

MISSOURI
AGRICULTURAL COLLEGE
EXPERIMENT STATION.

BULLETIN NO. 3.

GENERALITIES AND EXPERIMENTS IN SPAYING CATTLE.

(TO BE CONTINUED.)

APPENDIX ON GLANDERS.

BY

PAUL PAQUIN, M. D., M. V.

Mo. State Veterinarian, etc.

Copies sent on application to
S. C. YEAMAN, Sec'y.
Columbia, Mo.

BULLETIN NO. 3.

MISSOURI AGRICULTURAL COLLEGE

EXPERIMENT STATION.

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W. POPE YEAMAN, LL. D.,

*President Board of Curators State University and Agricultural
College, Columbia, Mo. :*

Dear Sir :

I have the honor to present you and the public the results of some observations and experiments continued under the auspices of the Missouri Agricultural Experiment Station in my capacity of its Veterinarian.

While this bulletin may be uninteresting to some, it presents new information not easily accessible without long and costly experimental work. It must not be thought that I aim to teach stockmen to be their own surgeons; I only wish to present facts gathered by actual practice, showing the financial value of spaying, the conditions under which it should be done and the best and most economical method to adopt. The numerous inquiring letters I have received on the subject from stockmen and farmers, in my capacity of State Veterinarian, and on the other hand live stock journals, have fully convinced me that the question of spaying is one which those interested want searched and discussed for the benefit of all. It is a long felt want.

SPAYING. *

In bovines (cattle) this operation is performed for two special purposes, viz. : The production of what I will call *steer beef* for convenience sake (and to set the analogy between it and true steer meat); and, secondly, the long continuation of the production of

* Methodical experiments on spaying, taking into account weight before spaying and the various breeds and kinds of feed, will be carried on we expect at the station for a year or more. This bulletin is in reference to stock not over two years.

milk. In the western countries it is at present for the production of beef. Hence, in this bulletin, I shall confine myself to this question.

WHY IT SHOULD BE PERFORMED.

The country is overstocked with scrub cattle. The scrub bulls are castrated every year and make good beef and sell at a good profit. But the scrub heifers, unfortunately, are either bred or sold for barely the cost of raising them two or three years.

In spaying heifers then, we may accomplish two things of financial value to owners and the country at large, viz. : Diminish if not end the production of scrub cattle, (thereby gradually influencing the raising of better stock); and second, the transformation of practically valueless heifers into valuable beasts of market.

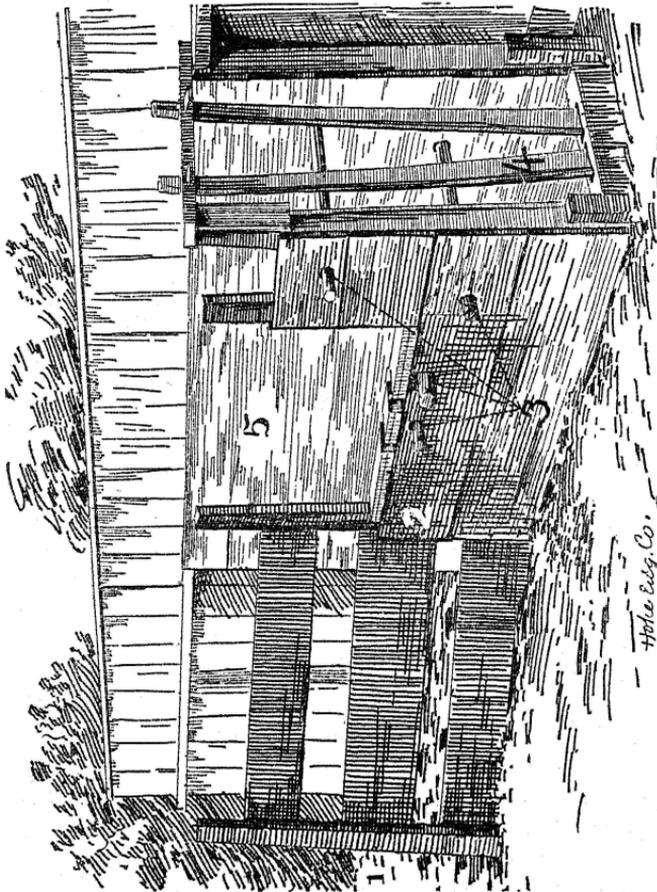
It is true that at present spayed heifers though they sell incomparably better than open ones, do not yet command quite the price of steers. This it would seem is because they are not what is termed export cattle. But should the country universally spay surplus heifers, and spay young to afford them better and longer opportunity to grow larger and heavier, and thus make to some extent standard beef subjects, why should they not become export cattle? Practical stockmen may see some obstacles in the way with which I am unacquainted. But it seems to me that the quality and increase of weight of spayed heifers would tend to that result.

