

3. HEIFER 4691.—Born at Onderstepoort on 21.9.18 and stabled since 11.12.18.

Treatment: 10.5.19: Drenched with 240 grammes blow-fly larvae collected from carcass of heifer 4765 on 10.5.19.

Result: 14.5.19: Impression of dullness, lack of interest, sluggish movement, drooping head.

15.5.19: 7 a.m.: Difficulty in rising; movements stiff in both forelegs.

1 p.m.: In sternal position, unable to rise.

17.5.19: Extended in costal position.

19.5.19: Died.

Epicrisis: After an incubation period of four days, the animal showed symptoms of illness which developed into a typical acute form of lamsiekte, lasting another five days before death supervened.

The temperature remained normal throughout the course of the disease, and the symptoms and post-mortem lesions were those seen in cases of lamsiekte.

4. HEIFER 4707.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: 9.5.19: Drenched with 240 grammes blow-fly larvae collected from carcass C. 4765 on 9.5.19.

Result: 13.5.19: Found down in the kraal this morning, and unable to rise; lying normally in sternal position. 4 p.m.: Still unable to get up; muzzle getting dry and caked.

14.5.19: 7 a.m.: Lying on side, groaning, nasal inspiration and buccal expiration. When propped on sternum endeavoured to rise, but collapsed again on side. Muzzle dry, caked; eye intelligent but anxious.

9 a.m.: Died.

Epicrisis: After an incubation period of four days, the animal commenced to show symptoms of lamsiekte, and only lived for about 1½ day.

A normal body temperature was maintained throughout the course of the disease; the symptoms and post-mortem lesions were those seen in an acute case of lamsiekte.

5. RED HEIFER 4770.—Arrived at Onderstepoort on the 29.3.19 from Pretoria and stabled since 8.5.19.

Treatment: 14.5.19: Drenched with 450 grammes ribs and vertebrae of carcass C. 4765 collected on 14.5.19.

Result: 17.5.19: 9 a.m.: Down, unable to rise. Oedema of eyelids, dribbling from the mouth, muzzle dry, food particles still adherent.

18.5.19: Died during night.

Epicrisis: Symptoms of lamsiekte appeared after an incubation period of only three days, and the animal only lived for one day. Among the symptoms may be noticed dribbling from the mouth, which is indicative of tongue and jaw paralysis, a symptom often seen in very acute fatal forms of the disease.

Microscopic examination of the blood gave negative results, and the post-mortem lesions were those usually seen in typical cases of lamsiekte.

6. BLACK HEIFER 4771.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 8.5.19.

Treatment: 14.5.19: Drenched with 450 grammes ribs and vertebrae of dorsal column of carcass 4765.

Result: 17.5.19: Empty and dull.

18.5.19: Stiff gait, inclined to lie down frequently.

19.5.19: 10 a.m.: Down; unable to rise.

20.5.19: Lying stretched out on its side. Died during the day.

Epicrisis: After an incubation period of only three days, the animal showed symptoms which closely resembled those seen in acute cases of lamsiekte, excepting that the temperature was raised at different times. It died after an illness lasting 3½ days. The post-mortem examination revealed the usual lesions seen in cases of lamsiekte, but also those of a broncho-pneumonia.

There is no doubt that the pneumonia was the result of material used for drenching entering the trachea and the lungs.

7. HEIFER 4731.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.6.19.

Treatment: 10.6.19: Drenched with 480 grammes ribs collected from carcass C. 4765 on 10.6.19.

Result: 18.6.19: Down; unable to rise; lying in sternal position.

19.6.19: Down in costal position, unable to get up.

20.6.19: Lying down stretched out on its side; unable to maintain itself in sternal position.

21.6.19: Died.

Epicrisis: Symptoms of lamsiekte developed after an incubation period of eight days, and paralysis of the muscular system set in early; the temperature remained normal until the day preceding death, when it dropped to sub-normal.

8. HEIFER 4748.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 15.6.19 with 480 grammes putrid bones from carcass of heifer 4765 which died on 4.5.19.

Result: Negative.

9. HEIFER 4747.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 28.5.19.

Treatment: 17.6.19: Drenched with 340 grammes ribs collected of carcass C.4765 on 17.6.19.

Result: 21.6.19: Down in sternal position, unable to rise, showing typical symptoms of acute lamsiekte.

22.6.19: Found dead this morning.

Epicrisis: After a rather short incubation period (four days), the animal suddenly developed symptoms of acute lamsiekte, it being found lying down and unable to rise. The course of the disease was very rapid, death taking place the same night. Its temperature remained normal throughout the period of the experiment, and blood examination revealed no abnormalities; the post-mortem lesions also were those usually seen in cases of lamsiekte.

10. HEIFER 4738.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 8.5.19.

Treatment: 14.5.19: Drenched with 350 grammes putrid muscle, skin, and ligaments of carcass C. 4765 collected on 14.5.19.

Result: 17.5.19: Found lying stretched out on its side early this morning, groaning, and apparently in a dying condition.

Died at 9 a.m.

Epicrisis: After an incubation period of only three days, the animal was found to be suffering from a peracute form of lamsiekte. It only lived for a few hours after it was first noticed to be ill; its temperature remained normal up to the time of death.

The examination of blood-smears gave negative results, and the post-mortem lesions were those commonly met with in cases of lamsiekte.

11. HEIFER 4742.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 8.5.19.

Treatment: 14.5.19: Drenched with 350 grammes putrid flesh, skin, and ligaments of carcass C. 4765 collected on 14.5.19.

Result: 17.5.19: Dull, not feeding, and inclined to lie down.

18.5.19: Lying down and unable to get up, showing complete muscular paralysis.

19.5.19: Found dead this morning.

Epicrisis: In this case, also, the incubation period was a very short one, only three days, and the disease was of the acute type, the animal living for only two days. Typical symptoms of lamsiekte (muscular paralysis, etc.) were present, and the blood appeared to be normal on microscopic examination.

12. HEIFER 4748.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: 15.7.19: Drenched with 480 grammes of putrid bones collected from carcass C. 4765.

Result: Negative.

13. HEIFER 4762.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: 10.5.19: Drenched with 480 grammes putrid bones from carcass C. 4765 collected on 10.5.19.

Result: 20.5.19: Down, but can rise with difficulty.

21.5.19: Down, cannot rise.

28.5.19: Still unable to rise and shows profuse frothy salivation.

It remained in this helpless position until 31.5.19, when it was killed for post-mortem examination.

Epicrisis: After a rather long incubation period—ten days—symptoms of muscular weakness developed, these soon becoming so severe that the animal lost control over its muscular system. On the eighth day signs of paralysis of the throat, jaw, and tongue muscles also became apparent. The animal was killed on the eleventh day, when it was practically *in extremis*. The symptoms were typical of those usually seen in the more subacute forms of lamsiekte.

The temperature remained normal throughout the course of the disease, and the post-mortem lesions resembled those usually met with in cases of lamsiekte.

14. HEIFER 4684.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: Drenched on 6.5.19 with 480 grammes putrid flesh from carcass of heifer 4765 that died on 4.5.19.

Result: Negative.

15. HEIFER 4676.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: Drenched on 7.5.19 with 480 grammes putrid flesh from carcass of heifer 4765 that died on 4.5.19.

Result: Negative.

16. HEIFER 4700.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: Drenched on 8.5.19 with 480 grammes putrid flesh from carcass of heifer 4765 that died on 4.5.19.

Result: Negative.

17. HEIFER 4709.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 30.4.19.

Treatment: Drenched on 9.5.19 with 480 grammes putrid flesh from carcass of heifer 4765 that died on 4.5.19.

Result: Negative.

EXPERIMENT IV.—DRENCHING WITH MATERIAL FROM HEIFER 4691.

1. HEIFER 4733.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.6.19.

Treatment: Drenched on 7.6.19 with 300 grammes fly larvae reared on the carcass of heifer 4691 that died on 19.5.19.

Result: Negative.

