

TEXAS AGRICULTURAL EXPERIMENT STATION.

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BULLETIN NO. 30.

MARCH 1894.

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# Veterinary Science:

- I. GLANDERS EXPERIMENTS.
  - II. TUBERCULINE EXPERIMENTS.
  - III. LUMP LAW OF CATTLE.
  - IV. NOTES ON PARASITES.
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  - VI. DEVICE FOR DESTROYING TICKS.
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*Agricultural and Mechanical College of Texas.*

POSTOFFICE,

COLLEGE STATION, BRAZOS CO., TEXAS.

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### ERRATA.

- On page 437 Law should read Jaw.
- “ 439 insiduous should read insidious.
- “ 439 verterinarians should read veterinarians.
- “ 450 psorptes should read psoroptes.
- “ “ one half should read one third.
- “ “ aesophegas should read oesophagus.
- “ 451 snilla should read suilla.
- “ “ Magrinata should read marginata.
- “ “ Oesophagostom should read oesophagastoma.
- “ “ Equium should read equinum.
- “ “ indigenaus should read indigenus.
- “ “ Equie should read equina.
- “ “ Megostoma should read megastoma.
- “ “ omit “and dogs.”
- “ “ Tenoides should read taenoides.
- “ 452 argus should read argas.
- “ “ Paradoxis should read paradoxus.
- “ “ Unicinaria Tregocephalus should read Uncinaria  
trigonocephala.
- “ “ Haematopinus should read Haematopinus.
- “ “ Tenuirostries should read tenuirostris.
- “ “ Avinn should read avium.
- “ “ Lucillia should read Lucilia.
- “ 453 catched should read collected.
- “ “ one should read ova.
- “ 455 and bloody should read latter are flabby
- “ “ September 6th should read October 6th.
- “ “ blood should read food.
- “ “ focces should read faeces.
- “ 456 Parrenchymatous should read Parenchymatous.

## TEXAS AGRICULTURAL EXPERIMENT STATION.

## I.—GLANDERS EXPERIMENTS.

M. FRANCIS, VETERINARIAN.

The manifestations of glanders are frequently so insidious in their character that it becomes exceedingly important and desirable that the true nature of the disease be promptly recognized.

Animals affected with a mild form of the disease are often a puzzle to veterinarians even, and any means of determining definitely whether the case be one of glanders or no, will meet with a hearty welcome.

It is not the purpose in this paper to present or discuss the causes, symptoms, nature, treatment, etc., of glanders, but to present to the public the results of some experiments conducted recently on the subject. It may, however, be of interest to state that glanders is due to a germ and to nothing else. This organism, it has been found, produces a complex chemical product called "Mallein."

Through the courtesy of the Bureau of Animal Industry we have been provided with the means of making the experiments here recorded.

Drs. Schweinitz and Kilborn describe its preparation in the following language:

"Acid peptonized beef broth culture containing 5 per cent. glycerine were inoculated with the glanders bacillus and the culture allowed to grow for two months at the temperature of the room. At this time the growth, which had been very abundant, had almost entirely ceased. The liquid was then heated for two hours from 80 to 100 degrees C, after which it was filtered through a Pasteur tube to remove the germs. The resulting clear amber liquid, after being tested to prove the absence of germs and diluted with 50 per cent. of glycerine for better preservation, was used for infection."

The mallein was injected under the skin by means of a hypodermic syringe in doses of 1 or 2 cubic centimeters as directed. The temperature was taken per rectum by exposing a clinical thermometer of superior quality for five minutes. It will be noticed that in several instances the data is not complete. This is regretted as it was almost unavoidable, as the cases were a considerable distance from our station and off the railroad, and time was limited.

Nos. 1, 2, 3, 4 and 5 have been made public in a paper on "The Use of Mallein, etc.," by Drs. Schweinitz & Kilborn in "Journal of Comparative Medicine, etc.," also in "American Veterinary Review" for November, 1892. See cut of the course described by the temperature in two representative cases.

## NO. I.—2 C. C.—MALLEIN.

Temp. Day before Injection			Temp. Day of Injection.			Temp. Day After Injection.		
DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.
1892.								
July 19	9 00 a m	100.0	July 21	7 00 a m	Injected	July 22	10 00 a m	103.0
" 19	2 00 p m	100.0	" 21	9 00 a m	100.0	" 22	2 00 p m	103.2
" 19	5 30 p m	100.6	" 21	11 00 a m	102.4	" 22	5 30 p m	102.2
" 20	9 00 a m	100.0	" 21	2 00 p m	103.5			
" 20	2 00 p m	100.4	" 21	5 00 p m	104.2			
			" 21	6 30 p m	103.5			

## NO. II.—2 C. C.—MALLEIN.

July 19	9 00 a m	99.9	July 21	7 00 a m	Injected	July 22	10 00 a m	101.9
" 19	2 00 p m	100.6	" 21	9 00 a m	100.0	" 22	2 00 p m	102.0
" 19	5 30 p m	100.7	" 21	11 00 a m	102.0	" 22	5 30 p m	101.5
" 20	9 00 a m	99.9	" 21	2 00 p m	102.0			
" 20	2 00 p m	100.6	" 21	5 00 p m	103.4			
			" 21	6 30 p m	104.0			

## NO. III.—2 C. C.—MALLEIN.

July 19	9 00 a m	100.6	July 19	7 00 a m	Injected	July 22	10 00 a m	101.5
" 19	2 00 p m	101.6	" 21	9 00 a m	100.0	" 22	2 00 p m	102.4
" 19	5 30 p m	101.6	" 21	11 00 a m	101.8	" 22	5 30 p m	102.0
" 20	9 00 a m	100.9	" 21	2 00 p m	103.5			
" 20	2 00 p m	101.9	" 21	5 00 p m	103.9			
			" 21	6 30 p m	104.2			

## NO. IV.—2 C. C. MALLEIN.

July 19	9 00 a m	102.0	July 21	7 00 a m	Injected	July 22	10 00 a m	103.8
" 19	2 00 p m	102.2	" 21	9 00 a m	102.5	" 22	2 00 p m	102.0
" 19	5 30 p m	102.2	" 21	11 00 a m	102.9	" 22	5 30 p m	101.5
" 20	9 00 a m	104.4	" 21	2 00 p m	103.5			
" 20	2 00 p m	102.9	" 21	5 00 p m	103.5			
			" 21	6 30 p m	103.1			

