

Control Paddock.—The cattle were tested as usual, and the following results were obtained:—

- (a) New rotten bones were picked by heifer 3910 and tollie 4106. The former chewed for a while; the latter dropped the bone.
- (b) Of the old rotten bones, two animals picked (tollie 4029, heifer 3856) and chewed bones for a while; two animals picked (heifer 3910 and tollie 4106) and chewed of the green bones for a while, and four animals picked of the cooked bones (tollie 3930, cow 3333, tollie 4106, tollie 4029). Tollie 4029, which still carried its bone from the previous lot (c), dropped it and picked one from this lot (d).

1.4.19: Carcass Paddock.—The cattle were still finding something to chew but would not go to the heaped-up carcasses. One dropped a stone which it had been chewing; one was busy licking the ground in the old-bone corner, mud sticking to its muzzle and nostrils.

Control Paddock.—The tests gave the following results:—

(a) Bones of the new rotten lot were picked by heifer 3911, by tollie 4029, by tollie 3930, and heifer 3910.

(b) Old rotten bones were picked by heifer 3856.

The animals mentioned [sub (a)] kept their bones and were busy chewing them whilst the test (c) was carried out.

(c) Green fresh bones were picked by two animals, tollie 4106 and heifer 3856.

(d) Cooked bones were picked by cow 3333, by tollie 4029, and by tollie 3930.

The observations recorded to-day were, however, not quite accurate. Some of the animals that picked bones in one test brought the bone to the next test and were not always observed to drop it before they approached the new lot. Cow 2844 was chewing a bone which she had picked up outside the paddock before entering it.

2.4.19: Carcass Paddock.—The animals still collecting at the old-bone place or at such places where old carcasses had been lying; they were still finding splinters to pick up and chew. Cow 2968 was seen at one of the piled-up carcass heaps and picked up a rib which she chewed. Later a piece of a vertebra with some dry rotten substance adhering to it was picked up.

Control Paddock.—Three of the tests were carried out to-day, but not in the same order as had been the case up to now.

(b) Four animals were picking and eating old rotten bones, viz., heifer 3910 very eagerly; tollies 4106 and 4029, and heifer 3856, which soon dropped the bone.

(a) Three were picking new rotten bones, viz., heifer 3910 and heifer 3856; the latter soon dropped it.

(d) Five animals were picking cooked bones, viz., heifer 3910, tollie 4029, tollie 4106, tollie 3930, heifer 3856.

3.5.19: Carcass Paddock.—The cattle again collected at the old-bone places and licked the soil, showing soiled muzzles and nostrils. Cow 2968 was again noted to pick a rib from the piled-up carcass heap. The blue schimmel cow still kept to one side, having lost all interest in bones.

Control Paddock.—The cattle were turned into the paddock and were left alone. In the paddock two sets of test bones had been left, viz., (a) new rotten, (b) old rotten. Heifer 3910 immediately made for the old rotten bones and was soon busy chewing a bone and doing so as long as the observation lasted. Three cattle found bones shortly after entering the kraal. These bones had probably been dropped by cattle in previous tests. (Cow 3333, heifer 3856, tollie 4029.)

4.5.19: Carcass Paddock.—Both lots of cattle were placed in the carcass paddock in order to see whether any of them will go to the heap of carcasses. Before long the majority of the cattle were busy chewing bone splinters that they had licked from the ground. Only one cow, 2968, was seen to chew a rib from the heap and to pick a lumbar vertebra, which she soon dropped.

Remarks: The observations thus again showed that there were different degrees of craving for bones. Common to all cattle apparently was the taste for bleached bones. The cattle (with one rare exception, cow 2968) would not go to the offensive-smelling bones of the piled-up carcasses as long as traces or even as long as the smell of the bleached bones was about.*

In the control paddock where no bleached bones were available, the cattle showed preference for the cooked bones and cared very little for fresh green bones. There were only a few animals that picked old rotten bones and still fewer that picked new rotten bones.

The results of these experiments were conspicuously contrasting with those recorded from feeding the old rotten bones from the same carcasses when supplied in troughs and which were eagerly eaten by some cattle (*vide* chapter on feeding bones from troughs).

It was by no means surprising to note that none of the control cattle so far had contracted lamsiekte. The old bleached bones had apparently passed the dangerous stage, and of the old and new rotten bones not enough had been consumed by the cattle to cause the intoxication. The tests did not allow much time for chewing.

Alteration of Experiment: Since the cattle that had access to palatable bones were apparently not so easily disposed to pick rotten bones, the question had to be decided whether they would turn to rotten bones if no palatable bones were available, as seemed to have been the case with the bones fed from the troughs. The experiment proposed was to place all cattle in the control paddock [III (b) of C], which hitherto had been free of carcasses and to bring the carcasses of the carcass paddock over as well.

EXPERIMENTS TO ASCERTAIN WHETHER CATTLE WOULD PICK OLD ROTTEN BONES THAT WERE KNOWN TO PRODUCE LAMSIEKTE IF NO PALATABLE BONES COULD BE OBTAINED.

5.4.19: The broken-up carcasses were placed in the control paddock and all were piled up in one heap. The two lots of cattle were turned into the paddock. They walked up to the bones; some had a sniff at them, but none were seen to pick any bones. Subsequently the cattle strolled away. Heifer 3910 turned to the place where the old rotten test bones had previously been lying and indeed picked up one that had been left behind. Heifer 3900 returned to the gate and there also found a bone.

* An analysis of the bleached bones showed that they still contained 4.3 per cent. nitrogenous substance, practically as much as commercial bonemeal.

