10	14	107	13	4	4	6, 21, "	6, 23, "
113	Jersey.	11 "	11 months	102.3	10	14	105.4	11	3.1	3.1	6, 21, "	6, 23, "
114	Do.	11 "	11 months	102.4	10	16	105.2	13	2.3	2.2	6, 21, "	6, 23, "
115	Grade.	11 "	11 months	102.1	10	15	105.2	12	3.1	2.3	6, 21, "	6, 23, "
116	Do.	3 years.	3 years	102.1	10	15	105.1	12	3	2.2	6, 21, "	6, 23, "
117	Holstein.	2 "	2 years	103	10	16	105.2	16	2.2	2.2	6, 21, "	6, 23, "
	Grade.	8 mos.	8 months	102.4	10	12	108	15	5.1	3.3	6, 21, "	6, 23, "
		3 years.	3 years	102	10	15	106.3	15	4.3	4.1	6, 21, "	6, 23, "

TABLE VII.—Case numbers are the same in all the tables; the herd numbers are not used, as many of them were duplicates, distinguished by difference of breed. The periods of residence in many of the cases are approximate only, varying within a month or so. All over 2 years, marked with a + sign, indicate old herd animals. The temperatures in this and all the tables are reckoned in fifths.

The general average for all the condemned animals was 102.3° This will be found one-fifth of a degree less than that for the sound animals, which was 102.4° The lowest average temperature obtained before injection was 100°, whereas the highest was 103.2°

The majority, 79.84 per cent., had a rise in temperature ten hours after injection exceeding maximum of previous day. From the following summary it will be seen that these cases correspond with those of others who say it is unnecessary to take the temperature for first eight hours following injection of tuberculin; hence the advantage of injecting animals in the evening and commencing early next morning to take temperatures and continue until all doubt as to reaction is past. Eight hours after injection, according to observations in this herd, is soon enough to commence taking the temperature.

8 hours.....	1	11 hours.....	4
9 "	1	12 "	13
10 "	93	13 "	5

Number of hours to maximum temperature varies, the majority, 33.33 per cent., reaching their highest at thirteen hours following injection. The earliest period, ten hours, had four cases; but these remained up several hours after as well. The latest period was eighteen hours after injection—one animal.

The following is the temperature chart of this animal; she had a peculiarly irregular temperature following injection. This irregularity was met with in but few cases, there being, as a rule, a gradual rise and subsequent fall.

COMMON COW, 10 YEARS OLD; WEIGHT 800 LBS.; BOUGHT IN 1893.

June 15th. Temperature before Injection.			June 16th. Temperature following Injection.							Date of Au- topsy.
4 hrs.	2 hrs.	1 hr.	10 hrs.	12 hrs.	13 hrs.	15 hrs.	16 hrs.	17 hrs.	18 hrs.	
101.3	102.1	102	102.1	104.4	103	103.2	104.1	104.3	105	June 26, '94.

Liver, Hepatic and Posterior Mediastinal Glands affected. No deposits in Lungs.

Therefore in from 12 to 14 hours following injection of tuberculin one may expect the temperatures of the majority of the animals to reach their maximum ; but by no means all, as will be seen in the summary.

10 hours after Injection.....	4	15 hours after Injection.....	6
11 " " "	11	16 " " "	7
12 " " "	27	17 " " "	4
13 " " "	39	18 " " "	1
14 " " "	18		

In a number of the cases the hour when the temperature was last taken is followed by a + sign ; this indicates that the temperature at that time was still higher than on the previous day. The reaction being positive and the time limited it was not considered necessary to keep on taking it.

It will also be noted in Table VII that the higher the reaction the sooner it occurred in the majority of the cases.

The average temperature of the condemned animals following injection was 106.1° The maximum temperature was 108.2°; the minimum temperature 104° That there was no relation between the temperature and the amount of the disease will be seen later. The temperatures as a rule were high, 80 animals having a reaction from 106° to 108.2° whereas but 37 had a temperature of from 104° to 105.4°.

There were 17 animals with temperatures of 107° and 15 each for 106.2° and 106.3°; 8 each for 106.1°, 106° and 105.2°; the balance being divided in smaller numbers.

Amplitude of Reaction.—The lowest temperature that condemned any of these animals was 2°; the highest 6.3° The greatest number condemned between any two degrees was 40,—104° to 104.4° Summary:

2° to 2.4°.....	7	5° to 5.4°.....	35
3° to 3.4°.....	23	6° to 6.3°.....	12
4° to 4.4°.....	40		

These are the reactions above the average temperatures of the previous day; there being some difference when the maximum is considered.

For various reasons ten (10) animals were set aside to be re-tested. The first was a common cow, aged 8 years, belonging to the old herd. As will be seen in Table VIII she reacted decidedly June 5th, but as she was springing there was a certain element of doubt, and it was deemed best to re-test her. Her temperature before injection was high both times, and in the light of the latter examination the first was undoubtedly a reaction to tuberculin and high temperature not due to springing alone. Then, too, it is of interest that the temperature did not rise as high following the second injection as it did after the first. It has been noted by many that this is frequently the case, especially after repeated injections, the equilibrium established by the animal to a certain amount of toxins not being as easily disturbed. Autopsy took place July 19th, 1894; animal markedly tubercular.

TABLE VIII.
CASE NO. 119—COMMON COW, 8 YEARS OLD.

Date of Injection.	Number of Hours before Injection.			Number of Hours after Injection.							Date of Autopsy.
	4	2	1	10	11	12	13	14	16	17	
6, 5, 1894.	104	104	104	105	105.4	106.2	107	106.4	106	.....	July 19th, 1894.
7, 10, "	103.3	103.3	103	102.3	102.3	103.3	104	105.1	105.4	105.3	

The next case, Table IX, is of interest from the fact that several veterinarians thought the animal diseased, although twice tuberculin failed to give characteristic reaction. In order to decide whether the physical examination or the tuberculin test were the correct one the animal, a Mixed Jersey, 7 years old, bought in 1893, was killed July 24th and found to be free from tubercular deposits. This case shows clearly that physical examination in the detection of tuberculosis is of little value unless the disease is advanced or superficial, and even then it takes a very careful diagnostician to elimit all other pulmonary disturbances.

TABLE IX.
CASE NO. 125—MIXED JERSEY, 7 YEARS OLD.

Date of Injection.	Number of Hours before Injection.			Number of Hours after Injection.							Date of Autopsy.
	4	2	1	10	12	13	15	16	17	18	
6, 15, 1894.	101.3	101.2	101.2	101.2	101.2	101.2	101.3	101.2	101.3	101.4	July 24th, 1894.
6, 21, "	.....	101.3	101.3	101.3	101.3	101.3	102	101.2	101.3	.....

Table X gives another very interesting case, that of a common cow, No. 118, 8 years old, belonging to old herd. This cow was marked for re-testing June 5th, on account of her high temperature before injection. There was no cause for this, the animal apparently being in good health. The time elapsing between the different tests and between them and the date of the autopsy was sufficient to allow any latent deposits to manifest themselves.

If an average temperature had been taken as a standard and all reactions computed by it this animal would undoubtedly have been condemned, which would have been a mistake, as at the autopsy, December 24th, animal was perfectly sound. Therefore, to avoid all mistakes, it is better to consider each case individually.

TABLE X.
CASE NO 118—COMMON COW, 8 YEARS OLD.

Date of Injection.	Number of Hours before Injection.			Number of Hours after Injection.						Date of Autopsy.	
	4	2	1	10	11	12	13	14	16		17
6, 5, 1894.	103.1	104	104.4	101.2	102.3	102.2	103.1	104	104	103.2	December 24, 1894.
6, 21, "	.....	102	102	102	101.3	101.3	102	102	.....	.....
10, 30, "	.....	101.2	101.3	101.1	101.1	.....	101.2	101.2	.....	103

The other seven (7) animals marked for re-testing were injected with tuberculin October 30th, at which time 2 were condemned. The first, No. 124, a common cow, 8 years old, was marked as "*suspicious*" following a physical examination, although twice failing to react to tuberculin. It was therefore decided to keep her and test again. October 30th, following third injection of tuberculin the animal reacted and was condemned, and at the autopsy, November 5th, was found to be slightly diseased, the chief deposit being in the middle posterior mediastinal gland. Considering the time that elapsed from the first test, June 15th, to November 5th, it is highly probable that the deposits originated during that period. Besides, at the time the animal was condemned physically the one deposit in the left lung, at the junction of the upper and middle lobes, could not have been of sufficient size to give any physical signs. Then, too, this case is of interest from the fact that the animal had been on the place but a few months; purchased in 1894.

The second animal, No. 127 Holstein, 1 year old, raised on the place, was marked for re-testing on account of high temperature before injection of tuberculin. At the third testing she was condemned, and the autopsy notes will show that she was markedly diseased.

TABLE XI.

CASE NO. 124—COMMON, 8 YEARS OLD.

CASE NO. 127—HOLSTEIN, 1 YEAR OLD.

	Date of Injection.	Number of Hours before Injection.			Number of Hours after Injection.							Date of Autopsy.
		4	2	1	10	11	12	13	14	16	17	
1.	6, 15, 1894.	102	102.1	102.1	101.2	101.2	101.2	102	101.4	101.3	November 5th, 1894.
	6, 21, " "	.....	102.3	102.1	101.3	102	101.2	102	102	101.2	.....
	10, 30, " "	.....	101	101	104.1	.....	105.3	.....	105	.....	103.3
2.	6, 21, 1894.	104.2	104.2	104	105	104.1	103	105	103.2	November 9th, 1894.
	7, 10, " "	.....	103.4	103.1	103	101.4	101.4	102.3	103	103.4	105
	10, 30, " "	.....	102	102.1	106	.....	105.4	.....	105.2	.....	105.2

The other five (5) did not react to tuberculin except at first testing. Following this, however, they were set aside for re-testing for various reasons. One (1) had high temperature before injecting—no cause appreciable; one (1) was springing and three (3) menstruating.

No. 121, Holstein, 4 years old, was an undoubted case of failure in reaction to tuberculin, that is if one regards the high temperature in first test, June 13th, to be due to her condition—springing. Then, again, from the number and extension of the tubercular deposits found post-mortem, the animal should have had physical signs. This case probably escaped a careful examination, or else the amount of tuberculin injected was not sufficient in quantity.

No. 126, Holstein, 2 years old, re-tested because of high temperature preceding first injection of tuberculin, June 21st. There was no cause appreciable for this high temperature, and in the light of the other two tests it was not a reaction. This animal was killed January 3d, 1895, and at that time had but three pea-sized deposits, all firm, and as will be seen by the autopsy records, all in very early stage. These could have originated in the time elapsing between the last test (October 30th) and autopsy (January 3d) and were hardly responsible for the high temperature in the first test.

No. 120, Holstein, 2½ years old, and No. 122, Holstein, 10 years old, never reacted to tuberculin; the high temperature in both being due to condition—menstruating. One was killed November 21st, 1894, and the other January 3d, 1895. At the autopsies both had a few small deposits, but these could have developed in the time elapsing between the test and autopsy. The third animal, No. 123, Grade, 2 years old, re-tested also on account of menstruating, probably reacted at the third test, but the amount of reaction (1.4°) was too small to condemn her. In this case also the amount of disease was slight and could not have been considered the cause of first reaction.

TABLE XII.

CASE NO. 121—HOLSTEIN, 4 YEARS ; SPRINGING.
 CASE NO. 126—HOLSTEIN, 2 YEARS ; HIGH TEMPERATURE.
 CASE NO. 120—HOLSTEIN, 2½ YEARS ; MENSTRUATING.
 CASE NO. 122—HOLSTEIN, 10 YEARS ; MENSTRUATING.
 CASE NO. 123—GRADE, 2 YEARS ; MENSTRUATING.

Case No.	Date of Injection.	Number of Hours before Injection.			Number of Hours after Injection.							Date of Autopsy.
		4	2	1	10	11	12	13	14	16	17	
121.	6, 13, 1894.	102.3	102.4	103	103	103.1	103.2	103.2	104.2	104.2	January 3d, 1895.
	7, 10, " "	.....	102.3	102.3	101.4	101.3	102	102.3	102.4	102.1	.....
	10, 30, " "	.....	103	102.3	102	102	.....	101	.....	101.1	.....
126.	6, 21, 1894.	104	104	102.2	104	104	104.3	105.4	105.3	January 3d, 1895.
	7, 10, " "	.....	102.4	103	101.1	101.1	101.3	102	102.4	102.3	.....
	10, 30, " "	.....	101.3	101.2	102	102	.....	102	.....	102	102
120.	6, 13, 1894.	101.2	102	101.4	103	102	102	102	104	104	January 3d, 1895.
	6, 21, " "	.....	102.3	102.3	101.3	102	101.4	102.3	102.3	.....	.....
	10, 30, " "	.....	102	101.2	102.1	102	.....	101.2	.....	101.2	.....
122.	6, 13, 1894.	101.2	101.1	101.4	101.3	102.2	104	104	104	November 21, 1894.
	6, 21, " "	.....	102	101.2	102	102.1	101.3	102.1	102	.....	.....
	10, 30, " "	.....	101.4	102	101.2	101.2	.....	101	.....	101	.....
123.	6, 13, 1894.	103.2	102.4	102.2	103	103	104	105	105.1	104	December 31, 1894.
	6, 21, " "	.....	102.2	102.3	103	103	103	103.2	103.2	.....	.....
	10, 40, " "	.....	102	102	103.1	103.4	.....	103.4	.....	103.4	.....

June 21st, 1894, seventeen of the young animals were injected. But one of these reacted, a Holstein 8 months old. At the autopsy, June 23d, it was found to be markedly diseased. The mother of this calf was No. 39, Holstein, aged 9 years, condemned June 13th and killed June 21st; slightly diseased, mesenteric and posterior mediastinal glands chiefly involved (see autopsy notes). The father, Prince James, was killed the latter part of 1893, and, according to the butcher's statement, was perfectly sound.

TABLE XIII.

HOLSTEIN, 8 MONTHS ; RAISED.

Case Number.	Temperature. Number of Hours before Injection.			Temperature. Number of Hours after Injection.							Date of Autopsy.	
	4	2	1	10	11	12	13	14	16	17		
116	104.2	102.4	108	107	106.3	107	107.2	June 23d, 1894.

The next, Table XIV gives temperatures of sixteen young animals injected June 21st, 1894. When the balance of the herd were re-tested, October 30th, it was decided that the young animals had better wait a few months more ; but the results of autopsies on the animals declared sound, October 30th, being so unfavorable, it was thought best to sacrifice all the animals on the place. It has only been possible to give the date of autopsy and condition in seven cases ; the other nine were killed January 11th, 12th and 15th, 1895, but as the animals had lost their ear-tags during the summer's run it was impossible to identify each animal. However, this is not of as much importance as it might have been owing to the fact that the nine animals killed on these days were all sound. This table shows the high temperature of calves ; and contrasting the temperatures before and after injection one can readily see the difficulty in condemning young animals. Notice Case No. 175. This animal had a rise of 2.1° . If one considers lowest temperature before injection or calculating by average 103.4° there was barely 2° rise, which was not considered sufficient to condemn the animal ; and when killed, 7 months later, no lesions were found, the animal being perfectly sound.

TABLE XIV — TEMPERATURES OF SIXTEEN YOUNG ANIMALS, EXAMINED JUNE 21ST AND 22D, 1894.

Case Number	Breed	Age	Temperature. Number of Hours before Injection.				Temperature. Number of Hours after Injection.							Autopsy.	Condition.		
			4	2	1	10	11	12	13	14	16	17					
													10			11	12	13	14	16	17
167	Grade	8 months	.....	105	105	103.2	104	104	103.4	.....	.....	.....	.....	.....	.....	12, 24, 1894.	Sound.
168	Holstein	2 "	.....	105	104	103.1	103.2	104	103.4	.....	.....	.....	.....	.....	.....	1, 1895.	"
169	Grade	6 "	.....	104	104	103.3	103.2	103.2	103.2	.....	.....	.....	.....	.....	.....	1, 11, "	"
170	"	4 "	.....	104	103.1	102.3	103	103.1	103.2	.....	.....	.....	.....	.....	.....	1, 1894.	"
171	Holstein	3 "	.....	104	104	103	103.4	103.3	103.3	.....	.....	.....	.....	.....	.....	12, 18, 1894.	"
172	"	3 "	.....	105.1	104	103.2	103.4	104.1	104.1	.....	.....	.....	.....	.....	.....	12, 19, "	"
173	Jersey	3 "	.....	102.3	102.4	102.3	103	102.3	102.2	.....	.....	.....	.....	.....	.....	1, 12, 1895.	"
174	Holstein	6 "	.....	103	103	103	103.2	104.3	104.2	.....	.....	.....	.....	.....	.....	1, 3, "	"
175	"	6 "	.....	103.3	104	105.2	105.4	105.3	105	.....	.....	.....	.....	.....	.....	1, 12, "	"
176	"	8 "	.....	103.2	102.2	104	104.2	103.4	104	.....	.....	.....	.....	.....	.....	1, 12, "	"
177	"	4 "	.....	103.3	104	103.2	103.4	103	103.3	.....	.....	.....	.....	.....	.....	1, 1, "	"
178	"	4 "	.....	104	104	103.2	103.4	103	103	.....	.....	.....	.....	.....	.....	1, 1, "	"
179	Grade	7 "	.....	104	104	103	104.2	104	103	.....	.....	.....	.....	.....	.....	1, 1, "	"
180	"	6 "	.....	104	103.2	103	102.2	103	102.2	.....	.....	.....	.....	.....	.....	1, 1, "	"
181	"	5 "	.....	103.2	103.2	102	102.3	103.2	102.3	.....	.....	.....	.....	.....	.....	1, 1, "	"
182	"	8 "	.....	103.2	103.4	102.3	103	102.3	102	.....	.....	.....	.....	.....	.....	1, 1, "	"
	"	6 "	.....	103.2	102.4	102.4	103	103	103	.....	.....	.....	.....	.....	.....	1, 1, "	"

ANIMALS CONSIDERED SOUND FOLLOWING FIRST TEST.

On the 17th of September two animals were killed for beef; one, No. 134, common cow, aged 9 years, was perfectly sound; the other, a Holstein, No. 136, 10 years old, was markedly tubercular. This was the first failure in the reaction to tuberculin, and it was considered advisable that the balance of the animals be re-tested.

The temperatures of these two animals were as follows:

TABLE XV

CASE No. 134—COMMON COW, 9 YEARS; BOUGHT IN 1893.

CASE No. 136—HOLSTEIN, 10 YEARS; OLD HERD.

Temperature. Number of Hours before Injection.			Temperature. Number of Hours after Injection.							Date of In- jection.	Date of Au- topsy.	Condition.
4	2	1	10	11	12	13	14	16	17			
102	101.4	101.2	101.1	102	101.2	102	101	101	101.2	6, 5, 1894.	9, 17, 1894.	Sound.
.....	102	101	101.4	101.3	102.1	.....	102.1	102	102	6, 13, "	9, 17, "	Diseas'd

Therefore on October 30th forty animals were injected; of this number eleven were condemned. Besides these, two other animals were condemned by physical examination. One of these, No. 160, Holstein, 1 year old, had a high temperature before testing, and the subsequent rise 1.4° above average or 1.2° above maximum was not considered sufficient to condemn her, yet in the light of the autopsy notes this probably was a reaction. The animal was decidedly diseased; too much for any question of the deposits having developed within the time between the testing, June 21st, and autopsy, November 12th, 1894. The second case, No. 165, Jersey, 9 months old, did not have as high a temperature after injecting as before. She was also killed November 13th, 1894, and the autopsy showed marked tubercular lesions; the condition of the posterior and anterior mediastinal glands proved it to be a case of some standing. This should undoubtedly be reckoned among the failures, as there was no question about the failure to react.

TABLE XVI.

CASE NO. 160—1 YEAR; RAISED.

CASE NO. 165—JERSEY, 9 MONTHS; RAISED.

Case Number.	Temperature. Number of Hours before Injection.			Temperature. Number of Hours after Injection.						Date of In- jection.	Date of Au- topsy.
	4	2	1	10	11	12	13	14	16		
160	102.2	102.2	103	103.4	104.2	104.1	103.4	104	103.2	6, 21, 1894.	11, 13, 1894.
165	.....	102.2	103	102	101.3	101.3	102	102.1	102.1	6, 21, "	11, 13, "

The young animals were not included in the October test, as it was thought better to allow more time to elapse before re-testing. Many of the animals marked for re-testing in June and July, were re-tested October 30th; these have all been considered. Of the eleven condemned October 30th there remain nine to be accounted for. The temperatures at both testings are given. They were all tubercular and several of them, especially Nos. 135 and 143, were markedly diseased, as will be seen in the autopsy records. Excepting Case No. 152, the temperatures at the first testings varied about 1° ; this rise could not be considered a reaction. Case No. 152 rose 2° or 1.3° when the rise is estimated by average temperature before injection. This was not considered sufficient to condemn the animal. At the test on October 30th No. 152 gave a decided reaction, and the autopsy showed only such lesions as probably developed during the summer, that is, from June 15th to October 30th, a period of $4\frac{1}{2}$ months. Several other animals besides this case can be accounted for in this way; the lesions being in a sufficiently incipient state.

The period of residence noted in the following table is that taken at the first test.

TABLE XVII.—ANIMALS CONDEMNED OCTOBER 30TH, 1894.

Case Number.	Breed.	Age.	Weight.	Period of Residence.	Date of Tubercular Infection.	Temperature.				Number of Hours after Injection.							Date of Autopsy.
						Number of Hours before Injection.	4	2	1	10	11	12	13	14	16	17	
135	Holstein	10 years.	850 lbs.	2½ years. +	6, 13, 1894. 10, 30, "	101.4 101	101.2 101	102.3 102	102.1 102	102.1 102	102.1 102	102.2 102	102.2 103	102 104	102 104	11, 16, 1894.	
143	Holstein	11 years.	1100 lbs.	2½ years. +	6, 13, 1894. 10, 30, "	102.3 101.2	102.1 101.1	102.4 103.1	102.4 103.1	103 105.1	103 104	103.1 104	103.2 103	103.1 103	103.1 103	11, 16, 1894.	
144	Common	8 years.	950 lbs.	2½ years. +	6, 13, 1894. 10, 30, "	101.1 101.3	100.4 102.1	101.2 104	102 104.2	102 104.3	102 103	102 103	101.3 103	101.2 102	101.2 102	11, 2, 1894.	
150	Common	5 years.	750 lbs.	4 months.	6, 15, 1894. 10, 30, "	102.2 101.3	103 101.4	102 104	102.1 102.1	102.1 106	102.1 106	102.3 106	102.3 106	102.3 106	102.3 106	11, 14, 1894.	
152	Common	12 years.	700 lbs.	2½ years.	6, 15, 1894. 10, 30, "	101.3 101.3	102 100.3	101.3 105	101.1 105.2	101.3 105.2	102 105.2	103.3 105.2	103.3 105.2	103.2 104	103.2 104	11, 9, 1894.	
154	Durham.....	5 years.	750 lbs.	2½ years. +	6, 15, 1894. 10, 30, "	102.3 101	102.4 101	102.3 104.1	102.4 104.1	102 105.3	102 105.3	101.4 105.3	102 105	102.2 103.3	102.1 103.3	11, 5, 1894.	
155	Common	9 years.	750 lbs.	1 year.	6, 15, 1894. 10, 30, "	102.2 101	102.1 101.2	101.2 102	101.2 103.2	102 103.2	102 103.2	102.2 103.2	102.2 102.1	102 102.1	102 102.1	11, 14, 1894.	
159	Mixed Jersey.	11 years.	700 lbs.	1 month.	6, 15, 1894. 10, 30, "	102.2 101.2	102.1 101.1	101.3 105	101.3 107	101.3 107	101.3 107	101.2 107	101.2 107	101.3 106.3	101.3 106.3	11, 2, 1894.	
183	Grade.	3 years.	600 lbs.	3 years.	7, 10, 1894. 10, 30, "	103 101.3	102.2 101.3	101.1 102	101.1 102	101.2 105	101.2 105	101.4 106	102.4 106	102 106	102 106	11, 16, 1894.	

The twenty-two animals referred to in Table XVIII are part of those considered sound following injection of tuberculin, October 30th, 1894; six others have already been dealt with in Tables X and XII, and the last or twenty-ninth will be given in Table XX.

Of the animals considered in Table XVIII, five only were sound; the balance at post-mortem were found more or less diseased. With one exception, they were not bad cases, the deposits being all small; in fact, in several of these animals the deposits were almost microscopical in size, requiring the most careful search. Comparing the date of injection with date of autopsy it will be seen that in the majority of the cases the time elapsing between these dates was sufficient to allow the development of lesions of the size and distribution found.

Common Cows, 12; of these two belonged to old herd; seven were purchased in 1893 and three in 1894. Two of the sound animals were common cows, one 7 years old belonged to old herd; the other, 5 years old, was purchased in 1893. The majority of these common cows were young, only five being 8 years or more.

Holstein, 3; all tubercular, two belonged to old herd, aged respectively 5 and 9 years; one was raised aged. 1½ years.

Grade Holstein, 3; the oldest 6 years, purchased in 1893; the other two raised on the place, aged respectively 2 and 2½ years.

The animal purchased and the one aged 2 years were both sound, whereas the third was slightly diseased.

Mixed Jerseys, 4; of these one was sound; No. 158. Two were purchased in 1893 and two in 1894. Three of these animals were 4, 5 and 6 years of age; the fourth was 9 years old.

Case No. 149 had a high temperature before and after second injection, but no true reaction; it was thought best to have the animal re-tested later, but when it was decided to kill all the animals on the place this one did not escape. At the autopsy a few small deposits were found. The temperature may have been due to their presence or to other causes.

Case No. 162 is equally as interesting. Here temperature was also high before injection, but as the animal was young it may be accounted for. At second test, October 30th, there was no question of a re-action. When examined post-mortem, seven weeks later, this animal had several small deposits almost microscopical in size and undoubtedly recent.

Case No. 156 was an undoubted failure in action of tuberculin. This was a common cow, aged 10 years, belonging to old herd. The amount of tubercular deposit present will be noted in the autopsy records, to which reference should be made.

As in the other tables, the period of residence is that taken at first examination; the age also is calculated then.

The hours for taking temperatures are approximately the same; the time given is that when the first animal was inspected and the others followed in rotation, having the same amount of time between the taking of the temperatures as in the case of the first animal.

The two Mixed Jersey cows, purchased in May, 1894, deserve special mention from the fact that they were perfectly sound animals when purchased and that one of them became infected on the place during the summer. They both were kept in the "box stalls" until after the first test, June 15th, never living in the old or new stables. The temperatures of these animals following injection of tuberculin, June 15th, were perfectly normal, as will be seen by reference to Table XVII—No. 159, or Table XVIII—No. 158. During the summer these animals were kept with those pronounced sound June 5th to July 10th. They were pastured as much as possible and given plenty of water and feed. When re-tested, October 30th, the one, aged 11 years, No. 159, was condemned, and at the autopsy the deposits were of such a character as to indicate recent development; the period between the first and last test being sufficient time for this. That this is without question will be seen by examining the autopsy records and also considering the temperature chart of this animal. At the first examination, June 15th, before injection the temperature was 102° to 102.2 ; after injection from 101.2° to 102° . At the second examination, October 30th, the temperature before injection was 101.1° to 101.2° ; whereas afterwards it rose to 107° and staid there for a couple of hours. Unless the temperature following the first examination be considered that of a perfectly sound animal the efficacy of tuberculin as a diagnostic agent in tuberculosis is nill. But when No. 158 is considered it will be seen that this animal had a perfectly normal temperatures at both injections of tuberculin and that at the autopsy, 6 months after the first injection, she was found to be perfectly sound.

TABLE XVIII.—ANIMALS CONSIDERED SOUND OCTOBER 30TH, 1894.

Case Number.	Breed.	Age.	Period of Residence.	Date of Injection.	Temperature, Number of Hours before Injection.				Temperature, Number of Hours after Injection.							Date of Autopsy.	Condition.
					4	2	1	10	11	12	13	14	16	17			
128	Common	6 years.	5 months.	6, 5, 1894. 10, 30, "	101.3 101.3	102	101.2 102.1	101.3 101.2	101.2 101.2	101.2 101.2	101.1	101.2 102	101.2	102 101	12, 29, 1894.	Tubercular.	
129	Mixed Jersey.	6 years.	1 year.	6, 5, 1894. 10, 30, "	103 101.1	101.2	101.1 102	100.4 101	100.2 101	101 102.1	100.4	101 102	101	102 102	12, 14, 1894.	Tubercular.	
130	Common	5 years.	5 months.	6, 5, 1894. 10, 30, "	101.3 102	102.2	102 102	101.2	101.2	101.2 101.2	101.4	101.1 102	101	101 101.2	12, 29, 1894.	Tubercular.	
131	Mixed Jersey.	5 years.	1 year.	6, 5, 1894. 10, 30, "	102.1 101.2	101.3	102.1 101.3	102.1 102.1	102	102 101.3	101.3	102 101	102	101.3 101.2	12, 19, 1894.	Tubercular.	
132	Common	4 years.	1 year.	6, 5, 1894. 10, 30, "	102 102.2	101.2	102 102	101 101.2	102	101 101.2	102	102.3 101.2	103.2	103 101.2	11, 23, 1894.	Tubercular.	
133	Common	8 years.	1 year.	6, 5, 1894. 10, 30, "	103 101	102.4	102.3 101	101.1 101	102	102.1 100.4	102.2	102.2 101	102.3	102.1 101	12, 24, 1894.	Tubercular.	
138	Holstein	5 years.	2 years. +	6, 13, 1894. 10, 30, "	102 101.3	..... .....	101.2 101.3	101.4 102	..... .....	101.4 102	102	102 101	102	102 101	1, 3, 1895.	Tubercular.
139	Holstein	9 years.	2 years. +	6, 13, 1894. 10, 30, "	102.2 101	..... .....	101.3 100.4	102 101.2	..... .....	102.2 101.2	102.2	103 101	103	103.3 101	11, 21, 1894.	Tubercular.
140	Grade	6 years.	1 year.	6, 13, 1894. 10, 30, "	102 101.1	..... .....	101 101.3	101.2 101.3	..... .....	101.4 102	102	101.2 102	101.3	101 102	12, 14, 1894.	Sound.
142	Grade	2 years.	2 years.	6, 13, 1894. 10, 30, "	102.1 101.2	..... .....	101.2 101.3	102 101.3	..... .....	102.2 102	103.2	103 102	..... .....	..... 101.4	12, 29, 1894.	Sound.
145	Common	6 years.	1 year.	6, 13, 1894. 10, 30, "	102 101.3	..... .....	102 101.2	101.1 101.3	..... .....	101.2 101.3	101.2	101.3 102	103	103 102	12, 29, 1894.	Tubercular.

TABLE XVIII.—CONTINUED.

Case Number.	Breed.	Age.	Period of Residence.	Date of Injection.	Temperature.				Temperature.							Date of Autopsy.	Condition.	
					Number of Hours before Injection.	Number of Hours before Injection.	Number of Hours before Injection.	Number of Hours before Injection.	Number of Hours after Injection.	Number of Hours after Injection.	Number of Hours after Injection.	Number of Hours after Injection.	Number of Hours after Injection.	Number of Hours after Injection.	Number of Hours after Injection.			Number of Hours after Injection.
146	Common	7 years.	2½ years.	6, 13, 1894. 10, 30, "	101 101	..... 101	101.1 101	101.2 101	..... 101	101.2 101	..... 101	101.3 101	102 101	101.2 101	101 101	101 101	11, 23, 1894.	Sound.
147	Common	8 years.	1 year.	6, 13, 1894. 10, 30, "	101.3 101.2	..... 101	101.1 101	101.2 101.1	..... 101.1	101.2 102	101.3 100.3	101.2 101	102 101	101.3 101	101.3 101.2	101.2 101.2	12, 19, 1894.	Tubercular.
148	Common	5 years.	1 year.	6, 15, 1894. 10, 30, "	101.2 101	101.2 101	101.4 101	102.3 102	..... 102	101.3 102	101.3 102	..... 101.1	102.2 101.1	102.1 102.1	..... 102.1	..... 102.1	12, 17, 1894.	Sound.
149	Mixed Jersey.	4 years.	4 months.	6, 15, 1894. 10, 30, "	102 104	102.1	102.1 103.3	102 104.2	..... 104	101.4 104.2	101.4 104.2	..... 104	102.1 104	101.4 101.4	..... 103.3	..... 103.3	12, 17, 1894.	Tubercular.
151	Common	9 years.	1 year.	6, 15, 1894. 10, 30, "	102.2 101.2	103	103.2 102	101.3 101	..... 101.2	101.4 101.2	101.4 101.2	..... 100.4	102.2 103.2	103.2 100.4	..... 100.4	..... 100.4	12, 17, 1894.	Tubercular.
153	Common	12 years.	6 months.	6, 15, 1894. 10, 30, "	101.3 101.2	101.3	101.2 102	101.3 101.2	..... 101.2	101.4 102	101.4 102	..... 101.3	101.4 101.3	102 101.3	..... 101.2	..... 101.2	12, 31, 1894.	Tubercular.
156	Common	10 years.	2½ years.	6, 15, 1894. 10, 30, "	102.2 101	102.2	102.3 101	101.2 101.2	..... 101.2	101.2 101.2	..... 102	102.1 102	102.2 102	103.1 102	103.2 101.3	103.2 101.3	12, 17, 1894.	Tubercular.
157	Grade.	2½ years.	2½ years.	6, 15, 1894. 10, 30, "	102.4 102	103.1	103 102	101.3 102.1	..... 102.1	101.3 102	101.3 102	..... 101.3	102 101.3	102 101.3	..... 102	..... 102	12, 31, 1894.	Tubercular.
158	Mixed Jersey.	9 years.	1 month.	6, 15, 1894. 10, 30, "	101.4 101.2	102	101.4 101.2	101.3 101.2	..... 101.2	101.2 102	101.2 102	..... 101.3	101.4 101.3	102.1 101.3	102 101.2	..... 101.2	12, 31, 1894.	Sound.
162	Holstein	1½ years.	1½ years.	6, 21, 1894. 10, 30, "	103 102	..... .....	103.1 102	103.3 102.1	..... 102.1	103.3 102.1	103.3 102.1	104 102.1	103.3 102.1	104 102.1	105 102	104.3 102	12, 20, 1894.	Tubercular.
166	Common	7 years.	1 year.	6, 21, 1894. 10, 30, "	102.2 102	..... .....	102.1 101.2	101.3 101.2	..... 101.2	101.3 102	101.3 102	..... 101.2	102 102.2	103 102.2	103 102.1	103.1 102.1	1, 3, 1895.	Tubercular.

Table XIX gives the temperatures of four animals injected but once, and at that time pronounced sound; and in all but one case, No. 163, Grade Holstein, this was found to be the correct diagnosis. No. 143 had but one deposit in the middle posterior mediastinal gland; this deposit was a little over $\frac{1}{8}$ of an inch in diameter, very firm and gray-white in color; undoubtedly of recent origin. The other glands and organs were carefully inspected but no lesions were demonstrable. No. 141, Holstein Bull, examined January 12, '95, was also perfectly sound; this animal fell and broke one of his hind legs the night previous to autopsy. Case No. 161 might appear a reaction, but age of animal must be considered as well as time of year; when examined some 7 months later was found to be perfectly sound.

TABLE XIX.—ANIMALS CONSIDERED SOUND.

Case Number.	Bred.	Age.	Period of Residence.	Date of Injection.	Temperature.				Temperature.				Date of Autopsy.	Condition.	
					before Injection.		Number of Hours after Injection.		before Injection.		Number of Hours after Injection.				
					4	2	1	10	11	12	13	14	16		
141	Holstein Bull.....	1 year.	1 year.	6, 13, 1894.	102.3	.....	102	102	.....	102.1	102.2	102	102	1, 12, 1895.	Sound.
161	Holstein	1 "	1 "	6, 21, "	103.2	.....	102.3	102.3	102.3	103	103	103.4	103.2	1, 12, "	"
163	Grade Holstein.....	1 "	1 "	6, 21, "	103	.....	103.2	101.1	102	101.4	102	102.3	102.1	12, 20, 1894.	Tubercular.
164	Mixed Jersey.....	1 "	1 "	6, 21, "	102	.....	102.3	101	101.3	101.4	101.4	101.4	101.4	12, 19, "	Sound.

Table XX gives the temperature of No. 137, Holstein; this animal was injected three times within a period of 8½ months; never reacting sufficiently to be condemned. At first examination, June 13th, the elevation in temperature was but 1.3°; at second examination, October 30th, still negative. When in December so many of the apparently sound animals were found to have tubercular deposits, it was thought wise to have this animal re-injected at a later period. In January she was springing, therefore the test was put off until her calf was 6 weeks old; the delay was necessary as there is always an element of doubt when animals are in that condition. She was re-tested March 2d, and did not react. The amount of tuberculin injected was 30 minims. The temperature was taken regularly and the thermometer was left in situ from 6 to 8 minutes. At the autopsy March 5th, this animal was found to have a number of deposits in the lungs; nothing in any of the glands or other organs. The deposits were such as to indicate the probability of an extensive and recent bacillary invasion; degenerative changes being rare as will be seen in the autopsy records. How to explain this failure is difficult; it was thought at first that it might be due to the tuberculin; this had been on hand since June, 1894; the bottle was opened for the first time however March 2d, 1895. Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, was consulted as to the possibility of the tuberculin losing its efficacy with time, but in a letter, dated March 8th, Dr. Salmon says "so far as we have observed, tuberculin retains its properties for a year or more without deterioration. We have, however, made no experiments to decide whether this is the case or not, but in some cases where it has been kept for that length of time, it has given apparently as good results as when fresh." Continuing, Dr. Salmon suggests that the cow in question may have lost her susceptibility to the tuberculin by repeated injections, or that she may have been one of those cases which never react under any circumstances. It is possible also that the dose of tuberculin may not have been sufficient to disturb the equilibrium established by the animal. It would seem to me that in many of these cases where the animals are re-tested, that the dose ought to be increased each time. There was no doubt but that the animal received the full amount injected; care was taken that the needle plunged sufficiently deep, and also at autopsy there were no local symptoms at site of injection.

TABLE XX.—SPECIAL CASE; FINAL INJECTION MARCH 2D, 1895.

Case Number.	Breed.	Age.	Period of Residence.	Date of Injection.	Temperature. Number of Hours before Injection.				Temperature. Number of Hours after Injection.							Date of Autopsy.
					4	2	1	10	11	12	13	14	16	17		
137	Holstein.....	8 years.	2½ years. +	6, 13, 1894. 10, 30, " 3, 2, 1895.	101.3	101.2	101	101.3	102	102	102	103	103	3, 5, 1895.
					101.3	.....	101.2	102	.....	102	102	.....	102	102
					101.2	100.2	100	.....	101.1	101.2	101.4	101.3	101.2	102.3	

AUTOPSY RECORDS.

The autopsies took place as soon after condemnation as possible; the animals were selected indiscriminately from the various tests. They were killed and opened by the butcher employed by the Hospital, under the observation of the Pathologist. Notes were taken at the time of examination in every case—whether diseased or not. At first the autopsies were made at the slaughter-house of the Hospital, the bodies being disposed of for phosphate, but after the 18th of June all examinations took place on an open space to the north of the grove; the situation being especially favorable on account of the distance from both the stables and the Hospital buildings proper. Then, too, the facilities for an increased number of autopsies daily and for a more rapid disposal of the bodies were much better. This latter was done by first dismembering them and then burying the parts in deep pits dug for the purpose in the immediate neighborhood of the grove. The pits were of sufficient size to hold 10 to 14 bodies; these were covered with quick-lime and over three feet of earth, well packed down. The space where the examinations were made was scraped thoroughly each time it was used and the ground sprinkled with quick-lime. All organs were removed and examined whether diseased or not; especial attention was directed to the udder, all segments being incised. The condition of the pelvic viscera was noted in every case. The brain was removed only in the worst cases; the method of killing the majority of the animals (shooting) rendering its removal in all cases impossible from the destruction of tissue. Tuberculosis of the brain is rare, however, in animals and undoubtedly they would have manifested some symptoms during life that would direct the attention to the nervous system as in the one case hereinafter mentioned.

Specimens of the different diseased areas as well as deposits that were somewhat doubtful were retained for microscopical study. If in the course of the examinations any very typical lesions were met with they were kept and prepared for the museum of the Pathological Department of the Hospital.

If any of these specimens were not retained, after removal, they were immediately burnt. Care was also taken that all objects with which they came in contact were burnt or disinfected.

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TUBERCULOSIS.

Showing tubercular nodes and abscess cavity.
No. 95—Asylum Herd.

TABLE XXI.
SUMMARY OF DATES OF AUTOPSIES.

June 7th	2	June 23d	9
“ 8th	4	“ 25th.....	10
“ 9th	3	“ 26th.....	10
“ 12th	3	“ 27th.....	7
“ 13th	3	“ 28th.....	10
“ 15th	3	“ 29th.....	3
“ 18th	3	July 9th.....	1
“ 20th	10	“ 19th.....	5
“ 21st	9	“ 20th.....	7
“ 22d	10	“ 24th.....	6
Total number condemned June 5th to July 10th.....		118	

NOTES OF 118 ANIMALS CONDEMNED BY TUBERCULIN,
JUNE 5TH TO JULY 10TH, 1894.

NO. I.—Examination No. 27.

Common cow, 6 years old; weight 700 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 7th, 1894. Before injection minimum temperature 101.2°; maximum 101.3° After injection maximum temperature reached in 12 hours, 108°

AUTOPSY.—Lungs—Right posterior border caudal lobe one deposit 1 inch in diameter, sharply defined; soft, yellow-white, caseous.