2. HEIFER 4686.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 28.5.19.

Treatment: Drenched on 3.6.19 with 480 grammes putrid flesh of heifer 4691 that died on 19.5.19.

Result: Negative.

3. HEIFER 4726.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.6.19.

Treatment: Drenched on 8.6.19 with 480 grammes putrid flesh of heifer 4691 that died on 19.5.19.

Result: Negative.

4. HEIFER 4772.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 10.6.19.

Treatment: Drenched on 30.6.19 with 480 grammes putrid bones (ribs and vertebrae) from carcass of heifer 4691 that died on 19.5.19.

Result: Negative.

5. HEIFER 4759.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 15.7.19 with 480 grammes putrid bones (ribs and vertebrae) from carcass of heifer 4691 that died on 19.5.19.

Result: Negative.

EXPERIMENT V.—DRENCHING WITH BONE MATERIAL FROM HEIFER 4707.

NOTE.—Heifer 4707 died at Onderstepoort of lamsiekte on 14.5.19, as a result of drenching with larvae reared on the carcass of heifer 4765 (*vide* previous experiment).

1. HEIFER 4678.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 28.5.19.

Treatment: Drenched on 17.6.19 with 480 grammes putrid bones (vertebrae and ribs) from carcass of heifer 4707 that died on 14.5.19.

Result: Negative.

2. HEIFER 4744.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled from 9.4.19.

Treatment: Drenched on 17.6.19 with 480 grammes putrid bones (vertebrae and ribs) from carcass of heifer 4707 that died on 14.6.19.

Result: Negative.

EXPERIMENT VI.—DRENCHING WITH MATERIAL FROM HEIFER 4770.

NOTE.—Heifer 4770 died of lamsiekte on 18.5.19 as a result of drenching with bones from the carcass of heifer 4765 (*vide* previous experiment).

1. HEIFER 4735.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.6.19.

Treatment: Drenched on 10.6.19 with 480 grammes putrid bones (vertebrae and ribs) of heifer 4770 that died on 18.5.19.

Result: Negative.

2. HEIFER 4749.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.6.19.

Treatment: Drenched on 10.6.19 with 480 grammes putrid bones (vertebrae and ribs) of heifer 4770 that died on 18.5.19.

Result: Negative.

3. HEIFER 4763.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 23.5.19 with 240 grammes fly larvae reared on the carcass of heifer 4770 that died on the 18.5.19.

Result: Negative.

4. HEIFER 4773.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 28.5.19 with 240 grammes fly larvae reared on the carcass of heifer 4770 that died on 18.5.19.

Result: Negative.

5. HEIFER 4764.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 23.5.19 with 480 grammes putrid flesh obtained from carcass of heifer 4770 that died on 18.5.19.

Result: Negative.

6. HEIFER 4736.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 18.6.19.

Treatment: Drenched on 28.5.19 with 480 grammes putrid flesh obtained from carcass of heifer 4770 that died on 18.5.19.

Result: Negative.

EXPERIMENT VII.—DRENCHING WITH MATERIAL FROM HEIFER 4738.

NOTE.—Heifer 4738 died of lamsiekte at Onderstepoort on 17.5.19 as a result of drenching with flesh from the carcass of heifer 4765 (*vide* previous experiment).

1. HEIFER 4728.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 10.6.19.

Treatment: Drenched on 17.6.19 with 215 grammes putrid flesh from the carcass of heifer 4738 that died on 17.5.19.

Result: Negative.

2. Ox 4787.—Arrived at Onderstepoort on 25.6.19 from Pretoria and stabled since 25.6.19.

Treatment: Drenched on 30.6.19 with 480 grammes putrid bones from the carcass of heifer 4738 that died on 17.5.19.

Result: Negative.

3. HEIFER 4758.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 15.5.19.

Treatment: Drenched on 15.7.19 with 480 grammes putrid bones from the carcass of heifer 4738 that died on 17.5.19.

Result: Negative.

EXPERIMENT VIII.—DRENCHING WITH MATERIAL FROM HEIFER 4742.

NOTE.—Heifer 4742 died of lamsiekte at Onderstepoort on the 19.5.19 as a result of drenching with putrid flesh from the carcass of heifer 4765.

1. HEIFER 4757.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 28.5.19.

Treatment: Drenched on 28.5.19 with 240 grammes fly larvae reared on the carcass of heifer 4742 that died on 19.5.19.

Result: Negative.

2. HEIFER 4683.—Arrived at Onderstepoort on 9.4.19 from Pretoria and stabled since 18.5.19.

Treatment: Drenched on 2.6.19 with 240 grammes fly larvae reared on the carcass of heifer 4742 that died on 19.5.19.

Result: Negative.

3. BULL 4785.—Arrived at Onderstepoort on 25.6.19 from Pretoria and stabled since arrival.

Treatment: Drenched on 30.6.19 with 480 grammes of putrid bones (vertebrae and ribs) obtained from the carcass of heifer 4742 that died on 19.6.19.

Result: Negative.

4. BULL 4792.—Arrived at Onderstepoort on 25.6.19 from Pretoria and stabled since then.

Treatment: Drenched on 15.7.19 with 480 grammes putrid bones (vertebrae and ribs) obtained from the carcass of heifer 4742 that died on 19.5.19.

Result: Negative.

SERIES D.

DRENCHING WITH MATERIAL OBTAINED AT ONDERSTEPOORT AS THE RESULT OF CULTIVATING ANAEROBIC ORGANISMS CONTAINED IN TOXIC BONES ORIGINATING FROM ARMOEDSVLAKTE.

EXPERIMENT I.—DRENCHING WITH CULTURE No. 1.

HEIFER 4704.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 3.11.19 with 400 grammes of contents of Jar No. 1.

Result: The animal was found dead on the morning of the 6th November without having shown any signs of ill-health prior to that.

Epicrisis: The attack was a very acute one with a short incubation period, the animal being found dead on the third day after it was drenched. Microscopic examination of the blood gave negative results while the post-mortem findings were similar to those usually met with in peracute cases of lamsiekte.

EXPERIMENT II.—DRENCHING WITH CONTENTS OF JAR No. 2, WHICH CONSISTED OF LIVER TISSUE INOCULATED WITH ORIGINAL BONE MATERIAL OF LOW TOXICITY RECEIVED FROM ARMOEDSVLAKTE.

HEIFER 4661.—Arrived at Onderstepoort on 29.3.19 from Pretoria and had been stabled since arrival.

Treatment: Drenched on 3.11.19 with 400 grammes of contents of Jar No. 2.

Result: Negative.

EXPERIMENT III.—DRENCHING WITH CONTENTS OF JAR No. 3, WHICH CONSISTED OF MUSCLE TISSUE INOCULATED WITH ORIGINAL BONE MATERIAL OF LOW TOXICITY RECEIVED FROM ARMOEDSVLAKTE.

HEIFER 4703.—Arrived at Onderstepoort on 29.3.19 from Pretoria and had been stabled since arrival.

Treatment: Drenched on 3.11.19 with 400 grammes of contents of Jar No. 3.

Result: Negative.

EXPERIMENT IV.—DRENCHING WITH CONTENTS OF JAR No. 4, WHICH CONSISTED OF MIXED BRAIN TISSUE INOCULATED WITH ORIGINAL BONE MATERIAL OF LOW TOXICITY, *ex* VRYBURG, AND PASTEURIZED AFTER INOCULATION.

HEIFER 4701.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 3.11.19 with 300 grammes of contents of Jar No. 4.

Result: The animal was found dead in the stable on the morning of the 5th November, no signs of ill-health having been noticed previously.

Epicrisis: In this case again, death took place suddenly, the incubation period being very short—only two days. The post-mortem lesions were similar to those usually seen in very acute cases of lamsiekte.

EXPERIMENT V.—DRENCHING WITH CONTENTS OF JAR No. 5, WHICH CONSISTED OF LIVER TISSUE INOCULATED WITH ORIGINAL BONE MATERIAL OF LOW TOXICITY RECEIVED FROM ARMOEDSVLAKTE, AND THEN PASTEURIZED.