6.4.19: The two lots of cattle were driven into the control paddock. On two occasions heifer 3910 was seen to walk up to the heap and to pick bones. Heifer 3911, tollie 3903, and cow 2968 were seen to pick bones and drop them again. It was thought that the bones piled up in a heap might, as a whole, be too offensive in smell for the cattle, and, therefore, it was suggested that they should be scattered about. This was accordingly done.

7.4.19: The cattle were turned into the control paddock and driven to the scattered bones. After a little while, three animals were seen to pick bones, viz.: cow 2968 was noted to do so several times—once she picked a rib; twice heifer 3910 was seen to pick bones; tollie 3930 chewed one bone all the time; tollie 4029 brought a bone into the camp from outside and was busy with it so long as the observation lasted. The other cattle soon dispersed and went to graze. Two lay down quite near the bones.

8.4.19: The cattle were driven into the control paddock at 7.30 a.m. Two were seen to pick and chew bones before 8 a.m., viz., heifer 3905 and tollie 3930. After 9 a.m. two more were seen, viz., tollie 4029 and tollie 4106. With the exception of 4029, all animals were lying down at this time.

9.4.19: At 7.20 a.m. the two lots of cattle were driven into the control paddock. There was a heavy dew this morning, and after entering the paddock the cattle seemed to hang back. Only one, heifer 3910, approached the bones and picked and chewed one during the time of observation. At 9.30 two animals were seen chewing bones, tollie 4106 and heifer 3856. The herd dispersed throughout the paddock. The cattle were then collected and driven to the bones, when some more were noted to pick bones, viz., heifer 3900, cow 2968, heifer 2910, tollie 3903. Heifer 3936 was busy chewing a bone.

10.4.19: After entering the control paddock at 7 a.m. the following animals were seen picking bones: cow 2968, tollie 3930, heifer 3910, heifer 3856, and tollie 3903. The remainder of the herd stood aloof. After 9 a.m. heifer 3856 was standing at the bones and eating one. The other cattle were scattered in the paddock and lying down. They were collected and driven over the bones when cow 2968 and tollie 3930 were again seen to pick bones. Heifer 3910 was then noted to lie down. This was contrary to the behaviour of the other cattle. When approached, she rose, but soon went down again. After she had been put up a second time, she walked away into a bush and lay down again. She was noticed to lick the lips and the nostrils frequently, stretching head and neck slightly. There was a thin string of saliva hanging from the mouth. This conduct and the symptoms were considered to be suspicious of lamsiekte; such symptoms had been previously noted in animals eating bones.

11.4.19: At 7.30 a.m. the cattle were turned into the control paddock and two animals were seen picking and chewing bones, viz., cow 2968 and heifer 3910.

12.4.19: At 7.10 the cattle entered the control paddock. Cow 2968, heifer 3910, and tollie 3930 chewed bones, tollie 3903 licked one for some time, and heifer 3905 picked one, but dropped it again. At 9.30 a.m. all animals were lying down. When put up and driven to the bones, tollie 3930 was seen to pick and chew a bone. Heifer 3910 again lay down. After she had been put up, she again lay down in the same place. It was evident that this heifer was not quite her former self.

13.4.19: At 7 a.m. the cattle were driven into the control paddock. Five animals, viz., tollie 4106, tollie 3903, cow 2968, tollie 3930, heifer 3910, were noted to chew bones. At 10.30 a.m. four animals were eating bones, viz., tollie 4106, heifer 3856, tollie 3930, and heifer 3910. Heifer 3910 was down, and when approached she rose, walked to the bones, and picked and chewed one.

15.4.19: When the cattle were driven into the control paddock at 7 a.m., heifer 3910 was noted to lag behind, showing a distinctly stiff gait. After arrival in the paddock, she lay down. When disturbed, she rose. When driven to the bones, she picked one and stood for a while, but soon lay down, chewing the bone which she had in the mouth. At 9.30 a.m. the heifer was still in the same place. At 1 p.m. she was brought to the water near the homestead, where she lay down. At 3 p.m. she was still found in recumbent position and in the same place. When driven with the herd, she lagged behind and walked with a forced gait. The diagnosis lamsiekte was now definitely made. At 7 a.m. five animals were noted to chew bones, viz., heifer 3856, tollie 3930, cow 2968, tollie 3903, heifer 3905; at 9.30 a.m. three animals, viz., tollie 3930, heifer 3856, tollie 4106.

16.4.19: Four head of cattle were noted to chew bones after arrival in the control paddock, viz., tollie 3930, cow 2968, heifer 3905, heifer 3856. Cow 3583 went down after entering the kraal. This morning heifer 3910 did not turn up with the herd to be watered at the homestead. She was found lying down near the corner of the camp where seen last the previous evening. When disturbed, she rose readily and walked with the herd into the paddock. Soon after arrival there she lay down behind a bush. When disturbed, she rose reluctantly and walked a short distance. After approaching the bones, she picked one and chewed it. At 9 a.m. she was again found lying on the ground, and when disturbed she rose, but lay down almost immediately afterwards. At noon she was brought to the water with the herd, but lagged behind all the time. When at 1 p.m. the herd was moved to the grazing camp, she only walked about a hundred yards and then lay down. At 3 p.m. she was found in the same place. The faeces were dry and formed chain-like cakes covered with a stinking mucus.

17.4.19: The following animals were observed to eat bones: tollie 3930, cow 2968, heifer 3905, tollie 4106, and heifer 3910. No improvement was noted in the sick heifer (3910); she walked with a distinctly stiff gait. It is of interest to note that this animal, although suffering from lamsiekte, continued to chew bones.

18.4.19: The following cattle were seen to pick and chew bones: cow 2968, tollie 3930, heifer 3905, tollie 3903, heifer 3856, tollie 4029, tollie 4106, and heifer 3910. The stiffness in the gait of the latter animal was less marked to-day, but as soon as she had entered the paddock she lay down. When driven to the bones, she did not pick any as usual, but returned to her former place and again lay down.