## NO. V.—2 C. C.—MALLEIN.

July 19	9 00 a m	101.6	July 21	7 00 a m	Injected	July 22	10 00 a m	102.3
" 19	2 00 p m	101.8	" 21	9 00 a m	101.4	" 22	2 00 p m	103.8
" 19	5 30 p m	101.8	" 21	11 00 a m	102.3	" 22	5 30 p m	102.2
" 20	9 00 a m	101.4	" 21	2 00 p m	102.7			
" 20	2 00 p m	101.8	" 21	5 00 p m	102.8			
			" 21	6 30 p m	103.4			

NO. VI.—2 C. C.—MALLEIN.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.
1892.								
July 24	9 00 a m	99.8	July 25	6 30 a m	Injected	July 26	6 30 a m	99.8
" 24	4 00 p m	100.2	" 25	8 30 a m	99.8	" 26	8 30 a m	100.0
" 24	6 06 p m	100.2	" 25	10 30 a m	100.2	" 26	10 30 a m	100.8
			" 25	12 30 p m	100.1	" 26	12 30 p m	100.2
			" 25	2 30 p m	101.0	" 26	2 30 p m	100.0
			" 25	4 30 p m	101.4			
			" 25	6 30 p m	101.8			
			" 25	8 30 p m	101.0			

NO. VII.—I C. C.—MALLEIN.

1893.

Not Taken.	Feb'y 4	10 00 a m	Injected	Feb'y 5	7 00 a m	103.6
	" 4	11 00 a m	101.2	" 5	1 00 p m	103.0
	" 4	3 00 p m	103.0	" 5	4 00 p m	102.6
	" 4	5 00 p m	103.0			
	" 4	7 00 p m	103.4			
	" 4	9 00 p m	104.0			
	" 4	11 00 p m	104.2			

NO. VIII.—I C. C.—MALLEIN.

Not Taken.	Feb'y 4	3 00 p m	102.5	Feb'y 5	7 00 a m	104.0
	" 4	5 00 p m	102.4	" 5	1 00 p m	103.4
	" 4	7 00 p m	103.6	" 5	4 00 p m	103.0
	" 4	9 00 p m	103.6	" 6	6 00 a m	102.6
	" 4	11 00 p m	104.4			

NO. IX.—I C. C.—MALLEIN.

Not Taken.	Feb'y 4	10 00 a m	Injected	Feb'y 5	7 00 a m	103.0
	" 4	11 00 a m	103.2	" 5	1 00 p m	103.2
	" 4	3 00 p m	104.8	" 5	4 00 p m	103.0
	" 4	5 00 p m	104.8			
	" 4	7 00 p m	104.8			
	" 4	9 00 p m	104.6			
	" 4	11 00 p m	104.2			

NO. X.—I C. C.—MALLEIN.

Not Taken.	Feb'y 4	10 00 a m	Injected	Feb'y 5	7 00 a m	101.2
	" 4	11 00 a m	99.7	" 5	1 00 p m	102.8
	" 4	3 00 p m	100.4	" 5	4 00 p m	102.2
	" 4	5 00 p m	102.0			
	" 4	7 00 p m	103.8			
	" 4	9 00 p m	104.4			
	" 4	11 00 p m	104.0			

## NO. XI.—MALLEIN.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.
1893.								
April 16	9 00 a m	101.8	April 18	8 00 a m	102.5	April 19	6 00 a m	103.2
" 16	3 00 p m	104.8	" 18	9 00 a m	101.5	" 19	1 00 p m	103.6
" 17	7 00 a m	101.8	" 18	12 30 p m	104.0	" 19	8 00 p m	100.0
" 17	3 00 p m	103.8	" 18	3 00 p m	104.0			
" 17	8 00 p m	103.0	" 18	7 00 p m	105.0			
			" 18	10 00 p m	103.0			

## NO. XII.—MALLEIN.

April 16	9 00 a m	99.8	April 18	8 00 a m	101.0	April 19	6 00 a m	102.6
" 16	3 00 p m	101.2	" 18	9 00 a m	99.0	" 19	2 00 p m	104.0
" 17	7 00 a m	101.0	" 18	12 30 p m	101.0	" 19	6 00 p m	104.0
" 17	3 00 p m	101.8	" 18	3 00 p m	102.6			
" 17	8 00 p m	101.0	" 18	7 00 p m	104.0			
			" 18	10 00 p m	103.4			

## NO. XIII.—MALLEIN.

April 16	7 00 p m	101.0	April 18	7 00 a m	101.0	April 19	6 00 a m	100.0
" 17	7 00 a m	101.0	" 18	1 00 p m	101.0	" 19	1 00 p m	100.6
" 17	12 30 p m	101.0	" 18	6 00 p m	101.0	" 19	6 00 p m	101.0
" 17	6 00 p m	101.0						

## NO. XIV.—MALLEIN.

April 16	7 00 p m	99.6	April 18	7 00 a m	99.8	April 19	6 00 a m	99.8
" 17	7 00 a m	99.6	" 18	1 00 p m	102.0	" 19	12 30 p m	99.0
" 17	12 30 p m	100.0	" 18	6 00 p m	101.0	" 19	6 00 p m	100.0
" 17	7 00 p m	100.0						

## NO. XV.—2 C. C.—MALLEIN. (1 year old.)

Not Taken.	June 28	9 00 a m	101.3	June 29	10 20 a m	103.2
	" 28	11 00 a m	102.0	" 29	7 40 p m	103.2
	" 28	1 00 p m	102.4			
	" 28	3 30 p m	102.8			
	" 28	6 00 p m	103.5			
	" 28	7 30 p m	104.0			



NO. XVI.—2 C. C.—MALLEIN. (1 year old.)

Not Taken.	Temp. Day of Injection.			Temp. Day After Injection.		
	DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.
	1893.					
	June 28		Injected	June 29	10 20 a m	104.4
	" 28	9 00 a m	101.8	" 29	7 40 p m	104.4
	" 28	11 00 a m	102.4			
	" 28	1 00 p m	103.2			
	" 28	3 30 p m	104.6			
	" 28	6 00 p m	105.2			
	" 28	7 30 p m	105.4			

NO. XVII.—1 C. C. MALLEIN. (fresh.)