Mediastinal Glands—Lower posterior ones somewhat enlarged. On section, numerous deposits, ranging in size from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; yellow in color; sharply defined; centre soft and caseous; periphery firm.

Bronchial Glands—Enlarged on both sides. Contain several small deposits similar to those in posterior mediastinal glands; these deposits all appear to be in about same stage, whereas the deposit in the lung is more advanced.

NO II.—Examination No. 1.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 7th, 1894. Before injection minimum temperature 101°; maximum 101.1° After injection maximum temperature reached in 13 hours, 106.2°

AUTOPSY.—Lungs—Right: Caudal lobe contains 15 deposits, principally situated along posterior border and at base, from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter; all are sharply defined; some have soft cheesy centres, the larger ones semi-fluid.

Left—10 deposits situated in substance and along posterior border of caudal lobe, from $\frac{1}{4}$ to 1 inch in diameter, sharply defined; nodules yellow in color and very firm. The centres of the larger deposits are just beginning to soften. Anterior lobe, one deposit, $\frac{1}{4}$ inch in diameter, firm and yellow, distinctly marked from surrounding structure by white connective tissue band.

Mediastinal Glands—Lower posterior ones size of adult human kidneys. On section, infiltrated throughout by caseous deposits, containing large quantity of calcareous particles, solid except at lower portions where deposits have broken down. There is no glandular structure visible. Upper posterior, mediastinal and bronchial glands on both sides contain numerous deposits, varying from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. All firm, sharply defined from surrounding tissue, and of a yellow color. On section, the larger ones have the centre slightly softer than the periphery.

NO. III.—Examination No. 24.

Common cow, 8 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 8th, 1894. Before injection minimum temperature 101.°; maximum temperature 101.2° After injection maximum temperature reached in 13 hours, 105.1°

AUTOPSY.—Lungs—Caudal lobes, both sides numerous deposits, ranging in size from $\frac{3}{4}$ to $1\frac{1}{4}$ inches; some grouped together so as to form masses size of large eggs. The large deposits are situated in the lower portion and along the posterior border, except one large mass which is found between caudal and ventral lobes, left side, close to bronchus. This focus is visible on surface, projecting slightly on account of collapsed condition of lung in immediate neighborhood. All the deposits are sharply defined, some having a distinct capsule. As a rule, the smaller nodules are firm and grayish-yellow. The larger ones, especially those masses formed by the coalescence of a number of small nodes, have soft, greenish-yellow centres, which exude readily on slight pressure; in some the centres almost semi-fluid. Cephalic and ventral lobes, both sides, contain a number of deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. These nodules are prominent on account of collapsed condition of lung; they are firm and hard. On section, yellowish-white color; centre slightly softer than periphery; latter is not sharply defined.

Mediastinal Glands—Two lower posterior ones are very much enlarged, being about size of adult human kidneys. The middle and posterior ones are also enlarged, varying in size from English walnut to a child's kidney. On section the largest ones are firm, centre calcified, giving cut-surface a gritty appearance. There is no sign of glandular structure in the larger ones. The smaller ones still show a glandular structure with numerous deposits, averaging $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, scattered throughout. Some of the deposits have coalesced, making one large deposit, having a nodular appearance. The centres of these nodules are somewhat softer than the peripheries.

Bronchial Glands—No deposits; glands slightly enlarged.

Lumbar Glands—Enlarged; contain a number of caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; all sharply defined.

Renal Glands—Left side, glands slightly enlarged; on section, contain three small deposits, each $\frac{1}{4}$ of an inch in diameter; firm, yellow, sharply defined.

Kidneys—Left one contained a small deposit on surface, $\frac{1}{4}$ inch in diameter; yellow color; centre softer than periphery; sharply defined. On section, involves cortical layer only.

Ovary—Left—Structure almost obliterated; site occupied by large cyst size of an orange; contained 8 ounces of a dark-brown fluid; no odor. Uterine structure, macroscopically no change.

NO. IV —Examination No. 10.

Common cow, 6 years old; weight 750 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 8th, 1894. Before injection minimum temperature 101.°; maximum 101.2° After injection maximum reached in 16 hours, 105°

AUTOPSY.—Lungs—Right: Base posteriorly, deposit $1\frac{1}{4}$ inches in diameter; sharply defined. On section, centre caseous; periphery firm; whole deposit made up of three small nodules which have coalesced.

Mediastinal Glands—Lower posterior gland has one deposit, $\frac{1}{4}$ inch in diameter; sharply defined from surrounding glandular tissue; it is of firm consistence; centre slightly softer than periphery.

NO. V —Examination No. 20.

Jersey cow, 10 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 8th, 1894. Before injection minimum temperature 101.3°; maximum 102.2° After injection maximum temperature reached in 13 hours, 106°

AUTOPSY.—Lungs—Right: Adhesions to pleura costalis and to deposit on pleura; difficult to separate; caudal lobe has numerous deposits, from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter, especially situated at base and along posterior border. For the most part they are

single, sharply defined, centre soft and caseous, periphery firmer. Surrounding these deposits are firm, white connective tissue capsules. Cephalic and ventral lobes completely infiltrated. Nodules of varying sizes, all undergoing cheesy degeneration. Very little lung structure remaining and this is much thickened and injected.

Left Lung—Caudal lobe contains numerous nodules, from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter; the smaller ones are single; larger ones, made up of several small nodules, which have only partly coalesced. Deposits chiefly situated along posterior border. On section, these deposits are sharply defined from surrounding tissue. The smaller ones are firm and hard, the larger deposits have soft and caseous centres. The lung tissue, surrounding the smallest nodes, is thickened and injected. Ventral lobe, few small deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, situated in substance; firm, caseous, sharply defined.

Mediastinal Glands—Lower posterior ones much enlarged; contain numerous deposits, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; centres soft and cheesy. Middle and upper glands contain quite a number of deposits varying in size from $\frac{1}{8}$ to $\frac{1}{4}$ inch, for most part firm and sharply defined from the surrounding glandular tissue. A few of the largest ones show signs of breaking down.

Bronchial Glands—Also somewhat enlarged, contain several caseous foci, each about $\frac{1}{4}$ inch in diameter, not so sharply defined from glandular structure as others.

Pleura Costalis—Right side, deposit 4 inches long and $2\frac{1}{2}$ inches wide, situated in neighborhood of 7th and 8th ribs. Surface somewhat nodular; on section, firm, tough, of a grayish-yellow color.

Liver—Weight 48 pounds; size 24x17x7 inches; adhesions to diaphragm and surrounding viscera; scattered over upper surface numerous deposits, $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter, extending somewhat beyond capsule; some single, others confluent. On section centres are more or less softened, caseous; a few are firm and of a bright yellow color. On under surface of right lobe, one large mass, 10x11 inches, made up of numerous nodules. On section periphery firm, hard, nodular; yellow-white color and sharply defined from surrounding tissue; centre composed of soft, yellow, caseous material, semi-fluid in places. *Lobus Spigelii* also contains several deposits, averaging 1 inch in diameter; on section, firm and caseous. On mesial section, liver seen to be infiltrated with nodules of varying sizes, $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter; several of these deposits are confluent, forming one large mass; the centre of this is broken down into a greenish-yellow fluid, of creamy consistency. Smallest nodules are firm and hard, sharply defined; centre of bright yellow hue.

Hepatic Glands—Considerably enlarged. On section, contain numerous nodular deposits, more or less caseous and softened; the larger ones semi-fluid contents.

Spleen—Two small deposits projecting a little beyond upper surface of spleen. On section, centre soft and cheesy; periphery firmer and of a yellowish-white color; whole sharply defined from splenic substance by a connective tissue capsule.

NO. VI.—Examination No. 18.

Common cow, 6 years old; weight 750 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 8th, 1894. Before injection minimum temperature 101.2° ; maximum 102° . After injection maximum temperature reached in 11 hours, 105.2° .

AUTOPSY.—**Lungs**—**Left**: In upper portion of caudal lobe, posteriorly, a deposit $1\frac{1}{2}$ inches in diameter. On section, centre soft, cheesy; periphery firm, yellow-white in color, sharply defined from surrounding tissue. **Ventral Lobe**—One deposit, size $\frac{1}{2}$ inch in diameter, firm, sharply defined from lung tissue. On section, centre bright yellow, caseous.

Right Lung—**Cephalic lobe**, one deposit, $\frac{1}{2}$ inch in diameter. On section, soft cheesy centre; periphery firmer, sharply defined.

Mediastinal Glands—Enlarged to twice usual size. On section, contain numerous deposits, sharply defined from glandular tissue; for most part firm and yellow; a few, especially the larger ones situated in the lower posterior glands, have centres soft and caseous, readily pressed out.

Bronchial Glands—Have three small deposits, averaging $\frac{1}{4}$ inch in diameter. On section, firm, yellow, sharply defined.

Liver—Two small nodules, $\frac{1}{2}$ inch in diameter, one in margin of right lobe, the other situated in substance, sharply defined by white connective tissue capsule; centres are soft, caseous, bright yellow in color; the peripheries are firmer, granular looking.

Hepatic Glands—Enlarged, several caseous foci; average $\frac{1}{4}$ inch in diameter; all necrotic.

NO. VII.—Examination No. 23.

Common cow, 6 years old; weight 700 pounds; bought in 1893. Date of injection June 5th; date of autopsy June 7th, 1894. Before injection minimum temperature 101° , maximum 102° . After injection maximum temperature reached in 14 hours, 105.1° .

AUTOPSY.—Lungs—In left lung numerous deposits scattered through caudal lobes, from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter; the larger deposits made up of a number of the small ones. On section, the larger ones have the centre soft, almost semi-fluid; the smaller ones are firm, centres just beginning to soften; they are sharply defined from the surrounding lung tissue and from one another by a firm, white connective tissue capsule. Upper lobe, left side, almost entirely infiltrated by nodules of varying sizes, leaves but little lung structure; this is injected and firmer than usual. Outer surface has the pleura thickened and adherent to pleura costalis in places; the whole has a nodular appearance. On section, most of the nodules have soft and caseous centres; some almost semi-fluid. Between the various deposits there is a firm connective tissue capsule, giving whole lobe a tough feeling. In extreme upper portion of lobe there are several small cavities filled with broken down tissue and thick, tenaceous, greenish-yellow fluid.

Right Lung—Four deposits in upper portion cephalic lobe, from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter, cheesy on section. Caudal and Ventral lobes have numerous deposits from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter; the larger ones being about the size of an English walnut; singly and in groups.

On section, some are firm, sharply defined, centres a little softer than periphery, of a bright-yellow color. The larger ones, especially those made up of several smaller ones, have central cavity filled with broken down tissue and thick, tenaceous, greenish-yellow fluid.

Mediastinal Glands—Posterior ones involved; the two lower ones being as large as adult human kidneys and fill in space between lungs completely. Cream on section; no glandular tissue visible; all of a uniform yellow tint, outer portions firm, calcareous in places, giving a gritty feeling to cut surface. The centres of these glands have broken down in places and cavities formed are filled with a thick yellow fluid containing caseous particles. Upper glands of posterior chain and also first one or two cervical glands are enlarged; lower ones especially so; containing numerous deposits, those in lower glands so extensive that glandular structure is reduced to a few lines only. The deposits vary in size from $\frac{1}{4}$ of an inch in diameter in the smaller glands to $1\frac{1}{2}$ inches in diameter in the larger ones; they are for the most part firm, yellow, sharply defined, extending somewhat beyond surface. Larger deposits have the periphery firm and white, while centre is soft and caseous.

Bronchial Glands—Somewhat enlarged, contain three small deposits; two in left, $\frac{3}{4}$ inch in diameter, firm, caseous, yellow, sharply defined; one in right, also sharply defined; periphery firm, yellow, the centre is softer, deposit $\frac{1}{2}$ inch in diameter.

Pleura Costalis—Left Side: Situated on costal pleura, left side, just above diaphragm posteriorly is a deposit, size of large human kidney. Numerous adhesions of the lung to this mass. On section, it was composed of hard nodules, some with caseous centres, others firm throughout; pleura, with this exception, has no deposits; it is somewhat dull at upper portion where there are numerous adhesions.

Hepatic Glands—Enlarged and contain several deposits, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter. On section, firm and yellow. One of the largest shows signs of breaking down.

Liver—Upper surface liver, deposit $\frac{3}{4}$ inch in diameter; projects slightly beyond surface. On section, sharply defined from liver structure. The centre is firm, caseous,

showing signs of beginning softening. On under surface of right lobe, close to anterior border, there is a deposit $1\frac{1}{2}$ inches in diameter. On section, this has a firm connective tissue capsule; the centre is filled with thick, tenaceous, greenish-yellow fluid, containing particles of caseous material. The periphery has a somewhat nodular appearance and is caseous.

NO. VIII.—Examination No. 28.

Common cow, 10 years old; weight 800 pounds; old herd. Date of injection June 5th. Date of autopsy June 9th, 1894. Before injection minimum temperature 100.4° ; maximum 101.2° . After injection maximum temperature reached in 16 hours, 105.1° .

AUTOPSY.—Lungs—Right: Lower portion caudal lobe, one deposit, $\frac{3}{4}$ inch in diameter; sharply defined; periphery firm and yellow; centre somewhat softer, exudes readily on slight pressure. Right cephalic lobe, one deposit, size $\frac{1}{4}$ inch in diameter; similar in appearance to the one in caudal lobe, except that it is firm throughout.

Mediastinal Glands—Lower posterior ones slightly enlarged; right one contains one small deposit, $\frac{1}{4}$ inch in diameter, yellow in color, firm, sharply defined from surrounding glandular tissue.

NO. IX.—Examination 19.

Common cow, 8 years old; weight 800; old herd. Date of injection June 5th, 1894. Date of autopsy June 9th, 1894. Before injection minimum temperature 101° ; maximum, 102° . After injection maximum temperature reached in 13 hours, 106° .

AUTOPSY.—Pleura Costalis—Both sides involved, but more marked on left. They are covered by a deposit made up of nodules, size from $\frac{1}{4}$ to $1\frac{1}{4}$ inches in diameter. Some single, others joined, forming large masses; to these the lungs are firmly adherent. Some of the single nodules have pedicles varying from $\frac{1}{2}$ to 1 inch in length, others are flat and firmly adherent to pleura. On section, these nodes are for the most part very firm and of cartilaginous consistence. On upper surface of diaphragm numerous deposits similar in character to those on parietal layers. Lungs also adherent to these masses.

Lungs—Right—Cephalic and Ventral lobes infiltrated throughout. No lung structure visible; whole has a nodular appearance. On section, this is seen to extend throughout; nodules of various sizes, $\frac{1}{2}$ to $2\frac{1}{2}$ inches in diameter. The latter are masses made up of a number of smaller deposits. The periphery of the majority of the nodules is firm, yellowish-white in color; the centres are caseous, some very soft; these press out readily. The structure between these nodules seen to be composed entirely of connective tissue. Caudal lobe contains numerous (10) large deposits; these are all from English walnut to hen eggs in size. The centres are for the most part broken down and contain a thick, tenaceous fluid, in which are caseous particles. These nodules are sharply defined from surrounding lung structure, but the tissue in the immediate neighborhood is injected and thickened. These deposits are for the most part at base or along posterior border. Along anterior border are a number of smaller deposits, averaging $\frac{3}{4}$ inch in diameter; all caseous. At junction of lower and upper lobes are a number of large deposits, similar in character to those described above; surrounding tissue infiltrated with small deposits. The whole forms one mass with pericardium; the pericardial cavity is obliterated, except for small space at apex of ventricles. The epicardium is also involved, the deposits extending down to muscle of heart. The nodules, for the most part, are small, averaging $\frac{1}{2}$ inch in diameter. Most of these have caseous centres, surrounded by a firmer yellow-white zone. The tissue between these nodules is chiefly connective, containing a number of very small beginning deposits, almost microscopical in size.

Left Lung—Upper lobes infiltrated same as in right lung. Deposit has similar characteristics. Caudal lobe also involved, especially anterior border, which forms one mass with pericardial sac. The deposits in the caudal lobe are all large, being made up of small ones. The centre has broken down and is filled with a thick, tenaceous, greenish-yellow fluid, containing numerous caseous particles. Hepatization occurs where there is no deposit. In the immediate neighborhood of the large bronchi the lung is of a healthy color; crepitates readily and the blood supply is good.

Mediastinal Glands—Posterior ones enlarged so as to fill in the space between the two lungs. The two lower glands are enlarged, each to size of adult human kidneys. On section, there is no evidence of glandular structure. The whole mass is made up of nodules of a bright yellow color; some having calcareous deposits; they all run together, forming one large mass, only distinguishable by the spots of softening. The contents of some are fluid, which escapes on section. The middle posterior glands are enlarged until they are the size of goose eggs. On section, contents bright yellow, of creamy consistence; other posterior glands also enlarged, from grape to large English walnut in size. On section, nodules more or less caseous scattered through them.

Anterior Mediastinal also involved and are part of the mass formed by the pleura; anterior borders of lungs, peri- and epi-cardium. The deposits are all of medium size and are rather firmer than the others; in a few some glandular structure is visible.

Bronchial Glands—Enlarged to twice usual size; contain several nodules which are sharply defined; soft and cheesy in centre.

Heart—Deposits in epi- and peri-cardium already described. Muscle does not appear involved. Endo-cardium smooth and lustrous; valves intact.

Parotid Glands—Enlarged; contain a number of caseous foci of varying sizes, $\frac{1}{4}$ to $1\frac{1}{4}$ inches in diameter; centres almost semi-fluid; periphery sharply defined, firmer, caseous.

Liver—Numerous small nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, scattered over surface; sharply defined; centres are firm, bright yellow, caseous.

Hepatic Glands—One deposit, size $\frac{1}{4}$ inch in diameter, caseous; centre just beginning to soften.

Spleen—On upper surface two small nodules, $\frac{1}{4}$ inch in diameter. On section, centres are yellow and of cheesy consistence; sharply defined from splenic substance.

Uterus—Numerous small nodules situated in walls, and there are three the size of large eggs; one on anterior wall near cervix; another on anterior wall of left horn, and the third at the junction of the right horn with body of uterus. Each of these is composed of a firm, white periphery with the centre filled with a quantity of semi-fluid, cheesy matter. In opening these nodules, the contents exuded readily. The one situated at junction of right horn with body had the centre filled with a thick, tenaceous, greenish-yellow fluid, containing numerous cheesy particles. It extended into uterine cavity, and there was but a small margin of firm caseous material remaining. In addition to these three large deposits there are numerous smaller ones, varying in size from $\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter. On section, the majority have soft, cheesy centres, surrounded by a zone of firmer, yellowish, caseous material. The smallest deposits are firm throughout. Endometrium irregular, thickened in places, but no sign of ulceration. Cavities of horns contained considerable yellowish, semi-fluid material, mixed with mucus and cheesy particles.

Fallopian Tubes—On both sides there are numerous deposits, from $\frac{1}{4}$ to 1 inch in diameter. On section, they are composed of an outer zone of firm, yellow, caseous material, with an inner one softer, semi-fluid. Some of these nodules are irregularly outlined and contain a soft, cheesy substance only; still others have ruptured into the tubes; no signs of any having ruptured into the pelvic cavity. The tubes are slightly distended, especially at the outer extremity and lumen filled with thick, tenaceous, greenish-yellow fluid and caseous particles.

Ovaries—Both have two small deposits; size $\frac{1}{4}$ inch in diameter. On section, centre soft, bright yellow, periphery somewhat firmer; both are sharply defined.

Omentum (Caul)—Adherent to abdominal parietes and to intestines in places. The whole is thickened and sprinkled with numerous deposits, varying from $\frac{1}{4}$ to 1 inch in diameter; smaller ones are firm, sharply defined; on section have bright-yellow centres. The larger have semi-fluid, caseous centres. At junction with Rumen there is a deposit, size of an English walnut; this also on section has a soft cheesy centre.

Parietal Peritoneum—On left side anteriorly and on both sides posteriorly there are numerous deposits, for the most part firmly adherent. A few have pedicles of varying

lengths, 1 to 2 inches. On section, the centres of those that are firmly attached are soft and caseous. The pedunculated ones are more or less flat and on section are firm and yellow-white throughout.

Renal Glands—In these there are several small deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. On section, the centres are yellow and slightly softer than the periphery. No deposits in kidneys.

Psoas Muscle—Left side—There are numerous deposits in tissue immediately covering Psoas muscle, left side; many of them are caseous, a few are firm and grayish-white throughout. The deposits are grouped together and extend down to muscular structure. On examination of the muscle itself there is one deposit, $\frac{1}{2}$ inch in diameter, situated in muscle tissue; close to surface however. The centre of this focus is markedly necrosed. The periphery is somewhat firmer, of a bright-yellow color and caseous.

Intestines—Numerous deposits, pin-head to large pea in size, more or less sharply defined, scattered along small intestines, especially at lower portion; project slightly. On section, the centres of the largest are slightly soft and of a yellow color; the smaller ones are firm throughout. Peritoneal coat of intestines dull; numerous adhesions to one another and to surrounding viscera. On opening intestines, no ulcers visible.

Mesenteric, inguinal and lumbar glands are enlarged, contain deposits of varying sizes from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. All have cheesy centres, from firm, caseous to semi-fluid consistency. The mesenteric glands especially enlarged; some being egg sized and filled with a number of these deposits.

Udder—Several deposits, $\frac{1}{4}$ inch in diameter, firm and yellow, situated in left posterior segment; tissue in immediate neighborhood somewhat firmer than that in other segments.

Glands—Contain two small foci, size of peas, firm caseous, sharply defined.

NO. X.—Examination No. 30.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 12th, 1894. Before injection minimum temperature 100.3° ; maximum 101.3° After injection minimum temperature reached in 13 hours, 106.2°

AUTOPSY.—Mediastinal Glands—Lower posterior one has a single deposit, $\frac{1}{4}$ inch in diameter; sharply defined from surrounding glandular tissue. On section, bright yellow, centre slightly softer than periphery.

Liver—Nine deposits on under and upper surfaces of liver; vary in size from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch in diameter; all are sharply defined. On section, the smaller ones are firm throughout, the centre bright yellow, the periphery lighter and the whole surrounded by a connective tissue capsule. The larger show capsule more distinctly, with caseous contents; the central portion being semi-fluid, exuding on slight pressure.

Hepatic Glands—Enlarged; have numerous caseous foci; the larger ones, $\frac{3}{4}$ inch in diameter, have centres broken down and semi-fluid, bright-yellow in color.

Intestines—Several deposits situated in wall of small intestines, average $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, project considerably beyond surface. On section, some have firm centres, containing calcareous particles, others have centres softer than the periphery and are bright-yellow in color.

Mesenteric Glands—Several caseous foci, average $\frac{1}{4}$ inch in diameter. As a rule, they are firm throughout and sharply defined from surrounding glandular tissue.

Renal Glands—Three deposits, each $\frac{1}{2}$ inch in diameter. On section, centres soft and caseous.

NO. XI.—Examination No. 26.

Common cow, 5 years old; weight 700 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 12th, 1894. Before injection minimum temperature 101° ; maximum 101.3° After injection maximum temperature reached in 12 hours, 106.3°

AUTOPSY.—Liver—Upper surface one nodule, 1 inch in diameter. On section, centre caseous and necrotic; in periphery cheesy material is firmer and somewhat nodular. On under surface firm, caseous nodule, $\frac{1}{4}$ inch in diameter.

Hepatic Glands—One deposit, size $\frac{1}{4}$ inch in diameter; firm except central focus of softening; of a bright-yellow color.

NO. XII.—Examination No. 32.

Common cow, 14 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 12th, 1894. Before injection minimum temperature 101° ; maximum 101° . After injection maximum temperature reached in 14 hours, 104.4° .

AUTOPSY.—Lungs—Right: Large deposit situated between upper and lower lobes, close to large bronchi, size of hen's egg; projects considerably. On section, made up of several nodules. The centres of these necrosed; the periphery is firmer and the whole surrounded by a connective tissue capsule. In neighborhood of this deposit in caudal lobe are eight small deposits, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. On section, they are caseous throughout; the larger ones just commencing to soften in the centre.

Left Lung—Several small deposits, scattered through caudal lobe, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; sharply defined for the most part; a few being surrounded by a zone of injection. On section, all are caseous, with central foci of softening.

Mediastinal Glands—Lower posterior gland slightly enlarged. On section, has one deposit, $\frac{1}{4}$ inch in diameter; firm, caseous yellow; situated at upper periphery of gland.

NO. XIII.—Examination No. 33.

Mixed Jersey Cow, 7 years old; weight 850 pounds; old herd. Date of injection June 11th, 1894. Date of autopsy, June 13th, 1894. Before injection minimum temperature 101° ; maximum 101° . After injection maximum temperature reached in 13 hours, 106.2° . This cow was one of those condemned by physical examination as well. They will all be considered later under the heading of "suspect barn" in which they were kept until killed.

AUTOPSY.—Lungs—Left: Posterior border, caudal lobe, large deposit, size of goose egg; projects slightly beyond lung; on section, made up of a number of nodules. The centres of these are breaking down and the caseous material can be pressed out readily. Surrounding these various nodules are bands of connective tissue. Situated in substance of caudal lobe are six other separate nodules, $\frac{3}{4}$ inch in diameter; centres caseous, beginning to soften. At junction of caudal and upper lobes in the left side is an area of hepatization about the size of a silver dollar; scattered through this are numerous small, bright-yellow spots, about size of a pin-head.

Mediastinal Glands—Middle posterior gland has focus $\frac{1}{4}$ inch in diameter; soft caseous centre; nodule sharply defined from glandular structure.

NO. XIV.—Examination No. 37.

Common cow, 9 years old; weight 750 pounds; old herd. Date of injection, June 11th, 1894. Date of autopsy June 13th, 1894. Before injection minimum temperature 101.1° ; maximum 101.3° . After injection, temperature reached maximum in 14 hours, 106.3° . This cow was also condemned by physical examination and kept in "suspect barn" until killed.

AUTOPSY.—Lungs—Right: Caudal lobe has three deposits, $1\frac{1}{2}$ inches in diameter, the centres of which are semi-fluid, containing caseous particles. The periphery is firm, caseous and of a bright yellow color. Broad bands of connective tissue separate these nodules from one another and from the surrounding lung tissue. Right cephalic lobe several small deposits, each $\frac{1}{4}$ inch in diameter; centres are caseous, just beginning to soften.

Left Lung—Caudal lobe, two deposits on posterior border, each $1\frac{1}{2}$ inches in diameter. On section, centres are soft and caseous; surrounded by a firm connective tissue band. These deposits are made up of a number of small ones. On under surface caudal lobe there are three nodules; one the size of an English walnut; each of the others average $\frac{3}{4}$ inch in diameter. All are soft and caseous in the centre; all sharply defined. In lung structure of this lobe, there are also several small scattered deposits, $\frac{1}{4}$ inch in diameter; firm and caseous.

Mediastinal Glands—Posterior ones are enlarged so as to fill in space between the

lungs; each of the two lower ones are about the size of adult human kidneys. On section, all glandular tissue has disappeared and the cut surface shows them to be made up of caseous foci, the centres of which have broken down and are semi-fluid exuding on slight pressure. The middle and upper posterior glands are also enlarged markedly and contain numerous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter; for the most part they are firm and caseous, with a central focus of necrosis; a few are still firm throughout.

Bronchial Glands—All enlarged, left especially so, being the size of a large egg. On section, numerous caseous deposits with centre broken down and necrotic; peripheral portion, as a rule, still firm. In left bronchial gland the deposits are most numerous and necrosis greatest.

Liver—Situated in upper surface is a large deposit, size of an egg, made up of a number of nodules; extends for some distance into parenchyma of liver, from which, however, it is sharply defined. The centres of these nodules have broken down and are for the most part semi-fluid, containing cheesy particles, readily pressed out; the peripheries are caseous, but are separated from liver structure by connective tissue capsule. Between this large deposit and under surface of diaphragm is an abscess cavity containing about $1\frac{1}{2}$ pints of greenish-yellow, creamy, foul-smelling pus. This abscess is situated at posterior portion of right lobe. On upper surface of left lobe there are foci, each $\frac{1}{2}$ inch in diameter, with caseous centres. On anterior border two deposits, each $\frac{1}{4}$ inch in diameter; centres soft, cheesy.

Hepatic Glands—Enlarged; on section, contain a few caseous deposits, averaging $\frac{1}{4}$ inch in diameter. A few have central focus of softening.

Spleen—Two deposits, $\frac{1}{4}$ inch in diameter, situated in parenchyma of spleen; sharply defined; centres just beginning to soften somewhat.

NO. XV — Examination No. 36.

Holstein cow, 10 years old; weight 950 pounds; old herd. Date of injection June 11th, 1894. Date of autopsy June 13th, 1894. Before injection minimum temperature 101.4° ; maximum 102° . After injection maximum temperature reached in 13 hours, 105.3° . This cow condemned by physical examination as well; one of those residing in "suspect barn."

AUTOPSY.—**Lungs**—**Right**: Numerous adhesions to costal plaura. Base, deposit size of an orange, nodular appearance, extends some distance beyond surface. On section, made up of a number of nodules, $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter, the centres of which are soft and cheesy; periphery firmer, but caseous; the whole deposit surrounded by a narrow band of connective tissue. In substance caudal lobe several deposits, averaging 1 to $1\frac{1}{2}$ inches in diameter, surrounded, as a rule, by a connective tissue capsule. On section, centres have broken down more or less completely and contain a thick, tenaceous, greenish-yellow fluid, in which are particles of caseous material. The peripheries are caseous and are readily pressed out. Scattered along upper border of caudal lobe are numerous deposits from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; centres just beginning to soften; peripheries firm, somewhat indistinctly separated from surrounding lung tissue. One deposit on anterior border, 1 inch in diameter; on section, soft and cheesy; centre readily pressed out. At junction of caudal with upper lobes, close to entrance of large bronchus, are situated quite a group of nodules, averaging $\frac{3}{4}$ inch in diameter. On section, centres are firm, although a few show beginning signs of disintegration. Cephalic lobe has three deposits, each $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined.

Left Lung—Caudal lobe, base, four small deposits, averaging $\frac{1}{2}$ inch in diameter, sharply defined; centre cheesy, somewhat softer than peripheries. Posterior border, caudal lobe, are two deposits, each $1\frac{1}{2}$ inches in diameter, extending a little beyond lung. On section, these are seen to be made up of several smaller nodules, the centres of which have broken down and are readily pressed out; peripheries firmer and surrounding whole deposit is a narrow band of connective tissue.

Mediastinal Glands—Not enlarged; on section, lower posterior ones contain firm, yellow nodules, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter. The central portion of the larger no-

dules shows signs of breaking down. The upper posterior glands contain a scattered nodule here and there, all averaging $\frac{1}{8}$ inch in diameter; firm, yellow, sharply defined.

Bronchial Glands—Not enlarged. Right, one deposit, $\frac{1}{4}$ of an inch in diameter; firm, yellow; somewhat indistinctly defined. Left, two small deposits, each $\frac{1}{8}$ of an inch in diameter; firm and sharply defined.

NO. XVI.—Examination No. 46.

Holstein cow, 11 years old; weight 850 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 15th, 1894. Before injection minimum temperature 100° ; maximum 100° . After injection maximum temperature reached in 12 hours, 106.2° .

AUTOPSY.—Lungs—Left: Adhesions to diaphragm marked. Base of caudal lobe infiltrated with nodules of varying sizes, $\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter. Many of these have coalesced and form one large deposit, size of a goose egg. On section, this deposit creaks like cartilage; it is sharply defined by a broad band of connective tissue. The nodules are firm, caseous and also separated, in places, from one another by connective tissue bands. On posterior border caudal lobe, close to large bronchus, there is a large deposit, size of human kidney; extends somewhat beyond lung and has numerous firm adhesions to pleura costalis. On section, it is firm and tough, apparently made up of connective tissue in which are numerous caseous foci. On anterior border and in substance of caudal lobe there are numerous nodules, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; majority of these, on section, have caseous centres. In some the cheesy material has broken down and the node is filled with creamy, yellow fluid, which exudes on section.

Right Lung—Between cephalic and ventral lobes there is a deposit similar in character to that on under surface, left lung. The size of this deposit is about that of a child's kidney; irregular, nodular appearance. Beside this there are numerous small deposits scattered in cephalic and ventral lobes, from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter, probably twenty in all; the majority are sharply defined; on section, are made up of an outer zone of connective tissue, an inner zone of caseous material, the central portion of which is broken down and of cream-like consistency. The smaller nodules are firm and caseous throughout.

Mediastinal Glands—Enlarged, especially the lower posterior ones; each the size of a duck's egg. On section, they contain numerous deposits, averaging $\frac{1}{2}$ inch in diameter; for the most part firm, caseous, sharply defined; a few of the larger ones have a central focus of softening. The upper posterior glands are slightly enlarged and the deposits are small as a rule, caseous and firm.

Bronchial Glands—Contain three deposits, each $\frac{1}{4}$ inch in diameter, firm, caseous, sharply defined from glandular structure.

Posterior Pharyngeal Glands—Enlarged; contain numerous deposits, averaging $\frac{1}{4}$ inch in diameter; all are caseous with marked central softening; indistinctly separated from glandular structure.

Parotid Glands—Both enlarged, each to size of an adult human kidney; nodular appearance. On section, peripheral portion of each composed of numerous nodules, $\frac{3}{4}$ to 1 inch in diameter, indistinctly defined; centres very much softer than outer zones; no glandular structure visible; the central portion of both glands completely broken down; consists of a thick, greenish-yellow, foul-smelling fluid, containing numerous caseous particles; exuded readily on section.

Liver—On anterior border of left lobe is a nodule, 1 inch in diameter, sharply defined from hepatic tissue. On section, surrounded by connective tissue capsule. The centre is broken down and consists of a thick, greenish-yellow fluid, in which are several caseous particles. The peripheral portion is caseous and firm.

NO. XVII.—Examination No. 49.

Grade Holstein, 4 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 15th, 1894. Before injection minimum

temperature 101°; maximum 101° After injection maximum temperature reached in 12 hours, 106°

AUTOPSY.—**Mediastinal Glands**—Lower posterior glands enlarged to five times usual size; are firm and hard. On section, creak like cartilage; there is no glandular structure visible; the cut surface is gritty and of a bright-yellow color. Calcareous infiltration marked, except at the central portion where there are beginning signs of softening. The middle glands are about the size of hens' eggs and, on section, are similar in character to the lower ones, except that the calcareous infiltration is not so marked and the softening is more advanced. The upper glands are not much enlarged, contain only a few small deposits, $\frac{1}{4}$ inch in diameter; these are firm, caseous and as a rule sharply defined.

Bronchial Glands—Left, two deposits, each $\frac{1}{2}$ of an inch in diameter, central portion somewhat softer than peripheral; indistinctly separated from glandular structure. Right, one deposit, $\frac{1}{4}$ inch in diameter; firm and caseous throughout; also one, $\frac{1}{2}$ of an inch in diameter, firm and sharply defined.

NO. XVIII. Examination No. 48.

Grade Holstein, 2½ years old; weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 15th, 1894. Before injection minimum temperature 102°; maximum 102.1° After injection maximum temperature reached in 12 hours, 107°.

AUTOPSY.—**Lungs**—Right: Upper lobes have a few small nodes scattered through their substance, from $\frac{1}{4}$ to $\frac{3}{8}$ of an inch in diameter. On section, the centre is caseous; the periphery is firm and sharply defined from surrounding lung tissue. Between the upper and lower lobes, close to the entrance of the large bronchus, is a mass made up of a number of nodes and nodules, about 4 inches in length; on section, creaks like cartilage; centre more or less firm, although there are several caseous foci. In the neighborhood of this deposit in caudal tube there are quite a number of small beginning deposits, about a pin-head in size, firm and yellow; sharply defined.

Left Lung—Five small deposits, $\frac{1}{4}$ to $\frac{3}{8}$ of an inch in diameter, scattered through caudal and ventral lobes; all sharply defined. Centres firm and caseous; peripheries surrounded by a narrow band of connective tissue.

Both lungs have numerous fibrinous adhesions to pleura costalis, varying in itself is free from all deposits.

Mediastinal Glands—Posterior chain enlarged, especially marked in lower ones; each about the size of a child's kidney. On section of the latter all glandular tissue has disappeared and the caseous deposits have broken down; the central portion consisting of soft, semi-fluid material, with cheesy particles. The middle and upper glands are enlarged and contain numerous caseous deposits, some of which are breaking down in the centres. The deposits in these upper glands average about $\frac{1}{4}$ of an inch in diameter; but in some places they are confluent and form a nodule $1\frac{1}{4}$ inches in diameter. These larger ones have soft, cheesy centres; the others are firm and caseous throughout.

Bronchial Glands—Enlarged until they are the size of English walnuts; soft, cheesy throughout. The only firm portion is a narrow strip of glandular tissue immediately beneath the capsule; but this has a number of pin-point to pin-head deposits which are firm, bright yellow and somewhat indistinctly defined.

NO. XIX.—Examination No. 94.

Common cow, 8 years old; weight 850 pounds; bought in 1894. Date of injection June 15th, 1894. Date of autopsy June 18th, 1894. Before injection minimum temperature 101.3°; maximum 102° After injection maximum temperature reached in 12 hours, 106.3°

AUTOPSY.—Left Lung—One deposit, $1\frac{1}{2}$ inches in diameter, situated in centre of caudal lobe, left side. On section, the central portion is soft and cheesy; the peripheral small ones. On section, they are made up of a softer central and an outer firm

portion is caseous and firm. The whole deposit is surrounded by a zone of redness extending for some distance in an irregular manner.

Mediastinal Glands—Left lower posterior gland slightly enlarged; contains several deposits $\frac{1}{4}$ of an inch in diameter; centres slightly softer than periphery; as a rule sharply defined from glandular structure and of a bright-yellow color. Two of the middle posterior glands each have one deposit; firm, yellow, sharply defined; $\frac{1}{4}$ of an inch in diameter.

NO. XX.—Examination No. 91.

Common cow, 12 years old; weight 900 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 18th, 1894. Before injection minimum temperature 101.3°; maximum 102° After injection maximum temperature reached in 16 hours, 106°

AUTOPSY.—Liver—Left lobe, upper surface, central portion has three deposits; two $\frac{1}{4}$ and one $\frac{3}{4}$ of an inch in diameter; sharply defined from hepatic parenchyma. Centres are soft and cheesy; periphery caseous but firmer and surrounded by a connective tissue capsule. The soft centres are readily pressed out.

Hepatic Glands—Somewhat enlarged and softer than usual; contain two caseous foci; each little over $\frac{1}{4}$ inch in diameter. Periphery indistinctly defined.

Intestines—A number of deposits size of peas; project slightly. On section, centres are soft; a few are cheesy, especially those close to mesenteric attachment.

Mesenteric Glands—Slightly enlarged and contain several small, firm, yellow deposits; average $\frac{1}{8}$ of an inch in diameter, and are indistinctly defined.

Parietal Peritoneum—Right side has numerous deposits; some are firmly attached, others have pedicles of various lengths. The pedunculated ones, on section, are firm and white throughout; those that are situated directly in the peritoneum have soft, cheesy centres. Several flat nodules, $\frac{1}{2}$ inch in diameter, similar to the pedunculated ones on section, were found lying loose in abdominal cavity.

NO. XXI.—Examination No. 80.

Common cow, 10 years old; weight 850 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 18th, 1894. Before injection minimum temperature 101.2°; maximum 101.3° After injection maximum temperature reached in 13 hours, 105.2°.

AUTOPSY.—Pleurae Costalium—On both sides covered with nodular deposit; nodules from $\frac{1}{4}$ to 1 inch in diameter. A few hang by pedicles; the majority are round and project slightly. The whole membrane studded; has a glistening appearance. From the larger nodules there are adhesions to the pulmonary pleura. On section, the larger nodules have caseous centres; the smaller are firm and glistening throughout. The pedunculated ones are especially firm and white.

Pleurae Pulmonum—That covering bases of caudal lobes, both sides, also studded with a similar nodular deposit, but the nodes are all small, averaging $\frac{1}{4}$ inch in diameter. On section, the centres consist of soft, yellow foci, surrounded by firm, caseous zones. The anterior borders of the caudal lobes have a complete fringe of nodules and here quite a number have short pedicles. Scattered over the remaining pleura are several deposits, for the most part small and situated directly on membrane.

Diaphragm—Thoracic layer also covered by a deposit similar to that on pleurae costalium et pulmonum; numerous adhesions to lungs.

Lungs—Right: Base of caudal lobe infiltrated throughout by nodes, from $\frac{1}{4}$ to 1 inch in diameter; some have coalesced, forming a large mass. As a rule, these aggregations of nodules have broken down and the centre is semi-fluid, of a greenish-yellow color, in which are particles of caseous material. The peripheries are firmer, but still caseous. The whole is surrounded by a narrow band of connective tissue. The smaller single deposits are generally firm and caseous throughout; not so distinctly defined, although a few have commenced to break down. The surrounding lung tissue is thickened and injected, especially in the neighborhood of the anterior margin; here the nodes are very

numerous and more or less cheesy. The connective tissue capsule of the nodules along the posterior border is not as distinct as that around the others, but the deposits show the most advanced necrosis; many have the centres composed of a thick, tenaceous, greenish-yellow fluid. Scattered through cephalic and ventral lobes are a few deposits, from $\frac{1}{4}$ to $\frac{3}{8}$ inches in diameter; the centres of these are all firm and caseous; the nodules are as a rule sharply defined.