19.4.19: To-day the following animals were seen to pick and chew bones at 7.45 a.m.: cow 3333, cow 2968, tollie 2930, heifer 3856, cow 2844. Heifer 3910 was not chewing. After 9 a.m., she was found in sterno-costal position. When disturbed, she rose in a very clumsy manner, with the front legs spreading and the front quarter falling

from side to side. She showed distinct loss of condition and a staring coat. She moved away from the herd to the far corner of the paddock, where she lay down.

20.4.19: At 7.30 a.m. three animals were seen chewing bones, cow 2968, tollie 3930, heifer 3936. After 9 a.m., none were noted to chew bones. Heifer 3910 was about the same as on the previous day. The blue schimmel cow (3146) was found lying down this morning, an unusual occurrence in this animal. She was never seen chewing bones since she had entered the control camp, and had always behaved in a peculiar manner, keeping away from the rest of the cattle and from the bones. Only rarely was she noticed to be grazing, but was practically always standing. At noon she was reported to be unable to rise, and water and food was brought to her. Later she rose and walked to the stable. A peculiar grunting noise was heard at intervals when walking. She appeared very full, the abdomen on both sides standing out very distinctly; the swollen abdomen had been noticed for some time. This cow died subsequently (26.4.19). The post-mortem revealed a most interesting condition. The reticulum was not found in the abdominal cavity, but in the pleural cavity, where it dislocated the heart and the lungs in cranio-dorsal position. It had fused partly with the pericardium. The rumen was fused together with the serosa of the left side of the diaphragm and the left abdominal wall by means of extensive fibrous adhesions. The rumen could only be removed by cutting out the diaphragm. The walls were much thickened, and a piece of wire was found sticking in it at one place. The reticulum was packed tightly with sand and small pieces of bones and dry food. The oesophageal groove and the reticulo-omasical opening were open. There was a broncho-pneumonia present in the left basal lobe.

The interpretation of the cause of this extraordinary condition was probably the overfilling of the reticulum with bones, which, pressing on the diaphragm, ruptured it and so formed a hernia. The cow was an unusually eager bone-eater at the beginning of the experiment and consumed large quantities. One day (15.3.19) she no longer picked bones, and from that date her conduct was so strange and peculiar, and she was so averse to bones that it seemed as if she knew that bone-eating had done her some harm. Apparently on that date the rupture had taken place; the fissure in the diaphragm healed out, but the reticulum became so fixed that it was placed out of action, and rumination was arrested. Indeed, for a long time the cow was never seen to ruminate. Although the opening into the omasum and abomasum was free, the rumen could not completely discharge its ingesta, and the hungry cow grazing at times packed it, until its functions entirely stopped. (For details of the case *vide* Appendix, page 1015.)

21.4.19: At 7.20 a.m. the following animals were seen chewing bones: heifer 2844, tollie 3903, heifer 3905, and heifer 3856. Heifer 3910 still had the clumsy walk. At 9 a.m. the whole herd was found lying down.

22.4.19: Two animals, heifer 3911 and ox 3621, which so far had not been seen picking rotten bones, were chewing bones this morning, which they had picked up outside the paddock. The following animals were standing amongst the rotten bones and were chewing eagerly: heifer 3910, cow 2968, tollie 3903, heifer 3905, tollie 3930, and heifer 3856. At 9.30 a.m. all animals were resting; heifer 3910 was a good distance away from the herd.

23.4.19: Four animals were noted to chew bones at 7.30 a.m., viz., tollie 4029, tollie 3903, heifer 3905, heifer 3856. At 9.30 all animals were in recumbent position.

24.4.19: The following animals were noted to chew bones at 7.30 a.m.: Cow 3333, heifer 3905. Heifer 3998 was chewing a horn. In the afternoon heifer 3910, when accompanying the herd to the water, was seen to lag behind at times and to show a distinctly clumsy gait in front, falling from side to side with each step.

25.4.19: Eight animals were seen chewing bones between 7 and 8 a.m.: tollie 4029, tollie 3930, heifer 3936, heifer 3905, heifer 3910, tollie 3903, ox 3621, cow 2968.

26.4.19: The following animals were seen chewing bones: cow 2908, heifer 3910, tollie 4029, tollie 3930, tollie 4106.

27.4.19: This morning a bull (2600) was placed amongst the herd for the first time. Between 7 and 8 a.m. the following animals were seen eating rotten bones: tollie 3818, tollie 3930, heifer 3900 heifer 3936, cow 2968, tollie 4029, cow 3333, heifer 3910, and the bull (2600). At 3.30 p.m. the following animals were eating bones: tollie 4029, tollie 3930, heifer 3936, cow 2844, tollie 4106, heifer 3910, and the bull (2600).

28.4.19: Between 7 and 8 a.m. the following animals were seen eating bones: heifer 3936, tollie 3930, tollie 4029, and tollie 4106.

29.4.19: Four animals were seen chewing bones this morning: heifer 3905, cow 2844, heifer 3856, heifer 3910.

30.4.19: The following animals were noted to pick and chew bones: cow 2844, heifer 3936, tollie 3930, and bull 2600.

Remarks: Since 5.4.19 only one animal, heifer 3910, had definitely contracted lamsiekte, which could be put down to the eating of rotten bones, for which she had been partial already in the former experiments. It was noted that a good number of cattle had been eating bones, and the negative results were not anticipated in the light of the previous bone-feeding experiments from troughs. The suggestion, therefore, occurred, that the bones might no longer be toxic, and it was decided to test their toxicity.

