

(b) 7 a.m. The following cattle of the loogas and rooibrak lot were tested with bleached bones (sweet bones):—

Heifer 3857, heifer 3853, ox 3240, ox 3849, heifer 3825, heifer 3807, ox 3810, ox 3854, ox 3826, heifer 3864, heifer 4004, heifer 4190, cow 2642, tollie 4090, cow 2315, cow 2886, cow 3174, heifer 3805, cow 2341.

Between 7 and 8 a.m. the following animals were noted to pick and chew bones:—

Black and white heifer 3857,\* black and white heifer 3853,\* dark yellow ox 3240,\* black ox 3849,\* blue schimmel heifer 4190,\* red heifer 3825, white and blue heifer 3807, black ox 3810, black ox 3854, black and white ox 3826.\*

At 9.30 a.m. some cattle were still chewing bones, although all bones had been removed at 8 a.m.

*Result:* Out of 19 cattle hitherto in experiment with free access to loogas and rooibrak, 10 showed craving for bleached bones, i.e. over 50 per cent.

*Third Test.—Testing for Craving with Rotten Bones.*

(a) *Sun-kraaled and Shade-kraaled Cattle.*

5.3.19.: 11 a.m. The animals belonging to these lots were re-tested with rotten bones, and of these the following were seen picking and chewing bones: Cow 2790, heifer 3898, cow 3004, heifer 4181, heifer 3865, cow 2907, and ox 3799. The latter two, however, discontinued after a short while.

(b) *Loogas and Rooibrak Cattle.*

11 a.m. This lot was tested with bleached bones (sweet bones), and the following animals were noted to pick and chew bones:—

Black and white heifer 3857, black and white heifer 3853, black ox 3840, blue schimmel heifer 4190, red heifer 3825, white and blue heifer 3807, black ox 3810, black ox 3854, black and white ox 3826, red heifer 3864, black and white heifer 4004, red tollie 4090, black cow 2642.

*Result:* Out of the 19 cattle in the loogas and rooibrak experiment, 13 animals were found eating old bleached bones (69 per cent.).

*Fourth Test.—Testing of Cattle with Bleached Bones.*

6.3.19: Shade-kraaled and sun-kraaled cattle. The two lots were re-tested with the bleached bones, and the following animals were noted to pick and chew bones:—

Brown and yellow cow 2790, black cow 3004, red and white heifer 4181, dun heifer 3865, red heifer 3898, red ox 3799, red heifer 2181, red and white cow 2907, black cow 4183, red and white cow 2650, red blaze cow 3000. Of these animals the first three, from the very beginning, were ravenous for bones. The remaining animals picked bones later, but once they had picked them they were chewing just as eagerly. Two cows—red and white cow 2388 and red and white cow 2165—were noted to pick bones and then drop them.

*Result:* Of the 28 head of cattle in the loogas and rooibrak experiment, this time 10 animals were found picking, viz., 39 per cent.

(d) *Testing of Surplus Cattle Running as Controls in the Veld.*

These cattle were constantly grazing.

There were 39 head of cattle in this lot at the time of the test.

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(\* The asterisk indicates eager craving.)

6.3.19: Testing for craving with bleached bones. The following animals were found chewing bones:—

Red tollie 4051, black cow 4177, white and black tollie 3990, dun heifer 3932, red tollie 3991, red tollie 3994, red tollie 4101, black tollie 3904, black tollie 3933, red cow 3770, red cow 4180, red heifer 3858, dark red heifer 4357.

With the exception of heifer 3932, the bone-eaters were taken out of the herd and driven over the native compound rubbish heap and kept there from 11.30 a.m. to 12.30 p.m. All animals were noted to pick bones, or coal or rags, and were busy chewing them. Heifer 3858 was observed to actually devour two rags and to chew at a third one during this time. Cow 4180 was the least eager animal of the lot for picking up refuse.

*Result:* Of 39 head of surplus cattle that had been grazing for at least a month previously, 13 were found to be bone-eaters, viz., 33 per cent.

*(e) Testing of Cattle for Craving in the Grazing Down Paddocks.*

Paddock B, sub-division 1A.—Heifer 2892, cow 1188, cow 957, cow 3601, cow 2371, cow 2667, cow 3221, cow 2994, cow 3604, cow 1937, heifer 3877, heifer 3901.

Paddock D, sub-division 1.—Heifer 3507, cow 2947, heifer 3843, heifer 3428, heifer 2707, cow 2581, heifer 3600, heifer 3594, heifer 3407, heifer 2756, cow 3486, heifer 2658, cow 2577, tollie 3448, heifer 3452, heifer 3646, heifer 4338, heifer 4343.

The combined lot (30 head of cattle) were tested with bleached bones.

*Result:* Three animals were noted to pick bones, viz., red cow 3486, black and white cow 2994, and red cow 3604. These cattle had been kept in the paddocks since 6.2.18, and grazing was supplemented by rations.

**CONCLUSION.**—The rationing of cattle had apparently reduced craving.

*(f) 6.3.19. Testing of Cattle which had been Dosed Individually with 8 oz. of Bonemeal per head since 17.12.17 daily.*

These cattle were running day and night in the paddock.

Numbers of cattle:—Cow 2183, cow 2431, cow 2646, heifer 2889, heifer 3371, cow 3383, cow 3556, cow 3596, bull 3667, tollie 3676, cow 3707, cow 3718, cow 3800, tollie 3863, heifer 3872, cow 982, cow 2314, heifer 4027.

*Result:* None were noted to pick bones.

**CONCLUSIONS.**—It was evident that the cattle that had regularly been supplied with a ration of bonemeal were not craving for bones. There was, however, no evidence to show that they were cravers at the time the experiment was commenced.

*(g) Testing of Cattle for Craving—The Alternate Grazing and Kraaling Lot (Lot B) that were not grazing at the time.*

This experiment was commenced on 5.2.18. The intervals of grazing and kraaling were three weeks. The cattle had been turned out to graze on 3.3.19.

Numbers of cattle:—Cow 1149, cow 2580, heifer 2632, cow 2691, cow 2746, cow 3059, cow 3136, cow 3154, cow 3159, cow 3232, cow 3255, cow 3306, cow 3331, cow 3381, cow 3386, heifer 3473, cow 3494, heifer 3561, cow 3617, cow 3620, heifer 3634, bull 3678.

*First Test:* 4.3.19. In order to make this experiment as natural as possible, the cattle were driven over the native homestead, where during the last few days cattle had easily found bones and coal to chew. None of the cattle, however, cared for the rubbish heap, and they lost no time in going for the green grass; where the grass was short, cattle browsed on bushes. None of the animals were noted to occupy themselves with anything else but feeding on green pasture.

*Second Test:* 5.3.19. The test of yesterday was controlled this morning at 11 a.m. in the manner adopted with bones placed into the troughs; bleached bones were used. Two animals were noted to pick bones—cow 2691 fairly eagerly, cow 3159 picked bones twice, the second time after some interval.

*Result:* Of the 22 head of cattle that had been kept away from pasture for a period of three weeks and were fed on a ration, only two were found to be bone-eaters. Three weeks' feeding on ration was thus sufficient to reduce craving. There is, however, no proof that cattle on date of entry into kraal were craving.

(h) *Testing of the Available Lot of Cattle.*

This lot of cattle consisted of 55 head of mixed cattle, and had been kept in a kraal and was fed on rations brought from Pretoria. The cattle had previously been running on the veld or had been brought from Pretoria. The object of keeping this lot of cattle out of the pasture and in a kraal was to secure animals for experiment in which latent lamsiekte could be excluded.