Left Lung—Along posterior border there are three deposits that project somewhat beyond the surface. On section, they contain a cream-like, yellowish fluid in centre; the peripheries are composed of zones of firm, caseous material, indistinctly defined. These deposits are from $1\frac{1}{2}$ to 2 inches in diameter, and apparently consisted at one time of a group of nodules which have coalesced. In substance of caudal lobe there are six smaller deposits, averaging $\frac{1}{2}$ inch in diameter. On section, the contents are cheesy; they are all more or less indistinctly defined; pulmonary tissue injected and thickened.

Mediastinal Glands—They are all more or less slightly enlarged; the lower posterior, in thickness, being the size of an English walnut. On section, the two lower posterior ones are yellow and caseous, with semi-fluid centres. The upper posterior and the anterior mediastinal glands contain numerous deposits, averaging $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, indistinctly defined; bright-yellow in color; firm throughout. Several are about to coalesce.

Bronchial Glands—All more or less enlarged. Right and left each have three deposits, averaging $\frac{1}{4}$ inch in diameter; caseous, beginning softening in centres.

NO. XXII.—Examination No. 95.

Mixed Durham cow, 9 years old; weight 900 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.3° ; maximum 102.1° . After injection maximum temperature reached in 13 hours, 105.3° .

AUTOPSY.—Lungs—Right On under surface of caudal lobe there is one deposit, the size of a large English walnut. On section, contains a cream-like yellowish fluid, in which are caseous particles. The periphery is firm, caseous and sharply defined, except at one side where large nodule joins a small one size of a pea, which is firm throughout. Along the posterior border there are two other deposits, distant about 2 inches from one another; they are not as distinctly defined as the one on under surface. They are each about $1\frac{1}{4}$ inches in diameter and, on section, the centres are caseous but not softened.

Left Lung—Scattered through caudal lobe are about ten deposits, averaging $\frac{1}{2}$ inch in diameter. On section, the centres are for the most part firm, though a few of the larger ones have commenced to break down.

Mediastinal Glands—Those of posterior chain enlarged slightly, and all contain deposits. These are most marked in the two lower glands. The deposits average $\frac{1}{4}$ inch in diameter; are firm and yellow, and as a rule somewhat sharply defined from surrounding glandular tissue. In several of the glands the deposits are arranged in a row along cortical layer; a few are on the point of coalescence; others of the glands have only one or two nodes situated deep in the glandular structure.

NO. XXIII.—Examination No. 97.

Common cow, 10 years old; weight 750 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 102.3° ; maximum 103° . After injection maximum temperature reached in 13 hours, 107.1° .

AUTOPSY.—Pleurae Costalium—Right side studded with deposit made up of nodules of varying sizes; lungs are firmly adherent to it in places. On section, the deposit is firm and white, with yellow, punctiform areas. A few of the nodules are suspended by pedicles, from 1 to 2 inches in length.

Lungs—Caudal lobes of both lungs have numerous deposits, varying in size from $\frac{1}{4}$ to $1\frac{1}{4}$ inches in diameter; the larger deposits formed by partial coalescence of several

caseous portion; the whole nodule is more or less sharply defined from lung tissue; the latter, however, is injected in immediate neighborhood of deposit.

Ventral Lobe—Right side is almost entirely infiltrated by various sized deposits, the majority averaging $\frac{1}{4}$ inch in diameter. On section, these deposits are firm and caseous, with central foci of softening.

Cephalic Lobe—Right side, an occasional deposit, majority little over $\frac{1}{8}$ inch in diameter; of a bright-yellow color, with boundaries indistinctly defined. On under surface, right caudal lobe, one large deposit, size of goose egg, undoubtedly made up of a number of small nodules; projects somewhat beyond pulmonary surface. On section, the centre of this mass entirely broken down, consists of a thick, greenish-yellow, cream-like fluid, which exudes readily. Edges of the deposit ragged, caseous, readily pressed out; entirely surrounded by broad connective tissue capsule.

Mediastinal Glands—Posterior very much enlarged; the two lower ones form a mass as large as a cow's kidney; nodular on outer surface. On section, centre one large cavity, filled with semi-fluid material, in which are caseous particles. The glands collapse after the central portion has escaped; there being only a thin layer of caseous, infiltrated tissue beneath capsule. Middle mediastinal glands are also enlarged; size of eggs. On section, contain a few soft, caseous foci, and a number of firm, yellow nodules; former $\frac{1}{2}$ inch, latter from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; sharply defined from remaining glandular structure. The upper glands are about the size of an English walnut and contain a number of firm, yellow nodules, averaging $\frac{1}{4}$ inch in diameter.

Bronchial Glands—Somewhat enlarged; contain two deposits in right gland, each $\frac{1}{4}$ inch in diameter, firm and caseous on section. Three deposits in left gland, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, yellow, indistinctly defined.

NO. XXIV.—Examination No. 96.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 102.1°; maximum 102.3° After injection maximum temperature reached in 13 hours, 107°.

AUTOPSY.—Lungs—Right: Posterior border of caudal lobe has four deposits, from $1\frac{1}{2}$ to 2 inches in diameter. On section, the two upper ones seen to be made up of several small deposits, separated from one another and from lung by connective tissue bands of varying widths. The central portion of each node is firm and caseous. Two lower and larger deposits have central portion broken down; this is readily pressed out and consists of a thick, tenaceous, greenish-yellow fluid, in which are seen cheesy particles. These two deposits have broad connective tissue capsules; within is a layer of firm, caseous material.

Left Lung—Caudal lobe has eight deposits scattered through it, averaging $\frac{1}{2}$ inch in diameter. On section, they are as a rule firm and caseous, although a few show signs of breaking down soon. Between caudal and ventral lobes there is situated a deposit, size of a large English walnut; on section, the centre of this is completely broken down, consisting of thick, creamy, yellow fluid, which escapes on slight pressure.

Mediastinal Glands—Posterior chain enlarged; two lower ones form a mass size of a cow's kidney. On section, the centre of this markedly softened, consists of a thick, greenish-yellow fluid; escapes readily. On the border are a number of caseous foci; a few have calcareous centres; no glandular structure visible.

Middle and upper glands contain a number of deposits, the majority being $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, yellow and more or less sharply defined.

Bronchial Glands—Somewhat enlarged, contain eight deposits, similar in character to those in middle and upper posterior mediastinal glands.

NO. XXV.—Examination No. 92.

Common cow, 8 years old; weight 700 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.2°; maximum 102.2° After injection maximum temperature reached in 15 hours, 105°

AUTOPSY.—Lungs—Right: Ten small deposits scattered in caudal lobe; the largest are $\frac{1}{2}$ inch in diameter; the definition is somewhat indistinct. On section, they are composed of firm, caseous centres, surrounded by a zone of firmer cheesy material.

Left Lung—Eight deposits, the largest average 1 inch in diameter; situated chiefly along posterior border of caudal lobe; the others in substance. On section, the centres are very soft, readily pressed out; the peripheries are firmer and the majority are surrounded by a connective capsule. The smaller ones are less sharply defined than the larger; in some places the small deposits are firm and yellow, situated in the centre of an area of hepatization.

NO. XXVI.—Examination No. 87.

Common cow, 7 years old; weight 800 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.2° ; maximum 101.3° . After injection maximum temperature reached in 17 hours, 104.2°

AUTOPSY.—Mediastinal Glands—Right: Lower posterior on section contains two deposits, each $\frac{1}{4}$ inch in diameter. They are bright yellow, sharply defined, the central portion of each being slightly softer than the periphery.

NO. XXVII.—Examination No. 78.

Common cow, 10 years old; weight 850 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.3° ; maximum 102° . After injection maximum temperature reached in 13 hours, 106°

AUTOPSY.—Lungs—Right: Anterior margin of caudal lobe three deposits, average $\frac{3}{4}$ inch in diameter. On section, they are firm and yellow, the centre is slightly softened.

Left Lung—Cephalic lobe infiltrated throughout; the nodes vary in size from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; the larger ones show in a few places that they are formed by the coalescence of several of the small ones. The centres of the smaller deposits are firm and caseous; the larger ones consist of a small margin of caseous material, the centre filled with broken down, caseous particles and a thick, creamy fluid.

Mediastinal Glands—The posterior chain contains on section, a number of small deposits, averaging $\frac{1}{4}$ inch in diameter. They are firm and yellow and as a rule sharply defined from surrounding glandular structure.

Bronchial Glands—Two deposits in left gland similar to those in posterior mediastinal glands.

Liver—On upper surface of Right lobe there is an elevation projecting somewhat above liver. On section, seen to be a nodule about the size of a large English walnut. The central portion is very soft, readily pressed out, surrounded by a zone of firmer, caseous material; the whole encapsulated by connective tissue. About three inches to left of this one, also situated close to upper margin of liver, there is another deposit, 1 inch in diameter. The central portion of this focus is just beginning to soften; the zone of firm, caseous material is wider and the connective tissue capsule narrower.

Hepatic Glands—Several small foci; indistinctly defined; all firm and caseous.

NO. XXVIII.—Examination No. 81.

Common cow, 6 years old; weight 800 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 102° ; maximum 102.3° . After injection maximum temperature reached in 12 hours, 107°

AUTOPSY.—Lungs—Left: On under surface caudal lobe there is a deposit, size of an egg; on section, the central portion is broken down and exudes readily; the outer zone is firmer than the central, but can also be pressed out. Surrounding entire deposit is a connective tissue capsule. In centre of caudal lobe there is another nodule, 1 inch in diameter; not so sharply defined from lung structure as the one on under surface. On section, composed entirely of firm, caseous material.

Right Lung—On posterior border there is a deposit, 1 inch in diameter, extending a little beyond surface of lung. On section, the central portion has broken down and is semi-fluid.

Mediastinal Glands—The posterior each have about six deposits, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, yellow and as a rule distinctly defined from surrounding glandular structure.

NO. XXIX.—Examination No. 83.

Common cow, 10 years old; weight 750 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.3°; maximum 102.1° After injection maximum temperature reached in 13 hours, 106.2°

AUTOPSY.—Lungs—Left: On lower posterior border caudal lobe a mass size of a large egg, made up of numerous, coalesced nodules. On section, the central portion of each node is in a more or less advanced stage of caseous degeneration. Some have broken down so far that the central portion is semi-fluid. Around the whole mass there is more or less injection and thickening of the pulmonary tissue.

Mediastinal Glands—Right: Lower posterior has number of deposits; size of an adult human kidney. On section, the whole is filled with a yellow, cream-like fluid, containing caseous particles. A very narrow margin of firm, caseous material surrounds this central softening; some calcareous infiltration. Upper glands contain few deposits, all firm, yellow, sharply defined; average $\frac{1}{4}$ inch in diameter.

Rumen—On surface there are four deposits, each 1 inch in diameter. On section, the central portion is soft and cheesy; the periphery is sharply defined. They are situated directly beneath peritoneal surface, but have no communication with cavity of stomach.

Parietal Peritoneum—Quite a number of deposits attached to it, either directly or by short pedicles. On section, those situated directly on the peritoneal surface have cheesy centres; some have a central focus of softening. The pedunculated ones are somewhat flattened and, on section, are firm and white throughout.

NO. XXX.—Examination No. 77.

Common cow, 6 years old; weight 800 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101°; maximum 101.3°. After injection maximum temperature reached in 12 hours, 106.2°

AUTOPSY.—Lungs—Right: One deposit in cephalic lobe, $1\frac{1}{2}$ inches in diameter. On section, the centre is cheesy and the periphery firm and caseous; the boundary is not very distinctly marked, there being several yellow deposits in the tissue immediately surrounding the larger node. These nodules are from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter.

Mediastinal Glands—The lower posterior ones are enlarged to five times their usual size. On section, they contain numerous deposits, averaging $\frac{1}{2}$ inch in diameter; several are about to coalesce. The deposits are caseous throughout, except in a few which show signs of beginning central softening. The middle and upper glands have quite a number of deposits, varying in size from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter. The larger deposits are as a rule single; the smaller ones are grouped together in threes and fours in the different glands. All but the very smallest are soft and caseous; a few have semi-fluid centres, which exude on section.

NO. XXXI.—Examination No. 84.

Common cow, 8 years old; weight 800 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.2°; maximum 102° After injection maximum temperature reached in 13 hours, 106.2°

AUTOPSY.—Lungs—Bases of both lungs contain a number of deposits, six in the Left and eight in the Right. They average $\frac{1}{4}$ inch in diameter; are firm and bright-yellow in color. A few of the larger ones have the central portion slightly softer than the periph-

ery. They are all more or less sharply defined; in a few places the lung immediately surrounding the deposit is hepatized.

Mediastinal Glands—Posterior contain a number of scattered nodules, $\frac{1}{4}$ inch in diameter. They are all bright yellow; sharply defined from glandular tissue, and as a rule situated in cortical portion of gland. On section, caseous throughout; no signs of softening.

NO. XXXII.—Examination No. 39.

Holstein cow, 9 years old; weight 1100 pounds; old herd; (mother of No. 116, condemned on June 21st, 1894.) Date of injection June 13th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 101° ; maximum 101.2° . After injection maximum temperature reached in 13 hours, 107° .

AUTOPSY.—Mediastinal Glands—Lowest posterior gland one deposit, $\frac{1}{4}$ inch in diameter; firm, bright yellow, sharply defined; centre is caseous but not necrotic. Gland very slightly enlarged.

Intestines—One deposit, 1 inch in diameter, in the lower portion of the small intestine, close to the mesenteric attachment. On section, soft and cheesy in the centre; periphery somewhat firmer. Also several smaller deposits, averaging $\frac{1}{4}$ inch in diameter, scattered over small intestine; all situated close to mesenteric attachment. As a rule, they are firm, caseous throughout; a few have calcareous deposits.

Mesenteric Glands—Enlarged; contain a number of caseous foci, averaging $\frac{1}{2}$ inch in diameter. On section, the central portion is much softer than the peripheral; readily pressed out.

NO. XXXIII.—Examination No. 44.

Holstein cow, 6 years old; weight 900 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 102.1° ; maximum 102.2° . After injection maximum temperature reached in 10 hours, 105.2° .

AUTOPSY.—Lungs—Left: On the under surface of caudal lobe a deposit size of large egg; projects slightly beyond organ. On section, made up of a number of smaller nodules, varying in size from $\frac{1}{2}$ to $1\frac{1}{4}$ inches. The centres of these nodules have broken down and coalesced and consist of a soft, yellow, cheesy fluid; the borders are firm and caseous. The whole is surrounded by a connective tissue capsule $\frac{1}{8}$ inch wide.

Cephalic and ventral lobes have several deposits along the posterior border, $\frac{1}{4}$ to 1 inch in diameter. The smaller ones are firm and caseous throughout; the larger ones are necrotic in the centre, almost semi-fluid. All are more or less sharply defined.

Right Lung—On the under surface of caudal lobe is a deposit, $1\frac{1}{2}$ inches in diameter. On section, centre is soft and cheesy, readily pressed out; the entire deposit surrounded by a connective tissue capsule, $\frac{1}{8}$ inch in diameter. Scattered through the caudal lobe are six other deposits, each $\frac{1}{4}$ inch in diameter. These are firm, yellow and somewhat indistinctly defined.

Cephalic and ventral lobes have no deposits in the centre, but along the posterior border are several firm, yellow, pea-sized nodules, each surrounded by a zone of injection; on section, firm throughout.

Mediastinal Glands—The lower posterior gland has two deposits; bright-yellow color; pin-point in size; somewhat indistinctly defined. The middle gland has one deposit size of grape seed; firm and caseous throughout. One of the upper glands contains a pin-head sized, firm, yellow, sharply defined deposit. None of the glands are enlarged.

Bronchial Glands—The right gland has a single deposit, $\frac{1}{8}$ of an inch in diameter; firm; caseous; indistinctly defined. Glands slightly enlarged.

NO. XXXIV.—Examination No. 2.

Mixed Jersey cow, 6 years old; weight 800 pounds; bought in 1893. Before injection minimum temperature 101° ; maximum 102° . After injection maximum temperature reached in 13 hours, 106.3° .

AUTOPSY.—Lungs—Left: Firmly adherent to pleura costalis; on removal entire caudal lobe infiltrated with deposits of various sizes, giving surface a nodular appearance. Posteriorly close to base is a large mass the size of an orange, made up of nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. On section, show various stages of degeneration. The centres of the largest consist of thick, tenaceous, greenish-yellow fluid, containing caseous particles; escapes on slight pressure; the outer zones are composed of firm, caseous material. The remaining portion of the caudal lobe is infiltrated by nodules of various sizes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; some are single, others grouped together, forming masses $1\frac{1}{2}$ to 2 inches in diameter. The centres of these latter are considerably softer than the peripheries, the caseous material being of an intense yellow here. The smaller nodules are firm and caseous throughout, with the exception of a very few which show signs of breaking down. The lung tissue in the caudal lobe is almost entirely replaced by connective tissue.

Mediastinal Glands—Lower posterior glands enlarged to size of duck's eggs, filling in the space between the lungs; there are also several small nodes in the surrounding tissue. On section, the glands have soft, creamy, bright-yellow fluid in the centre, containing a number of caseous particles. The outer zone of the gland is a broad layer of firm, caseous material; the whole is readily pressed out. No glandular tissue visible.

The middle mediastinal glands are also enlarged, about the size of large English walnuts, very firm. On section, the cut surface is gritty and contains a number of calcareous particles. The centre is beginning to soften and there is no glandular tissue visible.

The upper glands contain several deposits, varying from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter. The larger are formed by the coalescence of several small deposits and are all caseous, with central foci of softening. The small deposits are firm and caseous throughout; somewhat indistinctly defined.

Bronchial Glands—Contain several small deposits, especially marked in gland on left side; they are all about $\frac{1}{4}$ inch in diameter, firm and yellow throughout. There is no sign of softening or enlargement of any of the glands.

NO. XXXV — Examination No. 33.

Jersey bull, 3 years old; weight 900 pounds; old herd. Date of injection June 11th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 103° ; maximum 103° . After injection temperature reached maximum in 14 hours, 105.2° . This bull was condemned by physical examination and kept in "suspect barn" until killed.

AUTOPSY.—Lungs—Left: Adherent to costal pleura or deposits on the pleura; there is no sign of division into lobes; the whole lung is so completely infiltrated that it appears to be one mass. The pulmonary pleura is thickened throughout and has a nodular appearance, due to deposits on the pleural surface and to the projection of nodules from the lung itself. On section of lung, all lobes infiltrated by nodules, single and grouped, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. The larger have coalesced in places and form masses, the central portion of which is in the most advanced stage of degeneration, consisting of a thick, tenaceous, greenish-yellow fluid, with caseous particles. The circumference of these larger masses is composed of thick, cheesy material, which is readily pressed out. Of the smaller nodules, some are hard and caseous throughout, others have broken down in the centre; degeneration not as advanced as in the large masses; they are filled with soft cheesy material, of a bright-yellow color. Some of the nodules are sharply defined, others are indistinct, others again are surrounded by a broad zone of injection; connective tissue abundant, surrounding separate nodules, and again three or more nodules. The only pulmonary tissue present lies close to the large bronchi, and here it is thickened and injected. The deposits are as a rule larger close to the posterior border and at the base of the caudal lobe.

Right Lung—Cephalic and ventral lobes are infiltrated throughout. Pleural surface is also nodular, thickened and dull. On section, these lobes are similar to those of left lung; the only difference being that the deposits are more segregated. The degeneration is extensive, but central portion has not become semi-fluid as in deposits in left lung.

Right caudal lobe free except on under surface; here there are three large deposits, averaging about size of hen's eggs. On section, they have soft, semi-fluid centres, surrounded by a zone of firmer, caseous material; they are sharply defined from lung tissue by an area of injection. The structure of the lower lobe is very much firmer than usual and has a number of small hepatized areas, but no tubercular deposits.

Pleurae Costalium—On both sides but more especially on the left there is a nodular deposit situated directly on the pleural surface, 1 to $1\frac{1}{2}$ inches in thickness; a few have pedicles, $\frac{1}{2}$ to $\frac{3}{4}$ inch in length. The lungs are more or less firmly adherent to costal pleura or to deposit. On section, these nodules, which vary from $\frac{1}{4}$ of an inch (most numerous and directly situated on pleura) to $\frac{3}{4}$ inch in diameter, are seen to differ somewhat in structure. Those having pedicles are firm throughout; the whole cut surface is white and glistening; in some there are a few punctiform, yellow areas. The centres of the larger deposits situated directly on the pleura are soft and of creamy consistence; the smaller have centres bright yellow, caseous; all are readily pressed out, except the smallest ones which are very firm; a number of these latter are white throughout. Pleural surface of diaphragm on both sides, but most marked on left, covered by a similar deposit.

Mediastinal Glands—Posterior chain is one firm mass filling in space between lungs. On section, no glandular structure visible; the whole is nodular; nodes varying in size from $\frac{1}{2}$ to $1\frac{1}{2}$ inches; a large number have coalesced forming large masses, the centres of which are in an advanced state of disintegration, containing considerable greenish-yellow fluid, thick and tenaceous; the outer zones of caseous material in many places are cretaceous. Most marked signs of breaking down in lower extremity; the deposits in the upper portion are firmer, more sharply defined.

Anterior Mediastinal Glands—Somewhat enlarged. On section, contain quite a number of single deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. The periphery is, as a rule, firm; the central portion caseous with foci of marked softening.

Bronchial Glands—Enlarged four times; all contain caseous foci, averaging $\frac{1}{4}$ inch in diameter.

Thyroid—Enlarged. On section, there are numerous caseous deposits, about the size of a large pea; some have coalesced forming nodules size of hickory nuts. These have soft, caseous centres; peripheries sharply defined, except where two or more join.

Cervical Glands—Enlarged and contain numerous small deposits, averaging $\frac{1}{8}$ inch in diameter; firm, yellow, sharply defined.

Parotid Glands—Each enlarged to size of child's kidney; nodular in character. On section, infiltrated throughout, the whole surface has a firm, yellow appearance, with a number of gritty particles scattered in substance; the most central portion shows signs of softening; this most marked in right parotid.

Submaxillary Glands—There are several small deposits in these glands, about the size of peas. They are firm, yellow and sharply defined from surrounding structure.

Pharyngeal Glands—Several caseous foci, average inch $\frac{1}{4}$ in diameter; caseous throughout; not softened.

Liver—Six nodules, scattered on upper surface and through substance, vary in size from $\frac{1}{4}$ to 1 inch in diameter; they are sharply defined by bands of connective tissue; the outer zone is firm and caseous; the inner is more or less disintegrated. Some are almost semi-fluid, greenish-yellow, containing particles of cheesy material.

Hepatic Glands—Have several deposits, averaging about $\frac{1}{4}$ inch in diameter; few have soft centres; balance are firm, cheesy, all rather indistinctly defined.

Renal Glands—Contain numerous caseous foci; all are small, averaging $\frac{1}{4}$ inch in diameter.

Intestines—On section, there are quite a number of ulcers in the lower portion of the ileum; the long diameter, for the most part is transverse, although a few have the longest longitudinally; and a few are circular. The edges of these ulcers are indurated; a number of small gray-white nodules, size $\frac{1}{8}$ inch, are in immediate neighborhood. The ulcers are shallow, in no case extending through to serous coat. Scattered over peritoneal coat of the small intestines are numerous deposits, $\frac{1}{4}$ inch in diameter, firm, sharply defined. On section, the centres are somewhat softer than the periphery; the former are readily pressed out; the large intestine has a few similar deposits scattered on its surface; they are much smaller than those on the small intestine.

Mesenteric Glands—Enlarged; contain a number of caseous foci, averaging $\frac{1}{4}$ inch in diameter, indistinctly defined; centres softer than peripheries.

Spleen—At the outer extremity a deposit, 1 inch in diameter; one end of this nodule is firmly adherent to the under surface of diaphragm; the other end is situated in splenic substance. On section, the central portion consists of soft, caseous material, the outer zone being firmer and the whole is surrounded by a broad band of connective tissue.

Supra-renal Capsule—The one on the left side is very much enlarged; contains numerous caseous foci, averaging $\frac{1}{2}$ inch in diameter. The centres of a few are necrotic; the balance are firm and caseous throughout. As a rule the deposits are indistinctly defined from substance of capsule. A few have partly coalesced to form large deposits; centres of these markedly necrotic.

Parietal Peritoneum—Numerous nodules hanging by pedicles from parietal peritoneum. Some of these nodules are round, others flattened. On section, they are firm throughout, of a yellowish-white color. Beside these nodules there is a thick deposit situated directly on peritoneal surface, nodular in character, all small however. On section, for most part firm and yellowish-white; a few have soft caseous centres. This deposit most marked on left side and posteriorly.

Psoas Muscles—Sheath of left muscle covered by thick, nodular deposit. On section, a few of the nodules have soft, caseous centres. Immediately beneath sheath, situated in muscular tissue one deposit, $\frac{1}{4}$ inch in diameter, somewhat indistinctly defined; on section, yellow and cheesy with a central focus of softening.

NO. XXXVI.—Examination No. 34.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 11th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 103° ; maximum 103° . After injection maximum temperature reached in 14 hours, 105° . This animal was condemned by physical examination and kept in "suspect barn" until killed.

AUTOPSY.—Lungs—Right: Upper portion caudal lobe, at junction with ventral lobe, a deposit, $1\frac{1}{2}$ inches in diameter. On section, the contents are soft, yellow, semi-fluid and easily pressed out. The surrounding zone is soft and not sharply defined, there being considerable injection in immediate neighborhood. With this exception, caudal lobe is free; cephalic lobe deposit, $2\frac{1}{2}$ inches in diameter; on section, seen to be made up of a mass of small nodules; these have coalesced more or less and the central portion is much softer than the peripheral; the smaller nodules are firm and caseous throughout; whole surrounded by a connective tissue capsule, $\frac{1}{8}$ inch in width:

Left Lung—Scattered through caudal lobe are several nodules, $\frac{1}{2}$ inch in diameter; they are as a rule sharply defined, although a few of the smaller ones are surrounded by a zone of hepatization. In none has the central portion broken down; they are firm and of a bright-yellow color. Cephalic and ventral lobes have a few deposits scattered through their substance; none are larger than $\frac{1}{4}$ inch in diameter and only a few are sharply defined, the others are apparently situated in the centre of a hepatized area.

Bronchial Glands—Enlarged to size of large English walnuts; on section, contain several nodules, $\frac{1}{4}$ inch in diameter; they are for the most part firm and yellow, although the central portion of a few is softer than periphery.

NO. XXXVII.—Examination No. 35.

Common cow, 10 years old; weight 850 pounds; old herd. Date of injection June 11th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 101.1°; maximum 101.4° After injection temperature reached maximum in 11 hours, 104° This animal was condemned by physical examination as well; kept in "suspect barn" until killed.

AUTOPSY.—Mediastinal Glands—Lower posterior gland is slightly enlarged and on section, along periphery of gland there are numerous little nodes, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter. These are firm and caseous throughout, indistinctly defined from glandular structure. Middle glands posteriorly have three deposits, slightly larger, but with no evidence of disintegration.

Udder—In the left posterior segment are numerous caseous deposits (12), averaging in size from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch. In places they have coalesced; the central portion is filled with a greenish-yellow fluid which also contains caseous particles. The peripheries of these nodules are more or less sharply defined; this is most marked in the larger deposits. The smaller deposits have no central focus of softening; they are firm and caseous throughout. Anterior segment, left side has four deposits; these are somewhat larger than in posterior segment and the caseous material in the centre has broken down; in some consisting only of thick, tenaceous, greenish-yellow fluid which escapes on section, of very offensive odor. The glandular structure of both segments firmer than usual. Right segments carefully examined, macroscopically no evidence of any change.

NO. XXXVIII.—Examination No. 101.

Common cow, 8 years old; weight 1000 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 101.2°; maximum 101.4° After injection temperature reached maximum in 15 hours, 105.3°

AUTOPSY.—Lungs—Left: Deposit $\frac{1}{2}$ inch in diameter, in caudal lobe posteriorly; on section, central portion consists of soft, caseous particles surrounded by a firmer caseous zone. The whole nodule is sharply defined, except at one point where there is a small hepatized area in the centre of which are two, pin-head sized deposits, of a bright-yellow color.

Mediastinal Glands—The two lower posterior are each enlarged to the size of duck's egg. On section, the centre is filled with a soft, cheesy fluid, around the outer margin there is a firmer band composed of caseous nodules; these are firm, coalesce with one another; there is no glandular structure present.

The middle glands also enlarged, but not so much as the lower; they contain numerous deposits, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; they are sharply defined as a rule; the whole node firm and caseous throughout. Only a few are beginning to break down in the centres.

The upper glands are not enlarged but, on section, they contain a few small, sharply defined deposits, situated along the periphery of glands as a rule averaging about size of a pin-head.

Bronchial Gland—Left side, one deposit, firm, caseous, sharply defined, situated in centre of gland; $\frac{1}{4}$ inch in diameter.

NO. XXXIX.—Examination No. 64.

Grade Holstein, 2½ years old; weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 102.2°; maximum 102.2° After injection temperature reached maximum in 12½ hours, 108.2°

AUTOPSY.—Lungs—Left: Firmly adherent to central pleura and to deposit situated on costal pleura; difficult to separate. Cephalic lobe completely infiltrated with deposits, varying in size from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; they are more or less firm and caseous,

with central foci of softening. In a few the surrounding lung structure is thickened and hepatized; the largest deposits lie close to the larger bronchi; in these central softening most advanced. Few small deposits in ventral lobe, firm, caseous, sharply defined. Caudal lobe entirely free from deposits, but pulmonary pleura is thickened in numerous places.

Right Lung—Cephalic and ventral lobes studded with deposits, averaging $\frac{1}{2}$ inch in diameter; all more or less sharply defined. They coalesce in places forming larger deposits; these have centres of soft yellow, caseous material that is pressed out readily. The single deposits are firm and caseous throughout. The nodules are most abundant in cephalic lobe; few only in ventral lobe.

Costal Pleurae—On both sides there are numerous deposits, situated as a rule directly on pleura at upper and posterior portions. In size average $\frac{1}{4}$ inch in diameter. On section, they are firm throughout with exception of a few that have central focus of softening; this is readily pressed out; a few are pedunculated; these are somewhat flattened and on section, are firm and white. Scattered over lower portions are a few deposits; they all hang by pedicles from 1 to $1\frac{1}{2}$ inches in length.

Mediastinal Glands—The two lower posterior glands are enlarged; completely filling in space between two lungs. On section, they are infiltrated with caseous deposits, all glandular structure having disappeared. These deposits are broken down in the centres, the contents being bright yellow, semi-fluid, with a number of caseous particles.

The central and upper glands, posteriorly, have numerous deposits, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. The smaller are firm and yellow throughout; the larger have a central zone of very soft, caseous material, surrounded by a firmer zone. The whole can be readily pressed out, leaving a very narrow connective tissue capsule.

Bronchial Glands—Have five or six deposits, $\frac{1}{8}$ of an inch in diameter, also a few that are simply little, yellow dots; all are indistinctly defined and firm; no sign of central softening.

NO. XL.—Examination No. 58.

Grade Holstein, 2 years old; weight 550 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 21st, 1894. Before injection minimum temperature 101.1° ; maximum 101.2° . After injection temperature reached maximum in 13 hours, 107° .

AUTOPSY.—Lungs—Right: Entire cephalic lobe infiltrated by nodules of various sizes, average $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; majority are firm and caseous; central focus of softening in a few only. No lung tissue visible. Numerous bands of connective tissue separate nodules from one another.

Ventral lobe, patch size of a dollar; tissue much infiltrated and injected; in this area there are scattered a number of small nodules, $\frac{1}{8}$ inch in diameter, firm and bright yellow.

Left Lung—One small deposit, $\frac{1}{2}$ inch in diameter, situated in caudal lobe; sharply defined by connective tissue capsule, outer zone composed of firm, caseous material. The central portion softer and readily pressed out.

Mediastinal Glands—Are slightly enlarged. On section, posterior ones contain numerous small deposits, averaging $\frac{1}{8}$ inch in diameter; they are all firm and sharply defined.

Mesenteric Glands—Are very much enlarged; some few are size of eggs. On section, contain numerous deposits, for the most part soft and caseous; the central portion of largest being semi-fluid, escaping on slight pressure.

NO. XLI.—Examination No. 106.

Holstein bull, 3 years old; weight 1200 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101.1° ; maximum 101.2° . After injection temperature reached maximum in 12 hours, 107° .

AUTOPSY.—Lungs—Left: Base of caudal lobe has three deposits, each $\frac{1}{2}$ inch in diameter; they are soft and cheesy in the centre, surrounded by a zone of firmer caseous material; outside of this zone there is a connective tissue capsule. Ventral lobe, scattered through this are numerous nodules, the largest about the size of a small grape; they are all more or less firm, a few only showing signs of central softening.

Right Lung—Caudal lobe has one nodule, $1\frac{1}{2}$ inches in diameter; on section, the central portion is broken down, consisting of semi-fluid, caseous material, escaping on section; the outer zone is somewhat firmer, caseous and of a bright-yellow color; outside of this is a connective tissue capsule that defines entire nodule sharply from surrounding lung structure. On posterior border small area of hepatization, through which are scattered a number of nodes, $\frac{1}{8}$ inch in diameter; all sharply defined and bright-yellow in color.

Mediastinal Glands—Lower posterior glands have a number of deposits; very little glandular structure remaining. The nodes are for the most part large, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter; some composed of a number of smaller ones. On section, the centres of these are soft, yellow, semi-fluid, exuding on section; peripheries composed of firmer, caseous material. The smaller glands have a number of deposits scattered along their cortical layers; all are sharply defined, firm, yellow and cheesy throughout.

The upper posterior mediastinal glands are considerably enlarged, filling in the space between lungs; they are composed of caseous deposits, all glandular structure having disappeared. These deposits are firm and caseous, with a central focus of softening.

Bronchial Glands—Contain three or four deposits, averaging $\frac{1}{4}$ inch in diameter; these are firm, bright yellow; sharply defined from the glandular structure.

NO. XLII.—Examination No. 54.

Holstein bull, 2 years old; weight 900 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 103.2° ; maximum 103.3° . After injection temperature reached maximum in 11 hours, 106.2° .

AUTOPSY.—Lungs—Left: Caudal lobe posteriorly, near base, one large deposit, size of goose egg, filled with semi-fluid, purulent matter; around outer zone, which is irregular, there is a considerable quantity of caseous material, just beginning to soften. The whole deposit is sharply defined from surrounding structure by a connective tissue capsule, $\frac{1}{8}$ inch wide.

Right Lung—Ventral lobe numerous deposits, all small and firm; majority sharply defined. On section, a few show signs of central softening, but not marked.

Mediastinal Glands—Enlarged until they fill in the space between the two lungs; on section, the glandular structure has disappeared entirely; the whole mass is composed of firm, caseous deposits, with considerable calcareous infiltration, giving cut surface a gritty appearance. The central portion of the deposits occupying site of lower posterior mediastinal glands, is softened and exudes on section.

Bronchial Glands—Several caseous foci, average $\frac{1}{4}$ inch in diameter; on section, indistinctly defined; firm and caseous throughout.

Liver—Three deposits; two, each $\frac{1}{2}$ inch in diameter, close to upper surface; third, $\frac{3}{4}$ inch in diameter, situated deep in parenchyma. On section, they are soft and bright yellow in the centre; the periphery is composed of a zone of firmer caseous material, and outside of this is a connective tissue capsule, less than $\frac{1}{8}$ inch in width. The central portions of these deposits are readily pressed out, leaving capsule intact.

NO. XLIII.—Examination No. 107.

Jersey bull, 6 years old; weight 1100 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101° ; maximum 101.3° . After injection temperature reached maximum in 13 hours, 105° .

AUTOPSY.—Lungs—Right: Entire cephalic lobe infiltrated by nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in

diameter. On section, these have centres soft and caseous, readily pressed out; peripheries formed zones of firmer caseous material; considerable connective tissue replaces lung tissue; except at lower posterior portion. The whole lobe has a collapsed, nodular appearance. Numerous adhesions to pleura costalis.

Caudal Lobe—Few scattered nodes, average $\frac{1}{2}$ inch in diameter. On section, the centres show necrotic areas; peripheries firm and caseous. Surrounding lung structure firm; markedly injected in places.

Mediastinal Glands—Very much enlarged; lower posterior ones size of adult human kidneys. On section, they are firm and caseous, except in the centres; these are markedly necrotic. Both are full of calcareous deposits, which gives a gritty appearance to cut surface; no glandular tissue visible. The middle glands are enlarged and contain a large amount of cretaceous material but no areas of softening, all the foci being firm and caseous throughout; no glandular structure visible. The upper glands have a number of caseous deposits, firm, yellow and distinctly defined; in these there is still evidence of glandular structure. The deposits in the upper are glands situated as a rule in cortical portions.

Liver—One nodule, $1\frac{1}{4}$ inches in diameter; on section, the centre is soft and caseous; the periphery firmer, but both are readily pressed out. The deposit is somewhat indistinctly defined.

NO. XLIV — Examination No. 105.

Jersey bull, 15 months old; weight 650 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101.1°; maximum 101.2° After injection temperature reached maximum in 12 hours, 106.2°

AUTOPSY.—Lungs—Right: Cephalic lobe anterior surface one deposit, $\frac{1}{2}$ inch in diameter; sharply defined from surrounding lung structure. On section, composed of a bright yellow, soft, caseous centre, surrounded by a caseous layer of firmer consistence. This lobe of lung considerably collapsed; blood supply poor; others macroscopically no changes.

Mediastinal Glands—Lower posterior glands size of eggs; on section, they are composed entirely of caseous deposits, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter; all glandular structure has disappeared. The peripheral zone of these deposits is firm and caseous, also considerable calcareous infiltration; the central zone soft, cheesy, almost semi-fluid in places; exudes on slight pressure. The middle and upper mediastinal glands somewhat enlarged. The middle glands are completely infiltrated by deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; no glandular structure visible. These deposits are all caseous; some are firm throughout and sharply defined; others are indistinctly defined, consist of firm caseous material with central foci of marked softening. The upper glands have a number of deposits, averaging $\frac{1}{4}$ inch in diameter, scattered along cortical layers. These deposits are as a rule indistinctly defined, firm and caseous throughout.

NO. XLV.—Examination No. 53.

Holstein bull, 2 years old; weight 900 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 103°; maximum 103° After injection temperature reached maximum in 14 hours, 106.3°

AUTOPSY.—Lungs—Left: One deposit in centre of caudal lobe, $\frac{3}{4}$ inch in diameter. On section, the centre is just beginning to soften; the periphery is firmer, and entire deposit very indistinctly defined from lung structure. In cephalic and ventral lobes are scattered five deposits, $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter. On section, the largest have a central focus of marked softening; the smaller ones are firm throughout; with exception of one large one all indistinctly defined. This one has a narrow connective tissue capsule.

Mediastinal Glands—Extreme lower posterior gland enlarged to size of child's kidney; on section, completely infiltrated by caseous and calcareous nodules. Cut surface has a gritty appearance, excepting central portion which is slightly broken down, soft, cheesy, semi-fluid; exudes on section.

Liver—Four deposits, average $\frac{1}{4}$ inch in diameter, situated in parenchyma of liver; all have cheesy centres and are more or less sharply defined from hepatic structure.

NO. XLVI.—Examination No. 55.

Holstein bull, 2 years old; weight 900 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 102.2°; maximum 103° After injection temperature reached maximum in 11 hours, 106.3°

AUTOPSY.—Liver—Eight deposits in liver; majority situated deep in parenchyma; they average $\frac{1}{4}$ inch in diameter and vary somewhat in stage of development. The larger, on section, are composed in centre of cheesy material that is readily pressed out; surrounded by a zone of firmer caseation; these are defined by narrow connective tissue capsules. The smaller ones are firm and caseous throughout, indistinctly defined from hepatic structure.

Hepatic Glands—Enlarged; on section, contain a dozen caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. The larger ones have soft centres, bright-yellow in color, readily pressed out; surrounding this there is a zone of firm, caseous material. The small deposits are firm throughout, bright-yellow color, indistinctly defined; several about to coalesce.

NO. XLVII.—Examination No. 76.

Holstein bull, 3 years old; weight 1200 pounds; raised on place. Date of injection June 15th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101.3°; maximum 101.3° After injection temperature reached maximum in 12 hours, 106.2°.

AUTOPSY.—Lungs—In both lungs close to entrance of large bronchi several deposits, four in left and five in right; average $1\frac{1}{4}$ inches in diameter. On section, the centres of all are semi-fluid, exuding readily. The peripheries composed of zones of firm, caseous material, nodular in appearance. The largest deposits are surrounded by connective tissue capsules, less than $\frac{1}{2}$ inch wide; the smaller deposits are indistinctly defined; the pulmonary tissue in immediate neighborhood is injected and scattered through it; a number of pin-point sized deposits, bright-yellow in color, also indistinctly defined, most numerous close to large nodules. On section of bronchi, lining injected but no evidence of ulceration.

NO. XLVIII.—Examination No. 67.

Common cow, 9 years old; weight 900 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101.2°; maximum 101.3° After injection temperature reached maximum in 12 hours, 107.1°

AUTOPSY.—Lungs—Right: Cephalic lobe collapsed and nodular in appearance, except at apex which is firmly adherent to costal pleura. On section, entire lobe infiltrated by caseous nodules separated from one another by connective tissue bands; no lung tissue visible. These nodules are as a rule firm and caseous throughout; in a few the central cheesy matter has softened and exudes readily. The deposits average $\frac{1}{2}$ inch in diameter; the largest are situated in apex and along posterior border. Ventral lobe, one deposit, situated close to posterior border, size of an egg; on section, seen to be composed of a number of small deposits, which have coalesced more or less. The central portion of this deposit consists of soft, cheesy, semi-fluid material, which exudes on section. Entire mass surrounded by connective tissue capsule, three lines in width. Caudal lobe, numerous deposits, situated along posterior border chiefly, average 1 inch in diameter. On section, centres soft, cheesy, readily pressed out; peripheries of firmer, caseous material; majority surrounded by narrow connective tissue capsules.