Export or no export, however, the facts herein related demonstrate to me that it is advisable to spay even in the present condition of live stock markets.

METHODS OF OPERATION.

Of the three modes of spaying, only one deserves explanation for the task at hand. That is the one BY THE FLANK. The other two methods I will only mention briefly. One is by the vagina (canal going to the womb) and is practicable only at a certain age. It is especially useful in spaying milch cows. The other is by making an incision through the abdomen (belly) a few inches in front of the udder directly in the median line. To perform this way, the heifer's hind legs are lifted high above the operator's head by means of pulleys or a long lever attached to a beam or something else, and ropes fastened below the hock or about the ankles. This method necessitates tight suture of the wound on account of the pressure and weight of the bowels upon it when the animal regains its feet. There results too often from this an inflammation—hence, exudation in the body and frequently death. If sutures are not tight a rupture is often the result making an ugly enlargement.

SPAYING BY THE FLANK.—I cannot here give all the reasons why this method is the most successful if properly adhered to. Having spayed in the three ways mentioned, under a variety of circumstances at owner's homes, I have come to the conclusion that for heifers it is superior to others. This is emphasized by the usual condition of existence of heifers and their surroundings and care in the west. Under the section entitled "Success and Failures" will be found the conditions necessary for the best results.



Hole Eddy Co.

Figure 2. Spaying Chute or Stall with Stanchion.

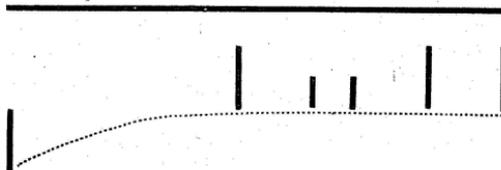
1. Entrance of the chute.
2. Third long post.
3. Four bars to hold animal.
4. Stanchion bars that close on the neck.
5. Fence forming left side of chute.

A. *How to hold heifers.*—This point should never be neglected. Heifers thrown roughly or badly held exhaust their breathing, causes bruises and the operation is unnecessarily long, painful and dangerous. In figure 2 will be seen the representation of a chute that I improvised to spay heifers at the laboratory. It is simple and may be constructed by any one. If new lumber be used it will cost about seventy-five cents.

The above chute was constructed as follows :

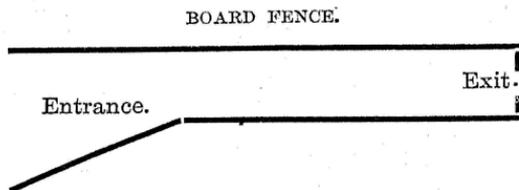
I chose a place by the side of a high board fence (with planks closely joined and perpendicular). This fence constitutes the left side of the chute. (The side of a building solid and without holes or cracks would do as well.) Now at two feet three inches from this fence are set solidly into the ground all in a line, three sound posts about five and one-half feet above the surface. Further to the left is another post of same length, but about four or five feet from the fence. Between the second and third posts are set two short ones coming only two feet and four inches above ground. Thus in facing the fence the appearance of the posts planted is as this diagram shows—the long dashes representing the long posts and the short dashes the two short ones :

BOARD FENCE.



The distance between the first and second long posts is two feet four inches; from the second to the third long post, four feet two inches; and from the third and fourth long posts, six feet. The two short posts are about equal distances between the second and third long ones. Those posts are closely boarded, both sides, from the first to the third long posts, and only three planks inside from the third long to the last.

Thus the boarded chute gives the following diagram of its ground plan :



As will be seen in figure two the boarding varies in height from the first to the last post. Between the two first long ones it goes to about the top of the posts; between the second and third long ones it goes as high as the short posts only, or two feet four inches high, whilst the third to the fourth have three or four planks inside in the manner given above.