The test for craving was carried out with sterilized old bones which were placed in a number of feeding-boxes.

*First Test for Craving:* 4.3.19. The cattle attracted by the rattling of the bones immediately inquired what material was being placed in their feeding-boxes. Some licked at the bones for a short while. Some were seen subsequently salivating a little, and some went away yawning. The bones were soon left alone. Only one animal (white and black heifer 3909) was seen to pick a bone and was noticed chewing it for half an hour. Finally, it dropped a small piece of the *substantia compacta*. This particular heifer had been stabled since 23.11.18.

*Second Test for Craving:* 5.3.19. At 11 a.m. the available cattle were tested for craving a second time with sterilized old bones. None were noted to pick bones.

*Result:* Out of 55 head of cattle that had been kept constantly in a kraal and that were fed on foodstuffs brought from Pretoria, only one was found eating bones, and that only on one of the two occasions.

(i) 5.3.19. *Testing Cattle Kept in a Paddock from which all Grass had been Removed for the Craving of Bones.*

*Vide* Fifth and Sixth Reports of Director of Veterinary Research: Experiments to test soil infection theory (Experiment No. 21, page 286). Eighteen head of cattle were running in this camp since 25.8.16.

Numbers of cattle:—Cow 3082, heifer 3307, cow 1743, cow 3380, heifer 3320, cow 3297, cow 3379, cow 3247, cow 3406, heifer 3867, heifer 3870, heifer 3873, heifer 3778, heifer 3841, heifer 3842, cow 2724, cow 3876, cow 3868.

The cattle received a maintenance ration consisting of 2 lb. crushed mealies, 1 lb. of bran, and Pretoria hay *ad lib.* 3.15 p.m. The test was carried out with old bleached bones. Immediately the

bones were rattling in the boxes and mangers, the cattle approached to inquire. All first took a careful sniff from a short distance, and most of them withdrew as if frightened; some yawned. Subsequently some were seen to lick at the bones, and still later three cattle finally picked bones, viz., a black cow (3297), the best conditioned of the lot, chewed for a while, but did not return for a second helping after she had finished the first bone; a yellow cow (3406), in good condition, continued a little longer and was still seen chewing at 3.45 p.m., returning several times to the troughs during this time; 3379, a poor conditioned cow, picked one bone at 3.35 p.m. She cracked it and then discontinued.

*Result:* Of 18 head of cattle that had been kept in a paddock free of vegetation and had been fed on rations, 3 showed slight craving for old bones.

**SUMMARY OF OBSERVATIONS.**—It was evident from these tests that bone-eaters were mainly found amongst cattle that were grazing, and that cattle kept in paddocks or kraals and fed on ration, or dosed with bonemeal, did not show any craving at all or only to a very limited extent. Cattle intended for the experiments with rotten bones had to be selected from those that in the tests had shown to be bone-eaters. Only these could be expected to contract lamsiekte under natural conditions if the eating of bones had any connexion with the cause of lamsiekte.

(j) *Experiment to note whether Cattle that had been Selected on account of their Craving for Bleached Bones would eat Rotten Bones and whether they would Contract Lamsiekte.*

*Selection of Animals:*

1. Dun heifer 3865. Arrived from Pretoria (Pienaars River) on 25.1.18. Sun-kraaled since 25.1.18.
2. Black and white cow 3004. Arrived from Bestersput 1.3.17. Sun-kraaled since 25.1.18.
3. Black and white tollie 3907. Born at Armoedsvlakte on 24.12.16. Shade-kraaled since 5.11.18.
4. Red ox 3799. At Armoedsvlakte since 25.1.17. Sun-kraaled since 25.1.18.
5. Red and white cow 2907. At Armoedsvlakte since 1.3.17. Sun-kraaled since 25.1.18.
6. Brown and red cow 2790. Arrived from Bestersput on 29.11.16. Sun-kraaled since 25.4.18.
7. Red cow 2181. At Armoedsvlakte since 5.9.15. Shade-kraaled since 25.1.18.
8. Red and white heifer 4181. Arrived from Grahamstown 10.5.18. Sun-kraaled since 23.9.18.
9. Black cow 4183. Arrived from Grahamstown 10.5.18. Shade-kraaled since 17.9.18.
10. Red and white cow 2650. Arrived from the farm Kaffraria 24.5.14. Shade-kraaled since 20.5.18.
11. Black ox 3854. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.
12. Black ox 3849. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.
13. Black and white heifer 3853. At Armoedsvlakte since 15.4.18. In loogas and rooibrak experiment since 24.4.18.

14. Black ox 3810. At Armoedsvlakte since 25.1.17. In loogas and rooibrak experiment since 24.4.18.

15. Red tollie 4090. Born at Armoedsvlakte 31.10.17. In loogas and rooibrak experiment since 4.1.19.

16. Black and white heifer 3857. At Armoedsvlakte since 15.4.18. In loogas and rooibrak experiment since 24.4.18.

17. Blue schimmel heifer 4190. Arrived from Grahamstown 10.5.18. In loogas and rooibrak experiment since 31.10.18.

18. Black and white heifer 4004. Born at Armoedsvlakte 4.6.17. In loogas and rooibrak experiment since 24.4.18.

19. Black and white tollie 3826. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.

20. White and blue heifer 3807. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.

21. Black and white cow 2642. Arrived from the farm Kaffraria 4.5.14. In loogas and rooibrak experiment since 24.4.18.

22. Red heifer 3825. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.

23. Red heifer 3864. At Armoedsvlakte since 6.12.17. In loogas and rooibrak experiment since 24.4.18.

24. Dark yellow ox 3240. At Armoedsvlakte since 21.3.17. In loogas and rooibrak experiment since 24.4.18.

25. Red heifer 3898. Born at Armoedsvlakte 20.11.16. Shaded-kraaled since 25.1.18.

OBSERVATIONS.—7.3.19. At 7 a.m. the rotten bones selected from the carcass paddock were placed into troughs in the kraal in which the cattle were collected directly after their return from the veld. The bones had been collected on the previous day and were taken from carcasses in which putrefaction was no longer present; dry, biltong-like flesh and sinews were adhering to the bones. Both bones and biltong were supplied. The material had a somewhat offensive smell. At first the cattle hardly took any notice of it. Some that had approached the trough withdrew at once, some sniffed at the bones for a short while, but none picked bones. The brown cow (2790) that in the previous experiment had been noted to be ravenous for bleached bones left the rotten ones alone. Only two animals were noted to pick a bone before 8 a.m., viz., cow 3004 and heifer 2650. The former dropped it soon afterwards; the latter was still busy chewing at 8 a.m. At 9 a.m. cow 3004, and in addition a red and white tollie (3854), were noted to be chewing. At 10.30 the following animals were noted chewing:—3810, 2650, 4181, 3799, 3004, and 4183. The latter was chewing most eagerly. At about noon all the cattle were turned out into the pasture. 8.3.19: The cattle arrived in the kraal at 7.10 a.m. The following animals picked and chewed bones:—4181, 3004, 2790, 3240, 2907, 3898, 4183, 3865, 3854. The latter did it in a half-hearted manner; 3807, on coming into the kraal, picked up a bone from the ground and subsequently chewed it very eagerly. At 9.15 a.m. the following animals were chewing bones:—3865, 2650, 4183, 3004, 3853, 3826, 2790, 4181, 3799. The last two mentioned animals were by no means eager—they picked up the bones but dropped them soon afterwards. At 11.45 a.m. the following were noted to be chewing bones:—4004, 4183, 3898, 3826, 3854, 4181, 3857, 3799, 2642, 3004. At about noon the cattle were turned out to graze.

9.3.19: The experiment was discontinued for the day.