Left Lung—Caudal lobe has six deposits, similar in character and distribution to those in right caudal lobe, except that they are indistinctly defined from surrounding pulmonary tissue.

Pleura Costalis—Right side thick deposit, nodular in character; in part firmly at-

tached to pleura, in part pedunculated; former, on section, are firm and white with an occasional caseous focus; these average $\frac{1}{2}$ inch in diameter. The pedunculated ones are firm and gray-white throughout; some are flattened, others perfectly round; the pedicles are from $\frac{1}{4}$ to $\frac{3}{8}$ inch in length; the deposits average $\frac{1}{2}$ inch in diameter.

Mediastinal Glands—Posterior glands markedly enlarged and infiltrated; fill in space between lungs. On section, very little glandular tissue remaining; nodules $\frac{1}{4}$ to 1 inch in diameter; majority soft and cheesy, centres readily pressed out. The smaller deposits are firm and caseous throughout; all are indistinctly defined. Considerable calcareous infiltration in the deposits occupying site of lower posterior glands.

Anterior mediastinal glands, somewhat enlarged; contain a number of firm, caseous deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all indistinctly defined from glandular structure.

Pericardial Sac—Outer surface covered by numerous deposits, similar in character to those on pleura costalis. Right side, also a few that have markedly caseous centres. On section, does not involve inner surface, except at upper portion where there are a few firm, white nodules. Pericardial sac contained about $\frac{1}{2}$ pint of clear, yellow fluid. Heart, macroscopically no changes present.

Bronchial Glands—All slightly enlarged. Left one, on section, has three deposits, each $\frac{1}{4}$ inch in diameter; firm and caseous, somewhat indistinctly defined. The right gland has two deposits, each $\frac{1}{8}$ inch in diameter, indistinctly defined, firm and bright yellow throughout.

Hepatic Glands—Four caseous foci in these glands, which are slightly enlarged. These deposits average $\frac{1}{2}$ inch in diameter; the centres are soft, cheesy and readily pressed out. The peripheries are composed of firmer, caseous material; all four deposits somewhat indistinctly defined.

NO. XLIX.—Examination No. 5.

Mixed Jersey cow, 5 years old; weight 800 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101°; maximum 101.4° After injection temperature reached maximum in 13 hours, 107°.

AUTOPSY.—Lungs—Right: Three deposits; one, 1 $\frac{1}{2}$ inches in diameter, situated at junction of caudal and ventral lobes; on section, centre semi-fluid, soft, cheesy; periphery firmer in caseous material and surrounding entire deposit narrow connective tissue capsule. In caudal lobe close to posterior border is situated the second deposit; this is 1 inch in diameter, indistinctly defined; caseous throughout with beginning focus of softening in the centre. The third deposit is on the under surface of caudal lobe, about $\frac{1}{4}$ inch in diameter; on section, made up of three or four small, firm, yellow nodules, situated in a zone of hepatization.

Mediastinal Glands—Enlarged, especially lower ones; on section, contain numerous caseous deposits, situated chiefly in cortical layers. These deposits average $\frac{1}{4}$ inch in diameter; they are firm and yellow, slightly elevated above the cut surface; as a rule distinctly defined. The deposits in the middle and upper glands are not so numerous as in lower glands, but they are the largest, some being $\frac{3}{8}$ inch in diameter.

NO. L.—Examination No. 17.

Jersey cow, 8 years old; weight 850 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 22d, 1894. Before injection minimum temperature 101.2°; maximum 101.3°. After injection temperature reached maximum in 13 hours, 105.3°.

AUTOPSY.—Lungs—Left: Ventral lobe completely infiltrated, has somewhat collapsed and nodular appearance; on section, no lung tissue visible; replaced by caseous nodules or connective tissue; latter abundant. The nodules average $\frac{1}{2}$ inch in diameter; the cheesy material of which they are composed shows signs of beginning softening; centres can be readily pressed out.

Caudal lobe, three small deposits, average $\frac{1}{4}$ inch in diameter; on section, firm, bright yellow, indistinctly defined.

Medastinal Glands—Posterior chain slightly enlarged; on section, scattered along cortical layers numerous deposits, average $\frac{1}{4}$ inch in diameter; somewhat elevated above cut surface. On section, these nodules are firm throughout, of a bright-yellow hue; as a rule sharply defined. There is an occasional nodule in medullary portion.

Liver—Situated $\frac{1}{4}$ deep in parenchyma three deposits, each inch in diameter; on section, indistinctly defined, bright-yellow color, caseous throughout.

NO. LI.—Examination No. 114.

Grade Holstein, 3 years old; weight 550 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.1° ; maximum 102.4° . After injection temperature reached maximum in 12 hours, 105.1° .

AUTOPSY.—Mediastinal Glands—All the glands of posterior chain markedly enlarged. On section, the lower ones, which fill in space between lungs, have no glandular structure present; consist entirely of caseous deposits in more or less advanced state of disintegration. These deposits average $\frac{1}{2}$ inch in diameter, indistinctly defined; of a bright-yellow color. The nodules situated in the cortical layer are the least degenerated; the central deposits are semi-fluid in places, exuding on section. The middle and upper glands have numerous deposits, but there is still glandular tissue visible. The nodules average $\frac{1}{2}$ inch in diameter; they are firm, bright-yellow and more or less distinctly defined; the central portion of a few has broken down and exudes readily. The deposits in the extreme upper glands not quite so large and are firm throughout; these average $\frac{1}{4}$ inch in diameter.

NO. LII.—Examination No. 108.

Holstein, 1 year old; weight 500 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 103° ; maximum 103° . After injection temperature reached maximum in 13 hours, 105.3° .

AUTOPSY.—Lungs—Right: In caudal lobe, posteriorly, area of hepatization size of a dollar; situated in this are few small deposits, bright-yellow in color, nodular in character, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; more or less sharply defined; firm and caseous throughout.

Mediastinal Glands—Enlarged to four times usual size; nodular in appearance. On section, numerous deposits scattered throughout; glandular structure much diminished in lower two glands. The deposits vary from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; majority are firm and caseous; a few have central foci of softening. The larger deposits are most sharply defined from glandular structure and are situated chiefly in the lower glands. A few of the largest nodules have some calcareous infiltration, but this is not marked.

NO. LIII.—Examination No. 110.

Holstein, 1 year old; weight 400 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 103° ; maximum 103° . After injection temperature reached maximum in 13 hours, 107° .

AUTOPSY.—Lungs—Bases of both caudal lobes numerous deposits, average $\frac{1}{2}$ inch in diameter; about twenty deposits in each, situated chiefly along posterior border and in parenchyma. Nodules are indistinctly defined, of a bright-yellow hue, caseous, with central softening and in some places deposit surrounded by a number of little nodules, pin-point to pin-head in size.

Mediastinal Glands—Lower posterior mediastinal glands enlarged six times; nodular in character and of firm consistence. On section, glandular structure has disappeared; place occupied by numerous, caseous deposits, varying from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter. The majority of these nodules have the centre soft and caseous, readily pressed out and the periphery of a firmer, caseous layer, indistinctly defined; in fact, a number of the deposits are about to coalesce. The larger caseous

deposits have a number of calcareous particles in them, giving cut surface a gritty appearance. The middle glands have a number of caseous foci scattered through them, in medullary as well as in cortical portion; all more or less sharply defined; nodular in character; bright yellow, cheesy, with central softening, average $\frac{1}{2}$ inch in diameter. Upper glands posteriorly numerous deposits scattered in cortical layers; on section, similar in character to those in the middle glands, but smaller and no central softening; average $\frac{1}{4}$ inch in diameter.

NO. LIV.—Examination No. 111.

Holstein, 11 months old; weight 500 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.3°; maximum 102.3° After injection temperature reached maximum in 11 hours, 105.4°

AUTOPSY.—Lungs—Right: Pleuritic adhesions base and posteriorly. On section, two deposits, each $\frac{3}{4}$ inch in diameter, situated in substance of caudal lobe close to posterior border; both sharply defined by connective tissue capsules; inner cheesy zone, of which the central portion is softened; both can be pressed out readily. Beside these there are three or four small deposits of firm and caseous character scattered through caudal lobe, average $\frac{1}{4}$ inch in diameter. On section, they are all sharply defined; of a bright-yellow color and firm throughout.

Mediastinal Glands—The lower posterior glands have several deposits, size of peas, scattered through various portions; majority distinctly defined, of a bright-yellow color, firm and caseous; a few are indistinctly defined and show signs of central softening.

Rumen—On posterior surface one nodule, $\frac{1}{2}$ inch in diameter, situated immediately beneath peritoneal surface; on section, caseous, indistinctly defined, of a bright-yellow color; centre very soft, pressed out readily.

NO. LV.—Examination No. 109.

Grade Holstein, 1 year old; weight 450 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.3°; maximum 103° After injection temperature reached maximum in 13 hours, 106.2°.

AUTOPSY.—Lungs—Right: Base caudal lobe nodular deposit, size of hen's egg; projects somewhat above lung surface. On section, made up of a number of nodules, averaging $\frac{1}{2}$ inch in diameter. The peripheries of these nodules are firm and caseous; the centres consist of thick, tenaceous, greenish-yellow fluid with caseous particles; exudes on section. Whole deposit sharply defined from pulmonary structure by connective tissue capsule. Scattered through caudal lobe and especially situated near posterior border are eight deposits, average $1\frac{1}{4}$ inches in diameter. On section, they consist of a soft, cheesy centre, surrounded by a firmer, caseous zone, and outside of this is a narrow connective tissue capsule. In a few cases outside the connective tissue capsule there is a zone of injection.

Left Lung—In caudal lobe six deposits, averaging $1\frac{1}{4}$ inches in diameter, situated chiefly along posterior border and at base; on section, similar in character to the single deposits in Right caudal lobe.

Mediastinal Glands—The two lower posterior ones each the size of an adult human kidney; somewhat nodular and firm. On section, completely infiltrated with nodules of various sizes; the central portion has broken down and consists of a cheesy, yellow, semi-fluid mass, which exudes on section. The peripheral portions of the glands are firm and caseous and the deposits are more or less infiltrated by calcareous particles. There is no glandular structure visible in either of the two lower glands. The middle and upper mediastinal glands posteriorly also enlarged three and four times; on section, have numerous deposits, scattered through them. These deposits are nodular in character, of a bright-yellow color, more or less sharply defined, and vary from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter. A few of the larger ones have a central focus of softening.

Bronchial Glands—Enlarged; all have caseous deposits. Left gland most marked,

very little glandular tissue remaining; deposits nodular, caseous, bright yellow, average $\frac{1}{4}$ inch in diameter. In the other glands the deposits are smaller and not quite so distinctly defined.

Hepatic Glands—Enlarged three times; on section, contain four caseous deposits, average $\frac{1}{4}$ inch in diameter, similar to those in bronchial and upper mediastinal glands.

NO. LVI.—Examination No. 112.

Jersey, 11 months old; weight 300 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.4°; maximum 103°. After injection temperature reached maximum in 13 hours, 105.2°

AUTOPSY.—Lungs—Left: Caudal lobe near posterior border deposit, $\frac{1}{2}$ inch in diameter; firm and caseous; indistinctly defined; of bright-yellow color. Base of caudal lobe similar deposit, only smaller, $\frac{1}{4}$ inch in diameter.

Right Lung—A number of firm, yellow, cheesy nodules scattered through caudal lobe; largest $\frac{1}{4}$ inch and smallest $\frac{1}{8}$ inch in diameter.

Mediastinal Glands—Lower posterior gland size of child's kidney, nodular in appearance; on section, completely infiltrated by caseous deposits; the centres of these are soft and cheesy, readily pressed out. The peripheral portions are firmer; many formed by the coalescence of still smaller deposits. Middle and upper mediastinal glands have a number of nodular deposits scattered through them, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; more or less sharply defined; central softening in a few; all are bright-yellow in hue and caseous.

Bronchial Glands—Few small deposits, from less than $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all are firm and caseous, sharply defined and of bright-yellow hue.

Liver—On upper surface of liver, immediately beneath capsule, one nodule, $\frac{1}{4}$ inch in diameter. On section, centre firm and caseous; periphery still firmer, and whole deposit is indistinctly defined.

Rumen—Beneath peritoneal surface posteriorly one nodular deposit, $\frac{1}{4}$ inch in diameter. On section, central portion very soft and cheesy; peripheral firmer, caseous, bright-yellow color; indistinctly defined.

NO. LVII.—Examination No. 115.

Grade Holstein, 2 years old; weight 500 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 103°; maximum 103°. After injection temperature reached maximum in 16 hours, 105.2°

AUTOPSY.—Lungs—Left: Ventral lobe, close to junction with caudal, deposit size of hen's egg; nodular in appearance; projects somewhat above surface. On section, seen to be made up of nodules of various sizes, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; majority are firm and caseous throughout; a few have the centres softened. The nodules are separated from one another and from lung tissue by connective tissue bands of varying widths. Caudal lobe, numerous deposits (15), from 1 to 1 $\frac{1}{2}$ inches in diameter; majority are single, a few are grouped, forming large masses; these latter situated chiefly at base. On section, they all have connective tissue capsules and are sharply defined from pulmonary tissue. The central portion of each deposit has broken down and consists of cream-like, cheesy fluid, which exudes readily. Surrounding this is a zone of firmer caseous material.

Left Lung—Numerous deposits in caudal lobes (18 in all), from 1 to 1 $\frac{1}{2}$ inches in diameter; majority sharply defined. On section, consist of a connective tissue layer, an inner, firm, caseous layer and the central portion almost semi-fluid; consisting of soft, bright-yellow, cheesy material; many of these deposits have originally been made up of a number of smaller ones and bands of connective tissue separates one from the other.

Mediastinal Glands—All the posterior chain markedly enlarged; fill in space between the lungs. The two lower glands the size of adult human kidneys; nodular and firm. On section, the central portion of each consists of soft, yellow, cheesy fluid,

which escapes on pressure. The peripheral portion is composed of firm, caseous nodules with considerable calcareous infiltration. No glandular structure visible. Surrounding these large masses of deposits there are numerous small ones, but, on section, these are firm and caseous throughout; indistinctly defined. The middle mediastinal glands each enlarged to size of goose eggs. On section, infiltrated with soft, caseous nodules; exude on slight pressure, leaving gland in a collapsed state; very narrow band of glandular tissue visible. The upper mediastinal glands enlarged to size of English walnuts. On section, a number of caseous nodules situated in substance and along cortex; these are as a rule firm except for small area of softening in the centre; they are indistinctly defined and average $\frac{1}{2}$ inch in diameter. The tissue between the various glands of the posterior chain is studded with deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; larger ones soft and caseous; smaller firm, with central focus of softening only.

Bronchial Glands—Left enlarged to size of hen's egg. On section, all glandular tissue absent; simply a mass of necrotic deposits; on section, larger fluid portion escapes, leaving a margin of firm, caseous material. The other bronchial glands enlarged; contain numerous deposits from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; on section, indistinctly defined; centre soft, semi-fluid; readily pressed out; periphery firm, caseous; bright-yellow color.

Liver—In substance right lobe one deposit, $\frac{3}{4}$ inch in diameter, indistinctly defined; firm and caseous throughout and of a bright yellow color.

Hepatic Glands—Enlarged to size of eggs. On section, infiltrated with caseous deposits, all undergoing central necrosis; many of the deposits are about to coalesce; all are indistinctly defined; very little glandular tissue visible.

NO. LVIII.—Examination No. 113.

Jersey, 11 months old; weight 300 pounds; raised on place. Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.1°; maximum 102.4° After injection temperature reached maximum in 12 hours, 105.2°

AUTOPSY.—Lungs—Right: Caudal lobe one deposit, $1\frac{1}{4}$ inches in diameter, situated close to posterior border. On section, central portion soft, cheesy, readily pressed out; peripheral portion firmer, caseous and distinctly separated from pulmonary structure by a zone of injection.

Ventral lobe three deposits, each $\frac{1}{4}$ inch in diameter; firm and caseous throughout, indistinctly defined.

Mediastinal Glands—Not enlarged; the posterior glands have a number of deposits scattered through them, situated chiefly in cortical portion. On section, more or less distinctly defined; average $\frac{1}{4}$ inch in diameter; firm and caseous, except the largest ones; these show signs of beginning central softening.

Mesenteric Glands—Enlarged markedly; on section, majority infiltrated by caseous nodules; many exceedingly necrotic. These nodules are from $\frac{1}{2}$ to 1 inch in diameter, indistinctly defined; central portion as a rule soft, cheesy, readily pressed out; peripheral portion caseous but firm.

Rumen—On posterior surface immediately beneath peritoneal surface, one deposit, $\frac{3}{4}$ inch in diameter, caseous throughout, indistinctly defined; centre slightly softer than periphery.

NO. LIX.—Examination No. 116.

Holstein, 8 months old; raised on place; (mother No. 39.) Date of injection June 21st, 1894. Date of autopsy June 23d, 1894. Before injection minimum temperature 102.4°; maximum 104.2° After injection temperature reached maximum in 10 hours, 108°

AUTOPSY.—Left Lung: Base caudal lobe one nodule, $\frac{3}{4}$ inch in diameter; indistinctly defined from lung tissue. On section, cheesy throughout; central portion little softer than peripheral, but not marked.

Mediastinal Glands—Lower posterior glands markedly enlarged; fill in space between lungs. On section, very little glandular tissue visible; whole surface infiltrated by nodules of varying sizes, $\frac{1}{8}$ to 1 inch in diameter; many of them have coalesced and form nodules of large size, the centres of which are semi-fluid. All the deposits are indistinctly defined; pale-yellow in color, and as a rule soft and cheesy. The middle and upper glands have a number of deposits, averaging $\frac{1}{4}$ inch in diameter, along cortical layers; majority firm, caseous, bright-yellow, sharply defined; a few have coalesced and form nodules 1 inch in diameter, the centres of which are markedly necrotic.

Anterior mediastinal glands somewhat enlarged; contain several small caseous nodules, $\frac{1}{4}$ inch in diameter. On section, yellow, cheesy, indistinctly defined.

Bronchial Glands—Left gland has three deposits, each $\frac{1}{4}$ inch in diameter. On section, nodular in character, sharply defined, bright yellow in color; centre little softer than periphery.

Pericardial Sac—On anterior surface a number of pearl-like deposits, nodular in character, average $\frac{1}{8}$ inch in diameter; a few pedunculated; majority situated directly on serous surface. On section, firm, gray-white in color, sharply defined, excepting a few of the larger ones which have caseous centres.

NO. LX.—Examination No. 88.

Mixed Durham cow, 5 years old; weight 800 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.1° ; maximum 101.3° . After injection temperature reached maximum in 12 hours, 107.1° .

AUTOPSY.—Lungs—Left: Three deposits, each 1 inch in diameter, situated in caudal lobe near posterior border. On section, centres cheesy and soft, readily pressed out; peripheries somewhat firmer; indistinctly defined from lung tissue by a zone of injection. In caudal lobe close to base area of hepatization size of a dollar, sprinkled with nodular deposits, less than $\frac{1}{8}$ inch in diameter, indistinctly defined; on section, firm yellow, caseous.

Mediastinal Glands—Lower posterior glands slightly enlarged. On section, contain a number of nodular deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; the centres of these nodules are somewhat softer than the peripheries. They are all distinctly defined from glandular structure, of a bright-yellow color and somewhat elevated above cut surface. Middle and upper mediastinal glands not enlarged; on section, contain a number of caseous deposits, similar to those in lower glands, except that little larger and central necrosis more marked.

Bronchial Glands—Left gland one deposit, $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined. On section, caseous throughout.

Omentum (Caul)—A number (15) of nodular deposits, averaging $\frac{1}{4}$ inch in diameter; on section, caseous, sharply defined with beginning central softening.

NO. LXI.—Examination No. 22.

Common cow, 12 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101° ; maximum 101.2° . After injection temperature reached maximum in 14 hours, 105.4° .

AUTOPSY.—Lungs—Left: Ventral lobe two nodular deposits close to junction of ventral with caudal lobe; smallest, size of large English walnut. On section, consist of several small deposits which have partly coalesced; centre markedly necrotic; periphery firm, caseous, indistinctly defined from lung tissue. The larger deposit, size of hen's egg, made up of a number of coalesced nodules; the centre is completely broken down; consisting of a thick, tenaceous, greenish-yellow fluid, in which are caseous particles; the periphery is still firm and cheesy; distinctly defined from surrounding lung tissue by narrow connective tissue capsule. Considerable injection of structure surrounding both deposits, in which are a number of nodules, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm,

caseous, somewhat indistinctly defined; these are scattered all through ventral lobe. The centres of the larger ones show signs of breaking down; a number of the deposits are on the point of coalescing.

Left Lung—Posteriorly close to base of caudal lobe, one nodule, situated in a zone of hepatization. The deposit is firm, yellow, indistinctly defined; little over $\frac{1}{8}$ inch in diameter.

Pleura Costalis—Right side, nodular deposit, $\frac{1}{4}$ to $\frac{1}{2}$ inch in thickness; situated chiefly along posterior portion; nodules from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; majority flat, firmly attached; a few pedunculated; on section, all are firm and gray-white in color. A few fibrinous adhesions to lung, readily separable.

Mediastinal Glands—Very much enlarged; the lower posterior gland size of child's kidney; nodular and firm. On section, the central portion disintegrated; consists of a thick, cheesy fluid which exudes on slight pressure; the peripheral portion made up of numerous caseous deposits, all firm, bright yellow in color; a few have calcareous particles in centres; very little glandular tissue visible. The middle and upper glands contain numerous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. The centres of the larger nodules soft and cheesy; readily pressed out; the smaller nodules are firm and caseous throughout. In tissue surrounding glands numerous deposits; all small, nodular in character; caseous on section.

NO. LXII.—Examination No. 93.

Common cow, 8 years old; weight 750 pounds; bought in 1894. Date of injection June 15th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.2°; maximum 101.4° After injection temperature reached maximum in 15 hours, 105°

AUTOPSY.—Mediastinal Glands—Posterior chain slightly enlarged; on section, soft and cloudy looking. Lower gland has eight deposits, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; majority indistinctly defined; slightly elevated above cut surface. On section, caseous, bright yellow; centre slightly softer than periphery.

NO. LXIII.—Examination No. 72.

Common cow, 11 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.2°; maximum 101.3° After injection temperature reached maximum in 17 hours, 105.4°

AUTOPSY.—Lungs—Right: Numerous fibrinous adhesions to pleura costalis. Caudal lobe base deposit, $1\frac{1}{4}$ inches in diameter; sharply defined by narrow connective tissue capsule. On section, cheesy and soft throughout; readily pressed out. Ventral lobe, close to posterior border, deposit 1 inch in diameter; similar to one in caudal lobe, except that it is not so sharply defined.

Left Lung—Caudal lobe eight small deposits, average $\frac{1}{4}$ inch in diameter. On section, firm, yellow, caseous, with beginning central softening; as a rule indistinctly defined from lung structure; a few surrounded by a zone of injection.

Bronchial Glands—Enlarged; soft; on section, contain a number of small caseous deposits, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter. They are firm and yellow throughout; somewhat indistinctly defined from glandular tissue. Left bronchial gland, deposits largest and most abundant

NO. LXIV.—Examination No. 98.

Mixed Durham cow, 5 years old; weight 750 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 102.2°; maximum 103°. After injection temperature reached maximum in 13 hours, 105.2°

AUTOPSY—Lungs—Caudal lobes, both sides numerous deposits; 10 in left, 12 in right;

majority sharply defined; from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter. On section, bright yellow color; periphery firm; centre much softer, readily pressed out. The deposits are situated chiefly along posterior border and base.

Mediastinal Glands—Posterior chain slightly enlarged. On section, the lower glands contain a number of caseous nodules, situated as a rule in cortex; project slightly above cut surface; majority are indistinctly defined, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; periphery firm, caseous; centre soft and cheesy; readily pressed out.

Bronchial Gland—Left side, one deposit, $\frac{1}{4}$ inch in diameter, indistinctly defined; bright-yellow color; caseous throughout.

NO. LXV.—Examination No. 4.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.2°; maximum 102°. After injection temperature reached maximum in 11 hours, 106°

AUTOPSY—Lungs—Left: Cephalic lobe numerous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, caseous throughout; indistinctly defined; a few show signs of central softening. Caudal lobe six deposits, nodular in character, situated along posterior border and at base; from 1 to $1\frac{1}{2}$ inches in diameter. On section, each deposit made up of a number of small nodules which have partly coalesced. The central portion of these nodules is soft and cheesy, readily pressed out; the peripheral portion is firmer, bright yellow, caseous, indistinctly defined from surrounding lung structure; a few have a zone of injection. One large deposit, size of hen's egg; situated between caudal and ventral lobes, close to large bronchus, extends somewhat above pulmonary surface; nodular in appearance. On section, similar in structure to those in caudal lobe, except that nodules have coalesced completely in places and centres are filled with thick, tenaceous, greenish-yellow fluid; surrounding this deposit is a connective tissue capsule, $\frac{1}{8}$ inch wide.

Left Lung—In centre caudal lobe one large mass, size of goose egg; composed of numerous nodules, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; sharply defined from one another and from surrounding lung tissue by connective tissue capsules. On section, these nodules are soft and cheesy throughout; majority can be readily pressed out, several on point of coalescing. In immediate neighborhood of this deposit are several small scattered nodules, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; indistinctly defined; firm and caseous.

Ventral Lobe—Right side completely infiltrated; collapsed, nodular appearance. On section, nodules all small, caseous, firm; a few show signs of central softening. Connective tissue marked, separating nodules from one another and from lung tissue. What remains of lung structure is infiltrated and injected, except close to posterior border, where crepitation is fair.

Mediastinal Glands—Posterior chain enlarged; all glands have caseous deposits; upper ones three or four; lower ones ten and fourteen; majority of these nodules are $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; sharply defined from glandular tissue, firm and caseous throughout. An exception to this is the extreme lower posterior gland; this is enlarged to size of an egg, and on section, is completely infiltrated with caseous deposits, the centres of which have broken down and exude readily; no glandular tissue visible.

Bronchial Glands—Few caseous deposits, most marked in left gland, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; caseous, bright yellow, indistinctly defined; largest deposits show central softening.

Parotid Glands—Enlarged on both sides. On section, right has a number of caseous deposits, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter. On section, these nodules are all soft and cheesy; indistinctly defined and readily pressed out. Left gland macroscopically no change.

Posterior Pharyngeal Glands—Similar deposits to those in right parotid; all the glands enlarged; some size of hen's eggs.

NO. LXVI.—Examination No. 52.

Grade Holstein, 6 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101°; maximum 101° After injection temperature reached maximum in 12 hours, 107°

AUTOPSY.—Lungs—Left: Ventral lobe, one deposit, size of hen's egg; nodular in appearance; sharply defined by connective tissue capsule; lung tissue somewhat injected in immediate neighborhood. On section, deposit consists of a number of nodules, $\frac{1}{4}$ to $\frac{3}{8}$ inch in diameter, which have partly coalesced. The centres of these nodules are a little softer than the peripheries, which are firm, caseous and of a bright-yellow color. About two inches distant from this large deposit there is a single nodule, $\frac{1}{4}$ inch in diameter, indistinctly defined, of a bright-yellow color.

Right Lung—Caudal lobe, one beginning deposit at base; pale-yellow color; indistinctly defined; situated in an area of hepatization. On section, the nodule is about $\frac{1}{8}$ inch in diameter.

Mediastinal Glands—Posterior chain slightly enlarged. On section, in cortical layers of upper and middle posterior glands are a number of caseous deposits; none in lower posterior glands. These deposits are nodular in character, extend somewhat above cut surface, pale-yellow in color and indistinctly defined; from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, firm and caseous throughout.

Bronchial Glands—Not enlarged; on section, contain several small, caseous deposits: average $\frac{1}{8}$ inch in diameter; all firm, bright yellow, indistinctly defined from surrounding glandular tissue.

Liver—Situated in parenchyma of right lobe deposit, $1\frac{1}{2}$ inches in diameter; on section, sharply defined from hepatic structure by broad band of connective tissue in which are a number of bright yellow nodular deposits. The centre of this large deposit is semi-fluid, bright yellow, cheesy, exudes on section. On under surface of right lobe, close to anterior border, deposit $1\frac{1}{2}$ inches in diameter, made up of a number of nodules. On section, these nodules have partly coalesced; centres are soft and cheesy, readily pressed out. A narrow connective tissue capsule separates these nodules from one another and from hepatic structure.

Hepatic Glands—Enlarged; on section, numerous caseous deposits, all soft and indistinctly defined from glandular structure.

NO. LXVII.—Examination No. 51.

Grade Holstein, $2\frac{1}{2}$ years old: weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.3°; maximum 102° After injection temperature reached maximum in 12 hours, 106.2°

AUTOPSY.—Lungs—Right: Caudal lobe, under surface base deposit, $1\frac{1}{4}$ inches in diameter, sharply defined by connective tissue capsule; on section, made up of several smaller nodules, caseous throughout, bright-yellow in color, readily pressed out. In centre and along posterior border of caudal lobe eight nodules, averaging $\frac{1}{4}$ inch in diameter, firm, caseous, as a rule sharply defined; a few situated in a zone of hepatization. Ventral lobe, six small deposits similar to those in caudal lobe, except they all are indistinctly defined.

Left Lung—One large deposit situated in centre of caudal lobe, egg sized; on section, made up of a number of nodules, separated from one another and from surrounding lung tissue by narrow bands of connective tissue. The nodules are from $\frac{1}{4}$ to $\frac{3}{8}$ inch in diameter, firm, yellow, cheesy, readily pressed out.

Mediastinal Glands—All the posterior chain enlarged; lower glands especially marked, fill in space between lungs. The two lower posterior glands nodular in appearance; on section, entirely infiltrated with deposits, no glandular tissue visible. The deposits are somewhat nodular in character, average $\frac{1}{2}$ inch in diameter; on section, caseous throughout; more or less necrosis of centres. The peripheral portions of these glands

firm and caseous, occasionally a little softened; the central portion is broken down, consisting of soft, cheesy material, in which are calcareous particles; this is readily pressed out. Calcareous infiltration of peripheral portion most marked, especially immediately beneath capsule. The middle mediastinal glands have a number of soft, caseous, indistinctly defined nodules, averaging $\frac{1}{2}$ inch in diameter; very little glandular tissue present. In the upper glands the deposits are smaller and firmer, averaging $\frac{1}{4}$ inch in diameter; there is also more glandular tissue present. Anterior mediastinal glands slightly enlarged; on section, contain a number of small, firm, yellow nodules; as a rule sharply defined; centres little softer than peripheries.

Parotid Glands—Both sides enlarged, each, size of adult human kidney. On section they are entirely infiltrated with caseous and cretaceous nodules. The central portion exudes on section, consists of cheesy fluid in which are particles of calcareous matter, most marked on right side; more calcareous infiltration on left side and disintegration not so marked.

Posterior Pharyngeal Glands—Slightly enlarged; all contain nodular caseous deposits, averaging $\frac{1}{4}$ inch in diameter; as a rule indistinctly defined; centres very soft, readily pressed out.

Liver—One deposit, nodular in character, situated in parenchyma. On section, indistinctly defined, centre soft and cheesy; periphery somewhat firmer, indistinctly defined, spreads out in all directions and situated in centre of area of injection.

NO. LXVIII.—Examination No. 61.

Grade Holstein, 2 years old; weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 102° ; maximum 102° . After injection maximum temperature reached in 13 hours, 106.1° .

AUTOPSY.—Lungs—Right: Caudal lobe has eighteen deposits situated along posterior border and in substance; some single, others grouped; from $\frac{3}{4}$ to $1\frac{1}{4}$ inch in diameter. The centres all soft, cheesy, readily pressed out; the peripheries are somewhat firmer, nodular in character and indistinctly defined from lung tissue; surrounding large deposits number of small nodules, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, caseous, indistinctly defined. Lung structure, caudal lobe, firm and leathery; considerable number hepatized areas.

Left Lung—Caudal lobe ten deposits, from $\frac{1}{4}$ to $1\frac{1}{4}$ inches in diameter. Larger deposits formed by coalescence of a number of small ones. On section, central portion disintegrated, consists of soft, cheesy, bright-yellow material; peripheral portion firm and caseous. These deposits are all indistinctly defined from lung tissue. The smaller nodules are firm and caseous throughout, of a pale-yellow color, and some of them situated in a hepatized area. Cephalic lobe, one small deposit, $\frac{1}{8}$ inch in diameter, situated in a zone of injection; indistinctly defined; firm throughout.

Mediastinal Glands—Two lower posterior ones enlarged; each size of adult human kidney; filled with numerous caseous deposits. On section, the central portion of each is markedly softened, exudes readily; consist of soft, yellow, cheesy material, in which are a few calcareous particles. The peripheral portion is firmer, composed of a number of partly coalesced nodules, surrounded by more or less connective tissue. Abundant infiltration of calcareous particles, which give cut surface a gritty appearance. Tissue surrounding these glands infiltrated by a number of small, bright-yellow, caseous nodules, many of which have soft centres and all are indistinctly defined. Middle and upper posterior mediastinal glands enlarged; on section, glandular tissue still visible, studded with caseous deposits, from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter, chiefly situated in cortical portions. These nodules are bright yellow, caseous, as a rule indistinctly defined and the centres of the larger show ones signs of beginning softening. Anterior mediastinal glands enlarged; on section, soft and pale but no deposits.

Bronchial Glands—Slightly enlarged; on section, contain eight small deposits: three in left, balance scattered in other bronchial glands. These deposits are from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, firm, yellow, indistinctly defined and situated as a rule in cortical portion of gland.

NO. LXIX.—Examination No. 59.

Grade Holstein, 2 years old; weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 25th, 1894. Before injection minimum temperature 101.3°; maximum 102° After injection temperature reached maximum in 14 hours, 103°

AUTOPSY.—Right Lung—Cephalic lobe adherent to costal pleura; on section, full of deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. These are nodular in character, firm, caseous, bright yellow with a central focus of beginning softening; all are more or less sharply defined from lung structure by connective tissue capsules. Lung tissue injected; firmer than usual deposits; most marked in apex and along anterior border. Ventral lobe two deposits, each $\frac{3}{4}$ of an inch in diameter; indistinctly defined; on section, centre soft, cheesy, readily pressed out; periphery firmer; nodular in character.

Left Lung—Ventral lobe collapsed; nodular in appearance. On section, numerous caseous foci and abundant connective tissue overgrowth. No lung tissue visible. Deposits as a rule are small; average $\frac{1}{4}$ inch in diameter; they are all sharply defined and central caseous material is just beginning to disintegrate. Cephalic lobe three deposits, each $\frac{1}{4}$ inch in diameter, firm, yellow, indistinctly defined; lung structure in immediate neighborhood injected.

Mediastinal Glands—Posterior chain slightly enlarged; on section, contain a number of caseous nodules, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; situated chiefly in cortical portion of glands, these nodules are as a rule firm; yellow, sharply defined; a few show signs of central softening.

Bronchial glands enlarged; contain a number of caseous foci. The left gland completely infiltrated with deposits; central portion very soft, cheesy; exudes on section.

NO. LXX.—Examination No. 21.

Common cow, 10 years old; weight 850 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 102°; maximum 102° After injection temperature reached maximum in 12 hours, 106.1°

AUTOPSY.—Lungs—Left: Caudal lobe, under surface close to posterior border, deposit size of goose egg, projects somewhat beyond surface of lung, nodular in character and sharply defined from lung structure by connective tissue capsule. On section, made up of a number of nodules, which have partly coalesced; separated in places by connective tissue bands; the central portion of deposit has broken down completely; consists of a thick, greenish-yellow fluid, which escapes on section. The peripheral portion is firm, caseous, bright-yellow in color.

Right Lung—One deposit, on posterior border of caudal lobe, similar, on section, to the one in left lung. In size, somewhat smaller and not so distinctly defined from surrounding lung tissue.

Mediastinal Glands—Posterior chain completely infiltrated. The lowest posterior gland size of a cow's kidney; the middle glands each child's kidney in size and the upper ones are the size of eggs; fill in space between lungs completely. On section, the largest glands are composed of a peripheral zone that is firm and caseous, containing numerous calcareous particles; and of a central zone that has broken down and consists of soft, cheesy material, readily pressed out. No glandular tissue present in this or any of the other glands. The middle posterior mediastinal glands are not so markedly softened in the centres as the lower ones and calcareous infiltration is more abundant. The upper mediastinal glands have numerous deposits, cheesy and soft, readily pressed out; a few calcareous particles only and these situated close to capsules of glands.

Bronchial Glands—Also enlarged; contain numerous deposits, similar to those in upper posterior mediastinal glands.

Liver—Two deposits on under surface of right lobe and three in parenchyma, average $\frac{1}{2}$ inch in diameter; nodular in character; distinctly defined from hepatic structure. On section, firm and caseous throughout.

Pectoralis Major and Minor—Right side, situated in a small gland between these

two muscles are two nodular deposits, one $\frac{1}{8}$ inch, other $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined; all other glands carefully examined, but no macroscopical changes.

NO. LXXI.—Examination No. 25.

Common cow, 6 years old; weight 750 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101.4°; maximum 102°. After injection temperature reached maximum in 12 hours, 106.4°.

AUTOPSY.—Lungs—Left: Caudal lobe, close to entrance of large bronchus, a single deposit, $\frac{3}{4}$ inch in diameter, nodular, indistinctly defined. On section, made up of a number of firm, caseous nodules; the central portion shows signs of breaking down.

Right Lung—In caudal lobe, near base, two deposits, each $\frac{1}{4}$ inch in diameter. On section, firm and caseous throughout, of bright yellow color and sharply defined from surrounding lung tissue.

Mediastinal Glands—Lower posterior glands each enlarged to size of child's kidneys. On section, nodular deposits throughout; centres of all markedly softened, exude readily; peripheries firmer and considerable calcification. The middle and upper posterior glands, on section, are studded with caseous deposits, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. On section, they are all more or less sharply defined and caseous throughout, excepting the largest; these have broken down in the centres and are indistinctly defined.

Omentum (Caul)—Numerous deposits, nodular in character, average $\frac{1}{2}$ inch in diameter. On section, soft, caseous; centres surrounded by firmer zone of caseous material, which is sharply defined by connective tissue capsule.

Diaphragm—Situated on under surface four small deposits, average $\frac{1}{4}$ inches in diameter. On section, firm, gray-white, with central caseous focus.

NO. LXXII.—Examination No. 29.

Common cow, 7 years old; weight 900 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101.1°; maximum 101.2°. After injection temperature reached maximum in 13 hours, 107°.

AUTOPSY.—Lungs—Left: Caudal lobe, close to posterior border, deposit $1\frac{1}{2}$ inch in diameter; sharply defined. On section, centre soft, cheesy, readily pressed out; periphery firmer, nodular, bright yellow; surrounding whole deposit narrow connective tissue capsule.

Right Lung—Ventral lobe one deposit, 1 inch in diameter; firm, caseous, indistinctly defined; apparently composed of several small deposits, which have coalesced; centre slightly softer than periphery. Lung tissue in immediate neighborhood of this deposit injected and infiltrated. Caudal lobe, one deposit, $\frac{3}{4}$ inch in diameter, indistinctly defined; on section, caseous throughout; central portion being little softer than peripheral.

Mediastinal Glands—Lower posterior glands enlarged to size of hen's eggs. On section, cheesy throughout; centres especially so, composed of soft, caseous, semi-fluid material, which exudes on slight pressure. The peripheral deposits are also soft and caseous, indistinctly defined from one another and from narrow margin of glandular tissue, which is still visible. Middle posterior mediastinal glands, size of English walnuts; on section, full of caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; centre soft and cheesy, readily pressed out; peripheries firmer, somewhat nodular, indistinctly defined from surrounding tissue. Upper glands numerous deposits, similar in character to those in middle posterior glands, except that they are smaller, averaging $\frac{1}{4}$ inch in diameter.

Bronchial Glands—Left bronchial gland enlarged; on section, contains four caseous deposits; smallest $\frac{1}{4}$ inch, largest $\frac{3}{4}$ inch in diameter; firm, sharply defined and caseous, except for central focus of softening in largest deposits.

NO. LXXIII.—Examination No. 57.

Grade Holstein, 2 years old; weight 550 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101.3°; maximum 102° After injection temperature reached maximum in 12 hours, 105.2°.

AUTOPSY.—Lungs—Left: Adherent to pleura costalis and to deposits on it; majority of adhesions readily separable. Cephalic lobe completely infiltrated by deposits; connective tissue abundant; lung tissue collapsed, injected and thickened. The deposits as a rule are small, averaging $\frac{1}{2}$ inch in diameter; distinctly defined by narrow connective tissue capsules. Peripheries firm and caseous; centres a little more cheesy and readily pressed out. Ventral lobe, several (6) deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; as a rule indistinctly defined, firm and caseous throughout, with central foci of softening in the largest deposits. Along posterior border ventral lobe, fringe-like deposits; pedicles of varying sizes, majority about $\frac{1}{2}$ inch in length. On section, the deposits are gray-white in color, firm throughout; a few are somewhat flattened. Pulmonary pleura of ventral and cephalic lobes thickened. Caudal lobe, ten deposits, $\frac{3}{8}$ to 1 inch in diameter, situated chiefly at base and along posterior border. On section, majority are sharply defined; several are on the point of coalescing. Peripheries firm, caseous, nodular; centres somewhat softer, cheesy material, readily pressed out.