At the exit or right end of the chute is a station made of two oak bars set four inches apart, with bolts in a solid base. Both bars are movable and open large. When closed they look as follows :

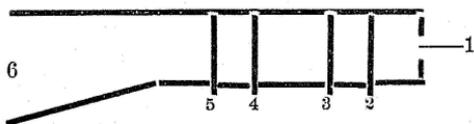


and when open look thus :



The stanchion is to close on the neck during the operation, and when this is over with, it is opened and the calf passes through.

The cross bars that hold the subject in position (without any injury) are four in number. One above and close to the neck, one behind the front legs to support the chest, one across the belly in front of the hind legs, and one just behind the hind legs opposite the thighs. The ground plan of the chute with the bars looks thus :



No. 1 points to the stanchion and exit; No. 2, the bar above the neck; No. 3, the bar across the chest behind the front legs; No. 4, the bar across the belly in front of the hind legs, and No. 5, the bar behind the hind legs; No. 6, the entrance. The two last bars are on a level with one another. To get the exact position of the bars we placed a two-year-old heifer in position and marked with pencil the places where the holes should be, and then we put a yearling and did likewise. Thus two sets of holes were made for

the bars—one for large and the other for smaller stock. The bars are so situated as to press on the body firmly. *

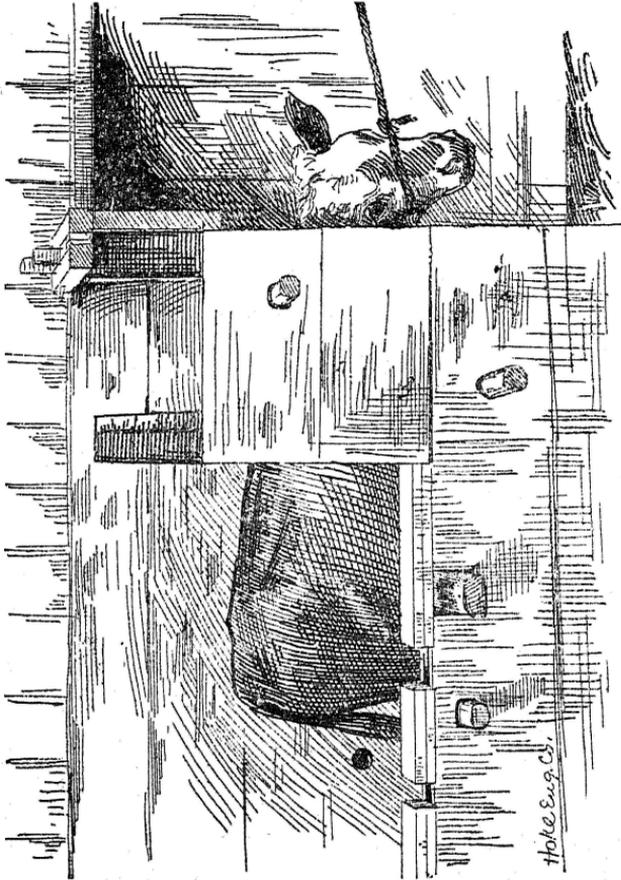


Figure 3. Calf in Stall Ready for the Operation.

B. The bars being pulled out, the heifer is driven into the stall, secured in the stanchion and the bars

*NOTE.—This chute is made to spay on the right flank. For left flank reverse the construction all through.

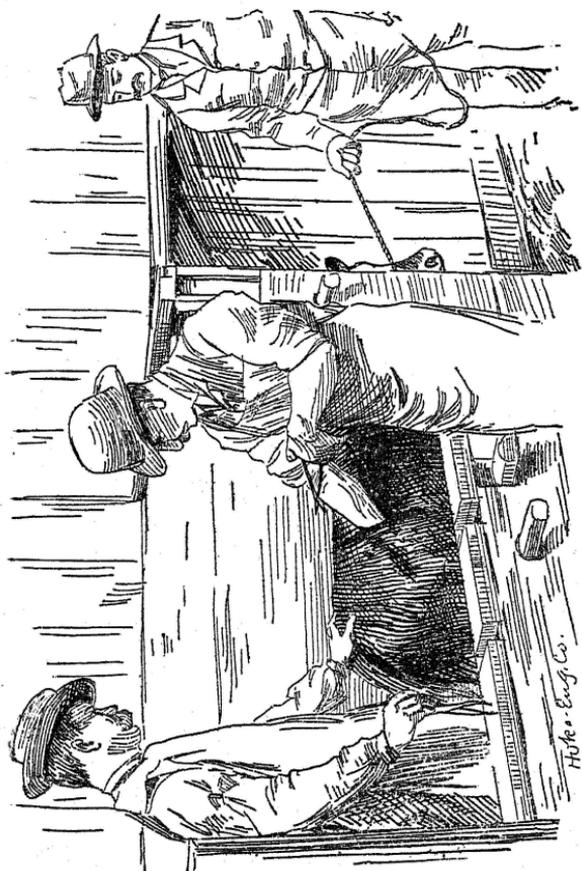
put back in position. The head and tail are held firmly by helpers. Then comes the surgical part.