10.3.19: This morning the experiment was repeated at 9 a.m., and the following animals were noted to pick and chew bones:—4183, 3799, 2907, 3857, 3854, 2790, 4181, 3865, 2650. At 10.30 a.m. cattle 3898 and 3826 were registered. At noon, 2650, 3826, 4183, 3857, 3799, 3854, and 3826 were chewing bones. The cattle were subsequently turned out to graze.

11.3.19: The cattle had returned early from the pasture, and by 7.30 a.m. the following were observed to chew bones:—3898, 2790, 4183, 3854, 4181. At 9 a.m., 3898, 4183, 2790, 4181, 2650. At 10.30 a.m., 3826, 3865, 3799, 4181, 4004, 3854. At noon, 3898, 3004.

It was observed that at times some cattle discontinued to chew bones without dropping the bone, and would continue some time later without having picked a new one, thus apparently retaining the bone in the mouth. This arrest of chewing may perhaps mean that the animals rest their tired masticating muscles. After 12 o'clock the cattle were turned out. 12.3.19: After their return from the pasture at 7.40 a.m. the following were noted to pick and chew bones:—3998, 4183, 3854, 3004, 4181. At 9 a.m., 4181, 4183, 3826. At 10 a.m., 4181, 4183, 3826, 3898, 3799, 2790, 2650. At noon, 3854, 3826, 3865. The cattle were sent out to graze after 12 o'clock.

13.3.19: The cattle arrived from the pasture at 7 a.m. The following cattle were noted to chew bones between 7-8 a.m.:—3854, 2650, 3898, 3004, 2907, 3826, 2790.

The first two animals had picked the bones from the ground and the rest from the troughs. At 9 a.m. the following animals were chewing bones:—3826, 2790, 3799, 3865, 3004, 3854. At 10.30 a.m., 3857, 3854, 3865, 3826, 3004, 3898. At noon, 3854, 3857, 4004. Subsequently the cattle were sent out to graze.

*Result of Eating Rotten Bones.—First Case of Lamsiekte:*

Cow 4183 was absent this morning, and the native herdsman reported that the previous day in the veld the cow was lying down and unable to rise. This cow died the same afternoon. The disease was diagnosed as lamsiekte, both from the clinical symptoms and the autopsy. For detailed account, *vide* Appendix, page 950.)

*Result of Eating Rotten Bones.—Second Case of Lamsiekte:*

Heifer 4181 was noted ill on the same date, and the symptoms that developed were typical of lamsiekte. This animal died subsequently from pneumonic complications as a sequel of lamsiekte. (For detailed account, *vide* Appendix, page 951.)

14.3.19: After arrival of the cattle from the pasture the following animals were chewing bones:—Between 7-8 a.m., 3799, 3898, 3826, 3004, 3854, 3807, 2650. At 9 a.m., 2650, 3865, 3826, 3854, 3004, 3898. At about noon the cattle were sent out to graze.

15.3.19: The herd returned about 7 a.m. Between 7 and 8 a.m. the following were chewing bones:—3854, 2790, 3004, 3826, 3810, 3799, 2650. At 10 a.m. all animals belonging to this lot were found lying down and resting. This might be due to the fact that the bone-eaters were tired of masticating bones. The cattle were sent out into the pasture about noon.

16.3.19: They returned at about 7 a.m., and between 7 and 8 a.m. the following five were seen to be chewing bones, *viz.*, 3826, 2650, 3854, 3004, 3865.

*Result of Bone-feeding.—Third Case of Lamsiekte :*

The brown-yellow cow (2790) that had hitherto been a notorious bone-eater, and was generally a lively animal, keeping other cattle away from the troughs, did not pick bones this morning. Soon after arrival she lay down. The disease lamsiekte was suspected, and it fully developed in the course of the next few days. The cow recovered after a long illness. (For details, *vide* Appendix, page 956.)

To-day, heifer 3898 also refused to pick bones, but was observed to smell at them. She went down early during the day. (This heifer subsequently developed lamsiekte and recovered, *viz.*, 23.3.19.)

17.3.19: The cattle returned at 7 a.m., and three were noted to chew bones between 7 and 8 a.m., *viz.*, 3898, 3865, 2650.

*Change of Bones :*

At 9 a.m. the bones which had been used up to now were removed and a fresh lot was put into the troughs. The bones came from the same paddock as the first lot, and probably originated from the carcass of the same animals. There was a fairly ready response, and the following animals were noted to pick and chew bones:—2907 (very eagerly), 3826 (eagerly), 4090, 2181, 3898, 3799, 3854, 3004, 3865.

NOTE.—It would appear that the bones which had been most palatable to the cattle had been picked and were eaten in the course of the experiments, and only such bones were left that were not liked by the cattle. As soon as a new supply had arrived, palatable bones were again found.

*Addition of Fresh Bone-eaters to the Rotten-bone Experiment.*

17.3.19: The following bone-eaters were selected:—

26. Red and white cow 2165. At Armoedsvlakte since 1.3.17. Sun-kraaled since 4.12.18.

27. Red blaze cow 3000. At Armoedsvlakte since 22.10.16. Shade-kraaled since 25.1.18.

28. Red and white heifer 3803. At Armoedsvlakte since 10.7.17. Sun-kraaled since 25.1.18.

29. Blue schimmel heifer 3812. At Armoedsvlakte since 25.1.18. Sun-kraaled since 25.1.18.

30. Dun tollie 3821. At Armoedsvlakte since 25.1.17. Shade-kraaled since 25.1.18.

31. Black heifer 4005. Born at Armoedsvlakte 8.7.17. In controls since 15.4.18.

32. Black tollie 4024. Born at Armoedsvlakte 16.3.17. In surplus lot since 11.12.18.

33. Black and white heifer 4026. Born at Armoedsvlakte 20.8.17. In surplus lot since 11.12.18.

34. Black and white tollie 4105. Born at Armoedsvlakte 16.12.17. In surplus lot since 11.12.18.

35. Red tollie 4344. Born at Armoedsvlakte 17.1.18. In surplus lot since 11.12.18.

18.3.19: The cattle selected yesterday were placed into the kraal together with the first lot. After their return from the pasture, three were chewing bones between 7 and 8 a.m., *viz.*, 3898, 2181, 2907. At 10 a.m., 2181, 3898, 2650, and 3826 were chewing bones. At 10.30 a.m., 3004, 3826, and 2650; and at noon, 3004, 3826, 3799, 3854, 3898, and two of the new lot (4005 4026). Subsequently the cattle were sent out to graze.

19.3.19: After the return from the pasture at 7.30 a.m., five were seen chewing bones:—3854, 3810, 3826, 3803, 3898. At 9.30 a.m., 3004 and 3865 were chewing bones. Rain had fallen during the night, and the kraal was very muddy. The cattle were therefore turned out into the veld earlier than usual.

20.3.19: There had been rain for the last twenty-four hours. It was cloudy this morning. The cattle returned somewhat late. Before 8 a.m., only one animal was seen chewing bones, viz., 3898. After 9 a.m., two more were registered, viz., 3826, 3004. At 10 a.m., the cattle were turned out to graze.

*Result of Bone-eating.—Fourth Case of Lamsiekte:*

Cow 2650 returned this morning with the herd and was noticed to be salivating. She lay down soon afterwards. Lamsiekte was suspected, and the diagnosis was confirmed within the next day. The cow died of lamsiekte on 25.3.19. (For details, *vide* Appendix, page 959.)