Right Lung—Cephalic lobe similar in appearance to left; deposits larger and necrosis more marked. Pulmonary pleura very much thickened and numerous deposits. Ventral lobe, three deposits, each 1 inch in diameter. On section, indistinctly defined, firm and caseous throughout. Caudal lobe, close to base, five deposits, averaging $\frac{1}{2}$ inch in diameter; firm, caseous, indistinctly defined; each situated in an area of injection. Along the anterior border fringe-like deposit similar to that on ventral lobe, left side, only more marked.

Mediastinal Glands—Posterior chain enlarged so as to completely fill in space between lungs. The lower gland is size of adult human kidney, nodular and firm. On section, completely infiltrated with caseous deposits; no glandular tissue present. The deposits in cortex are large, firm, caseous; slight calcareous infiltration. The central portion of gland has broken down completely, consisting of cheesy, yellow fluid, which exudes on section. The middle posterior glands all size of eggs; on section, similar in character to lower posterior gland. Upper posterior mediastinal glands contain a number of caseous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. Larger ones show foci of central softening; smaller firm throughout, sharply defined; narrow margin of glandular structure remaining. Tissue between these glands infiltrated and thickened; numerous caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; as a rule firm and caseous throughout. Anterior mediastinal glands enlarged; on section, contain a number of caseous deposits, all indistinctly defined, averaging $\frac{1}{2}$ inch in diameter; central portion slightly softer than peripheral.

Pleurae Costalum—Left side: Along lower borders of ribs numerous sessile deposits, sharply defined, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, firm, gray-white throughout. At apex one large, nodular deposit, size of adult human kidney; on section, composed of a number of firm, caseous nodes and abundant connective tissue over growth; firmly situated on costal pleura, numerous adhesions between it and cephalic lobe. Costal pleura, right side, deposit more marked at base and posteriorly. Deposits sessile and pedunculated; former on section; have numerous small, firm, caseous foci of a bright-yellow color; latter firm and gray-white throughout.

Bronchial Glands—All are enlarged; left one markedly so; filled with soft, cheesy, indistinctly defined nodules, averaging $\frac{1}{2}$ inch in diameter; glandular tissue paler and softer than usual.

Pericardial Sac—On outer surface, numerous deposits, all small and sharply defined; on section, majority firm and gray-white throughout; a few have caseous foci. On inner surface, at upper portion, three small deposits, average $\frac{3}{8}$ inch in diameter. On section, gray-white throughout, very firm, sharply defined.

NO. LXXIV.—Examination No. 60.

Grade Holstein, 2 years old; weight 600 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 102.2°; maximum 102.3° After injection temperature reached maximum in 14 hours, 103.3°

AUTOPSY.—Lungs—Close to base of both caudal lobes several deposits, six in left; five in right; all sharply defined by zone of injection; averaging $\frac{1}{4}$ inch in diameter; firm, yellow, caseous.

Mediastinal Glands—Posterior chain slightly enlarged; on section, the cortical layers of several of the lower glands are studded with bright-yellow nodules, average $\frac{1}{8}$ inch in diameter; indistinctly defined; situated chiefly in cortical portion to others, a few in medullary. Upper posterior glands, four or five scattered deposits, similar in character.

Bronchial Glands—Two small deposits, $\frac{1}{8}$ inch in diameter, bright yellow, indistinctly defined; somewhat elevated above cut surface; similar deposit in right bronchial gland.

NO. LXXV.—Examination No. 50.

Grade Holstein, 10 years old; weight 1000 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101°; maximum 101.2° After injection temperature reached maximum in 14 hours, 105°.

AUTOPSY.—Lungs—Left: Cephalic lobe, near apex; deposit 1 inch in diameter; on section, centre soft, cheesy, readily pressed out; periphery firmer, nodular, indistinctly defined from surrounding lung tissue by irregular injected area. Caudal lobe near base and along posterior border some ten deposits, average $\frac{3}{4}$ inch in diameter; on section, similar in character to deposit in cephalic lobe.

Right Lung—In caudal lobe, close to base, deposit 1 $\frac{1}{4}$ inches in diameter. On section, centre markedly disintegrated, consists of soft, greenish-yellow, tenaceous fluid; exudes on section; periphery composed of a zone of nodular, caseous material, sharply defined from surrounding lung structure by narrow connective tissue capsule. In centre caudal lobe three small deposits, average $\frac{1}{2}$ inch in diameter; all indistinctly defined, firm and caseous throughout. Ventral lobe four deposits, average $\frac{1}{4}$ inch in diameter; indistinctly defined. On section, nodular in character, firm and bright yellow throughout.

Mediastinal Glands—The posterior chain somewhat enlarged; especially marked on right side. On section, studded with caseous deposits; all in advanced stage of disintegration; indistinctly defined from remaining glandular tissue; on section, soft, cheesy, bright yellow throughout. The most numerous and most advanced nodules are in glands of right side. Those in the left are the smallest as well as the firmest.

Bronchial Glands—Slightly enlarged; contain four caseous deposits, more or less sharply defined; firm and caseous throughout; average $\frac{1}{4}$ inch in diameter; chiefly situated in left bronchial gland.

Omentum (Caul)—Lower portion two nodular deposits, each 1 inch in diameter; sharply defined by connective tissue capsule. On section, firm and caseous throughout; near these deposits are a number of small nodules, less than $\frac{1}{8}$ inch in diameter; small yellow dots, indistinctly defined, situated in centre of injected area.

NO. LXXVI.—Examination No. 68.

Common cow, 5 years old; weight 700 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101.2°; maximum 101.2° After injection temperature reached maximum in 12 hours, 107°

AUTOPSY.—Pulmonary Pleura—Right side, over base, several small nodular deposits, sharply defined; on section, majority firm and gray-white throughout; a few have a central caseous focus. No deposits in pulmonary parenchyma; numerous fibrinous adhesions of lungs to costal pleura and diaphragm.

Mediastinal Glands—Lower posterior glands enlarged; on section, cortex studded with a number of caseous nodules, projecting somewhat above cut surface. On section, these nodules indistinctly defined; peripheries firm and caseous, centres somewhat softer; average $\frac{1}{4}$ inch in diameter. Upper posterior mediastinal glands size of large English walnuts; on section, completely infiltrated with caseous deposits; centres consist of cheesy, yellow fluid, which exudes on section, leaving gland collapsed with narrow margin of firmer, caseous material.

Liver—Right lobe, large abscess cavity, size of cocoanut; filled with foul-smelling pus and numerous caseous particles. Cavity surrounded by broad band of connective tissue, in which are numerous firm, yellow nodules, more or less distinctly defined. In parenchyma of left lobe a number of small nodules, average little over $\frac{1}{4}$ inch in diameter; firm, caseous, somewhat indistinctly defined; central portion softer than peripheral.

NO. LXXVII.—Examination No. 66.

Common cow, 8 years old; weight 950 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 100.4° ; maximum 101.1° . After injection temperature reached maximum in 13 hours, 107° .

AUTOPSY.—Lungs—Left: Cephalic lobe one deposit, 1 inch in diameter, sharply defined. On section, caseous and firm, periphery somewhat softer and more readily pressed out in centre. Caudal lobe one deposit, 1 inch in diameter. On section, similar to deposit in cephalic lobe.

Right Lung—Ventral lobe, close to posterior border one deposit, $\frac{3}{4}$ inch in diameter; on section, firm and cheesy throughout, indistinctly defined.

Mediastinal Glands—Scattered in lower posterior glands are a few deposits, $\frac{1}{4}$ inch in diameter, situated chiefly in cortical portion. On section, firm, caseous, sharply defined.

Bronchial Glands—Three small deposits, similar to those in posterior mediastinal glands.

Liver—Under surface right lobe, four deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. On section, firm and caseous throughout, sharply defined from hepatic structure. On upper surface, right lobe, deposit $1\frac{1}{4}$ inches in diameter; sharply defined by narrow connective tissue capsules; centre soft, cheesy and readily pressed out; periphery firmer, yellow and nodular.

Hepatic Glands—Enlarged and contain numerous foci; majority $\frac{1}{2}$ inch in diameter; soft and necrotic in centre; firmer, caseous and indistinctly defined in periphery.

Rumen—On posterior surface beneath peritoneal coat one deposit, $\frac{3}{4}$ inch in diameter. On section, soft and cheesy in centre, readily pressed out; periphery firmer and sharply defined. No communication with cavity of rumen.

NO. LXXVIII.—Examination No. 100.

Common cow, 10 years old; weight 800 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 101.3° ; maximum 102.1° . After injection temperature reached maximum in 18 hours, 105° .

AUTOPSY.—Mediastinal Glands—Right lower posterior one contains one deposit, $\frac{1}{4}$ inch in diameter. On section, firm and caseous throughout; sharply defined from glandular tissue. Upper posterior mediastinal gland, right side, four deposits in cortex, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; as a rule sharply defined, bright-yellow in color, firm and caseous throughout.

Liver—On under surface of left lobe one deposit, 1 inch in diameter; sharply defined by connective tissue capsule from hepatic structure. On section, periphery firm and caseous; centre markedly softened, consists of thick, tenaceous, greenish-yellow fluid, in which are caseous particles.

Hepatic Glands—Numerous caseous deposits, indistinctly defined, averaging $\frac{1}{2}$ inch in diameter; soft and cheesy, readily pressed out; glands enlarged considerably; tissue softer and paler than usual.

NO. LXXIX.—Examination No. 90.

Durham cow, 8 years old; weight 850 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 26th, 1894. Before injection minimum temperature 102°; maximum 102.3° After injection temperature reached maximum in 15 hours, 105°.

AUTOPSY.—Mediastinal Glands—Not enlarged. Lower posterior glands, on section, are studded with deposits, situated chiefly in cortical layer, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, yellow, caseous, sharply defined.

Bronchial Gland—Left side contains two deposits, size $\frac{1}{4}$ inch in diameter; indistinctly defined, firm and caseous except for beginning central softening.

Liver—Left border of liver one deposit. $1\frac{1}{4}$ inches in diameter; on section, consists of firm, caseous zone, with central portion filled with thick, cheesy fluid. In parenchyma another deposit, $1\frac{1}{2}$ inches in diameter, sharply defined by narrow connective tissue capsule, less than $\frac{1}{8}$ inch wide; centre of this deposit filled with thick, greenish-yellow, tenaceous fluid, in which are a few particles of caseous material.

NO. LXXX.—Examination No. 86.

Common cow, 7 years old; weight 750 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101.3°; maximum 102.° After injection temperature reached maximum in 13 hours, 106.1°

AUTOPSY.—Lungs—Left: Caudal lobe infiltrated with deposits, from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter. These deposits are as a rule indistinctly defined, very soft and cheesy, readily pressed out; a few are encapsulated. The lung tissue in immediate neighborhood is injected and thickened. Along posterior border the deposits are not so numerous, but they are larger, projecting somewhat above lung surface; on section, made up of a number of partly coalesced nodules; the centres are completely broken down, consisting of thick, tenaceous, greenish-yellow fluid; the peripheries are of firmer, caseous material and the whole deposit surrounded by a connective tissue capsule. At junction with ventral lobe large deposit, size of egg, projects above surface; on section, nodular, caseous; central portion soft and cheesy, readily pressed out. There is very little lung tissue in caudal lobe that is not either the seat of deposits or injected and thickened.

Right Lung—Under surface caudal lobe one deposit, size of goose egg; nodular in appearance, projects somewhat beyond surface; on section, made up of various sized nodules, partly coalesced; the centres are softer than the peripheries, of bright-yellow color, cheesy and readily pressed out. Whole deposit sharply defined from lung structure by connective tissue capsule. Scattered through caudal lobe ten small nodules, indistinctly defined; many surrounded by zone of injection; on section, average $\frac{1}{4}$ inch in diameter, firm and yellow throughout. Cephalic lobe, one deposit, $\frac{1}{4}$ inch in diameter, similar in character to the small ones in caudal lobe.

Mediastinal Glands—Posterior glands enlarged four times; nodular in appearance. On section, cortical layers studded with caseous deposits, averaging $\frac{1}{2}$ inch in diameter. The majority of these deposits are sharply defined, bright-yellow in color; with central portion somewhat softer than peripheral. Few deposits in medullary layers; these are larger, averaging $\frac{3}{4}$ inch in diameter, and central softening more marked. Tissue in neighborhood of glands, infiltrated by deposits $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; firm, yellow, sharply defined.

Bronchial Glands—Enlarged; on section, contain a number of soft, caseous foci, averaging $\frac{1}{2}$ inch in diameter; all readily pressed out, indistinctly defined.

Omentum (Caul)—One deposit, $\frac{1}{2}$ inch in diameter; sharply defined; on section, caseous throughout, centre softer than periphery; surrounding deposit is a connective tissue capsule.

NO. LXXXI.—Examination No. 69.

Common cow, 7 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101.3°; maximum 102°. After injection temperature reached maximum in 11 hours, 106.3°

AUTOPSY.—Lungs—Left: Caudal lobe close, to posterior border, deposit 1½ inches in diameter, sharply defined by connective tissue capsule. On section, composed of several small caseous nodes, separated from one another by narrow bands of connective tissue. The nodules are all caseous throughout; the centres slightly softer than peripheries. Cephalic lobe, three small deposits, average ½ inch in diameter; indistinctly defined; on section, yellow, firm, caseous throughout.

Right Lung—Ventral lobe, one deposit, 1 inch in diameter, sharply defined from surrounding lung tissue. On section, caseous with central softening; entire deposit readily pressed out, leaving narrow connective tissue capsule.

Cephalic Lobe—One deposit, 1½ inches in diameter, situated in apex. On section, composed of a number of small nodules, partly separated from one another and from lung structure by connective tissue bands; caseous throughout, beginning central softening in larger nodules.

Mediastinal Glands—Not enlarged; on section, have cortical layers, studded with small deposits; few only in medullary layers. These nodules are from ⅓ to ½ inch in diameter, bright-yellow in color, indistinctly defined; somewhat elevated above cut surface; firm and caseous throughout. In lower glands from ten to eighteen deposits; middle and upper posterior glands have from ten to fourteen deposits. The glands on the right side posteriorly have largest number of nodules.

Bronchial Glands—Slightly enlarged; soft and cloudy on section; four small deposits, average ⅓ inch in diameter, indistinctly defined; pale-yellow in color; firm throughout.

NO. LXXXII.—Examination No. 85.

Mixed Jersey cow, 6 years old; weight 800 pounds; bought in the spring of 1893. Date of injection June 15th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101.2°; maximum 102°. After injection temperature reached maximum in 13 hours, 106°

AUTOPSY.—Lungs—Left: Caudal lobe, near base, one deposit size of large English walnut; on section, sharply defined from lung structure by connective tissue capsule; contents soft, cheesy, readily pressed out.

Right Lung—Caudal lobe, close to lower portion posterior border, deposit 1 inch in diameter. On section, indistinctly defined from lung structure by irregular zone of injection; the deposit is pale-yellow in color, cheesy throughout, readily pressed out.

Mediastinal Glands—Posterior chain enlarged three times. On section, studded with nodules, ¼ to ½ inch in diameter; more or less distinctly defined from glandular tissue, yellow and cheesy throughout; central portion of largest deposits much softer than peripheral. Four small deposits in tissue between glands; these are all firm and sharply defined, bright-yellow in color. Deposits largest and most numerous in lower posterior glands.

NO. LXXXIII.—Examination No. 89.

Common cow, 8 years old; weight 750 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101.2°; maximum 101.3°. After injection temperature reached maximum in 13 hours, 105.4°.

AUTOPSY.—Lungs—Left: Caudal lobe, close to base, area of hepatization, size of a dollar, in which are situated four or five nodular deposits. These average ¼ inch in diameter; several are about to coalesce; they are as a rule firm, somewhat indistinctly defined and caseous.

Liver—Upper surface, Right lobe, one deposit, 1 inch in diameter, sharply defined from hepatic structure. On section, firm and caseous, beginning central softening. On under surface same lobe slightly elevated nodule, $1\frac{1}{4}$ inches in diameter. On section, sharply defined from hepatic structure by connective tissue capsule; contents soft, yellow, cheesy, readily pressed out.

NO. LXXXIV.—Examination No. 74.

Common cow, 9 years old; weight 850 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101° ; maximum 101.1° . After injection temperature reached maximum in 14 hours, 105.1° .

AUTOPSY.—Lungs—Right: Situated in upper border caudal lobe, nodular deposit, $1\frac{1}{4}$ inches in diameter; on section, composed of several small nodules that have partly coalesced; somewhat distinctly separated from lung tissue by zone of injection; nodules caseous with beginning central softening.

Left Lung—Ventral lobe, deposit $\frac{1}{2}$ inch in diameter, situated in centre of area of hepatization, size one-half dollar. Deposits firm, yellow, indistinctly defined.

Mediastinal Glands—Posterior chain enlarged and numerous caseous deposits; most marked in lower posterior glands. The deposits are from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; many have partly coalesced and formed larger deposits; all of these are markedly softened, pressed out easily and as a rule are situated in medullary portions of glands. The smaller deposits are sharply defined, project above cut surface, bright-yellow color throughout.

Bronchial Glands—Enlarged; contain a number of firm, caseous deposits, averaging $\frac{1}{4}$ inch in diameter. Glands enlarged, tissue softer than usual.

Liver—Left lobe, seat of large nodular mass, size of orange; sharply defined from hepatic structure by connective tissue capsule. On section, made up of a number of cheesy nodules, separated in part from one another by bands of connective tissue. The central portion of this deposit has softened markedly; consists of thick, cheesy fluid, exuding on slight pressure. Scattered in Right lobe four deposits, similar in character to nodules that form mass, averaging 1 inch in diameter.

Hepatic Glands—Enlarged; contain a number of caseous foci, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; all markedly cheesy, readily pressed out; indistinctly defined.

NO. LXXXV.—Examination No. 79.

Common cow, 7 years old; weight 900 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101° ; maximum 101.2° . After injection temperature reached maximum in 13 hours, 106.2° .

AUTOPSY.—Lungs—Left: Caudal lobe, near posterior border, two deposits, each 1 inch in diameter; on section, centre soft and cheesy, periphery caseous but not softened; sharply defined from surrounding lung tissue.

Right Lung—Caudal lobe, close to base, deposit 1 inch in diameter, similar to those in Left lung. Scattered through caudal lobe a number of small deposits, all more or less firm and caseous, sharply defined and average $\frac{1}{4}$ inch in diameter. On posterior border, close to junction of caudal and ventral lobes, deposit size of egg; projects somewhat beyond lung. On section, made up of a number of small, caseous nodules, separated in part from one another and from surrounding lung structure. The centres of these nodules are somewhat softer than the peripheries; readily pressed out. Ventral lobe, some ten or more deposits, $\frac{1}{4}$ inch in diameter, sharply defined; on section, firm and caseous throughout. Cephalic lobe, near apex large deposit, size of egg, similar to that situated between caudal and ventral lobes, except that central portion has broken down more and consists of a soft, cheesy fluid that exudes on section. Along anterior border of cephalic lobe a number of deposits, $\frac{1}{2}$ to 1 inch in diameter; consist of soft, cheesy centres, surrounded by a zone of firmer caseous material and outside of this a connective tissue capsule, more or less distinct.

Mediastinal Glands—Lower posterior glands size of eggs; on section, completely infiltrated with caseous deposits; the centres of these deposits all very soft, exude on slight pressure; peripheries firmer, indistinctly defined from each other. Small amount of calcareous infiltration in cortical layers. Middle posterior mediastinal glands studded with deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; all sharply defined from glandular tissue; on section, project slightly above cut surface, central focus of softening marked in the larger deposits. Upper posterior glands numerous deposits, similar to those in middle glands; central softening not quite so marked. Several caseous deposits in tissue between glands.

Bronchial Glands—Slightly enlarged; on section, contain numerous deposits, in various stages of caseation; in size vary from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter; glandular tissue pale and soft.

NO. LXXXVI.—Examination No. 82.

Mixed Jersey cow, 7 years old; weight 750 pounds; old herd. Date of injection June 15th, 1894. Date of autopsy June 27th, 1894. Before injection minimum temperature 101.2°; maximum 101.2°. After injection temperature reached maximum in 13 hours, 105.4°

AUTOPSY.—Lungs—Left: Numerous fibrinous adhesions to costal pleura. On section, ventral lobe contains four deposits; smallest $\frac{1}{4}$ inch; largest 1 inch in diameter; all sharply defined, bright-yellow in color, caseous throughout. Caudal lobe several small patches of hepatization, average size of a twenty-five cent piece, in the centres of each are three or four small, bright-yellow dots; all indistinctly defined.

Mediastinal Glands—Upper posterior glands enlarged; on section, surface studded with small deposits, average $\frac{1}{4}$ inch in diameter, pale-yellow color, indistinctly outlined; all firm throughout.

Bronchial Glands—All enlarged; on section, soft and pale; contain a number of cheesy deposits. These average $\frac{1}{2}$ inch in diameter, indistinctly defined, pale-yellow and caseous; central focus of softening marked in larger deposits.

NO. LXXXVII.—Examination No. 71.

Common cow, 7 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101.2°; maximum 101.2°. After injection temperature reached maximum in 11 hours, 108°

AUTOPSY.—Lungs—Left: Caudal lobe base one deposit, size of large English walnut; on section, made up of a number of deposits that have partly coalesced; nodules separated from one another and from lung structure by connective tissue. These nodules are firm and caseous throughout; no sign of central softening.

Right Lung—Situated in centre of caudal lobe deposit, size of egg, composed of a collection of various sized nodules, all in different stages of caseation. Surrounding this mass more or less injection of lung tissue. On section, in central portion the nodules have coalesced completely and broken down into a soft, cheesy fluid that exudes on section; surrounding nodules firmer, but all have central foci of softening. Along posterior border three small areas of hepatization, in each are several small, bright spots, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, firm, yellow, indistinctly defined. Cephalic lobe, several small deposits, averaging $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined; several about to coalesce.

Mediastinal Glands—Lower posterior glands enlarged, most marked on right side; on section, contain numerous caseous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; project a little above cut surface, bright yellow, sharply defined; the larger nodules show foci of central softening. The middle posterior glands are the size of hen's eggs. On section, all glandular structure has disappeared; consist of caseous infiltration; deposits vary in sizes, indistinctly defined from one another; some calcareous infiltration in cortical layer. Central portion broken down, consists of yellow, cheesy fluid, which exudes on section.

Upper glands contain a number of deposits, similar in character to those in lower posterior mediastinal glands, except that largest are $\frac{1}{2}$ inch in diameter.

Bronchial Glands—All markedly enlarged. Left, size of hen's egg; right, size of English walnut; on section, all glandular structure absent, infiltrated with deposits similar to those in middle posterior mediastinal glands.

Omentum (Caul)—One deposit, $1\frac{1}{4}$ inches in diameter, sharply defined by connective tissue capsule. On section, caseous throughout, bright-yellow in color, readily pressed out of capsule.

NO. LXXXVIII.—Examination No. 41.

Holstein cow, 8 years old; weight 800 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 102° ; maximum 102° . After injection temperature reached maximum in 14 hours, 106.4° .

AUTOPSY.—Left Lung—Caudal lobe, close to posterior border, area of hepaticization, in which are situated three deposits, each $\frac{1}{4}$ inch in diameter; margin somewhat indistinct, pale-yellow in color; centre slightly softer than periphery.

NO. LXXXIX.—Examination No. 45.

Holstein cow, 5 years old; weight 800 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101° ; maximum 101.2° . After injection temperature reached maximum in 12 hours, 107° .

AUTOPSY.—Lungs—Left: On under surface caudal lobe, deposit size of goose egg; nodular in appearance, projects somewhat beyond lung. On section, made up of a number of nodules, $\frac{1}{2}$ to 1 inch in diameter, which have partly coalesced. The peripheral portion of this deposit is firm and caseous; nodules distinctly defined from one another and from pulmonary structure by connective tissue bands. Central portion broken down; consists of soft, cheesy fluid, exudes on slight pressure. In caudal lobe several small deposits, scattered along posterior border and in substance, averaging $\frac{1}{4}$ inch in diameter; firm, caseous, sharply defined.

Right Lung—Near posterior border caudal lobe deposit, 1 inch in diameter, sharply defined by connective tissue capsule; on section, caseous; centre slightly softer than periphery. At base and along posterior border a number (12) of small deposits $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; firm and caseous, sharply defined. Ventral lobe completely infiltrated with small deposits, averaging $\frac{1}{4}$ inch in diameter; on section, all firm and caseous, a few about to coalesce, majority separated from one another by connective tissue bands. Very little lung tissue visible, and that is injected and thickened. Pleura covering this lobe thickened and nodular; no adhesions.

Mediastinal Glands—Posterior chain markedly enlarged, fill in space between lungs; lower posterior glands each size of cow's kidney; on section, completely infiltrated with caseous deposits; abundant calcareous infiltration. The peripheral portion of these glands are firm, caseous and calcareous; latter gives cut surface gritty feeling. The central portion has broken down considerably; consists of soft, cheesy, bright-yellow fluid; this exudes on slight pressure. Middle posterior mediastinal glands each the size of adult human kidneys; on section, infiltration similar to that in lower glands, but central softening not as marked. Upper posterior mediastinal glands egg sized; on section, infiltrated by deposits, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in diameter; all soft and cheesy, indistinctly defined from glandular structure. In lower and middle posterior glands all glandular structure has disappeared; still visible in upper glands, but somewhat softer and paler than usual.

Bronchial Glands—Markedly enlarged; on section, contain a number of caseous deposits; in size vary from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. Small ones indistinctly defined, pale yellow, firm throughout; large nodules distinctly defined, soft, cheesy; centre exudes readily.

Liver—One deposit, size of grape, situated in Right lobe; on section, firm and caseous, sharply defined by connective tissue capsule.

Hepatic Glands—Enlarged markedly; on section, caseous throughout; peripheral portion firm, cheesy, sharply defined; centre almost semi-fluid, of a bright-yellow color, escapes on section. No glandular tissue visible.

Mesenteric Glands—Enlarged to size of English walnuts; on section, contain numerous caseous deposits, varying from $\frac{1}{4}$ to 1 inch in diameter. Small nodules firm, bright yellow, sharply defined, somewhat elevated above cut surface. Larger deposits indistinctly defined, soft and cheesy; central portion exudes on slight pressure.

NO. XC.—Examination No. 70.

Common cow, 6 years old; weight 800 pounds; bought in 1893. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101.2°; maximum 101.2° After injection temperature reached maximum in 14 hours, 107.2°

AUTOPSY.—Right Lung—In caudal lobe, close to posterior border, patch of hepatization, in which are three beginning deposits. These average $\frac{1}{8}$ inch in diameter, indistinctly defined, of a yellow-gray color. In centre of caudal lobe one deposit, $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined; centre slightly softer than periphery.

Mediastinal Glands—Posterior chain slightly enlarged; on section, surface studded with small deposits, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all more or less sharply defined, firm and caseous throughout, of a bright yellow-color.

Omentum (Caul)—Six deposits, average $\frac{1}{4}$ inch in diameter, sharply defined; on section, yellow and caseous; centre slightly softer than periphery; whole deposit readily pressed out, leaving fine connective tissue capsule.

Intestines—Close to mesenteric attachment beneath serous surface of ileum, one deposit, $\frac{1}{4}$ inch in diameter; centre soft and cheesy; periphery caseous, but firmer and entire deposit sharply defined from surrounding tissue; projects into lumen of ileum, but mucous lining of intestine not disturbed.

NO. XCI.—Examination No. 99.

Common cow, 5 years old; weight 700 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101°; maximum 101.2° After injection temperature reached maximum in 12 hours, 107.1°

AUTOPSY.—Lungs—Right: Caudal lobe, eight small deposits scattered through substance, average $\frac{1}{4}$ inch in diameter, firm, caseous, sharply defined; several about to coalesce; those not so distinctly defined. Ventral lobe, one large deposit, $2\frac{1}{2}$ inches in diameter, situated on under surface ventral lobe, projects slightly; made up of a number of small, cheesy nodules. On section, these nodules separated from one another and from lung structure by connective tissue bands. Cephalic lobe, several nodules, 1 inch in diameter, situated chiefly at apex; on section, peripheral layer, firm, caseous, sharply defined; central layer of soft, cheesy consistence, readily pressed out.

Left Lung—Caudal lobe, seven deposits, similar in character to those in right caudal lobe, average little over $\frac{1}{4}$ inch in diameter.

Mediastinal Glands—Posterior chain enlarged; two lower glands each size of child's kidney. On section, numerous caseous deposits, all more or less sharply defined; many on the point of coalescing. The deposits in the central portions of these glands are soft and cheesy, in places almost semi-fluid, readily pressed out. Considerable calcareous infiltration in cortical deposits. Middle and upper glands also enlarged; surface studded with caseous nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, firm, yellow, caseous throughout; all sharply defined from glandular tissue, which is softer and paler than usual.

Bronchial Glands—Enlarged to size of eggs; on section, all glandular tissue has disappeared; completely infiltrated with caseous deposits, the centres of which have broken down and consist of semi-fluid, cheesy material. Left gland largest and most markedly degenerated.

NO. XCII.—Examination No. 75.

Common cow, 11 years old; weight 900 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101°; maximum 101.2°. After injection temperature reached maximum in 12 hours, 107.2°

AUTOPSY.—Left Lung—Base caudal lobe deposit 1½ inches in diameter; on section, made up of four or five small deposits. The centres of these nodules are slightly softer than the peripheries; they are sharply defined from one another and from lung tissue by connective tissue bands. Upper margin caudal lobe one deposit, ½ inch in diameter; projects somewhat beyond lung; on section, caseous throughout, but beginning central softening.

Right Lung—Caudal lobe one deposit, ¼ inch in diameter, situated close to posterior border; on section, firm and caseous, sharply defined. At junction of caudal with upper lobes, deposit size of a dollar; sharply defined by connective tissue capsule. The central portion of this deposit is very soft, almost semi-fluid; the peripheral portion somewhat firmer, but entire deposit can be readily pressed out, leaving delicate connective tissue capsule. Ventral lobe, deposit ½ inch in diameter, indistinctly defined, caseous throughout.

Mediastinal Glands—Lower posterior gland on section has two deposits in cortical layer, one ¼ inch in diameter, other ⅓ inch. These deposits are sharply defined, firm, yellow, project slightly above cut surface. In upper posterior mediastinal glands one deposit, ⅓ inch in diameter, similar to one in lower gland.

Bronchial Glands—On section, left gland has two deposits, each ⅓ inch in diameter; right gland one deposit, ¼ inch in diameter; all are sharply defined, firm and caseous; project slightly above cut surface.

Hepatic Glands—Contain four caseous foci, average ½ inch in diameter, indistinctly defined, soft and cheesy throughout.

Diaphragm—Posteriorly on under surface nodular mass size of egg, sharply defined; on section, composed of a number of caseous deposits; the central ones have coalesced and broken down, consist of soft, cheesy fluid; the peripheral deposits are firm and caseous, more or less sharply defined by connective tissue bands. Numerous adhesions to liver, but no deposits in liver itself.

NO. XCIII.—Examination No. 47.

Holstein cow, 6 years old; weight 850 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101°; maximum 101.2°. After injection temperature reached maximum in 14 hours, 106.3°

AUTOPSY.—Lungs—Right: Near posterior border, close to base of caudal lobe, nodular deposit size of egg, projects slightly. On section, composed of numerous caseous nodules; peripheral ones sharply defined from one another and from lung structure by connective tissue bands; these nodules are as a rule firm and caseous throughout; a few show signs of beginning central softening. The central nodules have more or less coalesced, consist of soft, cheesy material, bright-yellow in color, readily pressed out. Lung tissue in neighborhood of this deposit somewhat injected. Close to anterior border caudal lobe firm, caseous deposit, sharply defined, 1 inch in diameter. Scattered through cephalic lobe several small deposits, all firm and caseous, sharply defined from lung tissue; average ¼ inch in diameter.

Left Lung—Caudal lobe five deposits, ¼ to ⅓ inch in diameter; all more or less sharply defined, firm and caseous, bright-yellow in color; larger deposits show signs of central softening.

Mediastinal Glands—Posterior chain slightly enlarged; on section, surface studded with caseous deposits, ⅓ to ¼ inch in diameter; all sharply defined, firm and caseous; the larger ones have the centres slightly softer than peripheries.

Bronchial Glands—Slightly enlarged; on section, contain numerous deposits, ¼ to ½ inch in diameter, similar to those in posterior mediastinal glands.

Mediastinal Glands—Lower posterior glands decidedly enlarged; on section, infiltrated with caseous deposits; very little glandular tissue remaining. Nodules are from $\frac{1}{2}$ to 1 inch in diameter, more or less distinctly defined from one another; several on the point of coalescing. The centres of the larger deposits have broken down and are soft, cheesy, yellowish, readily pressed out. The smaller deposits are firm and caseous throughout.

Bronchial Glands—Completely infiltrated; no glandular structure visible; on section, soft, cheesy, yellow fluid exudes, leaving capsule with margin of firmer, caseous material; most marked in left gland; others not quite so soft but all completely infiltrated.

NO. XCIV.—Examination No. 40.

Holstein cow, 11 years old; weight 800 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101°; maximum 101°. After injection temperature reached maximum in 12 hours, 106.3°

AUTOPSY.—Right Lung—Base caudal lobe one deposit, $\frac{1}{2}$ inch in diameter, indistinctly defined from lung tissue. Central portion soft, cheesy, readily pressed out; peripheral portion firmer, caseous, somewhat nodular.

Mediastinal Glands—Posterior chain slightly enlarged; on section, paler and softer than usual. Scattered in cortical layers a number of deposits, more or less sharply defined. The largest, $\frac{1}{2}$ inch in diameter, are situated in lower mediastinal glands; these are caseous throughout, the centre somewhat softer than the periphery. The nodules in middle and upper posterior glands average $\frac{1}{4}$ inch in diameter; these are firm and caseous throughout, project somewhat above cut surface.

NO. XCV.—Examination No. 42.

Holstein cow, 6 years old; weight 700 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101°; maximum 102°. After injection temperature reached maximum in 14 hours, 106.3°.

AUTOPSY.—Left Lung—Caudal lobe three deposits; largest size of English walnut, situated at extreme lower end near posterior border; on section, sharply defined by connective tissue capsule; centre soft, cheesy, bright yellow, readily pressed out. Second deposit, 1 inch in diameter, in centre of caudal lobe; indistinctly defined from lung tissue by zone of injection. Centre of deposit soft, cheesy, readily pressed out; periphery firmer, caseous, somewhat nodular. Third deposit $\frac{1}{4}$ inch in diameter, indistinctly defined, situated close to superior border of caudal lobe; firm, yellow, caseous throughout.

Right Lung—Deposit at base, $1\frac{1}{2}$ inches in diameter; sharply defined from lung tissue; centre soft and cheesy, readily pressed out, leaving distinct, connective tissue capsule. Near upper portion posterior border several small deposits, averaging $\frac{1}{4}$ inch in diameter, firm and yellow throughout, all sharply defined. Ventral lobe, four deposits, grouped together, averaging $\frac{1}{2}$ inch in diameter; all markedly caseous, bright-yellow in color and situated in a zone of hepatization. Scattered through this lobe are eight small deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all firm, sharply defined and of a bright-yellow color.

Mediastinal Glands—Posterior chain slightly enlarged. Lower posterior glands, on section, are studded with deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, all sharply defined and caseous, with central foci of softening. Middle posterior mediastinal glands contain a few deposits, averaging $\frac{1}{4}$ inch in diameter, all sharply defined, firm and caseous throughout.

Bronchial Glands—On section, several deposits, averaging $\frac{1}{4}$ inch in diameter, all firm, sharply defined and of a pale-yellow color.

NO. XCVI.—Examination No. 43.

Holstein, $2\frac{1}{2}$ years old; weight 700 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 28th, 1894. Before injection minimum temperature 101.3°; maximum 101.4°. After injection temperature reached maximum in 14 hours, 106.1°.

AUTOPSY.—Right Lung—Cephalic lobe one deposit, close to apex, $\frac{1}{4}$ inch in diameter, firm and caseous, sharply defined, bright-yellow in color. Ventral lobe one deposit, $\frac{1}{8}$ inch in diameter, indistinctly defined by irregular zone of injection; pale-yellow in color, firm throughout.

Mediastinal Glands—Posterior chain somewhat enlarged. Lower posterior gland size of child's kidney; on section, very little glandular tissue visible. Numerous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; caseous, indistinctly defined, centres much softer than peripheries; all readily pressed out. Upper and middle posterior glands have cut surfaces studded with deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all firm and caseous, sharply defined; somewhat elevated.

Bronchial Glands—Somewhat enlarged; contain a number of deposits similar to those in upper and middle posterior mediastinal glands.

NO. XCVII.—Examination No. 65.

Holstein bull, 2½ years old; weight 1100 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy June 29th, 1894. Before injection minimum temperature 102.3°; maximum 103°. After injection temperature reached maximum in 11 hours, 106.1°.

AUTOPSY.—Lungs—Left: Caudal lobe one deposit, $\frac{1}{2}$ inch in diameter, situated near posterior border; on section, firm and caseous throughout, surrounded by zone of injection. In centre of caudal lobe deposit, 1 inch in diameter, cheesy and irregularly defined; the central portion somewhat softer than the peripheral; readily pressed out.

Right Lung—Lower border caudal lobe infiltrated with small nodules; average $\frac{1}{4}$ inch in diameter; all more or less sharply defined by zones of injection. On section, these nodules are firm and caseous throughout, of a bright-yellow color, situated in centre of small area of hepatization.

Mediastinal Glands—Lower posterior gland, on section, has one deposit, $\frac{1}{4}$ inch in diameter; sharply defined, bright-yellow color, caseous and projects slightly above cut surface. One of the middle posterior glands has one deposit, $\frac{1}{8}$ inch in diameter; firm, yellow, sharply defined; situated in cortical layer of gland.

Bronchial Glands—Left, two small deposits, one $\frac{1}{8}$, the other $\frac{1}{4}$ inch in diameter, somewhat indistinctly defined, bright-yellow in color, firm throughout. Right bronchial gland one deposit, $\frac{1}{4}$ inch in diameter; irregularly defined, firm throughout.

NO. XCVIII.—Examination No. 104.

Holstein bull, 3 years old; weight 1000 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy June 29th, 1894. Before injection minimum temperature 101.3°; maximum 102°. After injection temperature reached maximum in 17 hours, 105°.

AUTOPSY.—Right Lung—Base caudal lobe six deposits, $\frac{1}{2}$ to 1½ inches in diameter; all more or less sharply defined by connective tissue capsules; considerable injection of pulmonary tissue in neighborhood of larger deposits. On section, the centres of the larger nodules are soft and cheesy, readily pressed out; the peripheries somewhat firmer but caseous. The smaller deposits are composed of three or four smaller nodules; these are firm and caseous throughout. Scattered through upper part of caudal lobe a number of small, firm, sharply defined, yellow nodules, averaging $\frac{1}{4}$ inch in diameter. Ventral lobe, one deposit on under surface, projects slightly, 1½ inches in diameter; on section, centre soft, cheesy, readily pressed out; periphery firmer, nodular and sharply defined from lung structure by connective tissue capsule.

Mediastinal Glands—Two lower posterior glands each have four to five deposits scattered along the cortical layers; all sharply defined, somewhat elevated above cut surface. On section, yellow, caseous throughout.

Bronchial Glands—Two deposits, each $\frac{1}{8}$ inch in diameter; sharply defined, bright-yellow color, situated in centre of left bronchial gland.

NO. XCIX.—Examination No. 103.

Holstein bull, 2 years old; weight 1000 pounds; raised on place. Date of injection June 15th, 1894. Date of autopsy June 29th, 1894. Before injection minimum temperature 101.1°; maximum 101.2°. After injection temperature reached maximum in 10 hours, 107°.

AUTOPSY.—Lungs—Left: Ventral lobe, deposit 1 inch in diameter, nodular in character; on section, indistinctly defined by irregular zone of injection. Central portion soft, cheesy, readily pressed out; peripheral somewhat firmer, bright yellow and nodular. Caudal lobe, posterior border, near base deposit 1½ inches in diameter, sharply defined by connective tissue capsule. On section, centre soft, cheesy, readily pressed out; periphery firmer, caseous. On lower border hepatized area size of a dollar in which are situated four small deposits, averaging ½ inch in diameter, bright-yellow color, indistinctly defined.

Right Lung—Posterior border, deposit 1½ inches in diameter, sharply defined by connective tissue capsule. On section, firm, caseous periphery with centre soft, cheesy, readily pressed out. Ventral lobe two small deposits, each ¼ inch in diameter, firm, yellow, sharply defined.

Mediastinal Glands—Lower posterior mediastinal gland has one deposit situated in cortex, ½ inch in diameter, firm, caseous and sharply defined; glandular tissue soft and pale.

Bronchial Glands—Slightly enlarged, soft and pale. Left gland has two deposits, one ¼ and other ½ inch in diameter; soft and cheesy, sharply defined.

NO. C.—Examination No. 14.

Durham cow, 8 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 9th, 1894. Before injection minimum temperature 101.3°; maximum 102.1°. After injection temperature reached maximum in 12 hours, 107.4°. Complete inversio uteri followed calving, evening of July 8th; at autopsy early next morning animal in comatose condition; numerous grangeous patches on uterus.

AUTOPSY.—Left Lung—Base caudal lobe one deposit, 1 inch in diameter, sharply defined by connective tissue capsule; contents soft, cheesy, readily pressed out. About middle of posterior border caudal lobe small hepatized area, in which are three yellow dots, barely distinguishable.

Right Lung—Caudal lobe one deposit, 1½ inches in diameter, surrounded by connective tissue capsule; centre soft and cheesy; periphery firmer. Lung tissue in immediate neighborhood of this deposit somewhat injected. Upper border caudal lobe deposit, ½ inch in diameter, firm, nodular, indistinctly defined. On section, all these little nodules are firm and caseous, separated by narrow bands of connective tissue; pale-yellow in color. Considerable injection in neighborhood.