1. HEIFER 4660.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 3.11.19 with 400 grammes of contents of Jar No. 5.

Result: The animal was found dead on the morning of the 5th November without having shown any signs of ill-health previously.

Epicrisis: Like the previous case, this animal died suddenly on the second day after drenching. No lesions other than those usually met with in acute cases of lamsiekte could be seen on post-mortem examination.

2. HEIFER 4805.—Arrived at Onderstepoort on 27.6.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 3.12.19 with 100 grammes of contents of Jar No. 5.

Result: Towards the evening of the 3rd December the animal was reported to be rather wild and excited, running about the stable, not feeding or drinking.

In the early morning of the 4th December it was found standing in one corner of the stable, dull and disinclined to move. It went down at 8 a.m. and was unable to rise. At 8.45 it was lying stretched out on its side, grunting, its mouth open, and saliva dribbling out. Spasms of the muscles could be noticed at frequent intervals. It died at 9.20 a.m.

Epicrisis: This case is remarkable in that the incubation period was as short as twenty-four hours.

Typical symptoms of a very acute case of lamsiekte were present, including complete muscular paralysis, involving the muscles of the tongue and jaw. The lesions seen on autopsy were consistent with those present in an acute case of lamsiekte.

3. HEIFER 4692.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 5.12.19 with 20 grammes of contents of Jar No. 5.

Result: The animal was found down and unable to get up on the morning of the 8th December. It died about 10 a.m. on the same day.

Epicrisis: Symptoms of lamsiekte, muscular paralysis, etc., were observed on the third day after drenching, the animal dying after only a few hours' illness.

4. HEIFER 4572.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 27.3.19.

Treatment: Drenched on 8.12.19 with $2\frac{1}{2}$ -3 grammes of contents of Jar No. 5.

Result: On the 15th December it was found lying in the sternal position, unable to get up, with its head turned to the flank. Slight salivation was present, and quivering of the muscles in the flank and gluteal regions. On the 16th it was lying stretched out on its side. On the 17th it was lying stretched out in a helpless condition and died the same day.

Epicrisis: This animal, which received only a very small dose of toxin, suffered from the usual form of lamsiekte met with in practice. The incubation period was seven days and the illness lasted only three days. No changes were present in the blood, while the lesions found at the autopsy were those of lamsiekte.

EXPERIMENT VI.—DRENCHING WITH CONTENTS OF JAR NO. 12, WHICH CONSISTED OF LIVER TISSUE INOCULATED WITH MATERIAL FROM JAR NO. 5, AND THEN PASTEURIZED.

1. HEIFER 4764.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 5.12.19 with 100 grammes of contents of Jar No. 12.

Result: On the morning of the 8th December it was found lying stretched out on its side, and died about 9 a.m. the same day.

Epicrisis: After an incubation period of only three days the animal went down with muscular paralysis and died the same day. The post-mortem changes were typical of a case of lamsiekte.

2. HEIFER 4017.—Arrived at Onderstepoort on 26.8.17 from Pretoria and stabled since 27.12.17.

Treatment: Drenched on 16.1.19 with 12 grammes of contents of Jar No. 12.

Result: Negative.

EXPERIMENT VII.—DRENCHING WITH CONTENTS OF JAR NO. 20, WHICH CONSISTED OF LIVER TISSUE INOCULATED WITH MATERIAL FROM JAR NO. 12, I.E. THE THIRD SUB-INOCULATION.

HEIFER 4008.—Born at Onderstepoort on 19.8.17 from cow 3725 and stabled since 18.12.19.

Treatment: Drenched on 19.12.19 with 30 grammes of contents of Jar No. 20.

Result: The animal was found dead on the morning of the 20th December without any signs of ill-health having been shown previously.

Epicrisis: In this case again, the results were remarkable in that the animal died suddenly after an incubation period of only about twenty-four hours, showing the extraordinarily high virulence of the toxin. Blood examination revealed no abnormalities, while the post-mortem lesions were those of a peracute case of lamsiekte.

EXPERIMENT VIII.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4805.

NOTE.—4805 died from peracute lamsiekte on 4.12.19 after receiving 100 grammes of culture.

1. HEIFER 4582.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.5.19.

Treatment: Drenched on 8.12.19 with 480 grammes pycnosoma larvae obtained from carcass 4805.

Result: On the second morning after the drenching was carried out the animal was found lying dead in the kraal, having died during the night, without any signs of illness having been observed prior to that.

Epicrisis: Microscopic examination of the blood revealed no abnormalities, and post-mortem inspection showed only the usual lesions seen in peracute cases of toxæmia or lamsiekte. From the history of the case, etc., there can be no doubt that the cause of death was peracute lamsiekte.

2. HEIFER 4017.—Born at Onderstepoort on 3.9.17 and stabled since 25.10.19.

Treatment: Drenched on 5.12.19 with 480 grammes of putrid meat obtained from the carcass of 4805.

Result: Negative.

EXPERIMENT IX.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4701.

NOTE.—4701 died from peracute lamsiekte on 5.11.19 after receiving 300 grammes of culture.

HEIFER 4021.—Arrived at Onderstepoort on 9.9.17 and stabled since 5.12.19.

Treatment: Drenched on 8.12.19 with 480 grammes pycnosoma larvae obtained from the carcass of 4701.

Result: On the third day after drenching the animal was found dead in the kraal, no symptoms of illness having been observed.

Epicrisis: Microscopic examination of the blood revealed nothing abnormal, and on post-mortem inspection the usual lesions found in acute cases of lamsiekte were seen. The cause of death apparently was peracute lamsiekte.

EXPERIMENT X.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4692.

NOTE.—4692 died from acute lamsiekte on 8.12.19.

HEIFER 4588.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 9.12.19 with 160 grammes pycnosoma larvae obtained from the carcass of 4692.

Result: On the morning of the second day after being drenched the animal appeared to be in good health, but was found dead at 1 p.m. the same day.

Epicrisis: Microscopic examination of blood-smears revealed no abnormalities, and post-mortem inspection showed only the lesions usually met with in peracute cases of lamsiekte.

EXPERIMENT XI.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4582, WHICH WAS KILLED WITH MATERIAL FROM CARCASS 4805, I.E. THIRD GENERATION (SEE EXPERIMENT VIII).

1. HEIFER 4661.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 9.12.19 with 480 grammes of putrid meat obtained from the carcass of 4582.

Result: Negative.

2. HEIFER 4047.—Born at Onderstepoort on 5.1.17, and stabled 5.12.19.

Treatment: Drenched on 12.12.19 with 480 grammes of pycnosoma larvae obtained from the carcass of 4582.

Result: The animal was found lying dead on the second day after drenching.

Epicrisis: Microscopic examination of blood-smears failed to show any abnormalities, and post-mortem inspection showed the presence of the usual lesions encountered in peracute cases of lamsiekte.

3. SHEEP 11546.—Arrived at Onderstepoort on 18.4.17 and stabled since then.

Treatment: Drenched on 17.12.19 with about 250 grammes of putrid bones and flesh obtained from the carcass of cattle 4582.

Result: Negative.

EXPERIMENT XII.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4021, WHICH WAS KILLED WITH MATERIAL FROM CARCASS 4701 (SEE EXPERIMENT IX), I.E. THIRD GENERATION.

HEIFER 4590.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 15.12.19 with 400 grammes putrid meat obtained from the carcass of 4021.

Result: On the 23rd, i.e. the eighth day after drenching, the animal was found lying down and disinclined to get up. During the following days it was unable to rise in the morning without assistance, but after having been assisted to the standing position it was able to walk about and feed fairly normally.

The animal was in rather poor condition, and this, combined with some other trouble, may have been responsible for the weakness. It is also possible that the animal suffered from a mild attack of lamsiekte, but a definite diagnosis could not be made. After a few days it gradually got stronger and made a complete recovery.

EXPERIMENT XIII.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4588, WHICH WAS KILLED WITH MATERIAL FROM CARCASS 4692 (EXPERIMENT X), I.E. THIRD GENERATION.