July 8	6 00 p m	101.0	July 10	5 30 a m	Injected	July 11	6 30 a m	103.2
" 9	8 00 a m	100.0	" 10	" 10	100.0	" 11	8 30 a m	103.4
" 9	12 00 m	100.4	" 10	7 30 a m	100.0	" 11	10 30 a m	103.6
" 9	6 00 p m	100.6	" 10	9 30 a m	100.6	" 11	1 00 p m	103.8
			" 10	11 30 a m	101.5	" 11	3 00 p m	103.8
			" 10	1 30 p m	104.8	" 11	5 00 p m	103.6
			" 10	3 30 p m	105.6	" 11	7 00 p m	103.6
			" 10	5 30 p m	105.4	" 12	6 30 a m	101.8
			" 10	7 30 p m	105.0	" 12	8 30 a m	101.8
			" 10	9 30 p m	104.2	" 12	12 00 m	101.6
						" 12	3 00 p m	101.6
						" 12	6 00 p m	101.6
						" 13	8 00 p m	100.4

NO. XVIII.—1 C. C. MALLEIN.

Oct 2	12 00 m	100.6	Oct 4	7 00 a m	100.0	Oct 5	7 00 a m	100.0
" 2	3 00 p m	100.2	" 4	9 00 a m	100.0	" 5	11 00 a m	100.2
" 3	11 00 a m	100.0	" 4	11 00 a m	100.0			
" 3	3 00 p m	100.0	" 4	1 00 p m	100.6			
" 3	6 00 p m	100.2	" 4	3 00 p m	101.4			
			" 4	5 00 p m	101.6			
			" 4	7 00 p m	101.8			
			" 4	9 00 p m	101.6			

NO. XIX.—1 C. C.—MALLEIN.

1894.

Jan 6	7 45 a m	99.4	Jan 7	8 00 a m	Injected	Jan 8	7 45 a m	103.6
" 6	9 45 a m	99.8	" 7	9 45 a m	100.4	" 8	9 45 a m	103.4
" 6	11 45 a m	100.4	" 7	11 45 a m	101.0	" 8	11 45 a m	103.2
" 6	1 00 p m	101.4	" 7	1 45 p m	101.6	" 8	1 45 p m	103.4
" 6	3 45 p m	101.2	" 7	3 45 p m	103.4	" 8	3 45 p m	104.0
" 6	5 45 p m	101.4	" 7	5 45 p m	105.2	" 8	5 45 p m	104.0
" 6	7 45 p m	101.6	" 7	7 45 p m	104.8	" 8	7 45 p m	103.8
			" 7	9 45 p m	103.6	" 9	7 45 a m	102.6
			" 7	11 45 p m	103.4	" 9	9 45 a m	103.2
						" 9	11 45 a m	102.6
						" 9	1 45 p m	103.0
						" 9	3 45 p m	102.8
						" 9	3 45 p m	102.2
						" 9	7 45 p m	102.4

## NO. XX.—I C. C.—MALLEIN.

Temp. Day Before Injection.			Temp. Day of Injection.			Temp. Day After Injection.		
DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.	DATE.	TIME.	TEMP.
1894.								
March 12	8 00 a m	101 6	March 13	7 00 a m	Injected	March 14	8 00 a m	102 6
" 12	10 00 a m	102 6	" 13	8 00 a m	103 0	" 14	10 00 a m	102 6
" 12	12 00 m	103 6	" 13	10 00 a m	103 8	" 14	12 00 m	103 2
" 12	2 00 p m	103 8	" 13	12 00 m	105 8	" 14	2 00 p m	103 6
" 12	4 00 p m	103 4	" 13	2 00 p m	105 6	" 14	4 00 p m	104 0
" 12	6 00 p m	102 8	" 13	4 00 p m	105 0	" 14	6 00 p m	103 6
" 12	8 00 p m	102 4	" 13	6 00 p m	103 4	" 14	8 00 p m	103 2
			" 13	8 00 p m	102 6	" 15	8 00 a m	102 2
			" 13	10 00 p m	102 4	" 15	4 00 p m	103 4
						" 16	8 00 a m	101 6

## NOTES.

CASE NO. 1. Horse 7 or 8 years old, right submaxillary gland enlarged, discharge from right nostril. No farcy buds, condition of animal good. The day after injection there was increased flow from right nostril and a painful enlargement at the point of injection.

CASE NO. 2. Horse 6 or 7 years old, both submaxillary glands enlarged, and slight nasal discharge. Had been affected 6 to 7 months. Condition of animal good

CASE NO. 3. Horse 4 years old, both submaxillary glands enlarged, no nasal discharge. Right hind leg swollen. There are thirteen farcy buds, general condition of animal is poor.

CASE NO. 4. Horse in fair condition, but had farcy buds in fore legs and breast. The respiration is labored. No nasal discharge. The left eye is mattering. Appears to have pneumonia.

CASE NO. 5. Horse 9 years old, both submaxillary glands enlarged and some nasal discharge. The horse produces a snoring sound. Condition very bad. Farcy buds and chancres on both hind legs. Veins of fore legs prominent. He urinates frequently.

CASE NO. 6. Horse healthy, injected to note the effect on sound animal.

CASE NO. 7. Horse in charge of Dr. Wm. Falsetter, Dallas, Texas, thoroughbred, 4 years old, has been running from right nostril since November, 1892. Ulcer on right eye, this recovered and left eye became affected, ICC injected, marked lumped followed, refused feed next day. P. M. showed numerous turbercles in the lungs and old ulcers in the nose.

CASE NO. 8. Thoroughbred filley, 3(?) years old, excellent condition, nose, throat and legs perfectly clean. Has been lame in right hind leg for two days, no apparent cause for it, except small abscess at root of tail on top. This was opened and evacuated  $\frac{1}{2}$  ounce of oily looking puss. ICC mallein injected, large swelling resulted, left feed next day.

This was the most interesting case that come under my notice. This was also Dr. Falsetter's patient.

CASE NO. 9. Horse 4 years old, condition medium, began running from the nose about January 10, 1893. Presents ulcers on left eye which has spread all over the cornea, is losing flesh, appetite good, ICC mallein injected, does not refuse feed. P. M. showed large chancres in nasal chambers, also tubercles in the lungs. Dr. Falsetter's patient.

CASE NO. 10. Horse 6 years old, discharge from nose since September 1, 1892. Condition good. ICC mallein injected, marked lump produced. P. M. showed tubercles in lungs, varying in size from No. 5 shot to that of a small hickory nut, also cicatrices on septum nasi. Dr. Falsetter's patient.

CASES 11, 12, 13, 14. Cases inoculated by Dr. R. P. Talley, Temple, Tex. Notes sent to Dr. Salmon and have mislaid copy.

CASE 15. Mare 8 years old, excellent condition. No buds or discharge visible, has been running at the nostril for about a year. Used 2CC mallein that had been in my possession over a year. It had retained its qualities. Large lump at point of injection.