Mediastinal Glands—In lower posterior mediastinal gland few deposits, averaging ¼ inch in diameter; all sharply defined, bright-yellow in color, firm and caseous throughout.

Bronchial Glands—Left somewhat enlarged; on section, pale and soft, has three small deposits, largest ¼ inch in diameter; all somewhat irregularly defined, pale-yellow color, firm throughout.

NO. CI.—Examination No. 3.

Jersey, 6 years old; weight 750 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 19th, 1894. Before injection minimum temperature 102.2°; maximum 102.3°. After injection temperature reached maximum in 10 hours, 106.1° (Special reference will be made to this animal, as it is one of those undergoing treatment in the "suspect barn.")

AUTOPSY.—Lungs—Right: Base of caudal lobe, very bad; numerous deposits, all large and all in marked stages of degeneration; the majority are sharply defined by connective tissue capsules. The deposits are from 1 to 2 inches in diameter, very soft and

cheesy, readily pressed out. Along posterior border of caudal lobe three large deposits, surrounding these nodules. Lung tissue infiltrated and injected in an irregular manner, one size of egg, composed of a number of smaller nodules, which have partly coalesced. Central portion very soft and caseous, readily pressed out; peripheral firmer, sharply defined from lung structure by connective tissue capsule. Scattered through caudal lobe numerous small deposits, indistinctly defined, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, firm and caseous throughout, of a bright-yellow color. Ventral lobe; infiltrated with a number of caseous deposits, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, all more or less sharply defined, firm and caseous, except a few of the larger ones; these have foci of central softening. Scattered through cephalic lobes a number of small deposits, similar to those in ventral lobe, situated chiefly near apex; here a few are on the point of coalescing, not so distinctly defined as others.

Left Lung—Caudal lobe has ten deposits, situated chiefly in base and along posterior border; one deposit on anterior surface close to entrance of large bronchus, this is nodular in appearance and size of an egg; on section, made up of a number of nodules that have partly coalesced. The peripheral portion is firm, nodules separated from one another and from lung structure by bands of connective tissue. The central portion is soft and cheesy, readily pressed out. The other nodules vary in diameter from 1 to $1\frac{3}{4}$ inches; all are sharply defined by connective tissue capsules; the peripheries composed of firm, caseous material; the centres very soft and cheesy, of a bright-yellow color, readily pressed out. Lung tissue surrounding these nodules injected, firmer than usual. Cephalic lobe, one deposit, $\frac{1}{2}$ inch in diameter, soft and cheesy, somewhat indistinctly defined.

Mediastinal Glands—Posterior chain enlarged, fill in space between lungs. On section, numerous nodules, $\frac{1}{4}$ to 1 inch in diameter, sharply defined, project somewhat above cut surface, many on point of coalescing. These nodules are soft and cheesy in centre, readily pressed out; peripheries somewhat firmer. Very little glandular tissue visible and this is pale and soft. Tissue between glands infiltrated with similar deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter, all caseous and sharply defined; a few show foci of central softening.

Bronchial Glands—Slightly enlarged; each contains three or four deposits, $\frac{1}{2}$ to $\frac{1}{2}$ inch in diameter, more or less distinctly defined. The larger deposits have the centres softened.

Liver—Numerous deposits in parenchyma of organ, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, centres soft and caseous, readily pressed out; peripheries firmer, caseous, sharply defined from hepatic structure.

Hepatic Glands—Enlarged, completely infiltrated; no glandular tissue present. The deposits are firm, caseous, more or less calcified and of a bright-yellow color. The central ones show signs of softening.

Spleen—Situated in substance immediately beneath capsule are three bright yellow deposits, $\frac{1}{2}$ to $\frac{1}{4}$ inch in diameter, sharply defined from splenic tissue; firm and caseous throughout.

Omentum (Caul)—Four deposits, sharply defined, averaging little over $\frac{1}{4}$ inch in diameter; on section, caseous centres, readily pressed out.

NO. CII.—Examination No. 62.

Grade Holstein, $2\frac{1}{2}$ years old; weight 550 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy July 19th, 1894. Before injection minimum temperature 102° ; maximum 102° . After injection temperature reached maximum in 13 hours, 105.3° .

AUTOPSY.—Lungs—Left: Apex of cephalic lobe consolidated; adhesions to costal pleura; lung has irregular, nodular appearance. On section, completely infiltrated with out; nodules of various sizes, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. Centres soft, cheesy, readily pressed peripheries firm, sharply defined from one another by connective tissue bands. In upper portion of lobe no lung structure visible; lower portion few scattered caseous deposits, averaging $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined. Caudal lobe, along posterior

border eight deposits, $\frac{3}{4}$ to $1\frac{1}{4}$ inches in diameter ; on section, sharply defined from lung by connective tissue capsules ; surrounding a few are zones of injection. The centres of the larger nodules are soft and cheesy, readily pressed out ; the peripheries are firm, caseous, somewhat granular in appearance. The smaller nodules are composed of four or five deposits that have partly coalesced. Centres of these are firm and caseous ; peripheries sharply defined from lung structure and in part from one another by connective tissue. Centre of caudal lobe four scattered deposits, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter ; firm, nodular, bright yellow, surrounded by zones of injection and thickening.

Right Lung—Caudal lobe numerous deposits, situated chiefly along posterior border and at base ; in size range from $\frac{3}{4}$ to $1\frac{3}{4}$ inches in diameter. The centres are all soft and cheesy, readily pressed out, bright-yellow in color ; the peripheries are somewhat firmer and majority are sharply defined by connective tissue capsules. A few are indistinctly defined, being surrounded by irregular zones of injection in which are a few small deposits, less than $\frac{1}{2}$ inch in diameter. Cephalic lobe, ten deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, indistinctly defined ; on section, firm and caseous throughout, bright-yellow color, somewhat granular appearance. Ventral lobe, three deposits, $\frac{3}{4}$ to 1 inch in diameter ; similar to those in cephalic lobe except that they are larger and have foci of central softening.

Mediastinal Glands—Lower posterior size of eggs, firm and nodular ; on section, completely infiltrated by caseous deposits ; abundant calcareous particles give cut surface gritty appearance. Central foci of softening in both glands, most marked in lower one ; soft, cheesy fluid exudes on section. The middle posterior glands enlarged three times ; on section, studded with caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, situated chiefly in cortical layers ; bright yellow, soft, cheesy, indistinctly defined from glandular tissue ; latter pale and somewhat softer than usual. Upper posterior glands contain a number of deposits, similar in character to those in middle glands, but smaller, averaging $\frac{1}{4}$ inch in diameter.

Bronchial Glands—Enlarged ; contain a number of caseous deposits, $\frac{1}{4}$ inch in diameter.

NO. CIII.—Examination No. 13.

Durham cow, 6 years old ; weight 800 pounds ; bought in 1893. Date of injection June 5th, 1894. Date of autopsy July 19th, 1894. Before injection minimum temperature 102° ; maximum 103° . After injection temperature reached maximum in 11 hours, 107°

AUTOPSY.—Lungs—Left: In caudal lobe near base four large caseous deposits, separated from one another by broad bands of connective tissue ; on section, each is the size of a large English walnut ; caseous throughout, of a bright-yellow hue, readily pressed out of capsulc. At upper end lung in immediate neighborhood is infiltrated with small deposits, from pin-head to grape-sized in size ; some sharply, others indistinctly defined ; of a bright-yellow color and firm as a rule ; this patch is about size of one dollar. [See plate No. II.] In upper portion of caudal lobe scattered nodules, all small, indistinctly defined and bright-yellow in color. Lung tissue somewhat firmer than usual, considerably injected. Cephalic lobe, occasional nodule, average size $\frac{1}{4}$ inch in diameter.

Right Lung—Numerous small deposits scattered through caudal and ventral lobes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter ; firm, sharply defined, bright-yellow in color. The larger ones have centre softer than periphery.

Mediastinal Glands—Lower posterior enlarged ; on section, studded with caseous deposits, all more or less sharply defined ; situated chiefly in cortical layer ; majority of a bright yellow hue [see plate No. II]. Middle and upper posterior glands on section are studded with similar deposits, not quite so numerous or so large, averaging little over $\frac{1}{8}$ inch in diameter.

Bronchial Glands—Each contain two or three starting deposits, just visible as minute yellow dots.

NO. CIV.—Examination No. 73.

Grade Holstein, 7 years old; weight 900 pounds; old herd. Date of injection June 13th, 1894. Date of autopsy July 19th, 1894. Before injection minimum temperature 102°; maximum 102.1° After injection temperature reached maximum in 14 hours, 107.2°

AUTOPSY.—Lungs—Left: Caudal lobe contains three deposits, $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter; larger deposits sharply defined from lung structure by connective tissue capsules. The central portion of the larger deposits is very soft, cheesy, exudes readily. The peripheries are firm, caseous, somewhat granular and of a bright-yellow color. These deposits are situated chiefly along the posterior border and at base of caudal lobe. Cephalic and ventral lobes contain a few scattered deposits, firm, caseous, bright yellow, sharply defined, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter.

Right Lung—Two deposits in caudal lobe, from $\frac{1}{2}$ to 1 inch in diameter; situated chiefly at base; all sharply defined from lung tissue by zones of injection. The nodules have the centres as a rule softer than the peripheries; they are bright-yellow in color and cheesy.

Mediastinal Glands—Posterior chain markedly enlarged, fill in space between lungs completely. The extreme lower posterior gland weighs five and a half pounds; is $13\frac{1}{2}$ inches long, 4 to $6\frac{1}{2}$ inches wide, and from 2 to 3 inches thick. On section, all glandular tissue has disappeared; mass composed entirely of caseous deposits with marked calcareous infiltration. The central portion is softer than peripheral and is more readily pressed out. The other posterior glands are enlarged from egg to cow's kidney in size; on section, marked caseous and calcareous infiltration, very little softening, as a rule confined to small foci scattered through glands. Tissue between these large masses of deposits infiltrated with various sized caseous nodules.

Bronchial Glands—Very markedly enlarged, especially left and right; on section, filled with soft, caseous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter.

Liver—Under surface left lobe one deposit, 1 inch in diameter, projects slightly above cut surface. On section, sharply defined by narrow connective tissue capsule; centre firm and caseous.

Hepatic Glands—Enlarged; on section, surface studded with a number of deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; firm, yellow, sharply defined.

 NO. CV.—Examination No. 9.

Durham cow, 8 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 102°; maximum 103°. After injection temperature reached maximum in 13 hours, 107° (This cow was treated in "suspect barn".)

AUTOPSY.—Lungs—Left: Caudal lobe at base and near posterior border has some ten deposits, $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter; all more or less sharply defined from lung structure by narrow bands of connective tissue. On section, the central portion of these deposits is soft and cheesy, readily pressed out; the peripheries firm, caseous, somewhat granular in appearance.

Right Lung—Caudal lobe base one deposit, 1 inch in diameter, firm and caseous throughout, sharply defined; bright-yellow in color.

Mediastinal Glands—Posterior glands slightly enlarged; on section, the lower ones all studded with small caseous deposits; the upper glands contain few nodules only. The majority of these deposits are situated in the cortical portions of the glands; all are more or less sharply defined, bright-yellow color. In size nodules range from $\frac{1}{8}$ to $\frac{3}{4}$ inch in diameter.

Bronchial Glands—In right gland one deposit, $\frac{1}{4}$ inch in diameter; somewhat indistinctly defined, bright-yellow color, firm throughout; other glands enlarged, on section, pale and softer than usual; no evidence of deposits.

Parotid Glands—Right gland contains two deposits, each 1 inch in diameter; firm, caseous, sharply defined, of a bright-yellow color. Right gland enlarged markedly; on

section, several large caseous deposits, some about to coalesce, surrounded in part by connective tissue capsules; centres soft and cheesy, readily pressed out. Deposits vary from $\frac{3}{4}$ to $1\frac{1}{2}$ inches in diameter.

Posterior Pharyngeal Glands—Enlarged also; on section, pale and soft, surface sprinkled with a number of small, caseous, nodules all more or less sharply defined, bright-yellow in color; centres much softer than peripheries.

NO. CVI.—Examination No. 7.

Common cow, 9 years old; weight 850 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy June 20th, 1894. Before injection minimum temperature 101.2° ; maximum 102.2° . After injection temperature reached maximum in 13 hours, 107.2°

AUTOPSY.—Lungs—Right: Base caudal lobe, deposit 1 inch in diameter, sharply defined; on section, firm and caseous, of a bright-yellow color, readily pressed out of capsule. At junction of caudal with ventral lobe area of hepatization, size of half dollar, in which are situated a number of small deposits, averaging $\frac{1}{4}$ inch in diameter, bright-yellow color, sharply defined, firm throughout.

Left Lung—A number of deposits in caudal lobe, chiefly situated at base, averaging $\frac{3}{4}$ inch in diameter. On section, indistinctly defined, composed of a number of smaller nodules, bright yellow and firm that have partly coalesced. Entire lung firmer than usual, considerable injection.

Mediastinal Glands—Posterior chain slightly enlarged; on section, cortical layers of middle and lower glands studded with caseous deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all are firm, bright yellow, indistinctly defined, somewhat elevated above cut surface. Upper posterior glands contain an occasional deposit, similar to those in lower glands. Medullary portions of glands have few deposits only and these are firmer, larger, more distinctly defined than those in cortical portions.

Parotid Glands—Enlarged; on section, right gland has one deposit, $\frac{3}{4}$ inch in diameter, sharply defined, bright yellow, caseous throughout, readily exudes, leaving delicate connective tissue capsule.

NO. CVII.—Examination No. 8.

Common cow, 9 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 101.3° ; maximum 102.2° . After injection temperature reached maximum in 16 hours, 106.1°

AUTOPSY.—Lungs—Right: Caudal lobe numerous deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; as a rule sharply defined, bright yellow, firm and caseous; situated chiefly along the posterior border and at base. Ventral lobe, close to junction with caudal lobe, a number of deposits, all small and grouped together; situated in a zone of injection.

Mediastinal Glands—Posterior chain slightly enlarged; on section, cut surface studded with small, bright-yellow, caseous nodules, from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter; all more or less sharply defined from glandular tissue which is softer and paler than usual.

NO. CVIII.—Examination No. 63.

Grade Holstein, $2\frac{1}{2}$ years old; weight 650 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 102° ; maximum 102.1° . After injection temperature reached maximum in 13 hours, 106.2°

AUTOPSY.—Lungs—Right: Caudal lobe numerous deposits in substance, from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter. On section, larger deposits are soft and cheesy in centre; readily pressed out; all are sharply defined from lung tissue; a few are about to coalesce. The ventral lobe has a deposit size of an egg, extends somewhat above surface; on section, composed of a number of smaller nodules, separated in part by connective tissue. These

nodules are from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, bright yellow, soft and cheesy. On anterior surface of ventral lobe close to pericardium deposit size of large English walnut; on section, made up of a number of small deposits, which are soft and cheesy, readily pressed out.

Left Lung—Caudal lobe close to anterior border, deposit size of large egg; on section, composed of a number of medium sized deposits, all more or less caseous, bright-yellow in color, sharply defined from one another and from lung structure by connective tissue. Scattered through lower lobe some ten or more single deposits, from $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, all firm, yellow, sharply defined.

Pleurae—Pulmonary pleurae covered with small deposits, single and grouped together; from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. On section, firm, gray-white; a few have central foci of caseation, chiefly situated on anterior surfaces of lungs and between lobes. Costal pleurae few deposits, majority small and pedunculated; pedicles from $\frac{1}{4}$ to $\frac{1}{2}$ inch in length; on section, similar in character to deposits on pulmonary pleura.

Pericardial Sac—Firmly adherent to sternum, seat of numerous deposits, majority firm, gray-white and pedunculated; a few of the larger ones situated directly in membrane are soft and cheesy on section. The firmer deposits involve chiefly the anterior surface of pericardium; few adhesions of epicardium, readily separable.

Mediastinal Glands—Slightly enlarged; on section, pale and somewhat softer than usual. No deposits except two in middle posterior gland. These are $\frac{1}{4}$ inch in diameter, of a pale-yellow color, indistinctly defined from glandular tissue.

Bronchial Glands—Enlarged considerably, especially gland on left side; on section, contain a number of caseous deposits, all small, averaging $\frac{1}{4}$ inch in diameter, indistinctly defined.

NO. CIX.—Examination No. 11.

Common cow, 10 years old; weight 800 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 102.3°; maximum 103° After injection temperature reached maximum in 10 hours, 106.3°

AUTOPSY.—Lungs—In caudal lobes both lungs a number of single deposits, all small, averaging $\frac{1}{4}$ inch in diameter, pale-yellow color, indistinctly defined, somewhat elevated above cut surface.

Mediastinal Glands—Two lower posterior glands enlarged, each size of cow's kidney. On section, no glandular tissue visible, complete infiltration by caseous and calcareous deposits. Central portion few foci of softening; but these are not marked. Cut surface has a markedly granular appearance and bright-yellow color. Middle and upper glands somewhat enlarged. On section, surface studded with deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; all more or less sharply defined from glandular tissue, situated chiefly in cortical layers.

Liver—Centre of Right lobe deposit, $\frac{3}{4}$ inch in diameter, centre soft and cheesy; periphery firmer and sharply defined from hepatic structure by connective tissue. About two inches to Right of this deposit, another size of hen's egg, composed of a number of nodules that have partly coalesced. The centres are soft and cheesy; the peripheries firmer; connective tissue defines these deposits from one another and from hepatic structure.

Hepatic Glands—Enlarged; on section, contain eight caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, soft and cheesy in centre, indistinctly defined.

NO. CX.—Examination No. 56.

Grade Holstein, 2 years old; weight 500 pounds; raised on place. Date of injection June 13th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 102.2°; maximum 102.4°. After injection temperature reached maximum in 13 hours, 107.1°.

AUTOPSY.—Lungs—Left: Caudal lobe base, deposit size of goose egg, projects considerably beyond surface; on section, central portion semi-fluid, bright yellow, cheesy, exudes readily; peripheral portion firm and caseous, somewhat nodular, sharply defined

by connective tissue capsule. In tissue in immediate neighborhood number of small deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined as a rule. In centre of caudal lobe large deposit, size of orange; central portion exudes on section, greenish-yellow fluid in which are caseous particles. Peripheral portion composed of a number of nodules $\frac{1}{2}$ to 1 inch in diameter, in varying stages of caseation. Considerable infiltration and injection of surrounding lung tissue. At junction of caudal with ventral lobe, deposit, size of large English walnut; on section, centre cheesy, readily pressed out; periphery somewhat firmer; whole surrounded by connective tissue capsule. Ventral lobe ten deposits, from $\frac{1}{2}$ to 1 inch in diameter, firm and caseous throughout, bright-yellow color, all somewhat indistinctly defined from lung tissue.

Right Lung—Base caudal lobe deposit size of egg, similar to one in left caudal lobe; several scattered deposits in immediate neighborhood, all small, averaging $\frac{1}{4}$ inch in diameter, and indistinctly defined.

Mediastinal Glands—Posterior chain enlarged so as to completely fill space between lungs; two lower posterior glands each size of adult human kidneys. On section, completely infiltrated with caseous and calcareous nodules; no glandular tissue visible; beginning central softening, but not marked. Middle posterior glands each size of child's kidney; marked caseous infiltration; few calcareous particles close to margin, none in central portion; latter markedly softened, readily pressed out; no glandular tissue visible. Upper glands size of large English walnuts, narrow margin of glandular tissue; caseous nodules more or less distinctly defined from one another; no calcareous infiltration. Tissue between glands numerous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; some calcareous, majority caseous.

Bronchial Glands—Enlarged, especially left one; contain a number of caseous nodules, several about to coalesce; as a rule indistinctly defined from glandular tissue, bright-yellow color; centre softer than periphery.

NO. CXI.—Examination No. 15.

Common cow, 7 years old; weight 850 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy July 20th, 1894. Before injection minimum temperature 101°; maximum 102°. After injection temperature reached maximum in 13 hours, 107.2°

AUTOPSY.—Lungs—Right: Posterior border caudal lobe, near base, deposit size of English walnut, projects above surface; on section, sharply defined from lung structure by connective tissue capsule; centre soft and cheesy, readily pressed out. At base infiltrated and injected area size of a dollar; deposits vary from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; pale-yellow in color, indistinctly defined. Anterior surface, nodule 1 inch in diameter; on section, centre soft and cheesy, readily pressed out; periphery firmer, sharply defined from lung tissue. Ventral lobe, one deposit, $\frac{3}{4}$ inch in diameter, indistinctly defined, firm and caseous throughout.

Left Lung—Cephalic lobe, near apex, deposit composed of four or five small nodules, all more or less sharply defined, pale-yellow, firm and caseous. Lung tissue in immediate neighborhood infiltrated and injected. Caudal lobe one deposit, size of hen's egg, close to under surface base. On section, composed of a number of small deposits that have partly coalesced. Periphery firm, nodular, sharply defined from lung tissue. Nodules are firm and caseous, separated from one another by connective tissue bands. Central portion of deposit softer, cheesy, readily pressed out.

Mediastinal Glands—Middle and upper posterior glands enlarged; on section, contain a number of caseous deposits, all more or less calcareous. Glandular tissue firm, somewhat injected; deposits sharply defined, bright-yellow in color, project slightly above cut surface.

Bronchial Glands—Slightly enlarged; contain a few deposits similar to those in mediastinal glands, but smaller; average $\frac{1}{4}$ inch in diameter.

NO. CXII.—Examination No. 16.

Common cow, 6 years old; weight 750 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 101°; maximum 101.1°. After injection temperature reached maximum in 14 hours, 106.3°.

AUTOPSY.—Lungs—Left: Under surface caudal lobe one deposit, $\frac{3}{4}$ inch in diameter, indistinctly defined, pale-yellow in color; on section, centre slightly softer than periphery.

Right Lung—Caudal lobe, deposit 1 inch in diameter; on section, centre soft and cheesy, readily pressed out; periphery firm, caseous, sharply defined from lung tissue.

Mediastinal Glands—Posterior chain slightly enlarged; on section, cortical layers studded with small deposits, all more or less sharply defined; a few in medullary layers. These deposits vary from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter.

Bronchial Glands—Right and left glands slightly enlarged; on section, contain four deposits, averaging $\frac{1}{8}$ inch in diameter; indistinctly defined, pale-yellow in color. Glandular tissue softer and paler than usual.

NO. CXIII.—Examination No. 102.

Mixed Jersey cow, 10 years old; weight 850 pounds; bought in 1893. Date of injection June 15th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 101.1°; maximum 102.2°. After injection temperature reached maximum in 13 hours, 106.2°

AUTOPSY.—Lungs—Left: Upper portion caudal lobe and along posterior border number of deposits, varying from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; firm and caseous throughout, indistinctly defined. Close to base caudal lobe one deposit, 1 inch in diameter, sharply defined; centre softer than periphery.

Right Lung—Caudal lobe, close to entrance large bronchus, deposit size of English walnut; on section, composed of a number of caseous deposits, separated from one another and from lung structure by narrow bands of connective tissue. Central portions beginning to soften, readily pressed out.

Mediastinal Glands—Lower posterior gland, on section, studded with small deposits, situated chiefly in cortical layer, averaging $\frac{1}{4}$ inch in diameter; bright yellow, sharply defined; centre slightly softer than periphery.

Bronchial Glands—Left, two deposits, each $\frac{1}{2}$ inch in diameter; Right, nodule $\frac{1}{2}$ inch in diameter. All are sharply defined, pale yellow, project slightly above cut surface.

NO. CXIV.—Examination No. 6.

Mixed Jersey, 6 years old; weight 800 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 101°; maximum 102° After injection temperature reached maximum in 13 hours, 107°

AUTOPSY.—Lungs—Left: At base four small deposits situated in an infiltrated and injected area size of a dollar. These deposits are about size of large peas, somewhat indistinctly defined, of a bright-yellow color. About two inches from this area in substance of caudal lobe one deposit, $\frac{3}{4}$ inch in diameter; made up of a number of minute nodules, all firm, bright yellow, irregularly defined from lung tissue.

Mediastinal Glands—Posterior chain slightly enlarged; on section, contain a number of deposits situated chiefly in cortical layers. These deposits in the lower posterior glands are the largest, averaging $\frac{1}{2}$ inch in diameter, centres somewhat softer than peripheries. Deposits in middle and upper glands average $\frac{1}{4}$ inch in diameter, firm and caseous throughout. Anterior mediastinal glands also enlarged slightly; on section, contain several small cheesy nodules, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, all irregularly defined from glandular tissue.

Bronchial Glands—On section, paler and softer than usual, contain a few scattered nodules, varying from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, all irregularly defined, pale-yellow color, somewhat elevated above cut surface.

NO. CXV.—Examination No. 12.

Common cow, 8 years old; weight 750 pounds; bought in 1893. Date of injection June 5th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 100.3°; maximum 101.2°. After injection temperature reached maximum in 17 hours, 105.4°.

AUTOPSY.—Mediastinal Glands—Lower posterior glands each contain six deposits, varying from $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, firm, yellow, irregularly defined; somewhat elevated above cut surface. Deposits situated chiefly in cortical layers. Middle glands few deposits, pin-head in size, pale yellow, irregularly defined.

NO. CXVI.—Examination No. 31.

Jersey cow, 6 years old; weight 700 pounds; old herd. Date of injection June 5th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 102°; maximum 103° After injection temperature reached maximum in 13 hours, 106.1°.

AUTOPSY.—Lungs—Right: Caudal lobe, lower part of posterior border orange sized deposit, projects considerably above surface; on section, made up of a number of caseous deposits, averaging $\frac{1}{2}$ inch in diameter, separated from lung tissue and in part from each other by connective tissue bands. Central portions of these deposits very soft and cheesy, exude readily; peripheral portions firmer, somewhat granular. Scattered through lower lobe some ten deposits, $\frac{1}{4}$ to $\frac{3}{8}$ inch in diameter, irregularly defined, nodular; on section, firm and caseous, bright-yellow. Ventral lobe two deposits, each $\frac{1}{2}$ inch in diameter, irregularly defined, bright yellow, nodular; on section, centre slightly softer than periphery.

Left Lung—Two deposits in caudal lobe, $\frac{1}{4}$ and $\frac{3}{8}$ inch in diameter, similar to those in caudal lobe Right side.

Mediastinal Glands—Lowest posterior gland enlarged to size of adult human kidney; completely infiltrated with caseous and calcareous deposits; central portion shows signs of beginning softening. Cut surface has gritty appearance; no glandular tissue visible. Middle posterior glands have a number of scattered nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; largest have central foci of softening; several contain calcareous deposits. Upper posterior glands occasional deposit, averaging $\frac{1}{2}$ inch in diameter; irregularly outlined, bright-yellow color, somewhat elevated above cut surface.

Bronchial Glands—Slightly enlarged, paler and softer than usual, contain a number of small deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; all irregularly outlined, pale-yellow, elevated above cut surface.

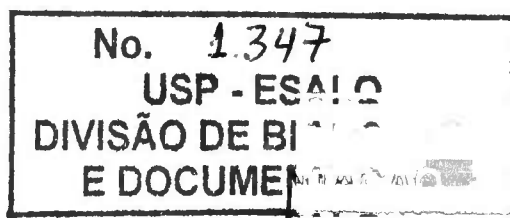
NO. CXVII.—Examination No. 117.

Grade Holstein, 3 years old; weight 700 pounds; raised on place. Date of injection July 10th, 1894. Date of autopsy July 24th, 1894. Before injection minimum temperature 102°; maximum 102°. After injection temperature reached maximum in 15 hours, 106.3°.

AUTOPSY.—Right Lung—Base caudal lobe four deposits, averaging $\frac{1}{2}$ inch in diameter; all irregularly outlined, bright-yellow in color, caseous; on section, central portion softer than peripheral, readily pressed out.

Mediastinal Glands—Lower posterior glands, on section, contain a number of nodular deposits, situated chiefly in cortical layers, averaging $\frac{1}{4}$ inch in diameter, firm, yellow, irregularly defined; centres of the larger nodules softer than peripheries. Middle posterior glands contain a few deposits, similar to those in lower glands except that they are smaller, averaging $\frac{1}{8}$ inch in diameter.

Left Bronchial Gland—One deposit, 1 inch in diameter, situated in cortex, irregularly defined, somewhat elevated above cut surface,



NO. CXVII.—Examination No. 119.

Common cow, 8 years old; weight 750 pounds; old herd. First examination June 5th. Second July 10th, 1894. Date of autopsy July 19th, 1894. [See Table VIII.] After second injection temperature reached maximum in 16 hours, 105.4°

AUTOPSY.—Lungs—Right: Caudal lobe ten deposits, from $\frac{3}{4}$ to $1\frac{1}{2}$ inches in diameter, situated at base and in substance of lobe. The larger deposits are sharply defined by connective tissue capsules, the smaller ones are irregular in outline and nodular. The centres are soft and cheesy, almost semi-fluid; the peripheries are firmer, of a bright-yellow color, granular and caseous. Lung tissue injected and immediately surrounding smaller deposits more or less infiltration. Along anterior border several deposits, all small, sharply defined; on section, firm and caseous, of a bright-yellow color. At junction of caudal with upper lobes area of infiltration size of dollar; irregularly outlined. Nodules in this all small, averaging $\frac{1}{8}$ inch in diameter, pale-yellow, firm, indistinctly defined from injected tissue.

Mediastinal Glands—Lower posterior glands enlarged; each size of adult human kidneys; on section, completely infiltrated with caseous deposits; no glandular tissue present; marked calcification especially in cortical layers; beginning central softening; most marked in lowest posterior gland. Middle and upper glands contain a number of deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; irregularly defined, pale yellow, somewhat elevated above surface; centres somewhat softer than peripheries. Glandular tissue pale and soft.

Bronchial Glands—Markedly enlarged; on section, all glandular tissue has disappeared; completely infiltrated with soft, caseous deposits; readily pressed out, leaving capsules only.

Liver—Left lobe three deposits, each $\frac{1}{2}$ inch in diameter; on section, irregularly defined, firm and caseous.

Hepatic glands—Soft and pale; on section, two caseous nodules situated in cortical layers, each $\frac{1}{4}$ inch in diameter, irregularly outlined, soft, cheesy, bright yellow, readily pressed out.

Omentum (Caul)—Four deposits, averaging $\frac{1}{2}$ inch in diameter, pedunculated; on section, gray-white and firm with central caseous focus.

TABLE XXII.
SUMMARY OF DATES OF AUTOPSIES.

November 2, 1894.....	2	November 14, 1894.....	2
“ 5, “	2	“ 16, “	3
“ 9, “	2		
Total number condemned November 30, 1894.....		11	

NO. CXIX.—Examination No. 144.

Common cow, 8 years old ; weight 950 pounds ; old herd. [See Table XVII.] First examination June 13th ; second examination October 30th, 1894. Date of autopsy November 2d, 1894. After second injection temperature reached maximum in 12 hours, 104.2°

AUTOPSY.—Left Lung—Deposit in caudal lobe, near base size of English walnut ; on section, irregularly defined, centre soft, cheesy, readily pressed out ; periphery firm, caseous, nodular ; surrounding lung tissue injected. About two inches from this deposit are two small nodules, each $\frac{1}{8}$ inch in diameter, firm, yellow, irregular in shape.

Left Bronchial Gland—Slightly enlarged ; on section, contains one caseous deposit, $\frac{1}{2}$ inch in diameter, irregularly defined. The centre is a little softer than the periphery ; glandular tissue paler and softer than usual.

NO. CXX.—Examination No. 159.

Mixed Jersey, 11 years old ; weight 750 pounds ; bought in May, 1894. [See Table XVII.] First examination June 15th ; second examination October 30th, 1894. Date of autopsy November 2d, 1894. After second injection temperature reached maximum in 12 hours, 107°

AUTOPSY.—Lungs—Right: Situated in caudal lobe, one deposit, $\frac{1}{2}$ inch in diameter ; irregularly defined, centre somewhat softer than periphery, readily pressed out. At base deposit, $\frac{1}{8}$ inch in diameter, firm, yellow, irregular, surrounded by a zone of injection.

Mediastinal Glands—Posterior chain slightly enlarged ; one middle gland especially, size of child's kidney. On section, this is entirely infiltrated with caseous deposits, all in marked stage of degeneration. The central portion semi-fluid, cheesy, exudes on section ; the peripheral portion somewhat firmer, but readily pressed out, leaving capsule only. On section of the other glands, cortical surfaces studded with small deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter ; majority firm, yellow, irregularly outlined, elevated above cut surface ; a few are on the point of coalescing ; these are somewhat softer, especially the centres.

Bronchial Glands—On section, left gland has two irregularly defined nodules, each $\frac{1}{4}$ inch in diameter. These are bright-yellow, caseous, centres somewhat softer than peripheries. The Right gland has one deposit, $\frac{1}{8}$ inch in diameter, irregularly defined, firm throughout.

Liver—Between posterior portion right lobe and under surface of diaphragm abscess cavity size of large orange, filled with foul-smelling pus.

NO. CXXI.—Examination No. 154.

Mixed Durham cow, 5 years old ; weight 750 pounds ; old herd. [See Table XVII.] First examination June 15th ; second examination October 30th, 1894. Date of autopsy November 5th, 1894. After second injection temperature reached maximum in 12 hours, 105.3°

AUTOPSY.—Lungs—Right: Upper portion caudal lobe near large bronchus one deposit size of English walnut; on section, centre soft, cheesy, readily pressed out; periphery firmer, irregularly defined, caseous material very granular and pale-yellow in color. Cephalic lobe, three small deposits, each $\frac{1}{4}$ inch in diameter; grouped together in centre of an injected area. These nodules are firm, caseous, irregularly outlined, pale-yellow in color; project slightly above cut surface.

Left Lung—Base caudal lobe, near posterior border, walnut sized deposit; on section, composed of several small nodules that have coalesced; entire nodule irregularly defined, cheesy throughout, pale yellow; projects somewhat above cut surface.

Mediastinal Glands—In lower posterior glands five deposits, averaging $\frac{1}{4}$ inch in diameter; all more or less sharply defined; situated chiefly in cortical layers. Nodules are of a pale-yellow color, firm throughout, slightly elevated above surface; glands pale and slightly larger and softer than usual.

Bronchial glands—Three small deposits, averaging $\frac{1}{4}$ inch in diameter; two in Left; one in Right gland; firm, yellow, irregular, project somewhat above cut surface.

NO. CXXII.—Examination No. 124.

Common cow, 8 years old; weight 750 pounds; bought in 1894. [See Table XI.] First examination June 15th; second, June 21st; third, October 30th, 1894. After third examination temperature reached maximum in 12 hours, 105.3°

AUTOPSY—Left Lung—Junction cephalic and ventral lobes one deposit, $\frac{3}{4}$ inch in diameter; caseous throughout, centre slightly softer than periphery, pale-yellow in color, projects slightly above cut surface and situated in a zone of injection.

Mediastinal Glands—Middle posterior gland size of child's kidney; on section, completely infiltrated by caseous deposits; no glandular tissue visible. These deposits have broken down in the central portion and consist of soft, cheesy, semi-fluid material which exudes on section. The peripheral deposits are nodular, granular and caseous, readily pressed out.

Bronchial Glands—Left gland, two deposits in cortex, each $\frac{1}{8}$ inch in diameter, pale yellow, firm, irregularly outlined.

NO. CXXIII.—Examination No. 127.

Grade Holstein, 1 year old; weight 600 pounds; raised on place. [See Table XI.] First examination June 21st; second, July 10th; third, October 30th, 1894. Date of autopsy November 9th, 1894. After third injection temperature reached maximum in 12 hours, 105.4°

AUTOPSY.—Right Lung—Caudal lobe, close to lower border, deposit $\frac{3}{4}$ inch in diameter, composed of four small nodules. These are irregularly outlined, pale-yellow in color, centres slightly softer than peripheries. Surrounding this deposit zone of injection. About four inches from this deposit, near anterior border, area of injection, size of twenty-five cent piece, in which are situated three small deposits, each pin-head in size, bright-yellow, irregular.

Mediastinal Glands—Posterior chain slightly enlarged. On section, the cortical layers of lower glands studded with caseous deposits, $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter; irregularly outlined. The centres of the larger deposits soft and cheesy; the smaller ones firm throughout; a few are about to coalesce.

Left Bronchial Gland—On section, one deposit, $\frac{1}{8}$ inch in diameter, situated in cortex; bright yellow, sharply defined, somewhat elevated above cut surface.

NO. CXXIV.—Examination No. 152.

Common cow, 12 years old; weight 750 pounds; old herd. [See Table XVII.] First examination June 15th; second examination October 30th, 1894. Date of autopsy November 9th, 1894. After second injection temperature reached maximum in 12 hours, 105.2°

AUTOPSY.—Lungs—Left: Centre caudal lobe deposit, size of egg; on section, composed of a number of soft, caseous nodules, $\frac{1}{4}$ to $\frac{3}{8}$ inch in diameter; all indistinctly defined, centres markedly softened; peripheries firm, granular and pale-yellow in color.

Right Lung—Caudal lobe, area of infiltration and injection, size of dollar; deposits all small, largest are $\frac{1}{4}$ inch in diameter; pale yellow, irregularly defined. Scattered through lobe besides these are several single deposits, averaging $\frac{1}{4}$ inch in diameter; firm, yellow, caseous, sharply defined. Cephalic lobe, one deposit $\frac{1}{4}$ inch in diameter; situated in apex, composed of four smaller nodules; all firm, yellow, irregularly defined.

Mediastinal Glands—Lower posterior glands have several nodular deposits in cortex; as a rule distinctly defined, project above cut surface, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. Centres of the larger deposits somewhat softer than peripheries. A few small nodules in medullary portions of glands; average $\frac{1}{2}$ inch in diameter; all soft and irregularly defined.

Bronchial Glands—Left gland, on section, cheesy deposit $\frac{1}{2}$ inch in diameter, indistinctly defined from glandular structure; centre soft and caseous; periphery firmer, granular. Right bronchial gland one deposit, $\frac{1}{8}$ inch in diameter, situated in cortical portion of gland; firm, yellow, sharply defined.

NO. CXXV —Examination No. 155.

Common cow, 9 years old; weight 750 pounds; bought in 1893. [See Table XVII.] First examination June 15th; second examination October 30th, 1894. After second examination temperature reached maximum in 12 hours, 103.2°

AUTOPSY.—Right Lung—Caudal lobe, lower border two deposits, each $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined by zone of injection; on section, centres slightly softer than peripheries, which are granular, pale-yellow color throughout.

Mediastinal Glands—Lower posterior gland, on section, has one deposit, $\frac{1}{4}$ inch in diameter, situated in cortex. This is pale yellow, cheesy, irregularly defined; the centre is somewhat softer than the periphery. Gland is slightly enlarged, paler and softer than is usual.

NO. CXXVI.—Examination No. 150.

Common cow, 5 years old; weight 750 pounds; bought in 1894. [See Table XVII.] First examination June 15th; second examination October 30th, 1894. Date of autopsy November 14th, 1894. After second injection temperature reached maximum in 12 hours, 106°

AUTOPSY.—Mediastinal Glands—Lower posterior glands slightly enlarged; on section, cortical layers studded with deposits; six to eight in each gland; all average $\frac{1}{4}$ inch in diameter; firm throughout, bright-yellow in color, somewhat elevated above cut surface and irregularly defined. Glandular structure pale and softer than usual.

Bronchial Glands—Left, two small deposits, each little over $\frac{1}{8}$ inch in diameter, firm and cheesy, irregularly defined, pale-yellow in color.

NO. CXXVII.—Examination No. 183.

Grade Holstein, 3 years old; weight 700 pounds; raised on place. [See Table XVII.] First examination July 10th; second examination October 30th, 1894. Date of autopsy November 16th, 1894. After second examination temperature reached maximum in 14 hours, 106°.

AUTOPSY.—Lungs—Right: Caudal lobe, in substance five deposits, averaging $\frac{1}{4}$ inch in diameter; on section, firm and caseous throughout, irregularly outlined; all project slightly above cut surface. A few of these deposits are surrounded by zones of injection. Ventral lobe, three deposits, little larger than those in caudal lobes, and centres somewhat soft and cheesy; otherwise similar.

Left Lung—Caudal lobe two small areas of injection and infiltration, each size of twenty-five cent piece. The nodules in these areas are all very small, many appearing as minute yellow dots, irregularly outlined.

Mediastinal Glands—One of the middle posterior glands, on section, has a single deposit situated in cortex, $\frac{1}{4}$ inch in diameter; centre slightly softer than periphery, irregularly outlined, pale-yellow in color, projects slightly above cut surface. Glandular tissue paler and softer than usual.

Parotid Glands—Each size of child's kidney; on section, both infiltrated with caseous deposits, all irregularly defined, averaging $\frac{1}{2}$ to 1 inch in diameter. The central portion of these glands has broken down and consists of a cheesy fluid, which exudes on section, leaving glands in a collapsed state; peripheral deposits firmer and somewhat granular, bright-yellow in color.

Posterior Pharyngeal Glands—Slightly enlarged; on section, few deposits scattered in cortical layers; all small and firm, somewhat irregularly defined; in size vary from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter; a few are on the point of coalescing.

NO. CXXVIII.—Examination No. 143

Holstein, 10 years old; weight 1100 pounds; old herd. [See Table XVII.] First examination June 13th; second examination October 30th, 1894. Date of autopsy November 16th, 1894. After first examination temperature reached maximum in 12 hours, 105.1°

AUTOPSY.—Lungs—Right: Caudal lobe, near base ten deposits; all small, varying from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, centres slightly softer than peripheries, latter granular and irregularly defined from lung tissue; several of the larger deposits are on the point of coalescing. Ventral lobe, four deposits, similar to those in caudal lobe. Cephalic lobe, one deposit, composed of three small partly coalesced nodules, each size of pin-head, surrounded by area of injection.

