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.
- 18.5.19: 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 C. 4765.

**Result:** 17.5.19: Empty and dull.
- 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.
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.
   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: 15.7.19: Drenched with 480 grammes of putrid bones collected from carcass C.4765.
   Result: Negative.

12. HEIFER 4762.—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 4768.—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 8.6.19 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 rear 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 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 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 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 4633.**—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 2½ 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 4784.—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 toxaemia 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 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 of putrid meat 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. Fourth 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. Fifth 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.
DRENCHING WITH MATERIAL OBTAINED FROM THE CARCASSES OF ANIMALS IN NATAL.

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

1. 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 350 grammes of putrid bones obtained from the camp where lambsiekte 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 lambsiekte 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 4579 was drenched on 28.1.20 with 135 grammes putrid bones derived from the above source.  
   Result: Negative.

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

1. 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 toxaemia, 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.

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, mucus material in abundance. Colon mucosa swollen and abundant mucus. Mesenteric glands enlarged and oedematous. Bladder empty.


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 congelated blood, endocardium shows a few recent ecchymoses. Left ventricle contains congelated 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, trabeulae 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; hemorrhagic and mucous-enteritis; hyperaemia of liver, spleen, and kidneys.

Etiological Diagnosis: Lambsiekte.


Etiological Diagnosis: Lambsiekte.


Etiological Diagnosis: Lamisekt.
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.


**Etiological Diagnosis:** Lamsiekte.


**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. Hemolymphatic 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.


**Etiological Diagnosis:** Lamsiekte.

Pathological Anatomical Diagnosis: Muco-enteritis.

Etiological Diagnosis: Lambsiekte.

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 paramesenteric part. 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 fibrinous 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, consistency 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, consistency soft. Kidneys capsules easily detached, on section hyperaemia of boundary zone, consistency 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 hemorrhages, 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.


Etiological Diagnosis: Killed while suffering from lambsiekte.


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

Etiological Diagnosis: Lamsietie.  


Pathological Anatomical Diagnosis: Hyperaemia of lymphatics; hydropericard; extravasations of epicard; gastritis; mucosal-enteritis.  

Etiological Diagnosis: Lamsietie.  


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. Thymus 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 pneumatic 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. Periporal 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.


Etiological Diagnosis: Broncho-pneumonia and lamsiekte.


Etiological Diagnosis: Lamsiekte.


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

**Etiological Diagnosis:** Lambsiekte.

**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 haemorrhages and slaty discoloration.


**Etiological Diagnosis:** Lambsiekte.

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**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 lambsiekte 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 lambsiekte. 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.