CASE NO. 16. Mare 7 years old, in bad condition, pulse 60, respiration 40, running freely at the nose. Used from same mallein as No. 15. There is a painful lump at point of injection 6 or 7 inches in diameter.

CASE NO. 17. Horse 10 years old, history not known, examined for soundness and suspicions aroused by small cicatrix on right septum, small ulcer on sheath, no nasal discharge, throat is clean, can't stand exertion, said to have been very poor several months previous. ICC mallein produced abrupt swelling 6 inches in diameter. Pulse 60, respiration 56.

CASE NO. 18. Horse sound, ICC mallein injected, no swelling at point of injection.

CASE NO. 19. Horse 7 years old, has discharge from both nostrils, is in fair condition. Cicatrix on inside of right hind thigh, ICC mallein used. Lump is not so large as in some cases, but abrupt and painful.

CASE NO. 20. Horse 10 years old, chancres visible in right nostril. Left maxillary sinus bulged, but sounds empty on percussion, left submaxillary lymphatic gland enlarged and nodular, considerable noise during respiration, no farcy buds noticed, discharge moderate, ICC used, lump moderate in size. Treatment followed by enormous oedema of the scrotum and prepuce the size of a cow's bag.

The experiments seem to show that in the mallein we have found a convenient, safe and reliable diagnostic agent for glanders. That the more occult the disease the more positive the temperature reaction. It also seems that the size, form and character of the lump produced at the point of injection is of great value.

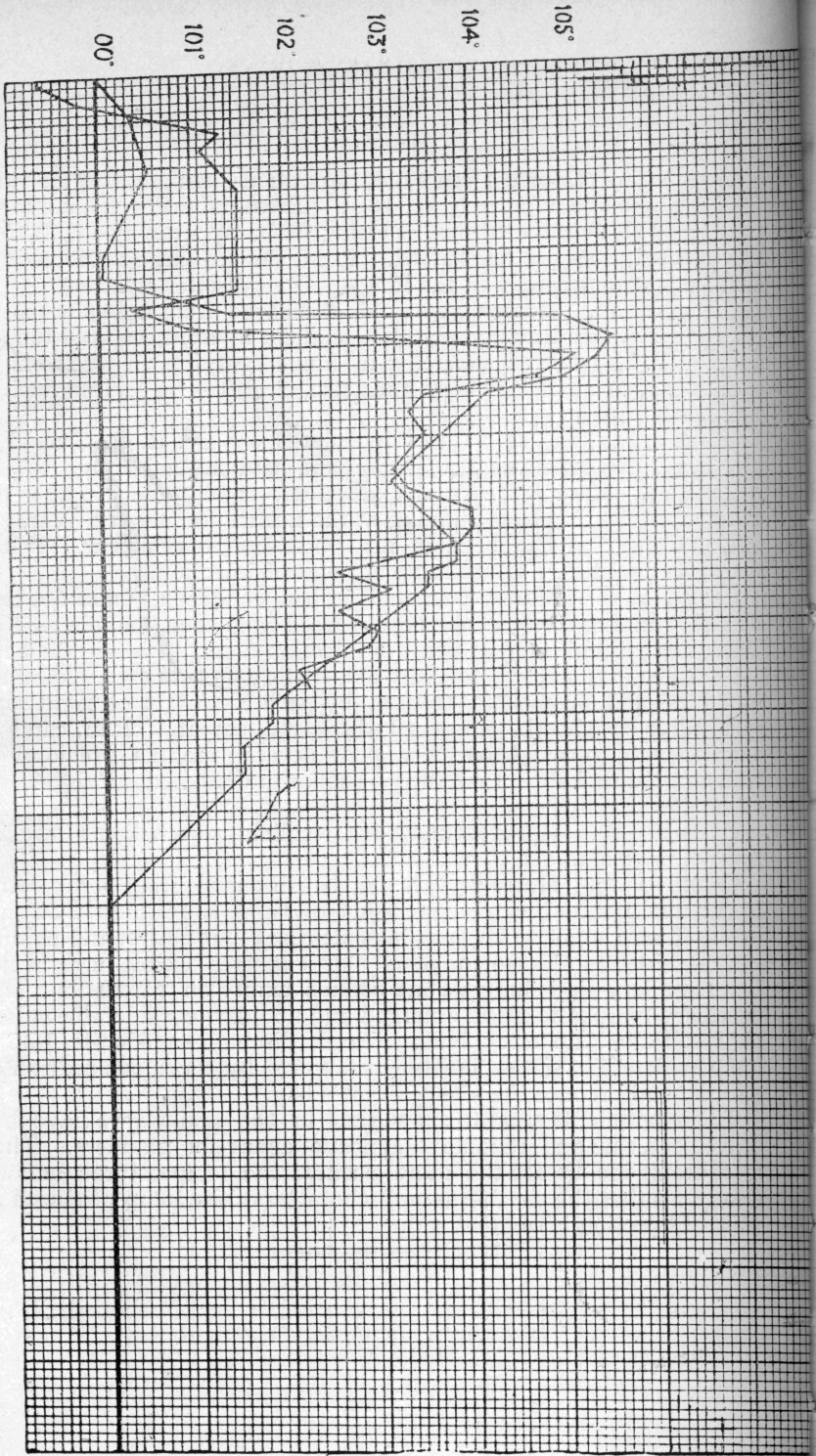


PLATE III

Diagram showing sudden rise in temperature following injections of Mallein, Cases XVII and XIX.



II.—TUBERCULINE EXPERIMENTS.

The recent discoveries of the prevalence of tuberculosis to a much greater extent than has been supposed among stock in several parts of the country, formed the basis for this experiment. Several years ago one of our Jersey cows died of this disease and these facts naturally led to an investigation of our dairy herd. The tuberculine used in these experiments was forwarded by the Bureau of Animal Industry and used according to directions for making the proper test. It will be noticed that the results are negative. The chief value of the results lies in the comparison of animals *not* injected with those that were injected. In all cases the thermometer was exposed for five minutes per rectum.

Six cows were selected for the experiment, four of which presented symptoms of a suspicious character.