21.3.19: The morning was very bright. The grass was still wet. The herd returned at about 7 a.m. Two animals were seen to pick bones between 7 and 8 a.m., viz., 3810 and 3898. These animals had been picking bones that were left on the ground unnoticed before the usual supply had been placed into the troughs. Subsequently, three were chewing bones, viz., 2181, 3803, 3898. At 9 a.m. two, viz., 3898, 3004; and between 10 and 11 a.m. the following ten:—3799, 3854, 3803, 3826, 4005, 2181, 3865, 3004, 3898, 4344. A heifer (3812) placed in this experiment on 17.3.19 was seen to be ill this morning. This animal had not been noted to pick bones since it was tested with bleached bones. The native herdsman reported that she had been lying down several times during the previous afternoon. She was noted to lie down in the kraal, but not for long. The flanks were fallen in and a little saliva was present. Temperature 102.6° F. On account of the by no means high temperature, the case was not diagnosed as one of lamsiekte, although the microscopical examination of the blood-smear had given negative results. Subsequent events proved this to be correct since the animal did not develop lamsiekte. This heifer subsequently died of traumatic pericarditis.

22.3.19: The herd returned at 7 a.m. Between 7 and 8 a.m. the following were noted to pick and chew bones, viz.:—4344, 3907, 3898, 3826. At 9 a.m., 3865, 3857, and 3826; and at 10 a.m., 3865, 3826, 3857, 4005, 3004, 3898, 3799, 4344.

*Result of Bone-eating.—Fifth Case of Lamsiekte:*

Cow 2181 went down directly after her arrival this morning. When disturbed by the cattle, she rose, but went down again. The presence of saliva hanging from her mouth was noticed. Lamsiekte was suggested, and the diagnosis was confirmed within the next few days. The cow was killed *in extremis* on 29.3.19. (For details, *vide* appendix, page 960.)

23.3.19: The cattle returned at the usual time. Three animals were noted to pick and chew bones between 7 and 8 a.m., viz., 2907, 4344, 3865. Between 10 and 11 a.m. the following seven were chewing bones, viz., 4005, 3865, 3000, 3004, 3854, 4344, 3799.

*Result of Bone-eating.—Sixth Case of Lamsiekte:*

Heifer 3898 had been a very lively animal during the time she was under observation. This morning she was noted to lie down immediately after arrival. When forced to rise, she did so, but soon



went down again. She was not seen to be chewing any bones to-day. She looked bright and was ruminating. Lamsiekte was suspected, and a typical case subsequently developed. The case was of a chronic nature and ended with recovery. (For details, *vide* Appendix, page 962.) Ox 3799 was also lying down this morning. This was an unusual occurrence for this animal. It rose subsequently and behaved like a healthy animal. The cattle were turned out at the usual time.

24.3.19: Immediately after arrival from the pasture, two animals were picking bones from the ground of the kraal (*viz.*, 3807, 3803) and five from the troughs (between 7 and 8 a.m.) (*viz.*, 3865, 2907, 3826, 3004, 3810); and at 9 a.m., eleven (*viz.*, 3865, 3854, 3826, 3799, 3849, 4024, 3810, 3853, 4004, 4344, 4026). Heifer 3898, suffering from lamsiekte, chewed bones between 11 and 12.

*Removal of One Animal.*—Ox 3240, which since its entry into the experiment was noted to pick bones on only one occasion, was transferred to-day to the transport oxen.

25.3.19. The cattle returned from grazing at 7 a.m. Three animals were picking and chewing bones before the bones were put into the troughs, *viz.*, 3854, 3004, 3803. These bones were left outside the troughs. Between 7 and 8 a.m. the following were picking from the troughs:—3826, 2907, 3004, 3807. Between 9 and 11 a.m., 4005, 3854, 3865, 3004, 3826, 3799, and 3849 were noted; and between 11 and 12 a.m., 3857, 3803, 4105, 4026. After 12 noon the cattle were turned out to graze.

26.3.19: Between 7 and 8 a.m. three animals were noted to eat bones, *viz.*, 3865, 3826, 3810. Between 9 and 11 a.m. the following were chewing bones:—3826, 3799, 3849, 3854, 3004, 4005, 4090, 3857, 3865.

*Result of Bone-eating.—Seventh Case of Lamsiekte:*

Cow 3000 was the first animal to go down this morning. She rose easily, but lay down again. She behaved in all other respects like a healthy animal and accepted the calf willingly. This cow subsequently developed lamsiekte that took a chronic course. The animal died on the 5.5.19. It is interesting to note that this cow on returning from the veld one day carried in the mouth the foot of a calf which she had been chewing eagerly (*viz.*, 16.3.19). She was observed to chew rotten bones on 23.3.19. (For details, *vide* Appendix, page 964.)

27.3.19: The cattle returned from the pasture about 7 a.m. Two animals were noted to pick and chew bones, *viz.*, 3854 and 3803. These two animals had picked the bones from the ground directly after their arrival in the kraal. Between 7 and 8 a.m. two animals (3826 and 3907) were picking bones from the troughs. Between 9.30 and 10.30 twelve animals, *viz.*, 3799, 3854, 3004, 3857, 3849, 4005, 3865, 3803, 3826, 4344, 4090, 3810. The cattle went out to graze at about noon.

28.3.19: The cattle returned at the usual time. There were seen picking and chewing bones:—Between 7 and 8 a.m., five animals (3865, 3004, 3907, 4005, 3799); between 9 and 10 a.m., eleven animals (4004, 3826, 3854, 3004, 3865, 3803, 3857, 3799, 3849, 3821, 3853).

*Result of Bone-eating.—Eighth Case of Lamsiekte:*

This morning tollie 3826 was noticed to lie down as soon as it had entered the kraal. When subsequently forced to rise, it rose on several occasions, but went down again immediately. It did not chew

bones in the early morning, but was seen to do so later. Although a lively animal, it had now completely changed, being very quiet. The coat was somewhat rough and staring. It was not turned out into the veld. The diagnosis lamsiekte was provisionally made, and it was confirmed within the course of the next few days; the disease was of a mild nature and the animal recovered. The tollie never entirely stopped picking and chewing bones during its illness. It had recovered by the 8.14.19. (For details, *vide* Appendix, page 966.)

*Result of Bone-eating.—Ninth Case of Lamsiekte:*

Contrary to her habit, cow 3004 went down very early after the return from the veld. Subsequently, she rose again and behaved as a normal and healthy animal. This observation must nevertheless be regarded as a forerunner of lamsiekte. The disease fully developed on the 4.4.19. During the intervening dates the cow was eating bones and behaved like a normal animal. She died of lamsiekte on the 5.4.19. (Details, *vide* Appendix, 967.)

29.3.19: After return from the pasture the following animals were seen picking and chewing bones:—Between 7 and 8 a.m., 3803, 3821, 3799, 3857, 3849, 3854, and 4005; between 9 and 11 a.m., 3853, 4105, 3857, 3854, 4005, 3865, 3004, 3821, 4026, 4344, 4090, and 3799. It is a striking observation that the cattle of the bone-eating lot lie down more frequently and sooner than the cattle in the other kraals do.

30.3.19: The cattle returned about 7 a.m. Eleven animals were noted picking and chewing bones this morning, *viz.*, 3853, 3826, 3807, 3004, 4344, 3865, 3857, 3854, 4105, 3799, 3810. The herd was turned out to graze at noon.

31.3.19: After return from the pasture, nine animals were seen picking and eating bones, *viz.*, 3857, 3803, 3854, 3821, 3810, 3799, 3865, 3812, 3849. The impression was gained that the cattle were no longer so eager for bones as they were during the beginning of the experiment.

*Result of Bone-eating.—Tenth Case of Lamsiekte:*

Black heifer 4005 did not return with the herd this morning. She died of lamsiekte the same afternoon. (For further details, *vide* Appendix, page 969.)