Heifer 3805 was accordingly drenched with 1 lb. crushed ribs and died of lamsiekte eight days later [*vide* Experiment 12 (*i*)]. The experiment established the fact that the bones were still toxic at the time of drenching. There was no change of bones made.

1.5.19: The following animals were seen eating bones this morning: cow 2844, cow 2968, heifer 3856, heifer 3905, tollie 3930, heifer 3910, heifer 3936, tollie 4029, tollie 4106. Cow 3583 was noted to stand aloof and lay down shortly afterwards.

2.5.19: Seven animals were noted to chew bones: cow 2968, tollie 4029, heifer 3910, heifer 3936, heifer 3856, tollie 3930, heifer 3905. The cow 3583 again was noted to go on one side and to lie down. This unusual behaviour in this animal was suggestive of the diagnosis of approaching lamsiekte.

Fresh supply of Bones (from Carcass of Ox 2519.) .

3.5.19: A fresh supply of bones from the carcass of ox 2519, which had died on 8.4.19 from internal haemorrhage was placed in the former carcass paddock (C IV) this morning, and the cattle were then driven in. The grass was, however, too attractive for the cattle and no attention was paid to the bones. No cattle had been in this

camp for some time and the grass had had a chance to grow. After a while two animals were seen picking and chewing from these bones, viz., 2844 and 3905. Some cattle had still found old bleached bones which they chewed (3818, 4023, 3911).

Bull 2600, which had been running with the cattle for about a week and which was noted to pick and chew bones eagerly during the first day, was reported ill before noon and was lying in the grazing camp set apart for the carcass camp cattle (hospital camp). When visited in the afternoon, he rose as soon as he was approached and walked away in a very clumsy manner, only to lie down again. The diagnosis lamsiekte was made. The animal died of the disease the following day (for details *vide* Appendix, page 1017).

Remarks: It is evident that the bull contracted the disease from eating the bones in the paddock in which he had been placed on 27.4.19, viz., six days ago. He had been eating bones very eagerly and had had no access to bones previous to the transfer to this experiment. It was nevertheless remarkable that this bull should so soon contract the disease, whilst the cattle that had hitherto been chewing bones frequently had so far escaped the disease, consequently the suggestion occurred at the time that cattle could become accustomed to the toxin of carcasses when partaking of it daily and in comparatively small quantities. In the case of cow 3583 (1.5.19), the behaviour of the animal was suggestive of lamsiekte, and although nothing further occurred, it might be considered as an extremely light case of the disease.

4.5.19: The cattle were again turned into the carcass paddock. They soon collected in the north-east corner, and before long had found some bones and were chewing them, viz., heifer 3911, heifer 3906, heifer 3936, cow 3583, tollie 4023, tollie 3818, heifer 3910, heifer 3900, heifer 3905, heifer 3856, cow 3333, tollie 4029, cow 2844. None of the animals touched any of the new rotten bones of ox 2519.

5.5.19: This morning the cattle were returned into the control paddock, where the old rotten bones had been left. The following animals were found chewing bones: heifer 3910, heifer 3856, tollie 3930, heifer 3936, tollie 4029, heifer 3905. Tollie 3903 was noted to lie down soon afterwards; when disturbed it rose and then remained standing. Heifer 3906 was also chewing a bone. She stood somewhat aloof, and most likely the bone she was chewing was not one of the above lot.

6.5.19: *Change of Bones (Ox 2519).*

All the old bones in the control paddock were removed and put back into the carcass paddock for safe-keeping. A fresh lot of bones was placed in the control paddock. These came from the carcass of ox 2519 and had already been used in the carcass paddock during the last two days. Three animals were noted to chew bones: heifer 3906, heifer 3910, tollie 3930. The bones, however, had not been picked from the new lot (ox 2519), but were found at the old place from which the bones had been removed.

7.5.19: This morning the cattle were driven into the control paddock, where they assembled near the gate. Some were licking at the salt-box, and when driven away returned. The new bones were scattered near the right side of the entrance. The cattle took no notice of them, even when driven over or standing between them.

At 10 a.m. all cattle were lying down. Heifer 3900 was chewing an old bone which had most likely been left behind. The cattle were again driven over the bones, but no notice was taken.

8.5.19: The cattle were driven into the paddock at 7 a.m. No notice was taken of the bones. After 9 a.m. all cattle were found resting. They were again driven over the bones, but again no notice was taken. Some animals were chewing bones, viz., cow 3333, heifer 3900, heifer 3905, cow 2844, heifer 3856, tollie 4029. Most likely the cattle had found the splinters at the former bone place.

9.5.19: The cattle entered the camp at 7.20 a.m., and walked over the bones repeatedly without taking any notice of them.

10.5.19: This morning all the cattle were found grazing near the paddock, except cow 2844, which was chewing a bone that she had picked up outside the paddock. At 9.30 a.m. she was still chewing, and at 10 a.m. the same observation was made. After 9 a.m., the cattle which meanwhile had wandered to the water-troughs were driven into the control paddock. Cow 3583, on entering, found a bone and kept chewing it all the time. Heifer 3905, wandering through the paddock, found a rib. Cow 2968 found a bone, and heifer 3856 a piece of dry sinew. These things had not been picked up at the bone place.

Change of Putrid Bones. Original Bones Returned.

It was evident that the new supply of rotten bones was not palatable to the cattle; it was therefore thought advisable to change them again, in particular because the bone test of 1.5.19 had given positive results, showing that the old bones were still toxic.

10.5.19: The bones were collected and removed from the paddock and placed in the adjacent one for safe-keeping. The old bones that had previously been in the paddock were now returned and put in a new place, a little way from their former site and quite away from the place of bones of ox 2519. The following animals were now noted to pick bones and chew them: heifer 3905, cow 2968, tollie 4029 (all these had picked ribs), heifer 3856 picked a vertebra. Tollie 3930 also picked up a bone at the former bone place (same kind of bones).