1st. The surgeon has handy a pair of shears, a keen-edged knife, (Farmer Miles' Spaying Knife preferred) curved blade scissors about ten or twelve inches long, heavy curved spaying needles and heavy thread—say waxed hemp. He gets a space sheared three inches wide and five or six inches long, beginning in the middle and at the top of the flank going downwards. Then an incision is made steadily through the skin and muscles from the top of the flank, about equal distance between the last rib and the hip bone, extending down between three and one-half to four and one-half inches long. Frequently the operator cuts blood vessels which spurt lively, but soon stop when the wound is closed.



Figure 4. Incision in the Right Flank.

The muscles being cut through there remains the peritoneum (lining membrane of the abdomen) to be punctured and torn open before the hand can penetrate and get in contact with the viscera. This is done with the finger nails or very carefully with the knife.



*Figure 5. Right Hand in the Body Searching for the Ovaries.
Long Curved Scissors in the Left Hand.*

2d. Now in spaying in the right side the right hand is oiled with carbolized oil, inserted into the body and finds the ovaries (so-called female prides) hanging each side of the rectum (last gut). These being held one after another, the left hand introduces the long scissors and cuts them off one by one.

The ovaries are found to vary in size from that of a small pecan nut to that of a shelled English walnut

and even larger. They feel dense and much like male testicles.

3d. The lips of the wound are drawn loosely together by suture, through skin and muscles, leaving a small aperture at the lower point to allow flow of matter. *

SUCCESS AND FAILURES.

There may be total failures caused by death; partial failures caused by general sickness, abscesses, fistulas, bruises and injuries of various kinds; and another sort of partial failures due to heifers coming in heat or even getting with calf after the operation. Therefore, to obtain the BEST POSSIBLE results the following conditions should be respected :

1st. Spay the animals young—four, five, six or eight months old. Before three months the ovaries are not always sufficiently developed.

2d. Be sure that the heifers have not been served.

3d. Pen up the animals the day before and leave them some hours without food or water—say all night.

4th. Have ready, a strong common sense chute or stall. See Fig. 2.

5th. Avoid running down and exhausting the subjects.

6th. Do not allow spayed heifers to go out at once in a cold rain, especially if they have had the misfortune of being heated.

* NOTE.—There are many fine details of the operation more or less useful to operators and too long and technical to enumerate here. Cattle with large paunch should always be spayed in the right flank. Either side for the young animal.

7th. The operation should not be undertaken in dark ignorance. One should study first the anatomy of the parts. Avoidable errors are sometimes committed by those who get excited from want of knowledge.

8th. A bull should not be allowed with spayed heifers before one or two weeks after the operation.

9th. Pay attention to the wounds after the operation and keep clean.

It occurs sometimes that a spayed heifer gives signs of being in heat or accepts the male. This heat is also shown in the steer even more frequently. Neither occurrence, however, is sufficiently pronounced or common to be an objection to spaying or castration.

Sometimes also, but very rarely, a spayed heifer gives birth to a calf. This may be due to a mistake in spaying, or the fact that the female was already pregnant from a recent covering, or possibly became pregnant from a covering soon after the operation in a case where eggs (or ova) had gone to the womb—having left the ovaries before these had been cut off.

This remarkable thing is not more so than that of males which have successfully covered soon after castration.

However, in certain conditions, a mistake may be unconsciously made by the best of operators and a heifer fail to become sterile. This is extremely rare.

A FEW STATISTICS.