1.4.19: The cattle returned at the usual time. Six animals were noticed to pick and chew bones:—4090, 3857, 4004, 3004, 3803, 3849.

*Result of Bone-eating.—Eleventh Case of Lamsiekte:*

Ox 3854 did not return this morning. The previous afternoon the native herdsman had noticed that it was down. The ox was found near the camp gate, and the diagnosis lamsiekte was made. The animal died of the disease the following day. (For details, *vide* Appendix, page 970.)

2.4.19: The cattle returned about 7 a.m. Between 7 and 8 a.m. none of the animals were noticed to pick bones. After 9 a.m. the following were noted, *viz.*, 3004, 3826, 3857, 3803, 3799, 3865.

The cattle were sent out before noon.

3.4.19: The herd returned at the usual time. Eight animals were noted to pick and chew bones, *viz.*, 2907, 3004, 3812, 3826, 3000, 3799, 3821, 3803. To-day, particular attention was given to the licking of salt. None of the animals were eager for salt, and certainly the bone-eaters neither more nor less than the non-bone-eaters.

4.4.19: After return from the pasture, five were noted to chew bones, *viz.*, 3857, 3807, 3799, 3865, 3849. The cattle returned to the pasture at noon.

*Result of Bone-eating.—Twelfth Case of Lamstekte :*

Dun tollie 3821 was observed to be ill to-day. The diagnosis lamsiekte could only be made during the next few days, and the disease showed itself only in a paralysis of the throat, from which the animal finally recovered. It never went down. (For details, *vide* Appendix, page 971.)

5.4.19: The cattle returned at the usual time. Three animals were seen chewing bones (3826, 3857, 3799). The decrease in the eagerness for bones was remarkable. Between 7 and 8 a.m. none of the cattle were seen picking bones. The herd was sent out to graze about noon.

6.4.19: After return from the pasture, only three head of cattle were noted to pick bones, viz., 3857, 3865, and cow 3000; the latter was one suffering from lamsiekte.

7.4.19: The cattle returned at the usual time from the pasture. Four animals were seen chewing bones this morning, viz., 3865, 3907, 3857, and cow 3000 (suffering from lamsiekte).

8.4.19: In order to note whether the bone-eaters were still partial to bleached bones, all cattle in the experiment were this morning submitted to the test with bleached bones, and the following were seen to pick and chew bones, viz., 3857, 3853, 4344, 3865, 2907, 2165, 3000, 3803, 4024. It was thus evident that no longer all the animals in this experiment could be considered to be bone-eaters.

*Removal of Animals.*—Two animals (3799 and 3826) were removed from this experiment and placed in a bonemeal experiment.

9.4.19: The cattle returned at the usual hour. None of the animals were seen picking bones in the morning. Circumstances prevented subsequent observations, so later events in the morning were not recorded.

10.4.19: After return from the pasture, three animals (3000, 2907, and 3857) were seen eating bones.

11.4.19: *Fresh Supply of Putrid Bones.*—The bones hitherto utilized in this experiment were removed this morning and a fresh lot was taken from both the old and new putrefaction paddocks.

Seven animals [3849, 3857, 3865, 2907, 3000 (the lamsiekte cow), 3853, 4344] were seen to pick and chew bones. Tollie 3826, taken out of this kraal two days ago, found its way back and was observed to pick and chew a bone.

12.4.19: After arrival from the pasture, nine animals [2907, 3807, 3853, 3865, 3803, 4344, 2642, 3854, 3000 (the lamsiekte cow)] were noted to pick and chew bones.

13.4.19: Three animals (3853, 2907, 3000) were seen chewing bones this morning.

14.4.19: After arrival from the pasture, the following animals were seen chewing bones, viz., 2642, 2907, 3000, 3810, 3857, 3803, 3849, 3853.

15.4.19: This morning seven animals (3857, 3807, 3000, 3853, 3865, 2907, 3849) were noted to chew bones.

16.5.19: After return from the veld, six animals were seen eating bones, viz., 3000, 3853, 3810, 3857, 3865, 3803.

17.4.19: Only two were observed to eat bones this morning (3853, 3857).

18.4.19: After return from grazing, six animals were observed to eat bones, viz., 3853, 2907, 2165, 3865, 3807, 3857.

20.4.19: To-day, six animals (2907, 3853, 3865, 3857, 3807, 3812) were seen eating bones.

21.4.19: Only two animals were seen chewing bones this morning after return from the pasture (3853, 3857).

22.4.19: Only two animals were seen eating bones this morning (3807, 3857).

23.4.19: After return from the veld, six were seen chewing bones (3853, 3857, 3807, 3865, 3849, 3803).

*Addition of New Animals to the Experiment.*—Ten new animals were placed in this experiment to-day. All these animals had arrived at Armoedsvlakte on 30.3.19 from Pretoria:—

36. Black heifer 172.

37. Red heifer 114.

38. Black heifer 169.

39. Red heifer 101.

40. Black heifer 142.

41. Black heifer 160.

42. Red heifer 136.

43. Red heifer 182.

44. Red heifer 106.

45. Black heifer 148.

These animals were picked as bone-eaters out of eighty-three animals that had arrived from Pretoria on 30.3.19.

24.4.19: The herd returned at the usual time. Nine were seen chewing bones (142, 172, 148, 114, 101, 2907, 3857, 3853, 3803). Cow 2790 and heifer 3898 (both recovered from lamsiekte) were returned to this experiment this morning. The cow was noted to pick and eat bones most eagerly, the heifer only smelling at them, however.

25.4.19: After return of the herd from the pasture, eight animals were seen eating bones (172, 114, 142, 2790, 2907, 3853, 3857, 3865).

26.4.19: The cattle returned at the usual time. Fourteen were seen eating bones (2790, 2907, 3807, 4344, 106, 3857, 114, 3849, 3865, 3853, 160, 148, 169, 142).

27.4.19: After entering the kraal the following animals were seen chewing bones:—2790, 3853, 2907, 3857, 114, 169, 142, 101, 172, 3812, 3853, 3865, 160.

28.4.19: This morning seven were noted to eat bones:—2790, 3849, 3803, 3865, 4344, 3807, 114.

*Change of Bones.*—29.4.19: The old bones were removed and a new lot was placed into the troughs. They originated from the carcass of ox 2519, which had died on 8.4.19 from internal hæmorrhage.

After their return from the pasture the following animals were seen eating bones:—2790, 3865, 3807.

30.4.19: This morning two were seen eating bones (2790, 101).

1.5.19: The herd returned at the usual time. Four were eating bones (2790, 101, 142, 114). (The bones still had a strong and offensive smell.)

2.5.19: Thirteen animals were noted to eat bones this morning [2790, 3853, 142, 2907, 106, 3865, 3857, 114, 169, 172, 160, 4190, and 3898 (the recovered heifer)].

3.5.19: After return from the pasture, five were seen eating bones (2790, 3812, 3853, 101, 142).

4.5.19: No observations were made on this date.

5.5.19: This morning the following animals were seen eating bones:—2790, 3898, 2907, 4344, 172, 101, 114, 3857, 142, 3865, 3812, 160, 3853.

6.5.19: The cattle returned at the usual time. The following animals were seen eating bones:—3898, 3857, 3865, 101, 142, 160.

7.5.19: After arrival in the kraal the following animals were seen eating bones:—3853, 101, 4190, 3803, 3812, 136, 160, 106, 2907, 3857, 172, 3865, 142, 114, 2790.

8.5.19: This morning ten animals were seen eating bones (160, 3865, 4026, 3898, 3803, 2790, 4004, 2907, 142, 101).