DATE.	TIME.	No. 115.	No. 318	No. 420.	Ida. 3d.	No. 219.	No. 307.
1893.		Temp.	Temp.	Temp.	Temp.	Temp.	Temp.
October 30	6 a m	101 4	102 2	102 4	102 6	101 4	102 5
" 30	7 a m	101 2	102 6	102 8	102 0	102 4	102 2
" 30	8 a m	102 0	102 2	102 2	101 8	102 0	102 0
" 30	9 a m	101 4	102 2	102 6	101 8	102 6	101 8
" 30	10 a m	101 4	102 2	102 4	101 6	102 0	101 8
" 30	11 a m	101 2	102 2	102 0	101 6	102 4	101 6
" 30	12 m	101 4	102 2	102 2	101 6	101 8	102 0
" 30	1 p m	101 2	102 0	102 0	102 2	102 0	101 8
" 30	2 p m	101 4	101 0	102 2	101 2	101 6	102 0
" 30	3 p m	101 6	101 6	102 4	102 4	102 6	102 4
" 30	4 p m	102 0	102 2	103 0	102 2	102 6	103 0
" 30	5 p m	101 8	102 6	103 0	102 8	102 6	103 0
" 30	6 p m	101 8	102 2	103 0	102 2	102 2	102 6
" 30	7 p m	101 8	102 2	103 0	102 4	102 2	102 4
" 50	8 p m	101 6	101 8	102 4	102 2	101 6	102 2
" 30	9 p m	101 4	101 6	102 4	102 0	102 2	101 8
" 30	10 p m	101 6	102 0	102 0	101 6	102 0	101 6
" 30	11 p m	101 6	101 8	102 0	101 8	101 8	101 4
" 30	12 p m	102 0	101 2	102 0	102 0	102 2	101 4
October 30	12 p m	Not Injected.		2 c. c. Tuberculin Injected.			
October 31	6 a m	101 4	101 6	101 6	102 2	101 4	101 4
" 31	7 a m	101 8	103 0	102 0	101 6	101 8	101 8
" 31	8 a m	101 2	102 6	101 8	102 6	101 6	101 4
" 31	9 a m	101 8	102 0	101 4	101 6	101 4	101 0
" 31	10 a m	101 2	102 0	101 4	101 8	101 2	101 2
" 31	11 a m	101 4	102 0	101 6	102 6	101 2	101 4
" 31	12 m	101 2	102 0	101 4	102 2	101 4	101 2
" 31	1 p m	101 4	102 0	101 8	102 4	101 4	101 2
" 31	2 p m	101 2	101 6	101 6	102 0	101 6	101 4
" 31	3 p m	102 0	101 6	102 0	102 4	101 8	102 8
" 31	4 p m	101 6	101 8	102 6	103 2	102 0	102 8
" 31	5 p m	102 0	102 2	102 4	102 8	102 6	102 2
" 31	6 p m	102 2	102 6	102 6	103 0	102 6	102 6
" 31	7 p m	102 2	102 2	102 2	102 8	102 8	102 4
" 31	8 p m	102 6	102 0	102 0	102 2	102 4	102 2
" 31	9 p m	102 4	102 2	101 8	102 0	102 2	102 6
" 31	10 p m	102 4	101 8	101 6	102 2	102 4	102 4



## III.—LUMPY JAW OF CATTLE.

During the summer of 1892 our attention was directed to an announcement of the successful treatment of this disease by the internal use of Iodide of Potassium. This announcement was made by the Bureau of Animal Industry and gave the results of some experiments conducted by its agents. The discovery seems to be of European origin. The number of our experiments is limited, but they have been very satisfactory. Case 1, noted below, being the only failure. We have adopted the following plan of treatment:

The Iodide of Potassium is given in water as a drench, in doses of 1 gram for every 100 pounds live weight of the animal, daily. In a few days a condition known as "iodism" sets in. This is shown by weeping eyes, running at the nose and an abundance of dandruff in the roots of the hair, especially along the sides of the neck. The stall smells strongly of iodine. When this condition has been reached it is perhaps advisable to discontinue the treatment for several weeks, then, if necessary, repeat it. In some cases iodism was not well marked, although the animal received as much as 12 grams per day, yet the case recovered perfectly.

One pregnant cow was treated and it is believed that the treatment caused abortion. The reader is referred to the notes on cases given below, which are submitted without further comment.

CASE 1. July 19, 1892. Jersey cow; on the lower right maxilla is located a large swelling. The bone is much enlarged. There are several places where the tumor has discharged.

Treatment begun on the 19th, cow received 15 grams of Potassium Iodide; July 20th, 13 grams; July 21st, 11 grams; July 22nd, 10 grains, and continued to receive 10 grains daily until July 29th.

Iodism well marked, and nose ran profusely. Skin shed off considerable quantities of dandruff. Stall smells strongly of Iodine. Result not satisfactory. In several months the tumor was discharging as before the treatment.

CASE NO. 2. Holstein steer; small tumor of right lower jaw bone opposite 5th tooth. This has broken and is discharging. The tumor is not larger than the fist. Began treatment July 5, 1893, by receiving 5 grams daily for 14 days. Iodism not marked. Treatment repeated October 16th in larger doses until 200 grams were consumed. From this the tumor has shrunken considerably and has not broken to date (May, '94). Steer is gaining rapidly in flesh. The case appears to be cured.

CASE NO. 3. Jersey Bull; abrupt spherical enlargement in right jugular region, 6 inches from border of jaw. This was first noticed October 26 and increased rapidly in size until 5 inches in diameter. Bull weighed 1260. He received 12 grams of Potassium Iodide daily for a week.

Iodism well marked. Bull lost 20 pounds during the treatment. Recovery perfect apparently. (January 1894.)

CASE NO. 4. Jersey cow; pregnant, weight 560 pounds. Enlargement of right lower jaw bone the size of a cocoa nut. Has not broken. October 26th received 5 grams of Potassium Iodide daily for 7 days. Iodism very well marked. Cow so sick that it is thought best to stop the treatment. Are suspicious that abortion has taken place. Tumor has shrunk very much and appears to have made a recovery. Recovery apparently perfect. (May 1894.)

CASE No. 5. September 6, 1893; a small Jersey heifer presented a marked swelling in the parotid region. Regarded as a "throat boil." Received Iodide of Potash in doses of 3 grams daily for a week. Iodism well marked. Case recovered perfectly.

## IV.—NOTES ON PARASITES.

The following notes have been prepared simply as a report on the geographical distribution of common forms. The list is restricted to those collected personally HERE, and is therefore incomplete; for instance, such common ones as *melophagus*, *ovinis*, *psorptes communis var ovis*, *stronglyus contortus*, *syngamus trachealis*, etc., have been reported by others and not having been collected personally, are omitted. An exception is made in case of *Argas Americanus*, because I felt that the note might be of interest.

The identifications are thought to be correct. In those cases where error is possible it is indicated.