This is a brief exposition of various cases under a variety of circumstances and conditions, given for the purpose of showing the best conditions and best method of operation as well as the bad ones, and the financial gains or losses, according to the means employed.

| Year. | Season. | No. of cases. | Operator. | Method. | Deaths reported. | Remarks. |
|-------|------------------------|---------------|---------------------------|-----------|------------------|--|
| 1887 | Fall (Sept. & Oct.) | 120 | P. Paquin.. | Flank.... | Six.... | The deaths occurred in those exposed to a cold severe rainy weather immediately after operation. They had all been more or less seriously run and heated and bruised—having then no stall. Operated under good circumstances. One case was found with calf during the operation. Suture of the wound had to be made tight. Inflammation set in. Operation done in stall and in good condition. Death due to neglect of the wound and allowing access to flies. Operation under good circumstances. |
| 1887 | November.... | 13 | P. Paquin.. | Flank.... | None... | |
| 1887 | Spring and fall. | 50 | P. Paquin.. | Belly.... | Five.... | |
| 1888 | Spring..... | 95 | P. Paquin.. | Flank.... | None... | |
| 1888 | Spring..... | 150 | T. J. Turn'r (Mexico.) | Flank.... | One.... | |

Now it will be seen by the above that the conditions attendant on the operation are solely responsible for the deaths. Of the two hundred and fifty-eight spayed by the flank in proper condition only one death occurred and this through neglect of the wound by the proprietor. On the other hand, there were eleven deaths of the one hundred and seventy spayed under adverse conditions—including the fifty spayed by the belly. I might give over two hundred more cases spayed by the flank in good condition and not a single death occurred. Indeed, with a chute and under favorable circumstances, I have sufficient statistics to show that less than one-half of one per cent. of deaths occur—*i. e.* not one head per two hundred.

Other brief statistical notes giving comparative value and weight of open and spayed heifers and steers.

| Number. | Breed. | Sex. | Age. | Open Spayed or Castrated. | Comparative weight of open and spayed, etc., about one year after operation. | | | Remarks. |
|---------|---|---------|-------|---------------------------|--|-----------------------|-------|--|
| | | | | | | | | |
| 1 | Shorthorn..... | Female | Two.. | Open..... | 695 | | | The property of Mr. Charles Turner, of Columbia, Mo. Their food was grass, and last winter only wheat straw. No grain. |
| 1 | " | " | " | " | 810 | | | |
| 1 | Grade..... (Hereford and Shorthorn.) | " | " | Spayed..... | | 965 | | |
| 1 | " | " | " | " | | 725 | | |
| 1 | " | Male... | " | Castrated.. | | | 875 | |
| 1 | Shorthorn..... | " | " | " | | | 955 | |
| | Respective weight of open heifers, spayed ones, and steers..... | | | | 1,505 | 1,790 <u>1,505</u> | 1,830 | |
| | Gained by spaying..... | | | | | 285 | 1,790 | |
| | Excess in weight of steers over spayed heifers..... | | | | | | 40 | |

This table shows that the two spayed heifers outweighed the two open ones of the same age by two hundred and eighty-five pounds and that the steers weighed only forty pounds more than the spayed animals notwithstanding that those steers were castrated younger and consequently had much more time to grow in this favorable condition.

Now open heifers at this writing are bought by local butchers at two and one-half cents. Spayed heifers at three cents. But suppose that only two and one-half cents were paid for either kind of stock, what difference would there be? It would be thus: Two open heifers 1,505 lbs. at $2\frac{1}{2}$ = \$37.62 $\frac{1}{2}$; two spayed heifers 1,790 lbs. at $2\frac{1}{2}$ = \$44.75 making \$7.13 more for the two spayed heives. But it being the case that even at home, spayed heifers sell at three cents we would realize as a matter of fact \$53.70 for 1,790

live weight, or \$16.08 more for the two spayed than the open ones. Stock men tell me that in large markets three-quarters and sometimes even one cent more is paid for spayed than for open cattle. This brings the heifers spayed when yearlings past, to very nearly the value of the steers castrated much younger and which as I said had better chances. None of these animals were ever fed corn or any grain. All last winter they were fed on wheat straw only.

I do not forget that the open heifers were pure Shorthorns, and that the spayed ones half Shorthorns. But the comparative weight of each kind of stock under the same condition from one to two years seems nearly alike. It will be seen in the above table that the thoroughbred Shorthorn steer weighed more than their grade brothers of the same age—having been in exactly the same condition the year around. This fact if it holds good in females, would tend to increase still the value of spaying, since in the heifers, the Shorthorns, notwithstanding their purity of breed, are far below their grade spayed sisters.