9.5.19: To-day, four were seen eating bones (101, 114, 142, 3857),

10.5.19: The following cattle were seen eating bones:—101, 3853, 172, 3865.

12.5.19: After arrival from the pasture, three animals were seen eating bones (101, 106, 114).

*Result of Bone-eating.—Thirteenth Case of Lamsiekte:*

Heifer 148 did not return this morning. She developed lamsiekte and recovered. (For details, *vide* Appendix, page 973.)

Only twice this heifer was recorded to have been seen picking rotten bones, viz., on 24.4.19 and 26.4.19. No naturally contracted cases of lamsiekte were noted in camp D, in which all the cattle were running at this time, hence it is concluded that she must have contracted it from the bones eaten at the time mentioned.

The cattle were submitted to a test with sterilized bones. The following animals were seen eating bones.—3864, 3865, 3898, 3849, 4004, 4190, 2907, 2642, 3807, 3853, 4344, 4026, 3857, 3000, 3803, 3821, 4024.

13.5.19: The herd returned at the usual time, and the following animals were noted to eat bones:—3865, 3849, 169, 3857, 3803, 3812, 4344, 2790.

The cattle were again tested with sterilized bones, and the following eight were seen eating bones:—101, 106, 136, 142, 160, 169, 172, 182.

14.5.19: No records were made on this date.

15.5.19: To-day, five were noted to chew bones (3898, 3853, 4344, 3807, 172).

*Result of Bone-eating.—Fourteenth Case of Lamsiekte:*

Heifer 101 was noted to be ill this morning. She developed lamsiekte and died on 16.5.19. (For details, *vide* Appendix, page 974.)

16.5.19: This morning, five were noted to chew bones (169, 3803, 114, 142, 3853).

17.5.19: After the animals had arrived in the kraal, six were noted to eat bones (4344, 3803, 3857, 3810, 3853, 3807).

18.5.19: To-day, seven were noted to eat bones (160, 3865, 4026, 3898, 3803, 2907, 4004).

19.5.19: This morning the following animals were noted to eat bones:—4344, 3812, 3803, 3857, 169, 3849, 3865, 3853.

20.5.19: After arrival of the herd, four animals were seen eating bones (4024, 142, 114, 4026).

*Removal of Cattle.*—The following cattle were removed from this experiment and utilized elsewhere (mealie-meal feeding experiments):—2642, 3803, 3807, 3821, 3849, 3853, 3857, 3865, 3898, 4190. All these cattle had been submitted to the test with sterilized rotten bones and were positive, i.e. bone-eaters.

21.5.19: The herd returned at the usual time, and the following animals were seen eating bones this morning:—182, 4024, 142, 4344, 136.

22.5.19: No records taken on this date.

*Result of Bone-eating.—Fifteenth Case of Lamsiekte:*

23.5.19: Heifer 3853 was ill this morning. She had been taken out of this experiment on 20.5.19. The native herdsman stated that she was down frequently on the previous afternoon. There was no doubt about the diagnosis of lamsiekte, the heifer developing the chronic form. She finally recovered. (For details, *vide* Appendix, page 975.)

24.5.19: Two were seen eating bones (114, 3812).

25.5.19: Three were seen eating bones (114, 3812, 160).

26.5.19: Two were seen eating bones (114, 169).

27.5.19: One was seen eating bones (114).

To-day the remaining cattle of this experiment were submitted to the bone test (sterilized rotten bones), and the following animals were seen picking and chewing bones:—106, 114, 142, 160, 169, 172, 182, 3864, 4024, 2907, 3810.

NOTE.—It would thus appear that the *sterilized* rotten bones proved to be more palatable to the cattle than those not sterilized (naturally putrid).

28.5.19: Three were seen chewing bones this morning (114, 169, 4004).

29.5.19: Only one animal was noted to chew bones this morning, *viz.*, 114.

*Result of Bone-eating.—Sixteenth Case of Lamsiekte:*

Heifer 142 did not return this morning with the herd. The native herdsman reported that she had been lying down frequently the previous afternoon. The diagnosis lamsiekte was made. The heifer recovered within a couple of days.

30.5.19: None of the animals were noted to pick bones to-day.

2.6.19: Four were noted to eat bones to-day, *viz.*, 114, 160, 4105, and 169.

3.6.19: Three were noted to eat bones to-day, *viz.*, 114, 169, 4105.

4.6.19: Five were noted to eat bones to-day, *viz.*, 114, 160, 169, 4105, 4090.

5.6.19: Four were noted to eat bones to-day, *viz.*, 169, 4004, 114, 160.

6.6.19: Three were noted to eat bones to-day, *viz.*, 169, 114, 172.

7.6.19: Five were noted to eat bones to-day, *viz.*, 114, 169, 172, 160, 4105.

8.6.19: Six were noted to eat bones to-day, *viz.*, 4105, 114, 106, 169, 172, 136.

9.6.19: Four were noted to eat bones to-day, *viz.*, 169, 4105, 172, 114.

10.6.19: Three were noted to eat bones to-day, *viz.*, 169, 114, 4105.

11.6.19: Three were noted to eat bones to-day, *viz.*, 169, 114, 172.

12.6.19: Four were noted to eat bones to-day, *viz.*, 114, 169, 172, 4105.

13.6.19: Four were noted to eat bones to-day, *viz.*, 172, 169, 4105, 114.

14.6.19: Four were noted to eat bones to-day, *viz.*, 169, 4105, 114, 172.

15.6.19: Four were noted to eat bones to-day, viz., 169, 114, 172, 4105.

16.6.19: Five were noted to eat bones to-day, viz., 114, 142, 4105, 3810, 169.

17.6.19: Four were noted to eat bones to-day, viz., 114, 142, 4105, 4004.

18.6.19: Four were noted to eat bones to-day, viz., 4105, 114, 142, 169.

19.6.19: Six were noted to eat bones to-day, viz., 4105, 142, 182, 4026, 148, 169.

20.6.19: Six were noted to eat bones to-day, viz., 169, 172, 114, 4105, 4026, 142.

21.6.19: Four were noted to eat bones to-day, viz., 169, 172, 142, 114.

Tested with sterilized rotten bones, the following were found to be bone-eaters:—106, 114, 142, 160, 169, 172, 182, 4105.

22.6.19: The experiment was discontinued to-day, and five of the animals (114, 142, 169, 172, and 4105) were placed into the carcass camp experiment.

*Result of Bone-eating.—Seventeenth Case of Lamsiekte.*

On the 26.6.19, heifer 142 went down with the second attack of lamsiekte, to which she succumbed. Since this heifer in the new experiment (carcass camp) did not pick any bone, the disease must be put down to the bones eaten before the 22nd. (For details, *vide* Appendix, page 978.)

Heifers 169 and 172 sickened of lamsiekte on 9.7.19 and 10.7.19. Both succumbed. They contracted the disease probably in the new experiment (carcass camp experiment).

#### SUMMARY.

##### *Lot No. 1.—Rotten-bone Feeding Tests.*

(Submitted to Bleached-bone Test on 5.3.19 and 6.3.19. Selected for Rotten-bone Test on 7.3.19.)

Animal.	Number.	Days under Observation.	Days on which Bones were Eaten.	No. of Days since Bone-eating commenced till first Symptoms of Illness.	Remarks on Bone-eating.	Result and Subsequent Disposal of Animal.
1. Heifer.	3865	74	45	—	—	20.5.19; transferred to mealie-meal feeding experiment.
2. Cow...	3004	29	21	21	Ate bones whilst ill	Died 5.4.19 of lamsiekte on 8th day of illness.
3. Tollie..	3907	45	4	—	—	Transferred to bone-meal feeding experiment, 21.4.19.
4. Ox....	3799	33	26	—	—	Transferred to bone-meal feeding experiment, 9.4.19.
5. Cow...	2907	108	27	—	—	Transferred to controls, 21.6.19.