*Distoma Hepaticum* occurs in bile ducts of cattle and sheep. Common in countries along the Gulf of Mexico and river bottoms. Damage great. See bulletin No. 18, Texas Experiment Station.

*Distoma Magnum*. The large American Fluke described in Bulletin No. 18 under the provisional name of *D. Texanicum*. Stiles, who has looked into the subject, regards it as *D. Magnum*. Curtice entertains the same opinion as Stiles. Prof. Whitney writes under date of February 25, 1892: "Many thanks for your specimens of *D. Hepaticum* and *Texanicum*. The latter is certainly a new one." (Personal correspondence.)

Occurs in liver tissue of cattle, distribution same as above. Damage great.

*Distoma* (Sp?) Occurs in intestines of opossum, common here. Description: (Balsam preparation), body white, length 6 m. m., concave ventrally, convex dorsal. Anterior one-half of body armed with numerous large spines directed backward, "head" very large, circular, concave below, constituting about one-half of the body, behind which is a marked constriction or neck. From the neck the body is a little larger, margins convex, but gradually tapers to a narrow flat tail. Mouth terminal, sessile, surrounded by a muscular sphincter, oesophagus straight and extends to about the middle of the "head." At the beginning of the posterior one-third of the oesophagus is the bulb. The oesophagus divides near the middle of the head into two plain caeca, which extend right and left, then backward to posterior one-third of body, perhaps further. Near the mouth are two kidney shaped areas, one right and one left, which bear straight spines or thorns directed forward, probably 10 or 12 in number. The form of this area may be influenced by cover glass pressure. Acetabulum large, circular, at posterior portion of anterior one-third of body. Genital openings midway between acetabulum and the point at which oesophagus divides. Male and female organs too transparent for accurate description. Ova duct very distinct, filled with ova. Terminal pore not seen.

*Taenia Mamillana* (Mehlis). Two specimens from duodenum of horse, not common.

*Taenia Plicata* (Rud). Eight specimens from illeum of horse, largest one 14 c. m. long, not common here.

*Taenia Marginata*, intestine of the dog, common.

*Taenia Cucumerina*, intestine of dog, common.

*Echinorhynchus gigas*, intestine of pig, common, damage considerable. There is also a species of echinorhynchus common in the intestine of the opossum here.

*Ascaris Megalocephalus*. Occurs in small intestine of horse, common, no damage noted.

*Ascaris Snilla*. Occurs in small intestine of hog. Common, no damage noted.

*Ascaris Magrinata*. Occurs in small intestine of dog, common, no damage noted.

*Ascaris Mystax*. Occurs in small intestine of cats, common.

*Oesophagostom Columbianum*. Occurs in intestines of sheep. Damage very great.

*Oesophagostom Inflatum?* Occurs in intestines of cattle. Common, but not in sufficient numbers to cause appreciable damage.

*Sclerostoma Equium*. Occurs in caecum of horses and mules, also in aneurisms of anterior Mesenteric artery. Common, regarded as a cause of colic.

*Tricocephalus Affinis*. Caecum of cattle. There is some doubt as to this being indigenous, as the only case under observation being a 2-year-old bull recently from Missouri. Not present in sufficient numbers to cause appreciable damage.

*Filaria Equie*. Occurs in abdomen of horse. Very common, but not in large numbers. Saw one case at Dallas, Tex., in anterior chamber of eye.

*Filaria Terebra*. Occurs in abdomen of cattle. Common, in limited numbers.

*Spiroptera Megostoma*. Occurs in tumors in stomach of horse. Not common. Have seen but one case in six years.

*Spiroptera Strongylina?* Stomach of pig, common.

*Boophilus Bovis*. On horse, mule, ox and dog. Very common from June to December. Damage very great.

*Amblyomma Unipunctata*. On horse, mule, ox, dog and cat. Common from April to August. This tick is more abundant during the spring and early summer. Not common after July 1st. There are two other species of ticks here. The first, which seems to be *Dermacentor Americanus*, I have collected but twice. Once on the horse and once on the calf. Both were females, males not seen. The second infests horses and dogs' ears in September; it is not common. Specimens sent to Cur-tice for identification.

*Dermanyssid Gallinae*. On horse, probably from chickens.

*Psoroptes Communis var Equi*. Horse, not common.

*Linguatula Tenoides?* One from dog.

*Argus Americanus* (Identified by F. W. Webster). Reported on chickens at San Marcos and Lampasas, Tex.

LAMPASAS, TEX., May 27, 1893.

DR. M. FRANCIS.

DEAR SIR:—I sent you a few days ago some of the insects that are so destructive to poultry. I found, in examining my poultry house, that it was infested by millions. The places infested by them are filled with the shells, eggs and bugs of all sizes. The larger ones are not found on the poultry, but the smaller ones get on their necks, under their wings and legs and produce a perfect paralysis. I have cured one or two with sassafras oil, and some with mercurial ointment. I am now trying the sheep dip. The necks of the little chickens are nearly eaten to the bone. I have found them in the stables, but they have never made their attack on the cows or horses.

MRS. J. H. M.

*Strongylus Micrurus*(?) Bronchi of calves.

*Strongylus Paradoxus*(?) Bronchi of pig.

*Unicinaria Trigocephalus*(?) Intestine of cat.

*Trichodectes Pilosus*. Horse and ass, very common on latter.

*Trichodectes Scalaris*. Ox, very common.

*Trichodectes Climax*(?) Angora goat.

*Haemotopinus Macrocephalus*. Horse, not common.

*Haemotopinus Eurysternus*. Adult cattle, not common.

*Haemotopinus Tenuirostris*. Calves, common.

*Haemotopinus Urius*. Pig, common.

*Pulex Avinm*. Chickens, common, very troublesome last summer at Bryan, Tex.

*Pulex Serraticeps*. Dog, common.

*Gastrophilus equi*. Horse and mule, very common.

*Oestrus Ovis*, Sheep, common.

*Hypoderma Lineata*. Cattle, very common.

*Hypoderma of the Horse*(?) Rare. Note January 14, 1894. Saddle pony presents three lumps under the skin the size of quail eggs. These contain pus and in one is found what is regarded as the moult of a large larva. Larva not found; seems to have been destroyed by saddle pressure,

*Lucillia Macellaria*, Very common on all animals,

*Haemotoba Serrata*, Cattle; common; appeared here October, 1892.