On accompanying the herd to the paddock, tollie 3930 was noted to lag behind, and as soon as it had entered the camp it lay down, and after being put on its feet it immediately went down again. Subsequently it rose, went to the bone heap, picked a bone, and chewed it. Examined in the afternoon, no further changes had become noticeable. This behaviour was suspicious of lamsiekte.

11.5.19: After 9 a.m. the cattle were turned into the old carcass paddock by mistake, and when examined a few minutes later the following animals were found chewing bones: cow 2844, tollie 3906, heifer 3856, tollie 4029, heifer 3998, heifer 3936, heifer 3900, heifer 3905. Two animals, tollie 3818 and cow 3333, were in the north-west corner in the old bone place licking up the ground on which tiny bone splinters were still strewn about. Heifer 3911, which had remained outside, was also chewing a bone.

The herd was then turned out of this paddock into the control paddock, and the following were seen to pick and chew bones from the lot of old bones returned the previous day: cow 2968, heifer 3910, tollie 4106, heifer 3856, heifer 3936.

12.5.19: The cattle were put into the paddock after 9 a.m. The following animals were seen to pick and chew bones: cow 2968, tollie 4029, heifer 3856, heifer 3910, heifer 3905, cow 3583. Tollies 3903 and 3930 at an early time were noticed to lie down, and the latter was lagging behind when the cattle were transferred to the camp.

13.5.19: After 9 a.m. the herd entered the paddock. The following cattle were noted to chew bones: Heifer 3910, tollie 4029, cow 2844, heifer 3856, cow 2968, heifer 3905, and tollie 4106.

14.5.19: The cattle were placed into the paddock at 7.20 a.m. The following animals were seen picking and chewing bones: tollie 4029, cow 2968, tollie 3930, cow 2844. It was observed that heifer 3856 was the first animal to lie down to-day.

15.5.19: The herd was driven into the paddock at 9 a.m. The following cattle were noted to pick and chew bones: tollie 4029, heifer 3910, cow 2968, heifer 3905, heifer 3900.

16.5.19: The cattle entered the paddock after 9 a.m. The following animals were seen to eat bones: heifer 3910, cow 2968, heifer 3900, tollie 4029, cow 2844, heifer 3936. After arrival in the paddock, heifer 3856 suddenly lay down as if she had let herself drop into sterno-costal position. She was slightly salivating. These symptoms were considered to be the initial symptoms of lamsiekte.

Testing the toxicity of the original bones of the carcass paddock used in the experiment (the old bones). A second test was thought advisable in order to obtain more information about the suitability of the bones for the experiment under discussion, and cow 4178 was drenched with 1 lb. rotten bones with negative results (*vide* Experiment 12 J).

It would thus appear that not all the bones of the carcass were toxic, or that some had lost their toxicity. This experiment was subsequently repeated on the 3.6.19 on tollie 4095 (*vide* Experiment 12 K), again with negative results.

It was thus quite evident that the bones tested on this day were no longer toxic. This conclusion, however, does not hold for the rest of the bones, and does not exclude the possibility that other bones were still toxic, as really must have been the case, since subsequently more animals in the experiment contracted the disease (3856, 3930, 2968).

These bones had been exposed to the open air and sun during this time and the object was to see whether they now had become palatable to the cattle. These bones were put into a new place, not far away from the former lot.

17.5.19: *Observations.*—Only heifer 3910 was seen to pick and chew one of the new bones. Cow 2968 picked one but dropped it again. The following animals were seen at the old place and there found bone splinters which they chewed: tollie 3930, heifer 3900, tollie 4029, and cow 3583. Heifer 3856, when turned into the camp, lay down almost immediately. When forced to rise she did so reluctantly and lay down again. The diagnosis lamsiekte was made.

18.5.19: At 10 a.m. the herd was driven into the paddock. The cattle gathered not far from the gate. Heifer 3856 was lying down at some distance from the rest. Tollie 3930 was also down, but was lying nearer the herd. The cattle were then collected and driven into the paddock and heifer 3856 lay down almost immediately. She was disturbed by an ox and rose, but went down again. Subsequently

tollie 3930 went down near her. Only one heifer (3900) was seen to pick a bone, which she soon dropped. In the afternoon the herd was brought to the water trough and heifer 3856 remained behind after the herd had gone to graze. Later in the afternoon she was seen grazing in the hospital camp. There could be no doubt about the diagnosis lamsiekte.

19.5.19: Heifer 3856 was almost at the same place where she was seen the previous night. She was standing; subsequently she lay down but rose again. She accompanied the herd to the paddock, but as soon as she had entered it she went down. When disturbed she rose easily, but immediately lay down again almost in the same place. The herd had entered the paddock at 9 a.m. None of the animals were noted to interest themselves in the bones. Heifer 3911 had forced her way into the carcass paddock and was found in the north-west corner chewing a bone. Tollie 3930 did not show any abnormality and moved about with the herd. Salt was still present in the salt-box.

20.5.19: The herd was driven into the paddock at 9 a.m. Heifer 3856 had been lying outside the gate and after being driven into the paddock she lay down again. The new bones were not touched by the cattle. At the old bone place the following cattle were seen picking up and chewing small pieces of bones: cow 3583, tollie 4029, heifer 3900, cow 3333.

21.5.19: At 9 a.m. the herd came to the water trough, but heifer 3856 remained behind. The cattle were then driven into the paddock; the heifer was then noted to have a stiff gait. She went down as soon as she had entered the paddock. She was once disturbed by an ox and rose only to lie down again almost immediately. The second animal to lie down was tollie 3930. None of the animals were noted to pick from the new bones; they passed over it, but no notice was taken.