HEIFER 4767.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 15.12.19 with 480 grammes pycnosoma larvae obtained from the carcass of 4588.

Result: After an incubation period of four days the animal was found lying stretched out on its side and unable to support itself in the sternal position. It died the same day.

Epicrisis: Its temperature remained normal until the day it was noticed ill, when it dropped to sub-normal. Post-mortem examination revealed lesions usually met with in acute cases of toxaemia or lamsiekte.

EXPERIMENT XIV.—DRENCHING WITH MATERIAL FROM THE CARCASS OF ANIMAL 4047, WHICH WAS KILLED WITH MATERIAL FROM CARCASS 4582 (EXPERIMENT XI), I.E. FOURTH GENERATION.

BULL 4792.—Arrived at Onderstepoort on 25.6.19 and stabled since 1.11.19.

Treatment: Drenched on 17.12.19 with 480 grammes of pycnosoma larvae collected on the carcass of animal 4047.

Result: Negative.

EXPERIMENT XV.—DRENCHING WITH MATERIAL FROM CARCASS OF ANIMAL 4767, WHICH WAS KILLED WITH CARCASS MATERIAL FROM 4588 (SEE EXPERIMENT XIII), I.E. FOURTH GENERATION.

HEIFER 4061.—Born at Onderstepoort on 12.11.17 and stabled since 18.12.19.

Treatment: Drenched on 22.12.19 with 480 grammes pycnosoma larvae obtained from the carcass of 4767.

Result: On the third day after drenching the animal was found lying dead in the stable.

Epicrisis: Its temperature remained normal to the time of death, and microscopic examination of blood-smears gave negative results. Post-mortem inspection revealed the usual lesions found in peracute cases of lamsiekte.

EXPERIMENT XVI.—DRENCHING WITH MATERIAL FROM THE CARCASS OF ANIMAL 4061, WHICH WAS KILLED WITH CARCASS MATERIAL FROM 4767 (EXPERIMENT XV), I.E. FIFTH GENERATION.

HEIFER 4480.—Born at Onderstepoort on 28.11.18 and stabled since 18.12.19.

Treatment: Drenched on 27.12.19 with 480 grammes pycnosoma larvae obtained from the carcass of heifer 4061.

Result: Negative.

SERIES E.

DRENCHING WITH MATERIAL OBTAINED FROM THE CARCASSES OF ANIMALS IN NATAL.

EXPERIMENT I.—DRENCHING WITH PUTRID BONE MATERIAL COLLECTED BY MR. C., MOOI RIVER.

HEIFER 4387.—Born at Onderstepoort on 9.9.18 and stabled since 18.12.18.

Treatment: Drenched on 12.1.20 with 480 grammes of putrid bones collected as above.

Result: Negative.

2. HEIFER 4661.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 21.1.20.

Treatment: Drenched on 13.2.20 with 465 grammes of putrid bones obtained as above.

Result: Negative.

EXPERIMENT II.—DRENCHING WITH BONE MATERIAL FORWARDED BY MR. S., WILLOW GRANGE.

1. HEIFER 4661.—Arrived at Onderstepoort on 26.10.19 from Pretoria and stabled since 26.10.19.

Treatment: Drenched on 21.1.20 with 380 grammes of putrid bones obtained from the camp where lamsiekte was not suspected.

Result: Negative.

2. HEIFER 4575.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 21.1.20 with 385 grammes putrid bones derived from the suspected lamsiekte camp.

Result: Negative.

3. HEIFER 4575 was drenched on 27.2.20 with 480 grammes of putrid bones derived from the same source as above.

Result: Negative.

EXPERIMENT III.—DRENCHING WITH BONE MATERIAL FORWARDED BY MR. B., WILLOW GRANGE.

1. HEIFER 4579.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 21.1.20 with 465 grammes putrid bones derived from the above source.

Result: Negative.

2. HEIFER 4706.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 21.1.20 with 480 grammes putrid bones derived from the above source.

Result: Negative.

3. HEIFER 4482.—Born at Onderstepoort on 10.12.18 and stabled since 12.2.20.

Treatment: Drenched on 12.2.20 with 325 grammes putrid bones derived from the above source.

Result: Negative.

4. HEIFER 4480.—Born at Onderstepoort on 28.11.18 and stabled since 15.12.19.

Treatment: Drenched on 12.2.20 with 300 grammes putrid bones obtained as above.

Result: Negative.

5. HEIFER 4590.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 27.2.20.

Treatment: Drenched on 5.3.20 with 480 grammes putrid bones obtained as above.

Result: Negative.

EXPERIMENT IV.—DRENCHING WITH BONE MATERIAL SUPPLIED BY MR. M., V. D. MERWE'S KRAAL.

HEIFER 4590.—Arrived at Onderstepoort on 17.3.19 from Pretoria and stabled since 5.12.19.

Treatment: Drenched on 28.1.20 with 135 grammes putrid bones derived from the above source.

Result: Negative.

EXPERIMENT V.—DRENCHING WITH BONE MATERIAL FORWARDED BY MR. R., ESTCOURT.

BULL 4085.—Born at Onderstepoort on 22.1.18 and stabled since 14.11.19.

Treatment: Drenched on 28.1.20 with 230 grammes of putrid bones forwarded by Mr. R., Estcourt, Natal, from the carcass of a dog.

Result: On the eighth day after drenching, the animal showed signs of illness, staring coat, dullness, tucked-up appearance, continually moving the jaws, with much salivation. The animal was, however, in poor condition. It gradually got weaker and poorer until, on the 8th February, it went down altogether, since when it was lying stretched out on its side in a helpless condition. It remained lying like this until death took place on the 12th February.

Epicrisis: Symptoms of illness appeared after an incubation period of eight days, and during the three days when the animal was still able to walk about the muscular weakness in the limbs, which is characteristic of lamsiekte, could not be observed. In the later stages the symptoms resembled those of a toxæmia, but, unfortunately, they were somewhat obscured by the poor condition of the animal.

EXPERIMENT VI.—DRENCHING WITH BONE MATERIAL FORWARDED BY MR. R., DARGLE ROAD.

1. HEIFER 4680.—Arrived at Onderstepoort on 29.3.19 from Pretoria and stabled since 25.10.19.

Treatment: Drenched on 28.1.20 with 480 grammes putrid bones obtained as above.

Result: Negative.

2. HEIFER 4509.—Born at Onderstepoort on 13.1.19 and stabled since 18.12.19.

Treatment: Drenched on 12.2.20 with 435 grammes putrid bones collected from a carcass on the above farm.

Result: Negative.

EXPERIMENT VII.—DRENCHING WITH BONE MATERIAL FORWARDED BY MR. M., LIDGETTON.

HEIFER 4503.—Born at Onderstepoort on 23.12.18 and stabled since 18.12.19.

Treatment: Drenched on 15.3.20 with 480 grammes putrid bones derived from cattle carcasses on the above farm.

Result: Negative.

SERIES F.

POST-MORTEM REPORTS OF SOME OF THE FATAL CASES.

Post-mortem Examination Heifer 4765: Age 1½ year. Condition good. Rigor mortis absent. Lymphatic glands markedly enlarged, oedematous, and hyperaemic. Pleural cavities normal. Trachea full of foam. Lungs partly collapsed; on section blood supply rich; oedema present; bronchi contain foam. Pericardial cavity contains 30 c.c. straw-coloured fluid; epicardium shows few ecchymoses. Right ventricle contains a small quantity of coagulated blood, endocardium pale. Left ventricle contains a little clotted blood, endocardium pale, myocardium pale, consistence friable. Periportal glands enlarged and oedematous. Liver normal size; capsule shows some fibrous filaments; on section rich in blood; lobulation very distinct. Gall-bladder distended with brown liquid. Spleen slightly enlarged, measuring 44 by 15 by 4 cm.; on section malpighian bodies markedly swollen, trabeculae distinct, colour darker than normal, consistence soft. Kidneys capsule easily detached; on section very marked diffuse hyperaemia, softer than normal. Rumen normal, large number of amphistoma conicum. Reticulum and omasum normal. Abomasum has liquid contents and contains large number of fly pupae; mucosa shows marked patchy hyperaemia and a great deal of mucus. Small intestines: mucosa markedly swollen in parts, some places very marked patchy hyperaemia, others haemorrhagic, mucous material in abundance. Colon mucosa swollen and abundant mucus. Mesenteric glands enlarged and oedematous. Bladder empty.