## V.—TEXAS FEVER EXPERIMENTS.

The investigation of the United States department of Agriculture of the relation of ticks (*Boophilus Bovis*) to Texas Cattle Fever have produced such astonishing results that any information in regard to these creatures commands interest and attention. The question that immediately comes to mind on reading the results is, are the other species of ticks capable of transmitting the disease?

With the question in mind, it was decided to make the experiments reported as follows:

July 3, 1893; ten adult females (*Amblyomma Unipunctata*) commonly called the "Lone Star" tick, were collected from cattle of the station. Their average weight was .44 grams. They were confined in the laboratory under ordinary conditions and began depositing eggs July 7th. This they continued about 10 days, having deposited about 48 per cent. of their original weight as eggs, Alive July 25th, that is, 6 or 7 days after having ceased laying eggs, though apparently dry and lifeless. August 8th larvae appeared. These were sent to Dr. Mayo, Kansas Experiment Station, and reached him August 17th. They were placed on two calves August 26th. See Dr. Mayo's report below for results.

July 14th, several cattle ticks (*Boophilus Bovis*) caught and one sent to Dr. Mayo with above. This is the lot reported on as having died before being tested. A second lot was collected for me by Mr. Watts and the eggs sent to Dr. Mayo, who received them September 8th. These eggs hatched September 15th. The young ticks were put on a four-year-old Jersey heifer September 28th. This animal is designated in Dr. Mayo's report as No. 3.

## REPORT ON TEXAS FEVER EXPERIMENT.

November 1, 1893. In co-operation with M. Francis, of Texas Experiment Station.

On August 17th, 1893, there was received by express from Dr. M. Francis two specimens of southern cattle ticks. The ticks were very young, possibly two weeks from the egg. One bottle labeled "A" containing young ticks of the "Lone Star" variety.

Bottle "B," young ticks of *Boophilus Bovis* or common southern cattle tick. These ticks were kept in the laboratory until August 26th. The ticks in bottle "B" were not doing well on their arrival, and by August 28th were all dead.

On August 26th the young ticks in bottle "A" were put upon two calves, half on one calf and half on the other, about 150 ticks put on each calf.

Calf No. 1 was about two months old, and evidently a grade Jersey, a small white star on forehead and Jersey color. No. 2 about ten weeks

old, native bull calf, large white spot on right flank and white brisket running back on belly, also large white spot on face. The temperatures of Nos. 1 and 2 throughout the experiment were as follows:

TEMPERATURE RECORD CALVES NO'S. 1 AND 2.

DATE.	NO. I.		NO. II.	
	A. M.	P. M.	A. M.	P. M.
August 29		102		102 2-5
" 30	101 3-5	104	101 2-5	103 2-5
" 31	102	104	102	103 1-5
September 1	102 3-5	103	102 2-5	103
" 2	102 4-5		102 4-5	
" 3	102		102	
" 4	102 3-5		104	
" 5	103 1-5		103 1-5	
" 6	103		103 2-5	
" 7	103		103	
" 8	102 1-5		102 1-5	
" 9	102 3-5		102 4-5	
" 11	102 1-5		103 2-5	
" 13	103		103 2-5	
" 15	102 3-5		102 3-5	
" 17	102 1-5		102 2-5	
" 19	102		102 1-5	
October 12	101 4-5	102 1-5	103 1-5	103
" 13	103 1-5	103	104	103
" 14	102 3-5	102 3-5	102 1-5	103 1-5
" 15	102	102 2-5	102 3-5	103 4-5
" 16	102	102 4-5	103 2-5	103 3-5
" 17	101 3-5		103 1-5	
" 19	102 3-5	103	103	104
" 20	101 4-5	102 3-5	103	104
" 21	101 4-5	103 1-5	102 2-5	103 4-5
" 22	101 4-5	103	102 3-5	103 2-5
" 23	102	103 3-5	102 3-5	103
" 24	102 2-5	103 3-5	102 2-5	103 2-5
" 25	101 4-5	102	103	103 1-5
" 26	103 3-5	103	103 3-5	103 2-5
" 27	102 2-5	102	103	103 2-5
" 28	102	102 2-5	103 1-5	102 4-5
" 29	102 2-5	102 4-2	102 3-5	102
" 30	102 2-5	101 4-5	103 1-5	103
" 31	102 2-5		102 3-5	

On August 31st ticks had increased considerably in size, but showed signs of moulting. Ticks seemed quite few, and on September 7th no ticks could be found on either calf. On September 5th one tick in larva stage was found on a careful search, but on September 7th, the one tick, found on the 5th, was gone. From this time until September 22d no ticks were found, but on September 22d three ticks were found, one between thighs and two on brisket. All of the three had eight legs. One was quite empty, the other two were filled with blood. These ticks were so few that the experiment with them was given up.

On September 8th received by mail eggs of common cattle tick (*B. Bovis*). On September 15th eggs began hatching. A few ticks being found in the bottle on September 22d. Three or four hundred of these ticks were placed upon calf No. 1 in flank region and given plenty of time to crawl well into the hair. The same number of young ticks were placed upon calf No. 2 in the same manner. Three ticks of former lot (*A. Unipunctata*) were found, all had eight legs and one was one-eighth of an inch in diameter. On September 23d a full blooded Jersey

heifer was placed in a pen with calves, It was my intention to keep her separate, but she was put in by an assistant during my absence from home. On September 28th placed upon the heifer No. 3 about two hundred young ticks from second lot (B. Bovis).

On September 6th ticks were numerous on all three of the animals, and on October 10th seemed to be nearly or quite full grown. On October 10th her temperature was reported very high; saw her at noon, temperature 106° F., pulse rapid and full, ears drooping, eyes bright, slight discharge from eyes and nostril.

## TEMPERATURE RECORD NO. III.

*Full Blood Jersey Heifer Four Years Old,*

DATE.	A. M.		P. M.
October 4	102 4		102 8
" 5	102 0		103 2
" 6	102 4		102 4
" 7	103 4		103 0
" 8	102 2	2 P. M.	103 2
" 9	102 2		103 8
" 10	105 4	106 0	105 6
" 11	104 4	106 0	105 4
" 12	104 4		106 2
" 13	101 6		106 2
" 14	105 2		106 8
" 15	107		107 4
" 16	106 8		107 8
" 17	104 6		110 0 *

NOTE—\* Thermometer only registered 110 °; ran clear to top. Died during night.

Autopsy held October 18, 1893, 2 P. M. by Dr. L. R. Brady, V. S. Manhattan Ks. Notes reported by him.

Subject:—Jersey heifer about 4 years old, in good condition. Experiment Station Ks.