Animal.	Number.	Days under Observation.	Days on which Bones were Eaten.	No. of Days since Bone-eating commenced till first Symptoms of Illness	Remarks on Bone-eating.	Result and Subsequent Disposal of Animal.
6. Cow...	2790	70	8	12	Ate bones after recovery	Recovered; transferred to bone-meal feeding experiment, 19.5.19.
7. Cow...	2181	12	3	5	—	Killed <i>in extremis</i> of lam-siekte, 29.3.19.
8. Heifer.	4181	35	5	6	—	Died 11.4.19 of lam-siekte.
9. Cow...	4183	6	5	5	—	Died 13.3.19 of lam-siekte the day after taking ill.
10. Cow...	2650	18	11	13	—	Died 25.3.19 of lam-siekte fifth day after taking ill.
11. Ox....	3854	26	23	24	—	Died 2.4.19 of lam-siekte 21 days after taking ill.
12. Ox....	3849	74	19	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
13. Heifer.	3853	114	29	76	Did not eat bones immediately after recovery, but later	Recovered.
14. Ox....	3810	108	14	—	—	Transferred to controls, 21.6.19.
15. Tollie..	4090	108	6	—	—	Transferred to controls, 21.6.19.
16. Heifer.	3857	74	42	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
17. Heifer.	4190	74	2	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
18. Heifer.	4004	108	11	—	—	Transferred to surplus, 21.6.19.
19. Tollie..	3826	31	20	20	Ate bones whilst ill	Recovered; transferred to bone-meal feeding experiment.
20. Heifer.	3807	74	19	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
21. Cow...	2642	74	3	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
22. Heifer.	3825	108	—	—	—	Transferred to controls, 21.6.19.
23. Heifer.	3864	108	—	—	—	Transferred to surplus, 21.6.19.
24. Ox....	3240	17	1	—	—	Transferred to transport, 24.3.19.
25. Heifer.	3898	77	11	19	Ate bones after recovery	Recovered; transferred to bone-meal feeding experiment 20.5.19.



*Lot No. 2.—Rotten-bone Feeding Tests.*

(Selected for Experiment on 17.3.19.)

Animal.	Number.	Days under Observation.	Days on which Bones were Eaten.	No. of Days since Bone-eating commenced till first Symptoms of Illness.	Remarks on Bone-eating.	Result and Subsequent Disposal of Animal.
26. Cow...	2165	97	1	—	—	Transferred to controls, 21.6.19
27. Cow...	3000	50	2	7	Ate whilst ill	Died 5.5.19 of lam-siekte.
28. Heifer.	3803	63	24	—	—	Transferred to mealie-meal feeding experiment, 20.5.19.
29. Heifer.	3812	63	11	—	—	Transferred to mealie-meal feeding experiment.
30. Tollie..	3821	43	4	7	Did not eat whilst under observation, but subsequently	Recovered; transferred to mealie-meal experiment, 20.5.19.
31. Heifer.	4005	13	9	13	—	Died 31.3.19 of lam-siekte.
32. Tollie..	4024	97	4	—	—	Controls, 21.6.19.
33. Heifer.	4026	97	9	—	—	Controls, 21.6.19.
34. Tollie..	4105	97	17	—	—	Carcass camp experiment, 21.6.19.
35. Tollie..	4344	97	17	—	—	Controls, 21.6.19.

*Lot No. 3.*

(Selected for Experiment 23.4.19.)

36. Heifer.	172	93	24	—	—	Transferred 23.6.19 to carcass camp experiment and died in this experiment.
37. Heifer.	114	62	40	—	—	Transferred 23.6.19 to carcass camp experiment.
38. Heifer.	169	93	32	—	—	Transferred 23.6.19 to carcass camp experiment and died in this experiment.
39. Heifer.	101	22	12	21	—	Died of lam-siekte, 16.5.19.
40. Heifer.	142	67	14	35	Ate whilst ill	Died of lam-siekte, 30.6.19.
41. Heifer.	160	62	13	—	—	Surplus, 21.6.19.
42. Heifer.	136	62	3	—	—	Control, 21.6.19.
43. Heifer.	182	62	1	—	—	Surplus, 21.6.19.
44. Heifer.	106	62	5	—	—	Surplus, 21.6.19.
45. Heifer.	148	43	2	18	Ate bones after recovery	Recovered.

## CONCLUSIONS.

All cattle when selected for the experiments by the bone test with sweet bones proved to be bone-eaters. In the experiments with rotten bones, two, however, did not eat rotten bones.

3 animals were noted to eat bones on *one* occasion only; none of these sickened.

3 animals ate bones on *two* occasions; one sickened and died; one sickened and recovered.

3 animals ate bones on *three* occasions; one sickened and was killed *in extremis*.

3 animals ate bones on *four* occasions; one sickened and recovered.

3 animals ate bones on *five* occasions; two contracted the disease and died.

1 animal ate bones on *six* occasions and remained healthy.

1 animal ate bones on *eight* occasions; sickened and recovered.

2 animals ate bones on *nine* occasions and one sickened and died.

4 animals ate bones on *eleven* occasions and one sickened and died.

1 animal ate bones on *twelve* occasions; sickened and died.

1 animal ate bones on *thirteen* occasions; it remained healthy.

2 animals ate bones on *fourteen* occasions; one sickened and died.

2 animals ate bones on *seventeen* occasions and remained healthy.

2 animals ate bones on *nineteen* occasions and remained healthy.

1 animal ate bones on *twenty* occasions; it sickened and recovered.

1 animal ate bones on *twenty-one* occasions; it sickened and died.

1 animal ate bones on *twenty-three* occasions; it sickened and died.

2 animals ate bones on *twenty-four* occasions; both remained healthy.

1 animal ate bones on *twenty-six* occasions; it remained healthy.

1 animal ate bones on *twenty-seven* occasions; it remained healthy.

1 animal ate bones on *twenty-nine* occasions; it sickened and recovered.

1 animal ate bones on *thirty-two* occasions; it remained healthy.

1 animal ate bones on *forty* occasions; it remained healthy.

1 animal ate bones on *forty-two* occasions; it remained healthy.

1 animal ate bones on *forty-five* occasions; it remained healthy.

The period which elapsed since bone eating commenced and until the first symptoms of illness were noted was:—

5 days in *two* cases.

6 days in *one* case.

7 days in *two* cases.

12 days in *one* case.

13 days in *two* cases.

18 days in *one* case.

19 days in *one* case.

20 days in *one* case.

21 days in *two* cases.

24 days in *one* case.

35 days in *one* case.

76 days in *one* case.

It thus appears that lamsiekte caused by eating rotten bones can be contracted in as short a time as 5 days since bone feeding commenced, or it may take as long as 76 days.

There were 43 animal bone-eaters. Of these, 16 contracted the disease, =37 per cent. Ten animals died, =23.2 per cent., or 62.5 per cent. of those that sickened.

It is a characteristic feature that often animals that were ill continued to eat bones during illness, or when recovering began bone eating sooner or later after recovery.

The experiment illustrates the fact that some cattle will voluntarily eat bones, and amongst the bone-eaters a certain percentage will contract a disease that is identical with naturally contracted lamsiekte or with the disease caused by drenching with putrid bones.