Pathological Anatomical Diagnosis: Gastro-enteritis; muco-enteritis. Hyperaemia of liver, spleen, and kidneys. Fatty degeneration of heart.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4694: Age 2½ years. Condition good. Rigor mortis present. Blood, flesh, and subcutaneous tissue normal. Lymphatic glands enlarged and oedematous. Peritoneal cavity excessive amount of fluid, slightly blood-tinged. Pleural cavity fluid normal, few fibrous adhesions left side. Lungs partly collapsed; on section marked oedema and patches of hyperaemia. Left lung shows blood stasis. Trachea hyperaemic and containing foam. Bronchi contain foam. Pharynx and larynx normal. Pericardial cavity contains 30 c.c. straw-coloured fluid. Epicardium shows a few small petechiae on the right side. Right ventricle contains coagulated blood, endocardium shows a few recent ecchymoses. Left ventricle contains coagulated blood, endocardium shows extensive blood extravasations. Myocardium rather pale and soft. Liver capsule shows brown mottled appearance due to putrefactive changes; on section lobulation distinct, blood supply rich, consistence rather tough, in some places putrefactive changes. Gall-bladder contains yellowish-brown bile. Spleen enlarged, measuring 43 by 16 by 4½ cm., on capsule few petechiae visible; on section, malpighian bodies much swollen, trabeculae just visible, colour darker than normal, consistence soft. Kidneys surrounded by abundant normal fat, capsule easily stripped off; on section, diffuse hyperaemia present, consistence normal. Rumen normal, a few fly pupae present. Reticulum shows nothing unusual. Omasum normal, except few signs of commencing decomposition. Abomasum has liquid food contents and contains fly pupae, mucosa shows marked diffuse hyperaemia in patches and blood extravasations. Small intestines have fluid contents with a few pupae, patchy hyperaemia throughout and in some places markedly diffuse hyperaemia, with few blood extravasations; liquid contents blood-tinged, in places mucosa much swollen and a good deal of mucus present. Caecum shows patchy hyperaemia, mucosa thickened. Colon shows marked patchy hyperaemia and a few blood extravasations, mucosa much swollen, abundant mucus and nematodes present. Bladder distended with normal urine.

Pathological Anatomical Diagnosis: Gastro-enteritis; hæmorrhagic and muco-enteritis; hyperaemia of liver, spleen, and kidneys.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4695: 7.5.19: Age 2 years. Condition fair. Rigor mortis absent. Blood non-coagulated; normal colour. Flesh pale, dull, slightly watery. Thyroid yellowish in colour, slightly oedematous, surrounding interstitial tissue oedematous. Tongue and buccal muscles show nothing unusual. Peritoneal cavity contains a slight increase of pale straw-coloured liquid. Pharynx, larynx, and cervical trachea normal. Left lung in expirium, inelastic, on section interlobular separation distinct, no oedema; bronchi normal. Right lung in inspirium, hyperaemia of middle third lobe distinct and showing mottling from pink to black; bronchi normal. Lymphatic system main glands hypoplastic, oedematous, and hyperaemic. Hæmolymphatics swollen and deeply congested. Pericardium contains 20 c.c. fluid containing fibrinous material. Epicardium shows fine subserosal petechiae on ridge of right ventricle. Sulci and coronary fat normal. Blood of left ventricle clotted, endocardium normal, myocardium normal colour and consistence. Liver normal in size and consistence; on section, lobulation distinct; biliary canals thickened and contain distoma. Gall-bladder contains 350 c.c. transparent green fluid bile, mucosa normal. Spleen measures 40 by 13 by 3½ cm., capsule stretched, pulpa swollen, deep in colour, malpighian bodies individually prominent, substance firm and inelastic. Suprarenal glands, medulla hyperaemic, cortex nothing unusual. Left kidney size and consistence normal, fat plentiful, capsule strips, on section congestion of intermediary zone and medulla. Right kidney the same. Rumen contents as food given. Reticulum contents normal. Amphistomum frequent. Omasum ingesta a little drier than normal. Abomasum contents porridge consistence, greyish-brown colour, gravel has been taken, no pupae seen, mucosa normal. Duodenum bile-stained, contents mucoid, mucosa oedematous, and showing patchy hyperaemic with rare hæmorrhagic points. Jejunum contains milk-like mucus, mucosa thickened and oedematous. Ileum contains semi-fluid ingesta and much mucus. Mucosa thickened and oedematous; areas deeply hyperaemic with marked transverse zebra markings. Peyer's patches swollen. Caecum contents soft and dark, partly grumous. Colon mucosa thickened, rugous and pin-point hæmorrhages. Bladder contains normal urine.

Pathological Anatomical Diagnosis: Tumor splenis. Renal hyperaemia. Oedema and hyperaemia of intestinal tract. Epicardial petechiae. Hypoplasia of lymphatics.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4670: 8.5.19: Died aged 2 years. Interim about eight hours. Rigor mortis present. Blood deep in colour and coagulated. Flesh dark in colour and dull in section. Odour of putrefaction present. Salivary glands congested. Thyroid deep chocolate and congested. Pharyngeal glands markedly swollen, oedematous, and diffusely hyperaemic; tongue and oesophagus nothing normal. Trachea slightly hyperaemic and submucous oedema. Pharynx cyanosed. Right lung in inspirium, hypostatic congestion, lobulation distinct. Left lung in inspirium, and showing nothing unusual. Bronchus of right lung shows ecchymoses and hæmorrhages, lesions extending into bifurcation of trachea. Lymphatic system main trunk glands slightly swollen, firm and deeply congested. Hæmolymphatics show pronounced hyperaemia, dark in colour. Pericardium contains 10 c.c. deep blood-stained fluid. Heart in diastole; both ventricles contain dark, clotted blood. Epicardium shows deep ecchymoses covering sulcus and angle of right ventricle, both furrows on left, and extending up pulmonary vein. Right endocardium shows diffuse hæmoglobin staining, left endocardium scanty ecchymoses on papillaris; myocardium firm, inelastic, and showing venous congestion. Liver normal size, post-mortem changes present, hepatic vein contains frothy blood. Gall-bladder contains 200 c.c. thick, mucoid, green bile. Pancreas friable and hyperaemic. Spleen measures 40 by 12 by 2 cm., capsule shrunken; on section trabeculae prominent, pulp deep coloured, friable, malpighian bodies not detectable. Suprarenal glands show nothing unusual. Kidneys fatty appearance, capsule strips. Left kidney on section diffusely congested, most marked in intermediary zone, venous system sharply outlined in cortex and medulla. Right kidney hyperaemic in cortex, medulla shows nothing unusual. Rumen contains food. Reticulum empty, but contains small wire nails. Abomasum contents porridge consistence; mucosa shows fairly diffuse hyperaemia with venous congestion of folds. Omasum shows nothing unusual. Duodenum and jejunum show blackened venous arborescence. Ileum empty, venous arborescence, patchy hæmorrhagic areas; and areas with oedema and acute enteritis; numerous taenia present. Caecum mucosa brownish in colour; venous arborescence with patchy hyperaemia. Colon, walls of mucosa thickened, contents hæmorrhagic.

Pathological Anatomical Diagnosis: Pulmonary hyperaemia. Extravasations of heart, muco-enteritis and colitis. Hypoplasia of lymphatics.

Etiological Diagnosis: Lamsiekte.