Left Lung—Two deposits near lower border caudal lobe, each $\frac{1}{2}$ inch in diameter, irregularly outlined; on section, caseous throughout, centre somewhat softer than periphery. At junction of caudal with upper lobes area of injection, size of twenty-five cent piece; in this are situated eight or more bright-yellow dots; pin-point to pin-head in size, all more or less indistinctly defined.

Pleurae—Pulmonary, thickened considerably; seat of numerous pearl-like deposits; all small, largest $\frac{1}{2}$ inch in diameter; majority but $\frac{1}{4}$ of an inch; situated directly in pleurae, chiefly between lobes and on anterior surfaces; a number grouped together and form excrescences size of grape. On section, a few have caseous centres; majority firm and gray-white throughout. Costal pleurae also seat of deposit similar to that on pulmonary pleurae, but very slight in extent, chiefly affecting the posterior surfaces. None of these nodules are pedunculated.

Mediastinal Glands—The lower posterior glands slightly enlarged; on section, studded with deposits from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter, all irregularly outlined; centres softer

than peripheries, especially in the larger deposits. Middle posterior mediastinal glands occasional deposit, $\frac{1}{4}$ inch in diameter; situated chiefly in cortical layers; on section, project slightly above cut surface, bright-yellow in color, irregularly defined.

Bronchial Glands—Slightly enlarged; on section, several small, firm, caseous deposits, averaging $\frac{1}{4}$ inch in diameter; on section, project slightly above surface.

Submaxillary Gland—Right side enlarged; on section, deposit $\frac{3}{4}$ inch in diameter, caseous, granular, irregularly defined; the centre is slightly softer than periphery. The gland itself is softer and paler than usual.

Posterior Pharyngeal Glands—Slightly enlarged; on section, contain four caseous deposits, averaging $\frac{1}{4}$ inch in diameter, soft and cheesy, irregularly defined; pale-yellow in color.

NO. CXXIX.—Examination No. 135.

Holstein cow, 10 years old; weight 850 pounds; old herd. [See Table XVII.] First examination June 13th, 1894; second examination October 30th, 1894. Date of autopsy November 16th, 1894. After second examination temperature reached maximum in 16 hours, 104°

AUTOPSY.—Lungs—Right: Several deposits (15 in all), $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, scattered through caudal lobe, situated chiefly at base and at junction of caudal and upper lobes. These deposits are all firm, yellow, nodular, irregularly defined. Lung tissue considerably injected surrounding these nodules; larger ones show signs of beginning central softening. Ventral lobe, patch of infiltration and injection size of half-dollar; the nodules in this vary from pin-point to pin-head in size, pale-yellow in color and very firm.

Left Lung—Situated in caudal lobe six deposits similar to those in Right lung; injection surrounding these more marked. Cephalic lobe, two deposits, size of peas, firm, yellow, irregular.

Pleurae—That covering lungs thickened and studded with deposits, majority situated directly on pleurae; a few have short pedicles. These nodules are from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, gray-white and firm throughout; numerous adhesions to costal pleurae and to similar deposit on the latter. The deposit on costal surfaces involves posterior portions chiefly, is $\frac{1}{2}$ to $\frac{3}{4}$ of an inch thick, nodular, firm, gray-white, situated directly on pleurae, except that a few have short pedicles.

Mediastinal Glands—Posterior chain enlarged; on section, the lower glands are studded with deposits, situated chiefly in cortical layers. These deposits are nodular in character, vary from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, more or less irregularly defined, bright yellow, slightly elevated above cut surfaces. The central portion of the larger deposits, few in number and situated chiefly in medullary layers, is very soft and cheesy, readily pressed out; the peripheral portion firmer, somewhat granular. The middle and upper glands contain an occasional nodule, all small, averaging $\frac{1}{4}$ inch in diameter, bright-yellow in color, distinctly defined.

Bronchial Glands—Enlarged considerably; on section, seat of numerous caseous deposits, averaging $\frac{1}{4}$ inch in diameter. These nodules are firm throughout; as a rule distinctly defined from glandular tissue.

Parotid Glands—Enlarged; seat of caseous deposits, from $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. On section, these deposits are somewhat irregularly defined, firm and caseous throughout, bright-yellow in color, nodular in character; very little glandular structure visible; none of the deposits have broken down, equally distributed in both glands.

Posterior Pharyngeal Glands—Two upper glands each have a single deposit, $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined, slightly elevated above cut surface.

TABLE XXIII.
SUMMARY OF DATES OF AUTOPSIES.

May 4, 1894.....	1	June 2, 1894.....	2
“ 10, “	2	“ 23, “	1
“ 14, “	1	July 20, “	3
“ 25, “	1	Sept. 17, “	1
June 1, “	1	Nov. 13, “	2

Animals condemned for various reasons.....15

NO. CXXX.—Examination No. 184.

Common cow, 6 years old; old herd; found dead May 4th 1894. Had calved on the day previous.

AUTOPSY.—Between second and fourth ribs Right side posteriorly deposit, 3 to 3½ inches long, situated on pleurae. with numerous adhesions to lungs; on section, composed of a number of caseous foci surrounded by considerable connective tissue; centres of some of these foci are soft and cheesy, readily pressed out; others firm and granular. (Adherent placental fragments in uterus.)

NO. CXXXI.—Examination No. 185

Common cow killed May 8th, 1894. Owing to a mistake in notification the Pathologist of the Hospital was not present at this examination on May 10th, received a specimen similar to that removed from cow No. 184. The butcher stated that with this exception tissues and organs were free from disease. The deposit was 4 inches long; 3 inches wide and 2 inches in thickness; situation same.

NO. CXXXII—Examination No. 186.

Holstein cow, 6 years old; old herd. This is an especially interesting case, not only on account of the brain lesions, but also from the fact that the animal manifested symptoms during life that were chiefly referable to the central nervous system. Date of autopsy May 10th, 1894. (Animal stabbed in medulla.)

Pia-Arachnoid—Adherent to cortex in places; entire membrane studded with miliary tubercles, especially numerous at base of brain. Tissue between the nodules clouded; vessels markedly injected. The tubercles averaged size of pin-heads, projected slightly above surface and on section, were firm and gray-white throughout.

Brain—In left Corpus Striatum and Optic Thalamus three small nodules, largest size of small pea; project slightly into ventricular cavity; on section, seen to extend some distance into substance; gray-white in color, sharply defined, firm. Right Optic Thalamus similar deposit, size of pin-head. Spinal cord and its meninges removed; macroscopically no changes.

Lungs—All the different lobes studded with nodules, varying from ¼ to ¾ of an inch in diameter; many of them still firm, but a few, especially the large ones show signs of central softening. The small nodules are most numerous and not as sharply defined as the larger ones, which are formed by the coalescence of a number of small deposits. The small nodules are gray-white to pale-yellow in color; firm throughout; the larger ones are bright yellow, cheesy, readily pressed out; numerous fibrinous adhesions to costal pleurae. At a point just above diaphragm right side posteriorly, between lung and pleura there is a small pocket of pus.

Mediastinal Glands—Posterior glands slightly enlarged; on section, cortical surfaces studded with deposits, ½ to ¼ inch in diameter, all firm and caseous, sharply defined, slightly elevated above cut surface, a few deposits, ¼ inch in diameter, situated in medullary layers; these are bright yellow, irregularly outlined and much softer than those in cortical layers.

Bronchial Glands—Enlarged; on section, a number of small, caseous, irregularly defined nodules; averaging $\frac{1}{4}$ inch in diameter, slightly elevated above cut surface.

Liver—Two deposits in parenchyma of liver, each 1 inch in diameter; on section, firm and caseous, sharply defined; central portion slightly softer than peripheral.

Hepatic Glands—Enlarged; on section, contain several caseous foci; average $\frac{1}{4}$ inch in diameter, project slightly above cut surface; centre slightly softer than periphery which is irregularly outlined.

Intestines—Entire length of small intestine studded with miliary tubercles similar to those on pia-arachnoid; also present on large intestine, but not so extensive; the peritoneum between these little nodules is clouded and thickened. Numerous adhesions between different coils of intestines and intestines and parietes. Deposits do not involve inner lining of intestine.

Mesenteric Glands—Enlarged; on section, numerous caseous deposits, averaging $\frac{1}{4}$ inch in diameter; firm and sharply defined. The mesentery itself is clouded and studded with miliary deposits similar to those on intestine and pia-arachnoid.

Parietal Peritoneum—Numerous miliary deposits, situated chiefly anteriorly; in character similar to those on intestine and pia-arachnoid. Abdominal cavity contained considerable cloudy fluid, in which were flakes of lymph.

NO. CXXXIII.—Examination No. 187.

Holstein cow, 10 years old; old heid. This cow had been sick for some time; was taking cod liver oil regularly. Autopsy May 14th, 1894.

Lungs—Numerous deposits, from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter, situated in caudal lobes, all sharply defined by connective tissue capsules; on section, centre soft and cheesy, readily pressed out; periphery firmer and somewhat granular. These deposits are situated at base chiefly, average about six in each lobe; those in left caudal lobe are the largest and most degenerated. Cephalic lobe, right side collapsed and nodular in appearance; on section, completely infiltrated with caseous nodules; abundant connective tissue. The nodules average $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter, firm, caseous, a few about to coalesce; these latter have central caseous material softer than peripheral portion.

Pleurae—On diaphragmatic surface, right side, deposit $4\frac{1}{2}$ inches long, 3 inches wide and about $1\frac{1}{2}$ inches thick; base of caudal lobe firmly adherent to this mass. On section, very firm, gray-white with numerous caseous foci; these are all firm, average $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter and are shaply defined.

Mediastinal Glands—Lower posterior glands enlarged, nodular in appearance; on section, studded with deposits, $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter, irregularly outlined as a rule, project slightly above cut surface. Several of them are on the point of coalescing; the centres of these and of the largest single deposits are softer than the peripheries. The middle and upper posterior glands contain an occasional deposit only; these average $\frac{1}{4}$ inch in diameter, similar to those in lower glands.

Bronchial Glands—All enlarged, left especially so, size of hen's egg; on section, very little glandular tissue visible, as the caseous infiltration is so marked. This is somewhat nodular in character, pale yellow, granular; central portion exudes readily. Nodules are more marked in cortical layers; have not coalesced as completely.

Liver—Left lobe consists of large, oval mass; very little hepatic structure visible. On section, seen to be composed of a large central cavity containing a quantity of greenish-yellow, foul-smelling liquid, in which are particles of broken down tissue and cheesy debris. Peripheral portion firm, nodular, sharply defined from surrounding structure by connective tissue capsule. These nodules are cheesy, granular, bright yellow; the centres slightly softer than the peripheries, which are irregularly separated from each other by narrow bands of connective tissue. Right lobe of liver, two nodules, each $\frac{1}{2}$ inch in diameter, composed of soft, cheesy zone, surrounded by layer of firmer, caseous material and around this a narrow connective tissue capsule.

Hepatic Glands—Slightly enlarged, nodular in appearance; on section, studded with small, bright-yellow, caseous nodules, all more or less irregularly defined. The centres are somewhat softer than the peripheries; glandular tissue pale.

NO. CXXXIV.—Examination No. 188.

Autopsy May 25th, 1894.

Lungs—Right: Adherent to growth on costal pleura; on section, cephalic lobe completely infiltrated with nodules, $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter; majority firm, yellow, caseous; a few show signs of central softening. Abundant connective tissue separates nodules from one another; no lung tissue visible in cephalic lobe. Caudal lobe, ten deposits, $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter. The smaller nodules are irregularly defined, firm, yellow, caseous; the larger ones are composed of soft, cheesy material in centres, surrounded by firm, caseous zone and around this is distinct connective tissue capsule. There is more or less injection surrounding all the nodules; they are situated chiefly at base and at junction of caudal with upper lobes.

Left Lung—Caudal lobe shows deposits, similar in character and size to those in right caudal lobe, situated principally at base and along posterior border of caudal lobe.

Mediastinal Glands—Posterior glands enlarged markedly; on section, lower ones completely infiltrated with calcareous and caseous nodules; the peripheral portions are firm, granular, gritty in places; the centres have broken down somewhat and consist of soft, cheesy fluid, which exudes readily.

Bronchial Glands—Slightly enlarged; on section, contain a few caseous foci; largest $\frac{1}{4}$ inch in diameter; centre slightly softer than periphery.

Liver—Two nodules, each $\frac{1}{2}$ inch in diameter, situated in parenchyma of right lobe; on section, firm throughout, centre yellow, granular; periphery paler and surrounded by narrow connective tissue capsule.

NO. CXXXV.—Examination No. 189.

Holstein cow, 9 years old; old herd. Date of autopsy June 1st, 1894.

Lungs—Caudal lobes both lungs markedly infiltrated by nodules of varying sizes and conditions, majority $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, pale yellow, granular, indistinctly defined from lung tissue; centre slightly softer than periphery. Larger deposits have very soft, cheesy centres that are readily pressed out; surrounded by a layer of caseous material. The larger deposits are all sharply defined by connective tissue capsules. Lung tissue in immediate neighborhood of these nodules injected and thickened. Cephalic and ventral lobes, left side numerous deposits, averaging $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; all firm, caseous, indistinctly defined, slightly elevated above cut surface of lung.

Mediastinal Glands—Posterior glands on section, contain a number of deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; scattered chiefly along cortical portions; a few deposits in medullary layers; these are larger and considerably softer than others. Glandular tissue pale, separation between deposits and tissue indistinct.

Bronchial Glands—Right and Left each have two deposits, small, firm, sharply defined; average $\frac{1}{4}$ inch in diameter.

Liver—One deposit, 1 inch in diameter, in Right lobe; on section, indistinctly defined from liver tissue; centre is softer than periphery, soft and cheesy, readily pressed out.

Ovary—Right no change. Left, large cyst size of orange; on section, contained dark-brown fluid with particles of tissue; portion of ovarian stroma at bottom of cyst; very soft, cheesy, irregularly defined.

NO. CXXXVI.—Examination No. 190.

Common cow, 8 years old; old herd. Date of autopsy June 2d, 1894.

Lungs—Left: All lobes infiltrated, very little lung structure visible. Deposits vary from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter, all in marked stage of caseous degeneration; they are indistinctly defined from one another by infiltrated and injected tissue. Deposits most marked along posterior border and at junction of different lobes. The centres of the larger deposits are very soft and cheesy, in places almost semi-fluid, readily pressed out. The centres of the smaller ones show signs of beginning softening.

Mediastinal Glands—Posterior glands enlarged so as to fill in space between lungs; on section, lower ones completely infiltrated with caseous and calcareous deposits; the centres have broken down in places and consist of semi-fluid, cheesy material that exudes on section. The middle and upper glands contain numerous deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter, situated chiefly in cortical portions. These are soft, cheesy, irregularly defined; glandular structure paler and softer than usual. The tissue between glands infiltrated with nodules similar to those in middle and upper glands.

Bronchial Glands—Left gland, on section, has one deposit, $\frac{1}{4}$ inch in diameter, indistinctly defined, pale-yellow color.

NO. CXXXVII.—Examination No. 191.

Common cow, 6 years old; old herd. Date of autopsy June 2d, 1894.

Lungs—Bases of both caudal lobes contain numerous caseous deposits; eight in Right, ten in Left; from $\frac{3}{4}$ to $1\frac{1}{4}$ inches in diameter; on section, these project somewhat above cut surface; irregularly defined, pale-yellow in color. The centres are slightly softer than the peripheries, most marked in large nodules.

Mediastinal Glands--Posterior chain enlarged; on section, contain a number of caseous nodules, situated chiefly in cortical portions, distinctly defined from one another. They average $\frac{1}{2}$ inch in diameter in lower glands and $\frac{1}{4}$ inch in middle and upper glands. The centres are slightly softer than the peripheries; granular, pale yellow.

NO. CXXXVIII.--Examination No. 192.

Holstein, 10 years old; old herd. Date of autopsy June 23d, 1894. Temperature of this animal was taken June 21st, but as it was 106° it was decided that the animal had better be tested at a later date. By a mistake animal was killed before this was done.

AUTOPSY.—Lungs—Left: Caudal lobe infiltrated with caseous deposits, 1 to 2 inches in diameter; centres very soft and cheesy, exude readily; peripheries firmer, nodular, indistinctly defined from surrounding tissue. The lung structure markedly injected and infiltrated by minute yellow dots. Entire lobe involved; no normal tissue present. Ventral and cephalic lobes, a number of scattered deposits, all indistinctly defined; average $\frac{1}{2}$ inch in diameter; bright yellow, caseous; centre softer than periphery.

Right Lung--Two deposits, each $\frac{3}{4}$ inch in diameter, situated in caudal lobe near anterior border; on section, centre cheesy, periphery firmer, indistinctly defined.

Mediastinal Glands--Markedly enlarged, all diseased; fill in space between lungs; tissue between glands also infiltrated. Deposit nodular in character, centres very soft and cheesy, periphery firmer, granular, irregularly defined. Deposits vary from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in diameter. The lower posterior glands size of kidneys; on section, infiltrated with these caseous deposits, many of which are calcified. In the middle and upper glands there are no calcareous particles; the deposits are all especially soft, readily exude.

Anterior Mediastinal Glands--Enlarged; contain a number of caseous, indistinctly defined nodules, averaging $\frac{1}{2}$ inch in diameter.

Bronchial Glands--Left, size of an egg; on section, completely infiltrated with caseous deposits; the central portion very soft, almost fluid.

Parotid Glands—Each size of kidneys; on section, completely infiltrated with caseous nodules; no glandular tissue visible. Nodules vary from 1 to $1\frac{1}{2}$ inches in diameter, soft and caseous throughout.

Posterior Pharyngeal Glands--Enlarged; on section, numerous caseous deposits; each $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; indistinctly defined; no glandular tissue.

Mesenteric Glands--Enlarged; on section, numerous deposits similar to those in posterior mediastinal glands.

Renal Glands--Numerous caseous deposits, firmer and smaller than others.

Udder—Left posterior segment, a number of firm, yellow nodules, averaging $\frac{1}{4}$ inch in diameter; distinctly defined; project slightly above cut surface.

NO. CXXXIX.—Examination No. 193.

Common cow, 6 years old; old herd. Date of autopsy July 20th, 1894. This cow was one of those treated in "suspect barn."

AUTOPSY.—Lungs—Caudal lobes, both lungs infiltrated with various sized nodules, 1 inch to 1½ inches in diameter; on section, indistinctly defined, pale-yellow in color, centre somewhat softer than periphery; tissue in immediate neighborhood injected and infiltrated. Nodules situated at base chiefly. Cephalic lobes, both sides very markedly diseased, collapsed, nodular; on section, completely infiltrated with nodules; these are all as a rule small and firm, averaging ¼ to ⅜ inch in diameter. The centres of a few are beginning to soften. Ventral lobes, an occasional nodule, small, firm, irregularly defined.

Mediastinal Glands—Slightly enlarged; on section, cortical layers studded with deposits, vary in size from ¼ to ½ inch in diameter; irregularly defined, project slightly above surface, pale-yellow in color; a few situated in medullary layers; these are all large, ½ to 1 inch in diameter, pale yellow, caseous; centres softer than peripheries, which are irregularly defined. Deposits most marked in middle and lower glands.

Anterior Mediastinal Glands—Four caseous deposits, ¼ inch in diameter, irregularly defined.

Bronchial Glands—Left, size of egg; Right, size of walnut; on section, completely infiltrated, with soft, cheesy nodules; centres almost semi-fluid, exude on section. No glandular tissue visible.

Costal Pleurae—Left side, four small nodular deposits, averaging ½ inch in diameter, pedunculated; on section, firm, gray-white.

Liver—Left lobe, deposit 2 inches in diameter; on section, composed of a number of small caseous foci, separated from one another and from hepatic structure by connective tissue bands.

 NO. CXL.—Examination No. 194.

Common cow, 8 years old; old herd. Date of autopsy July 20th, 1894. This animal was treated in "suspect barn."

AUTOPSY.—Lungs—Left: Caudal lobe, near base, deposit size of orange, projects somewhat beyond lung; on section, composed of a number of partly coalesced nodules; separated from one another and from lung tissue by narrow connective tissue bands. The nodules in the centre are very soft, cheesy, readily pressed out; in the peripheral portions somewhat firmer, granular, irregularly defined. Ventral and cephalic lobes, some ten deposits, ½ to 1 inch in diameter; on section, centres softer than peripheries, which are irregularly defined. Lung tissue in immediate neighborhood thickened and injected. At junction with lower lobe, deposit size of large English walnut, composed of four partly coalesced nodules; soft and cheesy, irregularly defined. Lung tissue injected.

Mediastinal Glands—Enlarged six times; on section, infiltrated with caseous nodules. These vary from ¼ to ⅜ inch in diameter; project somewhat above surface, more or less distinctly defined, firm and yellow, except for small foci of softening in centres.

Bronchial Glands—Enlarged; on section; numerous deposits, ¼ to ½ inch in diameter; soft and cheesy, centres readily pressed out.

 NO. CXLI.—Examination No. 195.

Common cow, 8 years old; old herd. Date of autopsy July 20th, 1894. This animal was treated in "suspect barn."

AUTOPSY.—Lungs—Left: Caudal lobe, base, large deposit, size of orange, projects considerably beyond lung; on section, composed of numerous caseous nodules, separated from one another and from lung structure by narrow bands of connective tissue. The central portion of this deposit is semi-fluid, cheesy, exuding on section. The peripheral portion is firmer and nodules are distinctly separated from one another. Ventral lobe, deposit 2 inches in diameter, nodular, irregularly defined; on section, centre filled with thick, tenaceous, greenish-yellow fluid; periphery firmer, caseous, granular.

Besides this there are four scattered nodules in lobe, from $\frac{1}{2}$ to 1 inch in diameter; firm, caseous and irregularly defined. Cephalic lobe also numerous deposits, all small, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; irregularly defined, firm and caseous. Apex one large deposit, $1\frac{1}{2}$ inches in diameter, composed of several small deposits that have partly coalesced. The central portion is much softer than the peripheral, readily pressed out.

Mediastinal Glands—Posterior chain slightly enlarged; on section, surface studded with a number of deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, all irregularly outlined, firm, yellow, project somewhat above surface.

Left Bronchial Gland—Two deposits similar to those in posterior mediastinal glands.

Parotid Glands—Both enlarged; on section, left contains three deposits, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in diameter; firm, caseous, irregularly defined.

Uterus—Left horn, on section, numerous caseous nodules, $\frac{1}{2}$ to 1 inch in diameter; the central portion is soft and cheesy; the peripheral somewhat firmer and sharply defined from surrounding tissue; several project into cavity of uterus, but the lining membrane is intact.

Left Ovary—Enlarged; on section, caseous throughout, all glandular tissue absent.

NO. CXLII.—Examination No. 136.

Holstein cow, 10 years old; weight 800 pounds; old herd. [See Table XV.] This animal was injected June 13th, 1894, and did not react. On September 17th she was killed and found to be markedly tubercular. This autopsy occurred during the absence of the Pathologist. Animal was inspected by Dr. E. M. Corson.

AUTOPSY.—Lungs: Both caudal and ventral lobes markedly infiltrated with deposits; central portions of these in last stages of caseation. Numerous adhesions to costal pleurae and to thick deposit on it. Anterior and posterior mediastinal glands markedly enlarged and infiltrated. The latter fill in space between lungs. Bronchial glands also involved.

NO. CXLIII.—Examination No. 160.

Holstein, 1 year old; weight 500 pounds; raised on place. [See Table XVI.] Date of injection June 21st, 1894. Date of autopsy November 13th, 1894. Minimum temperature before injection 102.2° ; maximum 103° . Temperature reached maximum 11 hours after injection, 104.2° . Animal condemned by physical examination October 30th, 1894.

AUTOPSY.—Lungs: Caudal lobes, both sides markedly infiltrated with small deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; are firm and caseous; irregularly defined. Lung tissue in immediate neighborhood infiltrated and injected. Ventral lobes contain a few deposits; these are larger and central softening marked; situated chiefly at junction of ventral and other lobes. Cephalic lobes, four scattered nodules, $\frac{1}{4}$ inch in diameter, firm, yellow, irregularly defined.

Pleurae—Thick deposit on costal and pulmonary pleurae; largely pedunculated; gray-white in color; on section, nodules firm throughout.

Mediastinal Glands—Posterior ones enlarged so as to fill in space between lungs; on section, numerous caseous and calcareous nodules; the central portion has broken down, consists of thick, cream-like fluid, which exudes on section. In the upper glands the deposits are smaller, irregularly outlined; very little calcareous matter. The glandular tissue is markedly diminished, paler and softer than usual.

Anterior Mediastinal Glands—Also enlarged; contain numerous caseous foci; all soft and readily pressed out. Covering peri-cardial sac, deposit similar to that on costal pleurae; pedicles not so long and besides a few of the large nodules have central cheesy foci.

Bronchial Glands—Size of English walnuts; on section, infiltrated with soft, cheesy deposits.

Renal Glands—Enlarged; on section, contain a number of cheesy foci; $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; irregularly outlined.

NO. CXLIV —Examination No. 165.

Jersey, 9 months old; weight 250 pounds; raised on place. [See Table XVI.] Date of injection June 21st, 1894. Date of autopsy November 13th, 1894. Before injection minimum temperature 102.2°; maximum 103°. After injection temperature reached maximum in 14 hours, 102.1°. This animal was condemned following a physical examination October 30th, 1894.

AUTOPSY.—Right Lung—One deposit size of grape, in caudal lobe; on section, firm and caseous throughout; sharply defined by connective tissue capsule.

Mediastinal Glands—Posterior glands slightly enlarged; on section, infiltrated with caseous nodules, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; project above cut surface, firm, yellow, caseous. In tissue between glands numerous deposits similar in character, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter.

Anterior Mediastinal Glands—Four deposits; soft and cheesy, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; irregularly outlined.

Bronchial Glands—Left has two deposits, each $\frac{1}{4}$ inch in diameter, distinctly defined; slightly elevated above surface, firm and caseous throughout.

Liver—In left lobe deposit size of large egg; on section, composed of firm nodules, which have partly coalesced. The central portions are soft, cheesy, readily pressed out; the peripheral portions are firmer and distinctly separated from each other and from hepatic structure by narrow bands of connective tissue.

Hepatic Glands—Enlarged; on section, several deposits, soft, caseous, indistinctly defined, averaging $\frac{1}{2}$ inch in diameter.

TABLE XXIV.
ANIMALS TUBERCULAR AT AUTOPSY.

Nov. 21, 1894.....	2	Dec. 20, 1894.....	2
“ 23, “	1	“ 24, “	1
Dec. 14, “	1	“ 29, “	3
“ 17, “	3	“ 31, “	3
“ 19, “	2	Jan. 3, 1895	5
		March 5, “	1

NO. CXLV.—Examination No. 139.

Holstein cow, 9 years old; weight 850 pounds; old herd. [See Table XVIII.] First examination June 13th, 1894; second examination October 30th, 1894. Date of autopsy November 21st, 1894.

AUTOPSY.—Lungs—Right: Caudal lobe, two deposits; each $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined.

Posterior Pharyngeal Glands—Upper Right gland, one firm, caseous deposit, $\frac{1}{2}$ inch in diameter; on section, centre slightly softer than periphery; latter indistinctly defined.

NO. CXLVI.—Examination No. 122.

Holstein cow, 10 years old; weight 1000 pounds; old herd. [See Table XII.] First examination June 13th, 1894; second, examination June 21st; third, examination October 30th, 1894. Date of autopsy November 21st, 1894.

AUTOPSY.—Lungs—Right: Caudal lobe four deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; two about to coalesce; on section, centres slightly softer than peripheries, readily pressed out; peripheral portions firmer, granular, irregularly defined from surrounding lung tissue, which is markedly injected.

Left Lung—One deposit, $\frac{1}{4}$ inch in diameter, firm, caseous, indistinctly defined.

Mediastinal Glands—On section, the posterior glands are studded with small deposits, pin-point to $\frac{1}{4}$ inch in diameter; all firm, yellow, project above surface, somewhat indistinctly defined. Largest number in lower posterior glands.

Bronchial Glands—Left side one deposit, $\frac{1}{4}$ inch in diameter, firm, yellow, indistinctly defined. Right side one deposit, $\frac{1}{8}$ inch in diameter, similar to the one in left.

NO. CXLVII.—Examination No. 132.

Common cow, 4 years old; weight 650 pounds; bought in 1893. [See Table XVIII.] First examination June 5th, 1894; second examination October 30th, 1894. Date of autopsy November 23d, 1894.

AUTOPSY.—Mediastinal Glands—Lower posterior gland two deposits, each $\frac{1}{4}$ inch in diameter; firm, yellow, indistinctly defined.

Posterior Pharyngeal Glands—Upper right gland, on section, contains a caseous deposit, $\frac{3}{4}$ inch in diameter; centre of this very soft and cheesy, readily pressed out; periphery firmer, irregularly defined.

NO. CXLVIII.—Examination. No. 129.

Mixed Jersey, 6 years old; weight 700 pounds; bought in 1893. [See Table XVIII.] First examination June 5th, 1894; second examination October 30th, 1894. Date of autopsy December 14th, 1894.

AUTOPSY.—Left Lung—Base caudal lobe deposit, $\frac{1}{2}$ inch in diameter, irregularly defined; on section, centre somewhat softer than periphery, readily pressed out. Periph-

eral portion firmer, granular, pale yellow. Ventral lobe, three deposits; each $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined by zones of injection.

Mediastinal Glands—Lower posterior gland, on section, three deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, sharply defined, firm, yellow, project slightly above surface.

NO. CXLIX.—Examination No. 149.

Mixed Jersey, 4 years old; weight 800 pounds; bought in February, 1894. [See Table XVIII.] First examination June 15th, 1894; second, October 30th, 1894. Date of autopsy December 17th, 1894.

AUTOPSY.—Right Lung: Caudal lobe two deposits, one $\frac{1}{4}$ inch in diameter, other $\frac{1}{2}$ inch in diameter; irregularly defined from lung tissue; on section, firm, yellow, granular, centre slightly softer than periphery.

Mediastinal Glands—Lower posterior gland, on section, two deposits; each $\frac{1}{4}$ inch in diameter, firm, yellow, irregularly defined. One middle posterior gland, one deposit, $\frac{1}{4}$ inch in diameter, similar to the two in lower gland.

CL.—Examination No. 151.

Common cow, 9 years old; weight 700 pounds; bought in 1893. [See Table XVIII.] First examination June 15th, 1894; second examination October 30th, 1894. Date of autopsy December 17th, 1894.

AUTOPSY.—Mediastinal Glands: Lower posterior gland, on section, has two deposits, each $\frac{1}{8}$ inch in diameter; appear as pale-yellow, granular nodules, sharply defined from glandular tissue.

NO. CLI.—Examination No. 156.

Common cow, 10 years old; weight 700 pounds; old herd. [See Table XVIII.] First injection June 15th, 1894; second injection October 30th, 1894. Date of autopsy December 17th, 1894.

AUTOPSY.—Lungs—Caudal lobes, both lungs a number of deposits, $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter; a number have coalesced to form masses size of large English walnuts. The centres of these are very soft, cheesy, readily pressed out; the others are firm throughout. All the deposits are distinctly defined by zones of injection. Cephalic lobe, Right side several small scattered nodules, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, firm, sharply defined and granular in appearance.

Mediastinal Glands—Lower posterior glands size of adult human kidneys; on section, completely infiltrated with caseous and calcareous particles. The central portions of both glands considerably broken down; exudes readily. Peripheral portions very firm, gritty. Middle posterior glands, size of large eggs; on section, no glandular tissue present; completely infiltrated with soft, cheesy deposits, all readily pressed out; no calcareous particles. Upper glands numerous deposits, 1 to $\frac{1}{2}$ inch in diameter; narrow margin of glandular tissue.

Bronchial Glands—Left, on section, one deposit, 1 inch in diameter, soft, cheesy, irregularly defined; Right two deposits, each $\frac{1}{4}$ inch in diameter, firm, caseous, distinctly defined.

NO. CLII.—Examination No. 131.

Mixed Jersey, 5 years old; weight 750 pounds; bought in 1893. [See Table XVIII.] First examination June 5th, 1894; second examination October 30th, 1894. Date of autopsy December 19th, 1894.

AUTOPSY.—Mediastinal Glands—One of the middle posterior glands, on section, contains one deposit, $\frac{1}{4}$ inch in diameter, firm, yellow, sharply defined.

NO. CLIII.—Examination No. 147.

Common cow, 8 years old; weight 750 pounds; old herd. [See Table XVIII.] First examination June 13th, 1894; second examination October 30th, 1894. Date of autopsy December 19th, 1894.

AUTOPSY.—Mediastinal Glands—Lower posterior gland one deposit size of pin-head; appears as pale-yellow, slightly elevated dot; indistinctly outlined. Upper posterior gland, on section, similar deposit.

NO. CLIV.—Examination No. 163.

Grade Holstein, 1 year old; weight 500 pounds; raised on place. [See Table XVIII.] First examination June 21st, 1894; second examination October 30th, 1894. Date of autopsy December 20th, 1894.

AUTOPSY.—Mediastinal Glands—Middle posterior gland one deposit, $\frac{1}{4}$ inch in diameter, firm, yellow, irregular in outline, slightly elevated above surface.

NO. CLV —Examination No. 162.

Holstein. $1\frac{1}{2}$ years old; weight 550 pounds; raised on place. [See Table XVIII.] First examination June 21st, 1894; second examination October 30th, 1894. Date of autopsy December 20th, 1894.

AUTOPSY.—Left Lung—Two deposits in centre of small area of hepatization in lower portion caudal lobe. These deposits appear as yellow dots, indistinct in outline; very firm.

Mediastinal Glands—Middle posterior gland, on section, has one deposit, size of pin-head; irregular in outline, pale-yellow color.

Left Bronchial Gland—Deposit $\frac{1}{4}$ inch in diameter; centre slightly softer than periphery, which is indistinctly outlined.

NO. CLVI.—Examination No. 133.

Common cow, 8 years old; weight 800 pounds; bought in 1893. [See Table XIX.] First examination June 5th, 1894. Date of autopsy December 24th, 1894.

AUTOPSY.—Lungs—Left: Caudal lobe one deposit, $\frac{3}{4}$ inch in diameter, formed by coalescence of a number of small nodules; beginning central softening; periphery irregularly defined. Lung tissue in immediate neighborhood injected.

Mediastinal Glands—In lower posterior gland, three small deposits, $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter; indistinctly defined, firm, caseous, project slightly above surface.

Bronchial Gland—Left, on section, has one deposit, $\frac{1}{4}$ inch in diameter, soft, cheesy, irregularly defined.

NO. CLVII.—Examination No. 128.

Common cow, 6 years old; weight 650 pounds; bought in 1894. [See Table XVIII.] First examination June 5th, 1894; second examination October 30th, 1894. Date of autopsy December 29th, 1894.

AUTOPSY.—Left Lung—Ventral lobe one deposit, 1 inch in diameter, granular irregularly outlined. Lung tissue in immediate neighborhood injected.

Mediastinal Glands—Middle posterior one deposit, $\frac{1}{2}$ inch in diameter, soft, cheesy, bright yellow, sharply defined from surrounding glandular tissue.

NO. CLVIII.—Examination No. 130.

Common cow, 5 years old; weight 800 pounds; bought in 1894. [See Table XVIII.] First examination June 5th, 1894; second examination October 30th, 1894. Date of autopsy December 29th, 1894.

AUTOPSY.—Mediastinal Glands—Middle posterior gland two deposits, each $\frac{1}{2}$ inch in diameter; bright yellow, distinctly defined, firm.

Bronchial Glands—Left one deposit, $\frac{1}{4}$ inch in diameter, firm, caseous, irregularly defined.

NO. CLIX.—Examination No. 145.

Common cow, 6 years old; weight 600 pounds; bought in 1893. [See Table XVIII.] First examination June 13th, 1894; second examination October 30th, 1894. Date of autopsy December 29th, 1894.

AUTOPSY.—Right Lung—Caudal, lobe near anterior border, one deposit, $\frac{3}{4}$ inch in diameter; firm, caseous; periphery distinctly defined from lung tissue; centre softer, cheesy, readily pressed out.

NO. CLX.—Examination No. 153.

Common cow, 12 years old; weight 750 pounds; bought in 1894. [See Table XVIII.] First examination June 15th, 1894; second examination October 30th, 1894. Date of autopsy December 31st, 1894.

AUTOPSY.—Bronchial Glands—Left slightly enlarged; on section, contains three deposits, each $\frac{1}{4}$ inch in diameter, partly coalesced; irregularly outlined, soft, cheesy, pale yellow.

NO. CLXI.—Examination No. 157.

Grade Holstein, 2½ years old; weight 650 pounds; raised on place. [See Table XVIII.] First examination June 15th, 1894; second examination October 30th, 1894. Date of autopsy December 31st, 1894.

AUTOPSY.—Lungs—Right: Caudal lobe one deposit, $\frac{3}{4}$ inch in diameter, firm, cheesy, irregularly defined; surrounded by zone of injection. Ventral lobe one deposit, $\frac{1}{4}$ inch in diameter; firm, sharply defined, bright yellow; centre calcified.

Mediastinal Glands—Lower posterior gland one deposit, $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined. Middle gland two deposits, one $\frac{1}{8}$ inch and one $1\frac{1}{2}$ inch in diameter, similar to deposit in lower gland.

Bronchial Gland—Left side, one deposit size of pin-head, bright yellow, distinctly defined and firm.

NO. CLXII.—Examination No. 123.

Grade Holstein, 2 years old; weight 550 pounds; raised on place. [See Table XIII.] First examination June 13th, 1894; second examination June 21st; third examination October 30th, 1894. Date of autopsy December 31st, 1894.

AUTOPSY.—Mediastinal Glands—Lower posterior gland size of English walnut; on section, infiltrated with caseous deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; many have partly coalesced. The centres are very soft, cheesy, bright yellow; peripheries firmer.

Bronchial Glands—Left, one deposit, $\frac{1}{2}$ inch in diameter, irregularly outlined, soft and cheesy throughout, pale yellow.

NO. CLXIII.—Examination No. 166.

Common cow, 7 years old; weight 850 pounds; bought in 1893. [See Table XVII.] First examination June 21st, 1894; second examination October 30th, 1894. Date of autopsy January 3d, 1895.

AUTOPSY.—Mediastinal Glands—Lower posterior gland, slightly enlarged; on section, contains four deposits, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, firm, granular, irregularly defined. The centres are somewhat softer than the peripheries, readily pressed out. Middle posterior glands contain three deposits, averaging $\frac{1}{4}$ inch in diameter; firm, yellow, sharply defined; project slightly above surface.

Bronchial Glands—Left one, on section, has two pin-head deposits, pale yellow, indistinctly defined. Gland enlarged; tissue softer and paler than usual.

NO. CLXIV.—Examination No. 120.

Holstein, 2½ years old; weight 600 pounds; raised on place. [See Table XII.] First examination June 13th; second examination June 21st; third examination October 30th, 1894. Date of autopsy January 3d, 1895.

AUTOPSY.—Lungs—Right: Ventral lobe, deposit ½ inch in diameter, situated close to entrance of large bronchus; on section, firm, yellow, granular, somewhat elevated; irregularly defined. Lung tissue in immediate neighborhood injected and infiltrated with minute yellow dots; firm and granular.

Mediastinal Glands—Lower posterior gland, on section, contains three small deposits, largest ¼ inch in diameter; firm, yellow, sharply defined, project slightly above cut surface. Middle gland two deposits, each ¼ inch in diameter, firm, yellow, caseous, irregularly defined.

Bronchial Glands—Two deposits, each ¼ inch in diameter; in left gland; one ½ inch in diameter in right gland. All these irregularly outlined, pale yellow, firm and slightly elevated above glandular tissue.

NO. CLXV.—Examination No. 138.

Holstein cow, 5 years old; weight 800 pounds. [See Table XVIII.] First examination June 13th, 1894; second examination October 30th, 1894. Date of autopsy January 3d, 1895.

AUTOPSY.—Bronchial Gland—Right side size of large English walnut; on section, completely infiltrated with soft, cheesy nodules; ½ to ¾ inch in diameter, all more or less. The centres are very soft and cheesy, readily pressed out; the peripheries somewhat firmer, granular.

Posterior Pharyngeal Glands—Posterior chain enlarged; on section, contain a number of caseous deposits, ½ to ¾ inch in diameter, irregularly defined from glandular tissue; firm, granular, caseous; centres of a few of the larger ones show signs of beginning softening.

NO. CLXVI.—Examination No. 126.

Holstein, 2 years old; weight 650 pounds; raised on place. [See Table XII.] First examination June 21st; second examination July 10th; third, October 30th, 1894. Date of autopsy January 3d, 1895.

AUTOPSY.—Lungs—Right: Caudal lobe one deposit, 1 inch in diameter, firm, yellow, sharply defined; on section, firm throughout. Lung tissue in immediate neighborhood injected.

Mediastinal Glands—One middle posterior gland has a single deposit, ¼ inch in diameter; firm, yellow, sharply defined; projects above surface.

Bronchial Gland—Left side, on section, one firm, yellow nodule, less than ¼ inch in diameter, distinctly defined from gland tissue.

NO. CLXVII.—Examination No. 121.

Holstein cow, 4 years old; weight 800 pounds; old herd. [See Table XII.] First examination June 13th; second examination July 10th; third examination October 30th, 1894. Date of autopsy January 3d, 1894.