It was thus apparent that the new bones were not yet palatable for the cattle.

Tollies 3903 and 4029 found something to chew in the old bone place. It is interesting to note that the cattle were looking for more palatable bones.

22.5.19: When the cattle were collected this morning at 9 a.m., heifer 3856 was found lying down. After the herd was put into the paddock, tollie 3930 was the first animal to lie down. Heifer 3856 lay down after two more had gone to rest (heifer 3905 and heifer 3906). Heifer 3900, when entering the kraal, found a bone and chewed it; she did not come near the putrid bones. None of the animals took any notice of the putrid bones and gradually, one after the other, they lay down.

23.5.19: The herd was driven into the paddock soon after 9 a.m. Heifer 3856 and tollie 3930 lay down immediately after arrival. Some other soon followed. None cared for the putrid bones. Tollie 4029 found a rib in a bush. Heifer 3911 had to be fetched in the adjacent old carcass camp where she was standing in the old bone corner chewing a bone. The behaviour of tollie 3930 was suggestive of lamsiekte.

24.5.19: The cattle were driven into the paddock after 9 a.m. Tollie 3930 lay down immediately. Heifer 3856 remained behind and had to be fetched. Her walk was slow and clumsy, and she lay down after arrival in the paddock. Tollie 4029 picked up the same

rib it had been chewing yesterday. None of the cattle picked any of the new putrid bones. One after another the cattle settled down before the observation was concluded.

25.5.19: The cattle went into the paddock after 9 a.m. None were noted to go for bones. Heifer 3856 lay down immediately after arrival. When forced to rise she did so very reluctantly, but went down again. Tollie 3930 also lay down and did not rise voluntarily when approached but did so when forced, only to lie down again almost immediately. The nose of this animal was somewhat dry and a string of clear saliva was hanging from the mouth. The diagnosis lamsiekte was made.

26.5.19: All the cattle had assembled at the water trough of the homestead with the exception of heifer 3856, which was lying in the veld. She was able to rise when forced to do so, and then walked to join the herd. The cattle were then on the way to the paddock. Heifer 3856 lagged behind and walked with some difficulty, markedly nodding with head and neck. Tollie 3930 was also lagging behind. This animal was the first to lie down after the herd had entered the paddock.

The second animal to lie down was cow 2968. Heifer 3936 picked the same rib as yesterday and chewed it during the whole period of observation. Heifer 3910 found some bones in the old place. Tollie 4029 was at the old place and had picked a bone which it chewed for some time. Since the animals refused to touch the new rotten bones (from carcass of ox 2519), but eagerly looked for palatable bones, it was soon thought advisable to test their craving for sweet bones. Accordingly they were submitted to the test with sterilized bones and the following animals were seen to pick bones: Cow 2844, tollie 3903, tollie 4029, tollie 3818, cow 3333, heifer 3900, heifer 3856, cow 3583, ox 3621, heifer 3936, tollie 3930, heifer 3911. None of the animals were, however, very eager.

27.5.19: At 9 a.m. the cattle collected near the gate, and heifer 3911 penetrated into the carcass paddock where she found a bone; and chewed it. Tollie 3930 was the first animal to lie down. It was followed by tollie 3903, which settled near her. The third animal to lie down was heifer 3856. Ox 3621 picked a bone near the new bone place. Heifer 3936 again found the same rib which she had been chewing the last few days and chewed it for some time. Heifer 3910 sniffed at the old bone place and found something to chew. None of the animals were noted to go deliberately to the new bone place and to pick any of the bones.

28.5.19: At 9 a.m. the cattle collected near the gate. Heifer 3856 was in recumbent position, but rose as soon as she was approached. Heifer 3911 again forced into the carcass paddock, where she was standing in the north-west corner and chewing a bone. After entering the paddock the cattle stood near the gate for a while; some interested themselves in the fresh salt supply. When driven away they returned. None of the animals took any notice of the rotten bones. Tollie 3930 was the first animal to lie down; it was followed shortly afterwards by heifer 3856. The latter animal made a slow recovery, whilst the former showed lamsiekte in a mild degree.

29.5.19: At 9 a.m. the cattle collected near the gate. Cow 2968 was lying down but rose as soon as she was approached. Heifer 3911 was again in the carcass paddock; she was returned into the

control camp and soon lay down. She was in oestrus. The next animal to settle down was tollie 3930. Apparently this animal had acquired a liking for the particular place where it lay, having recently been noticed always to settle in the same place. Heifer 3856 did not lie down during the period of observation and was still standing after the majority of the cattle had gone to rest. Heifer 3910 again went to the old bone place and picked up something which she chewed. None of the other animals were noted to interest themselves in the rotten bones which were lying about.

30.5.19: At 9 a.m. heifer 3911 was chewing a bone in the north-west corner of the old carcass camp. This animal was apparently determined to get a palatable bone. She knew where to find it. After being returned into the control paddock she lay down. She was in oestrus. The cattle were then driven to the rotten bones, but none were noted to take any interest in them and they soon began to settle down. Cow 3583 was the first to lie down. Tollie 3930 was the next, and heifer 3856 the third. This heifer chased cow 3583 out of her place and settled in it. Heifer 3910 from the commencement went to the old bone place and found something to chew, which, to judge from the dirty nose, she must have found by licking the soil very closely. Salt was still present in the box, and some animals were noted to lick it.

31.5.19: Most of the cattle were lying near the gate. Heifer 3911 was in the carcass paddock; after being returned to the control camp she was the first animal to lie down (she was still in oestrus). The next animal to settle down was cow 2968. Soon afterwards one animal after the other lay down. None were seen to pick a bone of any description, although some of the cattle were sniffing about and actually licking the ground at the old bone place.