Post-mortem Report Heifer 4774: Age 2 years. Condition fair. Interim five hours. Rigor mortis absent. Blood, flesh, and subcutaneous tissue normal. Pharyngeal lymphatic glands slightly hæmorrhagic infiltrations. Tongue a couple of ulcers on right side, probably due to wounds. Buccal muscle contains small quantity of gritty matter. Peritoneal cavity normal. Pleural cavities contain 250 c.c. clear straw-coloured fluid. Larynx mucosa cyanosed. Trachea empty, veins of mucosa congested. Lungs in expirium. Right lung pleura shows few fibrous filaments, mottled appearance of middle lobe, showing on section a few very darkly-stained patches, lobulation well marked, and a quantity of foam in smaller bronchi. Left lung pleura covering anterior and middle lobes dark in colour; on section marked hypostasis, parenchyma intensely dark in colour, lobulation distinct, mottled appearance in posterior lobe. Bronchi contain froth, veins of mucosa injected. Mediastinal glands show very slight hæmorrhagic infiltration. Bronchial glands normal. Main trunk of lymphatic system shows hæmorrhagic infiltration. Lymphatics embedded in muscles show slight hyperaemia. Pericardium contains 200 c.c. clear fluid; apex adherent to parietal epicardium. Heart in diastole. Epicardium shows evidence of recent pericarditis and extravasations. Left auricle shows marked hæmorrhagic extravasations. Left ventricle contains a very firm blood-clot extending into aorta, endocardium shows very marked extravasations tending to diffusion, myocardium firm. Periportal glands dark in colour showing slight hæmorrhagic infiltration. Liver slightly enlarged, capsule slaty-blue in colour, on section venous congestion, lobulation not very distinct, consistence firm. Gall-bladder contains 250 c.c. green viscid bile, mucosa bile-stained, and congestion of veins. Spleen measures 47 by 14 by 4 cm.; hæmorrhagic spots on capsule; on section trabeculae distinct, malpighian bodies fairly distinct, consistence firm. Right suprarenal gland hæmorrhagic, outer zone yellowish colour. Right kidney fat normal, and capsule easily detached, on section marked hyperaemia of cortex, most marked in intermediary zone; medulla normal, consistence normal. Left kidney the same. Rumen contents fairly

dry, a few amphistomum present. Reticulum contains no food, but a quantity of sand and grit. Omasum normal. Abomasum has soft contents, and pupae are present, mucosa shows well-marked diffuse hyperaemia, folds slightly thickened, a few darkly-stained patches tending to ulceration. Duodenum markedly bile-stained. Jejunum in parts bile-stained, in others patchy hyperaemia; muco-enteritis throughout. Ileum contains more mucus than jejunum, marked thickening of mucosa and intense hyperaemia in places.

Caecum shows patchy hyperaemia. Colon contains a small quantity of mucus, mucosa slightly thickened and showing very slight patchy hyperaemia. Bladder distended with normal urine. Uterus contains a foetus of about six weeks old.

Pathological Anatomical Diagnosis: Slight pericarditis. Endocardial extravasations. Slight venous congestion. Gastritis. Muco-enteritis. Haemorrhagic infiltration of lymphatic system.

Etiological Diagnosis: Lamsiekte.

Post-mortem Report Heifer 4766: Died 2 p.m., 12.5.19. Age 2½ years. Rigor mortis present. Serous exudate in submaxillary space. Subcutaneous tissue devoid of fat. Lymphatic glands enlarged and hyperaemic Prescapular and pharyngeal lymph glands enlarged and haemorrhagic. Tongue shows three bruises on surface. Oesophagus, pharynx and larynx normal. Cervical trachea contained a few particles of grit, its mucosa normal. Thoracic trachea foam present. Lungs swollen and congested, froth in bronchi. Pericardial cavity contains 20 c.c. clear fluid. Epicardium shows petechiae. Right ventricle contains coagulated blood, endocardium normal. Left ventricle empty, endocardium shows few extravasations, myocardium normal. Periportal glands oedematous. Liver swollen, capsule normal, parenchyma friable. Gall-bladder contains 300 c.c. yellow green bile. Pancreas shows nothing unusual. Spleen glands slightly hyperaemic. Spleen measures 34 by 11½ by 3 cm., few subcapsular petechiae, pulp swollen; malpighian bodies and trabeculae distinct. Suprarenal glands slightly hyperaemic. Kidneys capsules easily detached, parenchyma dark, congested. Rumen, reticulum, omasum, and abomasum show nothing unusual. Duodenum contains slime and bile only, mucosa intense hyperaemia. Jejunum and ileum have liquid contents, mucosa hyperaemic. Caecum contents fluid, mucosa hyperaemic. Colon normal. Bladder empty, contracted, mucosa slightly hyperaemic. Uterus normal.

Pathological Anatomical Diagnosis: Congestion of lungs. Enteritis. Hyperaemia of lymphatic glands.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4707: Age 2½ years. Condition good. Rigor mortis present. Natural openings and visible mucous membranes normal. Salivary glands and thyroid normal. Superficial lymphatic glands are enlarged and hyperaemic, pharyngeal glands hyperaemic, mediastinal and bronchial glands are normal. Haemolymphatic glands dark in colour. Tongue shows a few abrasions. Diaphragm shows few fibrous filaments. Pleural cavities contain about 50 c.c. clear fluid. In the cervical trachea ingesta are present; mucosa showing nothing unusual. Lungs collapsed, few fibrous filaments on right pleura; on section, lobules distinct, slightly hyperaemic and slightly oedematous; foam in bronchi. Pericardial cavity contains 50 c.c. clear fluid and a few flocculi. Epicardium shows few ecchymoses. Small blood coagula are present in ventricle; endocardium and myocardium normal. Liver enlarged, capsule tense; few fibrous filaments; on section hypostasis; lobulation indistinct; bile ducts congested. Gall-bladder contains 300 c.c. yellow green bile; mucosa normal. Pancreas is normal. Spleen measures 52 by 13 by 3½ cm., capsule tense, on section trabeculae and malpighian bodies distinct, consistence firm. Suprarenal glands normal. Kidneys contain the usual amount of fat; on section normal; rumen, reticulum, and omasum show nothing unusual. Abomasum has semi-fluid contents with grit and small stones; mucosa slightly diffuse hyperaemia. Duodenum bile stained, mucosa thickened and showing diffused hyperaemia. Jejunum thickened, showing well-marked diffuse hyperaemia and large quantity of mucus. In the ileum hyperaemia is not so marked as in jejunum, being very slight in parts; mucus present throughout. Peyer's patches not distinct. Caecum and colon show slight diffuse hyperaemia.

Pathological Anatomical Diagnosis: Slight hyperaemia of lungs. Slight gastritis. Muco-enteritis. Hyperaemia of lymphatics.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4738: Age 2 years. Condition fair. Rigor mortis absent. Anus and vulva swollen. Blood, flesh, and subcutaneous tissue nothing unusual. Superficial lymphatic glands swollen, markedly hæmorrhagic. Pharyngeal and mediastinal glands slightly hæmorrhagic. Mediastinum shows very marked gelatinous infiltration. Tongue shows abrasions on left side. Peritoneal and pleural cavities nothing unusual. Right lung collapsed, few fibrous filaments on pleura; on section lobulation well marked, tissue normal, ingesta in bronchi. Left lung pleura mottled appearance; lobulation well marked. Thoracic and cervical trachea contain some ingesta. Pericardium contains a few flocculi and about 30 c.c. fluid. Epicardium veins injected. Left ventricle empty. Endocardium normal. Right ventricle empty. Endocardium shows several small extravasations. Myocardium firm. Periportal glands slightly injected. Liver enlarged, capsule tense, on section slight hypostasis, lobulation not distinct, consistence firm. Gall-bladder contains 150 c.c. greenish bile. Pancreas normal. Spleen measures 54 by 17 by 4 cm., capsule tense, on section trabeculae distinct; malpighian bodies fairly distinct, consistence firm. Suprarenal glands normal. Right kidney fat and capsule normal, on section hyperaemia of cortex. Left kidney fat and capsule normal, on section very slight hyperaemia of intermediary zone. Rumen, reticulum, and abomasum normal. Abomasum contents fluid, gritty. Duodenum bile-stained, muco-enteritis present. Jejunum shows diffuse hyperaemia and muco-enteritis. Ileum shows muco-enteritis. Caecum and colon show patchy hyperaemia. Uterus contains a female foetus about five weeks old.