#### APPENDIX TO ROTTEN BONE FEEDING EXPERIMENTS.

1. BLACK COW 4183.—Arrived from Grahamstown on the 10.5.18, and was placed amongst the controls on the same date. On 17.9.18 she was placed in experiments, viz., cattle stabled by day in the shade and grazing by night. She calved on the 26.2.19. On 4.3.19 she was selected for testing with rotten bones. She did not take any bones.

5.3.19 and 6.3.19: Tested with bleached bones. She proved to be a bone-eater.

7.3.19: Selected for the rotten bone-feeding experiment. Noted to eat rotten bones on 7.3.19, and subsequently on 8.3.19, 10.3.19, 11.3.19, 12.3.19.

13.3.19: The cow did not return with the cattle this morning. The native herdsman stated that on the previous evening she was lying down and unable to rise. In the morning of the same day she had been milked as usual, and nothing abnormal had been reported. At noon she had left the kraal with the rest of the cattle and reached the pasture where they were grazing. Since this cow had a calf at foot (fifteen days old), the fact of her not returning to-day, together with the report of the native herdsman, was considered to be an alarming symptom. The boys were sent out to fetch the cow, but she refused to rise. She was subsequently examined in the veld, and was found in sterno-costal position, with the hind legs drawn in and placed somewhat backwards, just as if an attempt to rise had previously been made which had failed. Several such attempts must have been made, since the cow from her first resting-place had moved forwards a distance of about two yards, the disturbed sandy soil indicating a struggling of the legs. Faeces were lying in her former and in her present position; they were normal. The cow stretched the head somewhat forwards; saliva was running freely from the mouth, and had collected in a rather conspicuous quantity on the ground. The tongue was slightly protruding. The ears were still pricked, and freely moved about; the eyes had a somewhat wild look. The respiration was slightly hurried. Temperature, 100.6° F.

*Diagnosis:* Lamsiekte.

A scotch cart was sent out to fetch the cow. She died on the way home. Examination of blood-smear gave negative results.

*Post-mortem of Cow 4183:* Black cow in good condition. The autopsy was made soon after death. Rigor mortis was not present. The integument was intact. The apex of the tongue was slightly protruding. The visible mucous membranes were normal. The subcutaneous tissue contained fairly well developed fat deposits. The flesh was of normal colour. The blood stained well, but was not completely coagulated. The peritoneal cavity contained very little straw-coloured liquid; the serosa was smooth and glistening. The tongue showed no abnormalities on the surface; the pharynx and oesophagus showed no changes. The mandibular lymph nodes appeared unusually moist. The retropharyngeals were diffusely hæmorrhagic and slightly enlarged. The mucous membrane of the nasal cavity and of the turbinated bone was bluish. The septum nasi showed no changes. The larynx and the trachea contained some froth. The mucosa showed no changes. The pleural cavity contained a little clear fluid. The costal pleura was smooth and glistening. The mediastinal lymph nodes showed no changes. The lungs were deflated in expiratory stage. The visceral pleura in parts was slightly shrivelled. The lung tissue was elastic, soft, and in parts pigmented (under the pleura). On section the parenchyma appeared moist, the bronchi contained froth, in some of them ingesta were present; the mucous membrane was normal, however. The pericardium contained 10 c.c. straw-coloured fluid; the parietal serosa was smooth and glistening. The heart showed a considerable quantity of fat at the base. The ventricles were empty. The endocardium showed no changes, with the exception

of the right caudal atrio-ventricular valve, on which there was a small hæmorrhage. The epicardium was smooth and glistening; the myocardium appeared slightly opaque. The intima of the coronary arteries and of the vena cordis magna showed no changes. The aorta was elastic and the intima smooth. The periportal lymph nodes were of usual size; on section they appeared somewhat moist and unusually dark. The liver appeared slightly enlarged. The capsule contained some white patches of small dimensions; otherwise it was smooth, glistening, and transparent. The parenchyma showed a firm consistence. On section it appeared somewhat glossy, and was of a dark-brown colour. The gall-bladder was distended. The ductus choledochus was open; the bile was green and liquid. The pancreas showed no changes. The spleen (46 by 12 cms.) in its outer aspect showed no changes. The colour of the parenchyma was reddish brown, the consistence was normal, the trabeculae were distinct, not so the follicles. The serosa of the rumen showed injected blood-vessels; it was smooth and glistening. The rumen contained normal ingesta; some pieces of bones were present. The reticulum was attached by fibrous tissue to the diaphragm, and on severing the connexion with the knife a small cavity was opened containing pus. In the lumen of the reticulum pieces of bones and wire were found. The mucosa appeared normal. The omasum appeared hard in consistence, and contained somewhat dry ingesta. The abomasum contained liquid ingesta. The mucous membrane of the folds showed brownish pigmentation. The serosa of the small intestines was injected and fairly rich in blood, otherwise it was smooth and glistening. The contents of the duodenum consisted of a greenish, viscous, mucous substance. The mucosa of the jejunum and of the ileum appeared swollen and glossy. In some places it was much injected and distinctly hæmorrhagic. The mucosa of the caecum and of the colon was swollen and in parts wrinkled. It was slightly injected. The rectum contained faeces of normal consistence and colour. The mesentery was rich in fat and the vessels were injected; the lymph glands on section were somewhat moist. The suprarenal glands were of normal size. The cortex was almost bright yellow. The adipose capsule of the kidney was rich in fat and stripped easily. The kidneys were of normal size and consistence, and of a very dark colour; the intermediary zone was almost black. The bladder contained clear urine. The mucous membrane showed no changes. The udder was in lactation. The ovaries were normal. The cornua uteri contained a turbid liquid of the colour of plum jam (lochia). The vessels of the pia were somewhat injected. The brain itself showed no changes.

*Pathological Anatomical Diagnosis:* Foreign bodies (bones and wire) in rumen and reticulum. Very slight ascites, very slight hydrothorax. Oedema of the lungs. Hæmorrhagia in right atrio-ventricular valve. Peritonitis fibrosa of diaphragm, rumen, and reticulum. Abscess in the fibrous organization connecting reticulum with diaphragm. Impaction of omasum. Pigmentation of rumen and of abomasum. Enteritis catarrhalis. Hyperaemia of the lymph nodes of the head. Hyperaemia of the kidney.

*Etiological Diagnosis:* Lamsiekte.

*Epicrisis:* The cow had calved about fifteen days previously, and had been selected as a sweet bone-eater. Subsequently she picked and ate putrid bones on five different occasions. On the morning when she showed signs of illness she left the kraal in apparently good health, and nothing had been noted to be amiss when milked. She developed acute lamsiekte, which was characterized by paralysis of the locomotor muscles and partly of the tongue, by the absence of fever, and by a negative result obtained on examination of the blood. The case lasted probably a little more than twenty-four hours. At the autopsy bones were still found in rumen and reticulum. The lesions, more or less pathognomonic, were those of an acute enteritis of both large and small intestines. The case in every respect resembled acute lamsiekte as noted in the naturally contracted disease.

2. RED AND WHITE HEIFER 4181.—Arrived from Grahamstown on 10.5.18. She was placed amongst the controls on same date. On 23.9.18 she was transferred to the experiment: cattle to be kraaled in the sun by day and to be grazed by night. On 4.3.19 she was tested with bones, but refused to pick. On 6.3.19 she was tested with bleached bones. Transferred to the rotten bone-feeding experiment on 7.3.19. She was noted to eat rotten bones on 7.3.19, 8.3.19, 10.3.19, 11.3.19, and 12.3.19.

13.3.19: 6.30 a.m.: This morning the heifer did not appear to be quite well. She was not so lively as usual, and did not pick bones. After the cattle had been collected in the kraal she separated from the remainder of the heard and