However, as said before, we expect to continue the experiments more fully, taking into account weight before spaying as well as after, and age, breed, and various modes of feeding.

Hoping that the farmers and stock raisers of our country may find some useful information in these imperfect but sincere endeavors,

I remain very respectfully,

PAUL PAQUIN, M. D., V. S.

APPENDIX.

As the Veterinarian of the Station has state duties closely blended with his experimental work, we give here the substance of his third quarterly report for 1888, to the Dean of the Agricultural College of Missouri. While performing his state duties that officer collects material and data used in experimental work. This summary suggests partly the line of work and studies under way.

NUMBER OF CASES OF GLANDERS.

| | |
|--|-----------|
| In the neighborhood of Breckenridge, Mo..... | 2 cases. |
| In the neighborhood of Rothville, Mo..... | 2 cases. |
| In the neighborhood of East Leavenworth, Mo..... | 1 case. |
| In the neighborhood of Jamesport, Mo..... | 1 case. |
| In the neighborhood of Trenton, Mo..... | 1 case. |
| In the neighborhood of Carthage, Mo..... | 1 case. |
| In the neighborhood of Chain of Rocks, Mo..... | 2 cases. |
| In the neighborhood of Jackson, Mo..... | 2 cases. |
| In the neighborhood of Glasgow, Mo..... | 1 case. |
| Total..... | 13 cases. |

Number of miles travelled (approximately) 3,500.

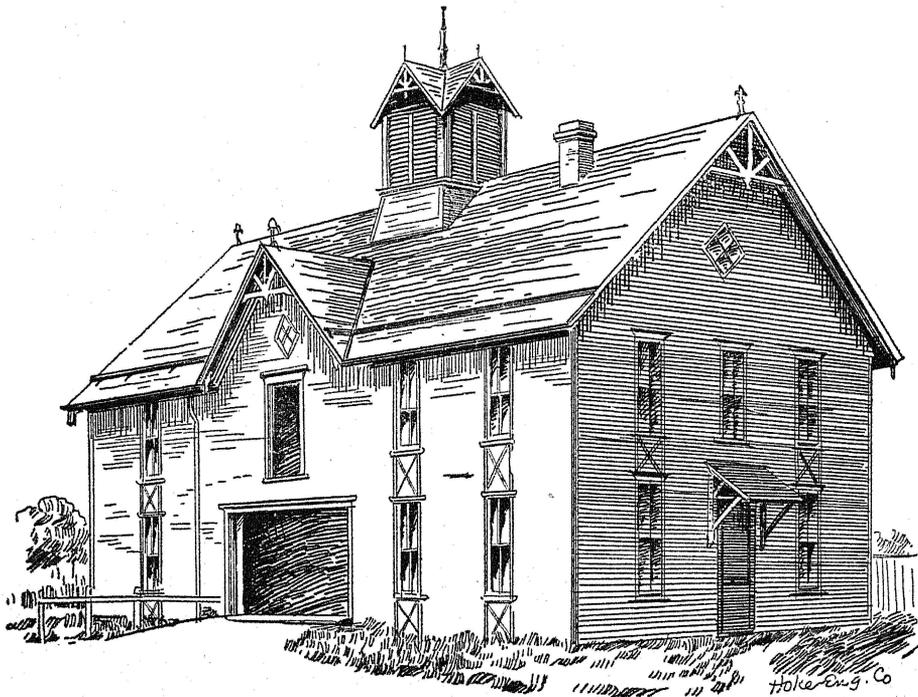
The treatment of all those cases consisted in either legal quarantine or slaughter. So protection was complete in every instance. However, some thirteen deaths had occurred all told before state service could be secured or was demanded. Material for experiments was gathered and is being used in the study of glanders.

Owing to an official circular from this office to the various railroad companies of this state regarding the laws on the subject of Texas fever, we have had much

less trouble so far, than last year at this date. Only three outbreaks of Texas fever called for state assistance and these were comparatively mild except the St. Louis case, whilst last year I travelled several thousand miles for Texas fever alone. This disease is also being systematically investigated by experiments.

Very respectfully submitted,

P. PAQUIN,
State Veterinarian.



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