Pathological Anatomical Diagnosis: Muco-enteritis.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4768: 15.5.19: Age 2½ years. Condition fair. Rigor mortis not present. Natural openings and visible mucous membranes show nothing unusual. Bruises on prominent parts. Superficial lymphatic glands enlarged. Pharyngeal glands slightly enlarged. Peritoneal cavity contains an excessive amount of straw-coloured fluid. Pleural cavities fluid normal. Vessels of costal pleura rather injected. Lungs partly collapsed; on section slight hyperaemia and oedema present, bronchi contain foam, pharynx and larynx normal. Trachea contains some foam, otherwise nothing unusual. Pericardial cavity contains 20 c.c. straw-coloured fluid with a few fibrous flocculi. Heart flabby and dilated. Epicardium shows nothing unusual. Right ventricle contains little blood, endocardium normal. Left ventricle contains a little blood, endocardium normal, myocardium rather soft. Liver capsule shows a few fibrous filaments on anterior surface; on section lobulation distinct, colour pale, consistence normal, bile ducts thickened, containing rare distoma. Gall-bladder distended with green-brown, rather turbid, bile. Mucosa slightly hyperaemic. Spleen rather enlarged, measuring 45 by 15 by 4 cm., capsule tense; on section malpighian bodies swollen, trabeculae visible, colour red, consistence soft. Kidneys capsules easily detached, on section hyperaemia of boundary zone, consistence normal. Rumen normal, except for the presence of a large number of amphistomum. Reticulum and omasum normal. Abomasum mucosa very much thickened and wrinkled with abundant mucus, few patches of punctiform hæmorrhages, one old-standing scar size of one shilling and rare blow-fly pupae present. Small intestines mucosa much thickened, more marked in some places, and containing abundant mucus. Caecum mucosa thickened and wrinkled with abundant mucus present. Colon much the same, and a few small patches of hyperaemia. At junction of duodenum and jejunum patchy hyperaemia is present, rather marked, and diffuse, with a great deal of frothy yellow mucus. Bladder empty. Uterus contains a few months' old foetus.

Pathological Anatomical Diagnosis: Dilatation of heart. Hyperaemia of spleen and kidneys. Muco-enteritis.

Etiological Diagnosis: Killed while suffering from lamsiekte.

Post-mortem Examination Heifer 4679: Age 2 years. Condition fair. Natural openings and visible mucous membranes show nothing unusual. Blood, flesh, and subcutaneous tissue normal. Salivary and precrural glands slightly swollen. Pharyngeal glands swollen. Thyroids dark in colour. Mediastinal glands hæmorrhagic. Mediastinal tissue shows gelatinous infiltration. Tongue normal. Oesophagus empty. Peritoneal cavity contains a few cubic centimetre blood-stained fluid. Pleural cavities contain 100 c.c. blood-stained fluid. Lungs partly collapsed. Right pleura shows a mottled appearance; on section mottling present in lung tissue; slight oedema and slight hyperaemia; in anterior lobe hypostatic congestion. Left lung on section

foam, oedema, slight hyperaemia and hypostasis. Thoracic trachea contains some mucus; mucosa slightly cyanotic. Cervical trachea full of froth; mucosa slightly injected. Larynx slightly injected. Pericardium contains 150 c.c. blood-stained fluid. Epicardium shows marked extravasations and hæmoglobin staining. Left ventricle contains firm blood coagula; endocardium, hæmoglobin stained, around valves into auricle a few small extravasations. Right ventricle contains firm blood coagula, endocardium shows marked hæmoglobin staining throughout, myocardium normal. Periportal glands slightly hyperaemic. Liver slightly enlarged, capsule blue in colour; on section lobulation not distinct, slight fatty infiltration and slight congestion of bile. Gall-bladder contains 200 c.c. dark, greenish bile, mucosa normal. Pancreas shows nothing unusual. Spleen measures 46 by 13½ by 4 cm., capsule normal; on section, trabeculae and malpighian bodies fairly distinct, consistence firm. Suprarenal glands show nothing unusual. Kidneys usual amount of fat, capsules normal, on section right kidney shows slight hyperaemia of cortex. Rumen, reticulum, and omasum normal. Abomasum contents soft, mucosa shows diffuse hyperaemia, and folds slightly thickened, few hæmorrhages present. Duodenum bile-stained. Jejunum and ileum diffusely hyperaemic and hæmorrhagic spots, muco-enteritis marked throughout. Caecum and colon show well-marked patches of hyperaemia. Superficial lymphatics slightly swollen and dark in colour. Hæmolympatics slightly swollen. Bladder normal.

Pathological Anatomical Diagnosis: Oedema and hyperaemia of lungs; gastritis, muco-enteritis.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4770: 18.5.19: Age 2 years. Condition good. Rigor mortis present. Natural openings, visible mucous membranes, blood, flesh, and subcutaneous tissue show nothing unusual. Superficial lymph glands enlarged. Pharyngeal glands show intense hyperaemia, and are enlarged. Mediastinal and bronchial lymph glands slightly hyperaemic. Peritoneal and pleural cavities normal. Thoracic trachea slightly hyperaemic. Lungs hypostasis. Pericardial cavity contains 50 c.c. clear fluid and gelatinous clots. Epicardium shows numerous extravasations. Left ventricle contains blood-clot, endocardium normal. Right ventricle contains blood-clot, endocardium shows nothing unusual. Periportal glands slightly hyperaemic. Liver shows hypostasis and is decomposed. Gall-bladder contains 50 c.c. yellow green bile, mucosa being normal. Spleen measures 57 by 16 by 4 cm., capsule tense; on section tissue firm, trabeculae and malpighian bodies distinct. Kidneys show nothing unusual. Rumen, reticulum, and omasum apparently normal. Abomasum mucosa hyperaemic; decomposition changes. Small intestines show patchy hyperaemia.

Pathological Anatomical Diagnosis: Hyperaemia of lymphatics; hydro-pericard; extravasations of epicard; gastritis; muco-enteritis.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4742: 19.5.19: Age 2 years. Condition fair. Rigor mortis absent. Visible mucous membranes pale. Flesh and subcutaneous tissue show nothing unusual. Superficial lymphatic glands moist, hyperaemic, and oedematous. Submaxillary and pharyngeal glands moist and hyperaemic. Bronchial and mediastinal glands moist, hyperaemic, and oedematous. Prepectoral glands enlarged, soft, and hyperaemic. Thyroid normal. Tongue, oesophagus, and pharynx show nothing unusual. Peritoneal and pleural cavities show nothing unusual. Cervical trachea and larynx slightly hyperaemic. Lungs collapsed, pleura smooth, on section marked hyperaemia and slight oedema, consistence normal. Thoracic trachea and bronchi slightly hyperaemic, with froth present. Pericardium contains 30 c.c. yellow turbid fluid and fibrinous coagula. Epicardium slightly echymosed. Right ventricle and auricle contain blood coagula. Endocardium show a few petechiae. Left ventricle and auricle contain blood coagula. Endocardium nothing unusual. Myocardium pale, reddish-brown, consistence firm. Periportal glands moist and hyperaemic. Liver capsule normal, on section reddish-brown coloured, numerous small areas, irregular in outline, pale-red in colour, and well marked off from liver tissue. Gall-bladder dark-green, turbid bile. Pancreas shows nothing unusual. Spleen measures 43 by 13 by 3 cm. Capsule normal, on section pulp dark in colour, soft and swollen. Kidneys capsule normal, on section both hyperaemic, consistence normal. Rumen, reticulum, and omasum show nothing unusual. Abomasum slightly hyperaemic, wire-worms present. Small intestines show intense muco-enteritis. Caecum and colon slightly hyperaemic. Rectum nothing unusual. Bladder brown turbid urine.