Patient having died previous night had been hauled out from barn; lying on right side, legs extended, *no rigor mortis*, southern cattle ticks were noticed on abdomen, skin normal, discharge of bloody urine from vulva and bloody froth from nostril, Visible mucus membranes congested and dark. Incision through skin and muscles and bloody and connective tissue, yellowish in color.

Rumen half full of blood and distended with gas, reticulum partially filled, omasum filled with blood, consistency of soft putty.

Abomasum filled with digested food, small intestines show hemorrhage spots and beginning to show signs of decomposition, Rectum filled with clay colored foeces, Lungs normal.

Heart:—Left auricle of a bluish color, darker than usual and empty, Left ventricle empty, small fibrous clot at *a. v.* opening. Right ventricle filled with clot, and aorta filled with clotted blood, Post aorta empty, Post venacava contained a bloody froth, Spleen about three times normal size, 26 inches long, 7 inches wide and 3 inches thick, weight estimated 7 pounds, of a bluish mottled appearance with a few hemorrhagic spots. Capsule distended, incision revealed contents, a

homogeneous mass of blood and broken down tissue the consistency of thick blood.

Liver:—Enlarged and of a peculiar mottled appearance; large blotches of a clay color and deep blue. Gall cyst greatly distended and filled with about 1 quart of bile of the consistency of honey and of a peculiar granular appearance, stains the hands readily a bright yellow.

The liver on section appears bloodless and after exposure to the atmosphere cut surface exhibits a peculiar clay color with a ring of true liver colored tissue. Parenchymatous tissue easily broken down.

Kidneys:—Left kidney shows in half its superior portion a blackish green color, while inferior portion is of a deep red color; capsule peels off easily. Extravasation of blood in pelvis; right kidney some.

Bladder:—Contains about two quarts of bloody urine, mucus membrane covered with pelechial spots.

Sub Lumbar glands:—Badly decomposed and broken down, a peculiar smell is noticed on section through muscular tissue. Adipose tissue, surrounding kidneys, of a yellow color. Uterus contains foetus of about three months development appears normal. Other organs and tissues normal.

L. R. BRADY.

## VI.—A DEVICE FOR DIPPING CATTLE TO DESTROY TICKS.

The economic importance of ticks cannot be estimated. They are becoming a greater curse every year. There are several reasons for this. It would naturally be supposed that the fencing and cultivation of the land would have a tendency to check their reproduction. Such is certainly true on farms under cultivation. The range is becoming shorter every year and cattle find less nourishment. The results are that the cattle are poor in flesh and are more subject to the attacks of the tick.

Another probable reason is that owing to the rapid settlement and fencing of the country, forest and prairie fires are less numerous and less extensive than formerly.

These must have destroyed great numbers of ticks, and thus checked, to some extent, their ravages.

It is therefore very desirable that some means be devised to destroy the ticks on a large scale at low cost. This condition of affairs has led to the construction of a large vat, into which the cattle are driven. So far as the writer is aware this was first accomplished by Hon. R. J. Kleburg of Alice, Tex. Its arrangement as in diagram below.

Construction—Vat 5 feet below ground, 4 feet above ground, 15 feet in bottom. Material, 4x4 cypress uprights and 2x12 cypress siding, joints calked with oakum. Trap, dripping floor, chute and pens as in diagram. Water supplied by wind pump. I saw this vat in operation and was so well pleased with its working that we have since built one at this station.

Station Vat:—At Mr. Kleburg's suggestion we have built the station vat deeper and longer, being 10 feet deep and 24 feet long on the bottom.

Construction:—2x4 uprights of pine 18 inches from centers. These rest on 4x4x24 pine sills; siding of 2x4x16, pine, dressed and matched. Trap of 2x12 pine. Dimensions according to plan. The uprights should be braced across to prevent bulging or collapse. Tramp the ground well around vat.

## COST OF CONSTRUCTION.

Lumber.....	\$80.00
Carpenter work.....	20.00
Nails.....	4.00
Paint, two coats.....	3.00
Total.....	\$107.00

No estimate is included for excavating or for water supply. The latter in this case was trifling, as it required but a few joints of 3-4 pipe to connect with water main.

Prof. D. W. Spence has kindly calculated the capacity of the vat, showing the depth for every 100 gallons. By using the table given be-



low a very convenient, graduated measuring stick can be made which will give the reading in gallons.

The vat can be used for the application of remedies for other parasites of the skin, viz: Screw worms (*Lucilla*), mange, horn fly, lice, ring worm, etc.

The device is the most rapid, and practical yet suggested.

TABLE GIVING DEPTH OF VAT FOR EVERY 100 GALLONS.

100 Gallons.....	3 35	2500 Gallons.....	48 96
200 Gallons.....	6 32	3000 Gallons.....	50 00
300 Gallons.....	9 05	3100 Gallons.....	51 02
400 Gallons.....	11 57	3200 Gallons.....	52 04
500 Gallons.....	13 92	3300 Gallons.....	53 04
600 Gallons.....	16 14	3400 Gallons.....	54 00
700 Gallons.....	18 20	3500 Gallons.....	54 95
800 Gallons.....	20 17	3600 Gallons.....	55 89
900 Gallons.....	22 05	3700 Gallons.....	56 80
1000 Gallons.....	24 84	3800 Gallons.....	57 70
1100 Gallons.....	25 55	3900 Gallons.....	58 58
1200 Gallons.....	27 20	4000 Gallons.....	59 45
1300 Gallons.....	28 80	4100 Gallons.....	60 32
1400 Gallons.....	30 34	4200 Gallons.....	61 18
1500 Gallons.....	31 82	4300 Gallons.....	62 04
1600 Gallons.....	33 25	4400 Gallons.....	62 86
1700 Gallons.....	34 64	4500 Gallons.....	63 67
1800 Gallons.....	36 01	4600 Gallons.....	64 48
1900 Gallons.....	37 36	4700 Gallons.....	65 28
2000 Gallons.....	38 65	4800 Gallons.....	66 08
2100 Gallons.....	39 88	4900 Gallons.....	66 87
2200 Gallons.....	41 10	5000 Gallons.....	67 64
2300 Gallons.....	42 31	5100 Gallons.....	68 40
2400 Gallons.....	43 48	5200 Gallons.....	69 15
2500 Gallons.....	44 60	5300 Gallons.....	69 89
2600 Gallons.....	45 72	5400 Gallons.....	70 63
2700 Gallons.....	46 81	5500 Gallons.....	71 36
2800 Gallons.....	47 90	5600 Gallons.....	72 00