1.6.19: Before 8 o'clock this morning heifer 3911 was found in the old carcass paddock standing at the heap of old bones placed there for safe-keeping some time ago. At 9 a.m. the cattle were put into the paddock (two animals were missing). The cattle took no notice of the bones. Ox 3621 was the first to lie down. On the way to the paddock cow 2968 was noted to lag behind somewhat and turn aside when the herd was hurried up. On arrival in the paddock she behaved normally and did not lie down before the conclusion of the observation (10 a.m.). The behaviour of the cow during the last few days was undoubtedly suspicious of lamsiekte, of which she probably was suffering in a very mild degree.

2.6.19: This morning heifer 3911 was again found in the adjoining carcass paddock chewing a bone. After entering the paddock, tollie 3903 was noted to walk to the new rotten bones and pick one, which it chewed during the time the observation lasted. Tollie 4029 was also noted to pick a bone, but soon dropped it. Tollie 4023 found a bone near the entrance, and this she chewed for a while. Cow 3333 found a bone at the former bone place and chewed it during the rest of the time she was under observation. Heifer 3856 was the first animal to lie down. The herd did not settle as readily as on the previous two days. At 10 a.m. the majority was still standing or grazing. There was a high wind from the north and north-west blowing at the time. Salt was still present in the trough, and one animal was noted to lick it.

[To control the toxicity of the old bones, tollie 4095 was drenched, with negative results (*vide supra*).]

3.6.19: The cattle were driven into the paddock at 9.30 a.m. and kept near the bones for some time. Only tollie 3903 was noted to pick up a piece of loose dry flesh, but soon desisted. Heifer 3910 was subsequently seen sniffing at the former bone place and finally found something to chew. Heifer 3856 was the first animal to lie down. The cattle did not settle down readily at the conclusion of the observation, only four head being in recumbent position. There was a high wind blowing from the north.

4.6.19: After 9 a.m. the herd entered the paddock and was kept near the bones. Tollie 3903 picked a bone and chewed it for some time. Heifer 3900 picked a bone on two occasions, but every time soon dropped it. Tollie 3930 also picked a bone, but dropped it. It then went to the old bone place and there found a piece of skin which kept it busy for some time, but finally dropped it. Tollie 4029 picked a bone, but soon dropped it. Heifer 3856 was the first animal to lie down. She was followed by heifer 3911, which was again found in the old carcass paddock, but grazing this time.

5.6.19: The cattle were put into the paddock shortly after 9 a.m., and were kept over the bones. Tollie 3903 was noted to pick a bone and chew it, subsequently it picked another one and continued chewing; it was still chewing at 10 a.m. Cow 2844 also picked a bone with dry flesh hanging to it and chewed it for some time; suddenly she dropped it and lay down. Tollies 4023 and 4029 and heifer 3910 found old bones and chewed them for some time. Cow 2968 was the first animal to lie down. Subsequently one animal after the other settled down, and the bone-eaters, in company with two non bone-eaters, were the only animals that were standing. It was windy during the whole time and the cattle did not scatter.

6.6.19: The cattle entered the paddock after 9 a.m. and assembled over the bones. Soon, however, they trailed away and returned to the salt-box near the gate. They were driven over the bones a second time. Tollies 3903 and 4029 were seen picking bones, but soon dropped them again. Cow 3583 found an old bone near the entrance and was busy chewing this during the whole period of the observation. Heifer 3910 was the first animal to lie down; heifer 3856 soon followed, and then one by one the herd settled down.

7.6.19: Heifer 3911 was in the old carcass paddock, chewing a bone. After being brought back into the control camp she continued chewing the same bone. Cow 2968 was seen at the new bones and was chewing the whole time (about forty-five minutes). Heifer 3900 took a bone, and after an interval another one. She was chewing. Tollie 3903 was also seen to pick a bone and chew it. Tollie 3930 was the first animal to lie down; it was followed almost immediately by heifer 3910. Subsequently the majority of the cattle went down and only the bone-eaters were standing. Tollie 4029 was picking and chewing a bone; after entering the paddock it soon dropped it and subsequently lay down.

8.6.19: The herd was put into the control paddock after 9 a.m. Three animals picked bones (2844, 2968, 3900) almost at the same time and chewed during the whole period of observation (9 a.m. to 10 a.m.). Tollie 3903 also picked a bone, but was the first to discontinue, and then went to lick salt. Tollie 3930 was the first animal to settle down. The rest settled very slowly, and at 10 a.m. a few were still standing, including the bone-eaters. It would thus appear that the new bones, which were refused for a considerable length of time, had become palatable to some of the cattle.

9.6.19: The cattle were driven into the paddock after 9 a.m. Heifer 3900 arrived chewing a bone; she was still chewing it at 10 a.m. Heifer 3910 picked a putrid bone and chewed it during the rest of the observation period. Cow 2844 and tollie 3903 were chewing for a short while, and then went to the salt-box. Heifer 3905 was the first animal to lie down. Most of the cattle were still standing at the conclusion of the observation.

Attention should be drawn to the fact that all the cattle had free access to the salt, which was renewed once a week. It was usually consumed by Monday of the following week. Its consumption apparently had nothing to do with the prevention of craving.

10.6.19: At 9.20 a.m. the cattle were over the bones. Tollie 3903 was the first to pick one, and subsequently was again seen picking. It was still chewing at the conclusion of the observation (10 a.m.). Equally eager and persistent was heifer 3900. Cow 2968 and heifer 3910 commenced somewhat later, chewing eagerly and until after the conclusion of the observation. The cow had picked up a bone with much dry flesh hanging on to it. She was salivating profusely whilst masticating. Cow 2844 and tollie 4029 chewed only for a little while. Tollie 4023 found a piece of bone at the former bone place and was noticed to chew eagerly for some time.