Pathological Anatomical Diagnosis: Ecchymoses on epicard. Hyperaemia of spleen. Hyperaemia of lungs, trachea, and bronchi. Hyperaemia of lymphatics. Muco-enteritis.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4771: Age 2 years. Rigor mortis present. Condition fair. Natural openings and visible mucous membranes show nothing unusual. Salivary glands normal. Superficial lymphatic glands slightly swollen and dark in colour. Mediastinal glands slightly swollen. Thyroids nothing unusual. Tongue shows one or two abrasions on its side. Cervical trachea and larynx contain foam and show marked extravasations. Right lung in inspirium, its pleura showing numerous fibrous patches in the posterior portion, anterior and middle lobes dark in colour; on section the middle and portion of posterior lobe are dark in colour, consolidated in numerous centres. Posterior portion of main lobe slightly hyperaemic. Left lung in inspirium, purulent pneumonic patches present in all three lobes, rest of lung tissue being hyperaemic. Thoracic trachea and bronchi contain foam, mucosa hyperaemic. Pericardial sac contains 5 c.c. clear liquid. On the epicardium the veins are injected. Left ventricle contains firm blood coagula, endocardium showing nothing unusual. Right ventricle and auricle contain blood coagula. Endocardium is slightly bloodstained, the myocardium soft. Periportal glands slightly swollen, dark in colour. Liver capsule slightly brown in colour; on section hypostasis. Gall-bladder distended with very dark-green bile. Pancreas shows nothing unusual. Spleen measures 47 by 15 by 5 cm., capsule tense, on section pulp swollen, consistence soft. Suprarenal glands nothing unusual. Kidneys capsule normal, on section hyperaemic. Abomasum slightly hyperaemic. Small intestines show muco-enteritis, caecum normal. Colon hyperaemic and contains a few ulcerations. Rectum hyperaemic. Bladder contains normal coloured urine.

Pathological Anatomical Diagnosis: Broncho-pneumonia. Hyperaemia of lymphatics. Gastritis. Muco-enteritis.

Etiological Diagnosis: Broncho-pneumonia and lamsiekte.

Post-mortem Examination Heifer 4762: Killed 31.15.19. Age 3 years. Condition fair. Rigor mortis present. Bloody froth discharge from nostrils. Anus slightly opened. Blood, flesh, and subcutaneous tissue normal. Pharyngeal glands enlarged and congested. Peritoneal cavity contains 20 c.c. bloodstained exudate. Serous mucous membranes oedematous. Pleural cavities contain 150 c.c. bloodstained exudate. Muscular tissue around pharynx dark red in colour. Pharynx mucosa purple colour. Larynx congested. Mucosa of trachea and bronchi post-mortem discoloration. Lungs collapsed. Right lung hypostatic congestion. Left lung outer half emphysematous. Pericardial sac contains 50 c.c. very dark red blood-tinged fluid. Heart in diastole. Epicardium dark red-brown, fat also bloodstained. All compartments contain firm, dark-red clots. Endocardium valve black in colour, rest bloodstained. Muscular tissue pale brown and easily broken up with finger. Liver shows commencing putrefactive discoloration, left lobe pale yellow colour, right lobe variegated purple-green, yellowish, and brown. Liver weighed 4½ kg. On section firm, but proper examination marred by putrefactive changes. Gall-bladder (½ kg.) contains thick viscid frothy dark-brown bile. Spleen 47 by 12 by 3 cm., tissue dark red and firm, on pressure foam exuding. Kidneys well enclosed in fat, capsules strip easily; on section putrefactive discoloration, softened. Rumen distended with gas; mucosa strips easily; amhistomum frequent. Reticulum and omasum normal. Abomasum large amount of mucus; mucosa congested in patches. Small intestines post-mortem discoloration and distended with gas; caecum apex and 10 cm. distance from it congested, rest shows mucous material. Colon shows similar changes, with, in addition, a few nematodes. Bladder contains 300 c.c. dark straw-coloured urine; mucosa yellow.

Pathological Anatomical Diagnosis: Muco-gastro-enteritis. Slight oedema in chest, heart, and peritoneal cavities. Decomposition masked other pathological changes.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4731: Died 21.6.19. Age 2 years. Condition poor. Rigor mortis absent. Natural openings and visible mucous membranes nothing unusual. Blood, flesh, and subcutaneous tissue are normal. Prescapular glands swollen. Thyroid gland normal. Tongue and oesophagus

are normal. Peritoneal cavity contains 500 c.c. clear fluid. Thoracic trachea contains foam, its mucosa being normal. Left lung shows hyperaemia and oedema, froth in bronchi. Right lung shows slight hypostasis. Pericardial sac contains fluid and a gelatinous clot. Epicardium shows extravasations. Left ventricle contains blood-clots and shows numerous extravasations. Right ventricle contains blood-clots and shows extravasations; myocardium normal. Liver capsule covered with fibrous filaments, on section hypostasis. Gall-bladder contains 50 c.c. thick green bile. Spleen measures 42 by 13 by 3 cm., pulp firm. Left kidney hyperaemic, right kidney normal. Rumen, reticulum, and omasum are normal. Abomasum shows a few extravasations, and the duodenum intense hyperaemia and bile-staining. Jejunum and ileum are bile-stained and show slight hyperaemia. Caecum normal. Colon contents blood-stained, mucosa hæmorrhagic. Rectum contains dry dung. The mucosa of the bladder shows hyperaemia, extravasations, its wall being thickened and oedematous.

Pathological Anatomical Diagnosis: Hyperaemia and oedema of left lung. Extravasations of epicard and endocard. Hydroperitoneum. Enteritis, oedema, and extravasations of bladder.

Etiological Diagnosis: Lamsiekte.

Post-mortem Examination Heifer 4747: Age 2 years. Condition good. Rigor mortis present. Pharyngeal glands very much enlarged and hyperaemic. Mediastinal and bronchial glands injected. Cervical trachea shows the vessels of its mucosa to be injected. Larynx shows hyperaemia and thickening of its mucosa. Oesophagus paralysed, portion being plugged with food. Lungs collapsed; the left one shows hypostasis and the right diffuse hyperaemia. Thoracic trachea deeply injected. Pericardial cavity contains 20 c.c. blood-stained fluid. Epicardium shows some petechiae and injection of vessels. Right endocardium shows numerous small extravasations. In the left ventricle the blood is well coagulated, endocardium shows extravasations. The surface of the liver is mottled in appearance, on section commencing decomposition. Gall-bladder distended with bile. Spleen measures 49 by 15 by 3 cm., enlarged, on section jelly-like fluid present. The surface of the kidneys mottled in appearance, showing on section patchy hyperaemia and injection of vessels of cortex. Rumen, reticulum, and omasum nothing unusual. Abomasum shows acute hyperaemia, mucosa thickened. Duodenum has its mucosa thickened and contains catarrhal exudate. Jejunum and ileum show acute hyperaemia and contain catarrhal exudate. Caecum and colon show punctiform hæmorrhages and slaty discoloration.

Pathological Anatomical Diagnosis: Hyperaemia of lungs, trachea, and larynx. Paralysis of oesophagus. Hyperaemia of the pharyngeal glands. Hyperaemia of kidneys. Enlarged spleen. Catarrhal gastro-enteritis.

Etiological Diagnosis: Lamsiekte.

THE LAMSIEKTE TOXIN.

THE experiments recorded in the following pages (the protocols of which will be found in Appendix, page 1152) were undertaken with the object (1) of studying the properties of the lamsiekte toxin and determining its minimum lethal dose for the various species of domestic animals; (2) of attenuating the toxin; and (3) of finding a method of immunization against lamsiekte. It may be stated at once that all three objects were achieved to some extent. The minimum lethal dose was determined for the more important domestic animals. Further, it was found possible to attenuate the toxin both by heat and by the addition of chemicals. And, thirdly, a certain degree of immunity could be conferred on cattle and goats, although unfortunately the immunity was afterwards found to be inadequate and the methods too cumbersome.