AUTOPSY.—Lungs—Left: Caudal lobe very markedly infiltrated, deposits all large, averaging 1½ inches in diameter; number have partly coalesced and form large masses, which project beyond surface; these are situated along the posterior border and in substance of base. The central portion of the nodules is very soft and cheesy, in the largest composed of thick, greenish-yellow fluid with caseous particles. The peripheral portions are granular, firmer, and more or less distinctly defined from one another and from surrounding lung tissue by narrow connective tissue bands. Marked injection and thickening of pulmonary tissue. Ventral lobe, few small deposits, all firm, distinctly defined, pale yellow.

Right Lung—Caudal lobe four deposits, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, composed of a number of minute nodules which have partly coalesced; the central portion being slightly softer than the peripheral.

Costal Pleurae—Along posterior border numerous pedunculated nodules; pedicles short, nodules somewhat flattened, averaging $\frac{1}{2}$ inch in diameter; on section, gray-white throughout. Covering anterior portions both sides nodular deposit, $\frac{1}{4}$ to $\frac{1}{2}$ inch thick. On section, glistening appearance, gray-white, very firm.

Mediastinal Glands—Lower posterior gland size of cow's kidney, completely infiltrated with caseous and calcareous deposits; no glandular tissue visible. The central portion is much softer than the peripheral; consists of thick, yellow, cheesy fluid which exudes on section. Peripheral portion very firm, bright yellow. Tissue in neighborhood of this large deposit, infiltrated with small nodules, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter; on section, caseous throughout. The middle and upper posterior glands enlarged each size of hen's eggs; on section, seat of numerous soft, bright-yellow, cheesy nodules, $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter; all irregularly outlined, very soft.

Bronchial Glands—Left size of hen's egg's; on section, similar to upper posterior mediastinal glands. Right has two deposits, each $\frac{1}{2}$ inch in diameter, pale yellow indistinctly outlined; centre softer than periphery.

Posterior Pharyngeal Glands—Enlarged; on section, contain a number of caseous nodules, $\frac{1}{2}$ to 1 inch in diameter, very little glandular structure visible. The deposits all show marked central softening; the peripheries are irregularly outlined.

NO. CLXVIII.—Examination No. 137.

Holstein, 8 years old; weight 900 pounds; old herd. [Sec Table XX.] First examination June 13th; second examination October 30th, 1894; third examination March 2d, 1895. Autopsy March 15th, 1895.

AUTOPSY.—Lungs—Left: Junction caudal with upper lobes mass of deposits, size of large egg; lung tissue completely infiltrated. The deposits are nodular in character, firm, pale yellow, averaging $\frac{1}{2}$ of an inch in diameter; all indistinctly defined from one another and from lung tissue; project above cut surface slightly.

NO. CLXIX.—Examination No. 196.

Common calf, 3 weeks old; killed July 2d, 1894. Mother No. 34. [Autopsy No. XXXVI.]

AUTOPSY.—Caseous focus, $\frac{3}{4}$ inch in diameter, in lower posterior mediastinal gland; on section, centre very soft, cheesy, bright yellow; periphery firmer, paler, sharply defined from surrounding glandular tissue.

NO. CLXX.—Examination No. 169.

Grade Holstein, 6 months old; raised on place. Date of injection June 21st, 1894. Date of autopsy January 11th, 1895. [See Table XIV.]

AUTOPSY.—Bronchial Gland—Left side slightly enlarged; on section, contain three small deposits, pin-head in size; pale yellow, irregularly defined.

TABLE XXV.—CONTINUED.

Case Number.	Autopsy Number.	Age of Animal.	Amplitude of Reaction to Tuberculin.	Lungs.	Bronchial Glands.	Mediastinal Glands.	Costal Pleurae.	Parotid Glands.	Posterior Pharyngeal Glands.	Liver.	Hepatic Glands.	Spleen.	Intestines.	Mesenteric and Lumbar Glands.	Kidneys and Renal Glands.	Parietal Peritoneum and Omentum.	Uterus and Appendages.	Udder.
169	170	6 mos.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
183	127	3 years.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
184	130	6 "	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
185	131	7 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
186	132	4 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
187	133	8 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
188	134	6 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
189	135	9 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
190	136	8 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
191	137	6 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
192	138	10 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
193	139	8 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
194	140	8 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
195	141	8 "	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
196	169	3 weeks.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
170	170	.....	.....	118 115	104 79	152 10	20 13	11 14	38 28	5 7	12 7	15 3	3 3	.....	.....	.....	.....	.....

DISTRIBUTION OF DISEASE.

BRAIN.

Case No. 186, autopsy No. CXXXII, was the only animal manifesting tubercular lesions in the brain or its meninges, although a number were examined. This animal, a Holstein, 4 years old, was apparently well up to a few days of death, probably ten. First symptom noticeable was that she staggered on rising from recumbent posture; also appeared to be losing appetite. When seen two days prior to death she could rise with great difficulty and then only after repeated urging; the next day even this was impossible, urging, eliciting a slight movement in legs only; these were doubled up under her and seemed powerless. Facial expression anxious, breathing extremely labored, marked movement of alar of nose; swallowing at first difficult, later impossible; [at autopsy the small bronchi as well as the large contained considerable cud]. Skin dry and hot; hair bristling in places, marked along the spine. The next morning animal was profoundly comatose; killed and examined. Tubercular lesions present of a miliary character, indicating marked bacillary invasion or rapid dissemination of gems by means of the blood. Tubercular meningitis has been observed in cattle occasionally and the disease may make considerable progress before any signs of ill health are manifested, as in this case; then suddenly symptoms, apoplectic in character, appear and animal succumbs shortly.

LUNGS.

Distribution of disease in lungs was as follows: Both lungs affected in 90 cases. Right alone in 27; Left alone in 24; total 141, animals out of the 170 condemned had tubercular processes in the lungs. Of the 90 having disease of both lungs, there was little difference as to which side was chiefly affected. In 23 cases the most marked lesions were found on the Right side and in 26 on the left. Both lungs equally diseased in 41 cases. Most observers are of the opinion that if any one side is especially susceptible it is the left; the Hospital cases show that the disease was equally distributed between Right and Left lungs.

Right alone.....	27	|	Left alone.....	24
Right chiefly.....	23	|	Left chiefly.....	26
Total.....	50	|	Total.....	50
Both lungs equally diseased.....	41	|	Total.....	141

Large caudal lobes involved in 133 animals. Both caudal alone in 23 cases. Both caudal and other lobes in 55. Right caudal only in 18 cases; combined with deposits in other lobes 11 cases. Left caudal only in 11 cases; left caudal and other lobes in 15 cases. The remaining cases, 8 in number, had lesions distributed in upper lobes as follows: Right cephalic alone, 2 cases; Right ventral alone, 1 case; Right cephalic and ventral only, 1 case. Total, 4 animals had deposits in upper lobes Right side only. Left cephalic and ventral, 1 case; left ventral only 1 case. Total, 2 had lesions on left side only. Cephalic and ventral lobes both sides, 2 cases. This would appear to indicate that when upper lobes are diseased, the Right are more susceptible than the left; but the numbers are entirely too small to make any positive statements. Nor does it seem deducible from the above statistics that the caudal lobes are always the primary seat of the tubercular lesions; 81 cases had other lobes diseased in connection with caudal lobes and in many of these the disease was equal in age and distribution, so that it was impossible to say just which lobe contained the primary focus; the disease being extensively distributed—and then again several areas could have been infected about the same time.

In many of the cases where the caudal lobes were diseased the lower posterior border seemed to be the seat of the most advanced lesions; again, quite a number had marked deposits at the junction of lower with upper lobes. It would also seem from cases examined in this herd that where the cephalic or ventral lobes are attacked that

the disease is more destructive than when the caudal lobes are the seat of the deposit. The nodules are as a rule smaller and the coalescence of these into masses of large size as in the caudal lobes, not as frequent as is complete infiltration of the lobe with small deposits. Nor is caseation of nodules so advanced. In a few cases the deposits in the cephalic lobes were markedly cheesy; still a few more in the ventral lobes, especially close to junction with caudal lobes, but none of them showed the marked degenerative character of the deposits found in the caudal lobes. When upper lobes were involved they were always more or less contracted—due possibly to their being less expansile than the lower lobes and also to the large amount of connective tissue separating nodules from one another or from lung tissue.

The development of tuberculosis in the lungs of these animals seemed to be entirely independent of any pre-existing disease of the lungs and with exception of two or three cases where the lungs were emphysematous there were no lesions found at the autopsies other than tubercular. As to the amount of tuberculosis present it is difficult to divide the cases in such a way as to be accurate; many stages being frequently represented in a single case. 34 of the 141 cases had slight lesions in the lungs; by this is meant either one or two medium-sized deposits or several very small ones in early stages. These 34 were divided into: Both lungs, 5; Left only, 9; Right only, 20. In 14 cases slight lesions in one lung were associated with marked lesions in the other; Left slight, Right marked, 9; Right slight, Left marked, 5. In 6 cases slight lesions were associated with very bad deposits in other lung; Right slight, Left very bad, 3; Left slight, Right very bad, 3.

Thirty-five were markedly diseased; among these are included cases where there was one or at most two large deposits present, or where there were numerous small ones, all more or less caseous. Of these 24 had both lungs marked; 5 had Left alone marked and 6 Right alone. In 22 cases marked lesions in one lung were associated with very extensive deposits in other, of these 10 had marked lesions in Left lung and bad ones in Right lung; whereas 12 were vice versa.

Thirty animals were extensively diseased. Of these in 19 cases the disease affected both lungs equally; 10 had Left alone extensively diseased, whereas there was but one case where the Right lung alone was the seat of the extensive deposit. By this latter term are meant such cases in which the deposits have coalesced more or less to form large masses, where retrograde changes are marked or where entire lobes are completely infiltrated with small deposits. To summarize according to most advanced stage of lesions—58 animals had extensively diseased lungs, one or both; 49 had marked lesions and 34 had very slight ones, making a total of 141 animals having lungs diseased.

BRONCHIAL GLANDS.

These were the seat of tubercular deposits in 107 cases; all glands involved in 76; Left bronchial alone in 28, and Right in 3 cases only. The lesions in the bronchial glands were associated with disease of the lungs, in 98 cases divided as follows: Both lungs, 79; with Left lung only, 12; with Right only, 10. The other 9 cases were associated chiefly with disease of the posterior mediastinal glands.

In 67 of the cases where bronchial glands were diseased the deposits were limited to the thoracic viscera; in 40 cases the disease was general. Of the 28 cases in which the Left gland was seat of deposit it was associated with other lesions as follows:

Left gland and Left lung.....	9
Left gland and Right lung.....	5
Left gland and both lungs.....	7
Left Gland and Posterior Mediastinal Glands.....	4
Left Bronchial Posterior Mediastinal Glands and Liver.....	1
Left Bronchial Gland seat of only tubercular desopits in animal.....	2

28

In the 3 cases in which the Right Bronchial gland contained the tubercular deposits it was associated with disease in both lungs, in 2 cases and with lesions of the posterior pharyngeal glands only in 1 case. According to most writers the left Bronchial gland is the

one most frequently involved, this appears to be the case in the animals examined and even where all glands were involved the one situated near the left Bronchus usually contained the most marked deposits.

Tubercular changes in the lung tissue are frequently accompanied by infection of the Bronchial glands ; 98 of the cases having deposits in one or both lungs; in 9 cases the lungs were certainly free; the disease being distributed as follows :

All Bronchial and Posterior Mediastinal Glands.....	1
Left Bronchial and Posterior Mediastinal Glands.....	4
Left Bronchial and Posterior Mediastinal Glands and Liver.....	1
Right Bronchial and Posterior Pharyngeal Glands.....	1
Left Bronchial seat of only deposits present.....	2
	9

In every one of these cases a very thorough examination of the lungs was made, but macroscopically no changes were found that could be regarded as suspicious in character, neither thickening, injection or hepatization. Many of these cases had advanced deposits in the glands and even if very slight lesions of the lungs are conceded, the primary infection of the bronchial glands was evident.

In 58 of the cases the deposits were slight, that is the glands contained two or three very small nodules or one large one, averaging $\frac{1}{4}$ inch in diameter. In 30 cases the deposits were more marked and in 19 cases very bad; these latter were decidedly enlarged and diseased; on section, all glandular tissue had disappeared, caseous infiltration complete; none showed calcareous changes; the central portion of the larger glands was as a rule very soft, in many of the cases semi-fluid.

POSTERIOR MEDIASTINAL GLANDS.

These glands were diseased in 152 cases, in 9 they were the seat of the only tubercular deposits in the animal. They were associated in 134 cases with disease of the lungs. In 20 of these cases the glands and lungs contained the only deposits divided as follows:

Posterior Mediastinal Glands and both Lungs.....	7
Posterior Mediastinal Glands and Right Lung.....	10
Posterior Mediastinal Glands and Left Lung.....	3
	20

The Bronchial and Posterior Mediastinal Glands were alone diseased, in 5 cases; same and liver 1 case. Posterior Mediastinal Glands and udder only 1 case, [No. XXXVII]; Posterior Pharyngeal and Posterior Mediastinal Glands 1 case, [No. CXLVII]. The balance of the cases were in different combinations, several viscera involved in each case. As a rule the entire posterior chain was involved and frequently the tissue between the different glands was infiltrated with deposits as well. 34 of the cases had the deposits limited to the lower posterior gland only. In 10 the middle posterior glands had the only deposits visible; middle and upper posterior in 2 cases only; upper alone, 1 case. Extreme caudal gland of the posterior chain was frequently bifurcated at its upper extremity; in a few cases consisted of a single gland and again in several cases the separation into two distinct glands, lying side by side was distinct. The middle and upper posterior glands were not so severely diseased as the lower gland, showing that this latter was the most frequent site for tubercles in this chain of glands. Calcareous changes were more frequent in it and hyperplasia was greater, very few of these glands being of the usual size; a number were removed the size of a cow's kidney and one twice as large, weighing $5\frac{1}{2}$ pounds, [Autopsy No. CIV]. In many of the cases the infiltration and enlargement was so great that the space between the lungs was obliterated. These glands were slightly diseased in 52 cases, many of these being the cases where the glands alone were the seat of the deposit or Posterior Mediastinal Glands and one other organ or gland. 48 cases were more marked, as a rule some glandular tissue visible and deposits of moderate size. Extensive infiltration and hyperplasia in 52 cases; majority not smaller than a child's kidney; no glandular structure present; on section, marked calcification or central softening.

ANTERIOR MEDIASTINAL GLANDS.

Diseased in 10 cases, always associated with disease of posterior mediastinal glands, lungs or bronchial glands, and in 5 cases with pearl disease of costal pleurae. In many of the cases the pericardial sac was also diseased, and in 1 case [Autopsy No. IX] the infiltration was so extensive as to obliterate the sac and involve epicardium.

COSTAL PLEURAE.

Diseased in 22 cases; both sides 11, left only in 2 and right only in 9 cases. The deposit was very extensive in 9 cases, marked in 12 and slight in 1 case.

The deposit on the Right Pleura in 2 cases was the only demonstrable lesion and in these the masses were so large as to seriously impair the function of the lungs. These large masses nodular in character, were seen in several of the cases; on section, creak like cartilage, of a pearly-white color, with a number of a bright-yellow, caseous foci. Beside these, there were a number of pearly bodies, situated directly on the pleura or pedunculated. Numerous adhesions to the lungs, especially posteriorly and at apices. Where these membranes have had deposits the majority of the cases were extensively diseased animals, excepting the two cases where the large masses found just above the diaphragm were the only tubercular deposits. In the case examined by the writer, although a very careful examination of the organs was made, no other macroscopical lesions were demonstrable; in the second case, owing to a mistake in notification, the Pathologist was not present at the autopsy on the animal and there is simply the butcher's statement that it was the only evidence of disease present.

LYMPH GLANDS OF HEAD AND NECK.

It is stated that these glands are frequently the seat of primary infection; in the 206 cases examined in the Norristown herd but 14 of the cases had the Posterior or Retro-pharyngeal Glands diseased and but 11 had one or both Parotid Glands the seat of the disease; the disease was combined in these two in 9 of the cases. None had deposits alone in these glands—in nearly all of the cases they were associated with marked lesions in other portions, limited to Thoracic Viscera in 10 cases and combined with generalized disease in 6 cases. With exception of 3, the former all had lesions in several of the organs or glands; these three were combined as follows:

Posterior Pharyngeal and Posterior Mediastinal, slight disease.....	1
Posterior Pharyngeal very marked, Bronchial marked.....	1
Posterior Pharyngeal and Right Lung, slight.....	1

Of the different sets of lymphatic glands in the neck and head the posterior or retro-pharyngeal are said to be the most frequently diseased; this was the case also in the animals at Norristown. Although most of these glands are usually diseased, occasionally but one is involved [No. CXXVII]. Parotid Glands are rarely infected; primarily, 2 of the cases had the Parotid Glands and not the Posterior Pharyngeal diseased [No. CVI and No. CXLII]. In the first case the Right Parotid had one deposit and the disease was limited to the thoracic organs; deposits all more or less equally distributed. In the second case the disease was general and the Left Parotid contained three deposits; disease most marked in Lungs and Pelvic Viscera. This case may have been secondarily infected with tubercle bacilli discharged from softened foci in the lungs. Many of these glands were markedly enlarged, so much so that in most of the cases the size of the Pharynx was considerably diminished [Case No. XVI], and animals breathed with some difficulty. In two of the cases where posterior to retro-pharyngeal glands were involved the submaxillary also contained caseous foci [No. XXXV and CXXVIII]. These glands are rarely diseased and where they are the seat of deposits the posterior pharyngeal also are involved.

Thyroid Gland diseased in one case [No. XXXV].

MUSCLES.

There were evidences of deposits in 3 cases; 2 affecting the Psoas muscle left side and 1 the glands between the Pectoralis Major and Minor Muscles. In the former the deposits were situated directly in the muscle as well as covering the sheath—[No. IX and No. XXXV]. These were both marked cases, the disease being general in distribu-

tion. In the third case there were two small nodules in a gland situated between the Right Pectoralis Major and Minor Muscles [No. LXX]. In this case the thoracic viscera and liver were involved.

LIVER.

Diseased in 38 cases. In two of these cases the liver and hepatic glands were seat of only tubercular lesions demonstrable [No. XI and No. XLVI]. Liver (including hepatic glands) associated with general disease in 13 cases; with thoracic disease alone in 21; with thoracic viscera and glands of head and neck 2, and with hepatic glands seat of only deposit 2. In two of the cases where liver and thoracic viscera were involved the lesions were confined to liver and posterior mediastinal glands 1 case; Liver and Left Lung 1 case. The deposits in the liver were slight in 21 cases, more marked in 11 and very extensive in 6 cases in the latter, involving an entire lobe at least and in several cases all lobes. The largest liver removed weighed 48 pounds; it was 25x17x7 inches and was completely infiltrated with nodules of various sizes; the central portion consisting of a large abscess cavity [No. V]. In 25 cases disease of the liver was associated with deposits in the Hepatic glands.

HEPATIC GLANDS.

Diseased in 28 cases; associated with deposits in the liver in 25 and alone in 3. In these latter there were no other deposits in the abdominal viscera, the disease being more or less marked in thoracic organs. In 7 of the cases there were diseased foci in the Mesenteric Glands as well. The deposits in the Hepatic Glands were slight in 6, more marked in 16 and very extensive in 6 cases.

SPLEEN.

Tubercular deposits in 5 cases, situated as a rule in parenchyma of organ; all were slight and the cases were all generalized ones.

INTESTINES.

Tuberculosis of the intestines is rare and the number of animals having worm nodules of the intestines renders its diagnosis difficult in many of the cases. Of the 206 animals examined in the Norristown herd the majority had these worm nodules. No mention has been made of them in the autopsy notes except where there was a question as to the true character of the deposit. Of the 7 cases considered tubercular, 6 were associated with caseous foci in the mesenteric glands and 1 with deposits in the omentum (Caul). In No. XXXV and No. CXXXII, there was no question as to the accuracy of the diagnosis. In the former the ulcers in the lower part of the ileum being typical and surrounding them a number of miliary deposits. In the latter case the similarity between the deposits on the pia-archnoid and those in the intestines together with the foci in the other viscera indicated the acute miliary character of the disease. In case, No. XX, the deposits were grouped together close to mesenteric attachment and on section, were similar in appearance to those in the mesenteric glands, only slightly larger. In this case the large intestines were studded with worm nodules, these were all small, sharply defined and calcified. In No. XXXII, there was a single deposit close to mesenteric attachment, 1 inch in diameter; on section, centre soft and cheesy, similar in character to the deposits in mesenteric glands, only larger. The other small deposits on the intestine microscopically did not show a tubercular character.

No. IX.—The deposits in the intestine in this case were similar to same sized ones in many of the abdominal organs and glands. The majority of these were pin-head in size, firm, gray-white in color; microscopically undoubted miliary tubercles.

No. X.—There were but a few deposits in this case; some of these were indistinctly defined and the tissue in immediate neighborhood was thickened. Microscopically two of these smaller deposits showed the characteristic histological structure of a tubercle; the others did not, being worm nodules.

No. XC.—On intestines one deposit only, $\frac{1}{4}$ inch in diameter, centre soft and cheesy, shading out gradually to periphery, which is firmer and granular. There were no other nodules on the intestines in this case. The deposits in the omentum were similar to the one on the wall of the intestines, macro-and microscopically.

MESENTERIC GLANDS.

Diseased in 10 cases, associated with disease of hepatic glands in 7 cases and with deposits in the intestines in 6 cases. The deposits were slight in 1, more marked in 3 and very extensive in 6 cases; they were all undoubtedly tubercular in character and associated with generalized disease in the majority of the cases.

LUMBAR AND INGUINAL GLANDS.

Lumbar glands involved in 2 cases [No. III and No. IX]. In both cases deposits were disseminated throughout the body. Inguinal glands involved in 1 case [No. IX.]

KIDNEYS AND RENAL GLANDS.

Renal glands diseased in 6 cases; 2 marked cases, balance extensively diseased; associated with tubercular deposit in kidney, in 1 case.

OMENTUM (CAUL.)

Omentum (Caul) diseased in 9 cases; associated with disease of abdominal peritoneum in 2 cases; 4 of these had marked deposits, the other 4 were slightly diseased, i. e. they had one large or several small deposits; a few of these nodules were pedunculated; majority situated directly in omental structure. In the 2 cases where the abdominal peritoneum was also involved, one case was associated with marked deposit on the parietal peritoneum [No. IX] the other had four small deposits situated on under surface of diaphragm [No. LXXI], where the peritoneum is reflected.

PARIETAL PERITONEUM.

Diseased in 7 cases, associated with disease of omentum in 1 case; with deposits on posterior surface of Rumen, 1 case with posterior surface of Rumen and omentum as well 1 case; the other 4 had the parietal with peritoneum involved, associated with disease of other organs.

RUMEN.

Seat of deposits in 6 cases, 4 alone combined with visceral disease, 1 Rumen and parietal peritoneum, 1 Rumen, parietal peritoneum and omentum. The deposits as a rule were single, varying from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter and situated beneath the peritoneal covering posteriorly none of them involved the inner wall of the Rumen. They were all markedly soft and caseous in the centre, shading gradually to a firmer periphery. The tissue in the neighborhood of these deposits was carefully examined for nails or other foreign bodies, but they were never demonstrable. With exception of one case the animals having the deposits on the posterior surface of the Rumen had both abdominal and thoracic lesions. This case, No. LIV, had marked deposits in Right lung and posterior mediastinal glands, and but a single deposit, $\frac{1}{2}$ inch in diameter on posterior surface of Rumen.

SUPRA-RENAL CAPSULES.

Although all the cases were carefully examined, but a single one was found where deposits were demonstrable in these glands; this was No. XXXV, a very badly diseased Jersey bull, 3 years old. The left supra-renal capsule was the seat of a number of caseous foci, averaging $\frac{1}{2}$ inch in diameter. The renal glands, Psoas muscle left side, and a number of the abdominal viscera and glands were involved as well, indicating plainly the method of infection.

UTERUS AND APPENDAGES.

Three cases only were found that had tubercular deposits; in Autopsy No. III, reference is made to a large cyst of left ovary but microscopically no evidences of tubercular disease were found. In the first case [No. IX] the uterus, ovaries and Fallopian tubes were markedly diseased, infiltration and caseation being extensive; this animal had been sterile for over three years. In the second case [No. CLVI] Left horn of uterus was extensively infiltrated; Left ovary caseous throughout. No personal history of this animal obtainable. In the third case [No. CXXXV] Left ovary was the seat of a large cyst; on section, some ovarian tissue at the bottom of cyst, very soft, cheesy and irregularly defined.

The generative organs of the bulls were also inspected carefully, but there were no lesions appreciable of any kind whatever.

UDDER AND GLANDS.

Udder diseased in 3 cases, associated with disease of glands in 1 case. In one of these cases [No. XXXVII] the udder and posterior mediastinal glands were the seat of only tubercular deposits in the body. This case is especially interesting from the fact that the deposits in the udder were more advanced than those in the posterior mediastinal glands. The deposits involved both the anterior and posterior segments Left side—those in anterior being much older and the central portions broken down considerably. The affected part was uniformly enlarged and much firmer than usual. According to statement of herdsman this animal had not given any milk from the anterior segment left side for some time. The second animal [No. IX] has already been referred to as a badly diseased cow, aged 8 years. She had several small deposits in left posterior segment and glands contained two small foci. The third case [No. CXXXVIII] had a number of firm, yellow nodules in the left posterior segment; this animal had the udder enlarged but otherwise no evidence of disease. The herdsman stated that this animal had given milk from three segments only for some time.

TABLE XXVI.
SUMMARY OF DISEASE IN HERD.

Total number of animals examined	206
“ “ of animals infected (82.52 per cent.)	170
“ “ in which disease was general.....	53
“ “ having thoracic lesions only.....	114
“ “ having abdominal lesions only	3
Number in which Lungs were diseased.....	133
“ in which Lungs only were diseased.....	5
“ in which Bronchial Glands were diseased	107
“ in which Bronchial Glands alone were diseased	2
“ in which Posterior Mediastinal Glands were affected.....	152
“ in which Posterior Mediastinal Glands alone were affected.....	9
“ in which Posterior Mediastinal Glands and Lungs contained only deposits...	20
“ in which Anterior Mediastinal Glands were diseased.....	10
“ in which Costal Pleurae was diseased	22
“ in which Costal Pleurae was seat of only deposit.....	2
“ in which Glands of Head and Neck were diseased	16
“ in which Glands of Head and Neck were associated with thoracic disease only.....	10
“ in which Glands of Head and Neck were associated with generalized lesions	6
“ having Liver diseased.....	38
“ having Hepatic Glands diseased.....	28
“ in which Hepatic Glands and Liver were associated.....	25
“ in which Liver and Hepatic Glands were seat of only deposit in animal.	2
“ in which Spleen was diseased.....	5
“ in which Intestines were diseased.....	7
“ having Intestinal deposits associated with lesions of Mesenteric Glands.....	6
Mesenteric Glands, affected in	10
Number in which Mesenteric and Hepatic Glands were associated.....	7
“ in which other abdominal glands were diseased.....	6
“ in which Kidney or Renal Glands were diseased	6
“ in which Serous Membranes were diseased....	18
“ in which Uterus or Appendages were diseased.....	3
“ in which Udder was diseased.....	3
“ in which disease of Udder was associated with disease of Pubic Glands.....	1
“ in which Muscles, or glands between, were involved.....	3
“ in which Supra-Renal Capsule diseased.....	1
“ in which Thyroid Gland seat of deposit.....	1



1.



2.

TUBERCULOSIS.

Section of Left Lung—Lower lobe, (slightly enlarged), containing tubercular nodules in the From Cow No. 96—Asylum Herd.

TABLE XXVII.
SOUND ANIMALS.

Date of Autopsy.	Animals.	Examination No.	Remarks.
May 14, 1894.	Common cow.	No. 197.	Never examined with Tuberculin.
July 24, "	Mixed Jersey cow.	" 125.	See Table IX.
Sept. 17, "	Common "	" 134.	" " XV.
Nov. 23, "	" "	" 146.	" " XVIII.
Dec. 14, "	Grade Holstein "	" 140.	" " "
" 17, "	Common "	" 148.	" " "
" 20, "	Mixed Jersey "	" 164.	" " XIX.
" 24, "	Common "	" 118.	" " X.
" 29, "	Grade Holstein "	" 142.	" " XVIII.
" 31, "	Mixed Jersey "	" 158.	" " "
Jan'y 12, 1895.	Holstein bull.	" 141.	" " XIX.
" " "	Holstein heifer.	" 161.	" " "

TABLE XXVIII.
PARENTAGE OF YOUNG ANIMALS.

Case No. Young Animal.	Age.	Condition.	Bull.	Condition.	Case No. of Cow.	Condition.
55	2 years.	Tubercular.	Prince David.	Tubercular.	39	Tubercular.
54	2½ "	"	" "	"	143	"
141	1 "	Sound.	" "	"	143	"
103	2 "	Tubercular.	" "	"	39	"
76	3 "	"	" "	"	430	Unknown.
162	1½ "	"	" "	"	189	Tubercular.
53	2 "	"	Prince James.	Sound.	44	"
161	1 "	Sound.	" "	"	40	"
127	1 "	Tubercular.	" "	"	192	"
160	1½ "	"	" "	"	42	"
108	1 "	"	" "	"	139	"
110	1½ "	"	" "	"	45	"
111	11 mos.	"	" "	"	121	"
65	2½ years.	"	No Shirk.	Unknown.	137	"
126	2 "	"	Hotspur.	"	40	"
178	7 mos.	Sound.	106	Tubercular.	47	"
177	4 "	"	106	"	120	"
176	8 "	"	Prince James.	Sound.	137	"
175	6 "	"	" "	"	41	"
172	3 "	"	" "	"	45	"
171	3 "	"	106	Tubercular.	138	"
168	2 "	"	106	"	42	"

For dates of autopsies on young animals, injected with Tuberculin, June 21st, 1894, and pronounced sound, when killed, see Table XIV. Besides these in the original number May 1st, 1894, there were 9 calves, these were all too young to test; they were killed at various dates during June and July, and pronounced sound. During the summer several calves were born on the place, these have not been included in the numbers given, excepting one born in June. They were chiefly common calves, living on the place but a short time, and when killed were found to be perfectly sound.

SUMMARY.

Animals having Tubercular Lesions.....	170
Sound animals, 1 year and over.....	12
Young stock (injected with Turberculin once only).....	15
Calves, never tested.....	9
	206

In the calves and young animals the mesenteric glands were almost invariably larger than is usual and in many cases much softer. Beside these the posterior mediastinal chain of glands were also frequently enlarged. The lungs poorly inflated and pale. Microscopically no evidence of disease. This enlarged condition of the lymphatic glands was noticeable in all the young animals, but was especially marked in the Holsteins and Grade Holsteins. During the autopsies quite a number of embryoes were removed, in varying stages of development; these were examined but no lesions noted except that the glands were also enlarged and soft.

In the animals examined at the Hospital there were none that gave positive evidence of the direct transmission of tuberculosis from mother to off-spring; in the embryoes no lesions were found macro- or microscopically. The only case in which there was doubt as to the mode of infection and which might be considered congenital by some, was in case of No. 196; autopsy No. 169; common calf, three weeks old. The mother No. 34 had been condemned by physical examination and was placed with four others similarly condemned in a small shed, some distance from stables proper, designated "suspect barn." Here she gave birth to a weak, miserable calf. Shortly afterward she was injected with tuberculin; this was done, as already stated, to compare the two methods of examination. See Table XII for the results of the tuberculin injection and No. XXXVI for autopsy notes of case. The calf spent the greater part of its existence in the suspect stable and was fed chiefly by the mother. It was killed when three weeks old as it did not seem to be thriving and the autopsy showed a caseous focus in the lower posterior mediastinal gland—see No. CLXIX. The upper glands were enlarged as were also the mesenteric, but these were not diseased. Development and caseation of a deposit of this size in three weeks would be remarkably rapid, but some allowance may be made for the environment and for the health of the mother. The lowered vitality of the cow coincident with the drain that pregnancy is on the system undoubtedly affected the young animal in utero; insufficiently nourished the tissues are not endowed with the resistance that is necessary for the successful combat with diseased germs; especially when the young animal takes its place in a stable where the air is more or less vitiated at all times by a number of badly tubercular cattle. Then, too, in the earlier days of its life this animal was nourished by the milk of its mother and if this

milk was impure there was another factor added to the many extant which caused its infection.

The animals in the suspect stable were all markedly diseased. They were examined physically by Dr. Bridge, prior to the tuberculin injections and were removed to this building at once, where they remained until killed. During the summer several of these animals underwent treatment—so-called cures for Bovine Tuberculosis—but the results obtained were not of such a character as to be of any importance. That the failures in the treatment might not be considered due to tuberculin, animals were selected indiscriminately from the injected and noninjected.

It has been noted with some surprise that the young animals have been, as a rule, among those most markedly diseased, differing somewhat from the observations of others that the disease increases in frequency with age of animal. That such a large percentage of young animals were diseased in this herd is undoubtedly due in part to the transmission of some taint from generation to generation that rendered their tissues readily susceptible to the germ of tuberculosis. In-breeding may also be a factor in this, intensifying, as it often does, personal and family characteristics. In-bred as well as high-bred families are supposed to be peculiarly susceptible to tuberculosis. These young animals were kept under fairly good hygienic surroundings, spending most of their time in the new stable, where the ventilation was good; light, especially sun-light, entering readily and everything done that was possible to promote cleanliness and comfort of animals. Notwithstanding this there must have been more or less contamination of the air. One must remember also that a couple of badly diseased animals in time can infect a large number. Still these young animals might have withstood the germ longer if their tissues had been better and their powers of resistance greater. It has been possible to trace the family history in the following cases only:

Case No. 143 had two calves by same bull—No. 54 and No. 141. The first was markedly diseased and the probability is that if the other had lived to the same age it too would have succumbed to the disease, providing the environment were the same. At the autopsy the lymphatic glands were all enlarged, soft and pale; the lungs poorly inflated, very firm and pale. No. 162—see Table XVIII relative to reaction to tuberculin and also the likelihood of a very recent infection. No. 137 was undoubtedly sound when she gave birth to No. 65, see Table XX. No. Shirk, as far as can be ascertained, was also free from disease when killed. Then, too, the diseased processes in No. 65 hardly date back 2½ years—see Autopsy No. XCVII. No. 126, very slightly diseased, see Table XII, also Autopsy Notes, No. CLXVI.

Table XXIX gives the amount of disease in the animals reacting to 107° and over after injection of tuberculin; and it will be seen that in these cases at least there was no relation between the amount of disease and temperature. No 64 reacted decidedly, having a temperature of 108.4° following injection of tuberculin, and at the autopsy was markedly diseased. This was also the case with the animals having a temperature of 108° and over, excepting No. 27 which was slightly diseased. In ages these animals ranged from 8 months to 19 years; the majority being under 8 years. Of the 32 cases considered in this table 8 were 3 years and under; 18 were between 3 and 8 years and 6 were over 8 years of age.

Table No XXX gives the relation of condemned and sound animals to the different stables. It is similar to Table No IV, which considers the animals condemned and sound at the first examination. Table XXX contains therefore the final summary of animals in these stables and it will be seen that out of 108 animals in the old stable 102 were condemned; of 68 in the new stable 63 were condemned, and of the 6 in the box stalls but one escaped; viz, the Mixed Jersey already referred to as being one of those on the place less than a month. From this table it will be noted that the disease was about equally distributed in the two stables. In the old stable were common cows chiefly; these are not supposed to be as susceptible to tuberculosis as the finer bred animals, but their environment must be considered. From the autopsy records it will be seen that some of the old stable animals were markedly affected and it is a well-known fact that one or two badly diseased animals in time can infect a large number of others, especially if the ventilation is poor and the animals are crowded; and if to these factors one adds susceptible animals, it is not surprising that a large number of animals succumb to tuberculosis. In the new stable the animals were not crowded, and the ventilation was good, yet a large percentage were condemned; here were kept the finer bred animals and Grades. From observations made at the autopsies and elsewhere it appears likely that many of these animals had tissues with little resisting powers—especially when they were daily exposed to Tubercle Bacilli. These may be the result of close in-breeding or the poor physical condition of their ancestors.

In considering the time the different animals have been on the place it is seen that the longer the period of residence the greater the number diseased. In examining the autopsy records the shorter the period of residence the fewer the tubercular lesions present (excepting of course those animals raised on the place 82) animals in the old herd, of these 3 escaped condemnation; 49 bought in 1893, 5 were sound; of the 10 bought in 1894, 1 was condemned in June and the balance October 30th or at the time of autopsy. None of these cases had marked lesions and judging from the appearance and number of deposits present they probably all originated during the summer.

Leaving out of consideration the 24 animals all under 8 months of age, 93.40 per cent. of the animals in the stables were condemned; counting the 24, 82.52 per cent. were tubercular. This included cases having but a single deposit, pin-point in size, and animals so markedly diseased that it was difficult to see how they ever lived without giving some physical signs of disease. It was frequently noted that many of the worst cases appeared ante-mortem in better physical condition than animals having but a deposit or two.

TABLE XXX.

FINAL NUMBER CONDEMNED AND SOUND IN EACH STABLE.

Breed.	Stable.	Old Herd.		1893.		1894.		Raised.		Total Number of each Breed.	Total Number Condemned.
		Condemned.	Sound.	Condemned.	Sound.	Condemned.	Sound.	Condemned.	Sound.		
I.—Common.....	Old Stable.	40	3	29	2	7	82	77
	Box Stalls.	1	.....	.....	.....	.....	.....	.....	.....
II.—Holstein	New Stable.	23	1	13	2	43	41
	Old Stable.	.....	.....	.....	.....	.....	.....	2	.....	
	Box Stalls.	.....	.....	1	.....	.....	.....	1	.....	
III.—Grade Holstein.	New Stable.	1	2	1	18	1	25	23
	Old Stable.	1	.....	.....	.....	.....	.....	.....	.....
	Box Stalls.	.....	.....	.....	.....	.....	.....	1	.....	
IV.—Jersey	New Stable.	2	3	10	10
	Old Stable.	.....	.....	.....	.....	.....	.....	.....	.....
V.—Mixed Jersey.....	New Stable.	1	1	14	11
	Old Stable.	.....	.....	7	1	1	.....	.....	.....
	Box Stalls.	2	13	13	12	12	13	1	.....	
VI.—Mixed Durham.	Old Stable.	8	8
		
		79	3	107	1	107	9	38	3	182	170

15 young animals sound and 9 calves untested..... 24

Total.....206

A brief summary will be given of the final results obtained from the examination of the animals at the State Hospital for the Insane.

I. Of 206 animals on the place May 1st, 1894, 170 were pronounced tubercular on post-mortem examination between May 4th, 1894, and March 5th, 1895.

II. Of the 170 tubercular animals 129 were condemned following injection of tuberculin; 13 by physical examination and the balance declared diseased at autopsy.

III. Of the 28 declared tubercular at the post-mortem examination 6 failed to respond to the tuberculin test; these have already been

referred to [Nos. 121; 136; 160; 165; 156; 137]. The other 22 cases were all slightly diseased ones and the probability is that the foci present developed in the time elapsing between examination and autopsy.

IV. There was not a single case of an animal reacting to tuberculin but that tubercular lesions were found post-mortem, except in one or two cases where the cause was explainable; these animals were all re-tested before being condemned—[Tables VIII, X and XII].

V. Few if any, of the cases had a rise in temperature until 8 hours after injection; the majority (93) did not commence to react for 10 hours.

VI. 33.33 per cent. of the cases reached maximum temperature in 13 hours; earliest period 4 cases, 10 hours, and latest, 1 case only 18 hours.

VII. The higher the reaction the sooner it occurred in the majority of the cases.

VIII. Each animal was considered separately; the reaction estimated according to the average temperature before injecting; and a reaction of at least 2° was considered necessary before condemnation.

IX. No relation between temperature and amount of disease was noted.

X. Tuberculosis in this herd did not increase with age of animals the young Holsteins, Jerseys and Grades being the most markedly diseased. Also their reaction to the tuberculin in these young animals was frequently highest.

In conclusion it is only necessary to state that from observations made on the cases in the State Hospital herd, tuberculin is to be recommended as a very valuable aid in diagnosing tuberculosis in cattle. Infallibility is not claimed, but by its means in the hands of one who understands its proper application and in connection with a careful physical examination the majority of tubercular animals can be removed from a herd and the danger from the use of the products of such animals reduced to a minimum.

During the summer those interested in the subject of Bovine Tuberculosis were given opportunities to witness the autopsies on the condemned animals and it was endeavored to make the cases of as much benefit to the community as possible.

Following examination of the animals all the stables were carefully cleaned and disinfected; among solutions of bi-chloride of mercury as well as iron and lime were used. The stables have been unoccupied.

up to the present time: the doors and windows have been open as much as possible, air and light entering readily. All rodents have been killed and the stalls and floors have been repeatedly disinfected and flushed with water. It is hoped by these means that any remaining germs will be eradicated and the stables prepared for future occupancy.

Thanks are due to Dr. Francis Bridge, State Veterinarian, for the original temperature charts, and to Mr. Thomas J. Edge, Secretary of the State Board of Agriculture, and Dr. Leonard V. Pearson, Veterinary Department, University of Pennsylvania, for much valuable information on Bovine Tuberculosis, which has aided materially in the compilation of this report.

EXPLANATION OF THE SIGNS.

— Slightly diseased ; a single deposit or a few small ones ; in early stages.

0 Markedly diseased ; large number of small deposits in early stage or several large ones in later stages.

+ Extensively diseased ; infiltration and caseation marked ; portions of or entire organ involved.

ERRATA.

P. 10—line 21 from top—for “but” read “both”

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