11.6.19: At 9.20 a.m. the cattle entered the paddock, and as soon as they arrived at the new bones the following animals began to eat: Cow 2844, heifer 3936, tollie 3903, heifer 3900. Cow 2968 first ruminated for a while, and then picked a bone and chewed it. At 10 a.m. all bone-eaters were still eagerly chewing. The first animal to lie down was heifer 3911. She was followed by heifer 3905. Heifer 3856 and tollie 3930 were amongst the last to lie down. Heifer 3910 went down at the conclusion of the observation.

12.6.19: The herd were at the bones at 9.15 a.m. The following animals were noted to pick bones: Cow 2844, heifer 3900, tollie 3903, cow 2968, and heifer 3910, which chewed bones during the whole time of the observation. Heifer 3905 commenced somewhat later and continued as busily as the rest. Heifer 3911 (apparently in oestrus) went down first. Heifer 3856 and tollie 3930 did not lie down before the conclusion of the observation (10 a.m.).

13.6.19: After 9 a.m. the cattle assembled over the bones. Tollie 3903 picked a bone and chewed it during the whole time of the observation. Heifer 3905 chewed a bone for a short while. Some of the cattle soon trailed away, while others lay down.

14.6.19. At 9.30 a.m. the herd was in the paddock. Three animals were noticed to pick bones, viz.: Heifer 3910, cow 2968, heifer 3900. They were still chewing at 10 a.m., when all other cattle, except one, had gone down.

15.6.19: At 9.30 a.m. the cattle had assembled at the bones. Heifer 3910 and cow 2844 were seen chewing. Tollie 3903 picked a piece of dry flesh, but soon dropped it again and went and licked salt.

16.6.19: The herd entered the paddock at 9.20 a.m. Tollie 3903 and cow 2968 soon picked bones and chewed them. Heifer 3910 picked a little later. All three were chewing at the conclusion of the observation (10 a.m.). Heifers 3900 and 3905 sniffed at the bones for a while, but did not pick any.

17.6.19: At 9.30 a.m. the cattle were driven over the bones. Four were noted to pick and chew bones, viz., cow 2968, tollie 3903, heifer 3905, heifer 3900. The first animal to lie down was cow 3583, long before any of the others settled down.

18.6.19: The herd was driven over the bones at 9.30 a.m. Only tollie 3930 picked a bone, but soon dropped it again.

19.6.19: The cattle were driven into the paddock at 9.30 a.m. They assembled at the bones, but as soon as the native herdsman had left they returned to the gate, where two (tollie 3818 and heifer 3900) were noted to lick salt (fresh salt had been placed in the box the previous day). Heifer 3900 was the first animal to arrive at the bones; she picked one, chewed it for a while, then dropped it and went to the salt-box. Cow 2968 was the next animal to pick a bone, which she chewed during the whole period of observation. Cow 2844 chewed for a while and then went to graze. Heifer 3905 licked at a bone for some time. The first animal to lie down was the tollie 3930. Shortly afterwards several others followed. There was still a considerable quantity of salt in the box. A fairly strong breeze was blowing from the north-east.

Testing for Bone Eating with Sterilized Bones.—To-day all cattle belonging to the herd were submitted to the craving test with sterilized bones. The following animals were noted to pick sterilized rotten bones: Cow 3583, cow 3333, heifer 3900, tollie 4023, tollie 3903, tollie 3818, cow 2844, heifer 3856. The following cattle were noted to pick bleached bones: Heifer 3936, tollie 3930, heifer 3911, heifer 3906, tollie 4029, heifer 3910, tollie 4106, ox 3621. It was thus evident that craving for palatable bones was still present.

Reduction in the Number of Cattle.—A number of bone-eaters being required in other experiments the herd was reduced, and the following animals were kept back, viz.: Heifer 3900, tollie 3903, cow 2844, heifer 3856, heifer 3936, tollie 3930, tollie 4029, heifer 3910, cow 2869, heifer 3905.

20.6.19: The ten cattle were standing over the bones at 9.15 a.m. There was a high wind blowing from the north-east. The cattle turned their backs to it. They soon lay down. Some returned to the salt-box as soon as the native attendant had turned away (heifer 3900, tollie 3903, heifer 3936, tollie 4023). Subsequently heifer 3900 returned to the bones and sniffed about for some minutes, but was not noticed to pick any. Cow 2968 was the only animal that picked a bone this morning, but not till some time after arrival and then only for a short while.

21.6.19: The ten cattle entered the paddock shortly after 9 a.m. and went to the bone place. Directly after arrival tollie 3903 lay down, it almost let itself drop, so sudden were its movements. After a while it was made to rise and did so hesitatingly. It stood for a few minutes, and then went down again in the same place. When forced to rise a second time it did so, but went down almost immediately. This time it changed its place. These symptoms were decidedly suspicious of lamsiekte. Heifer 3910 picked a bone shortly after arrival and chewed it. Cow 2968 sniffed about a good while, occasionally picking a bone, but dropping it every time. This cow showed symptoms of approaching calving.

22.6.19: The herd was driven into the paddock after 9 a.m., with the exception of cow 2968, which had calved during the night. Heifer 3900 at once picked a bone and chewed for some time, cow

2844 was the next to pick and chew a bone and continued for a longer while. Subsequently heifers 3900 and 3905 sniffed at some bones. Tollie 3903 lay down as soon as it had reached the place where the bones were lying. When disturbed it rose willingly, but went down again immediately. Tollie 4029 was the next animal to settle.

Addition of New Bone-eaters to the Experiment.—23.6.19: The five worst bone-eaters from the trough feeding experiment with rotten bones which was discontinued on 22.6.19 were transferred to this experiment, viz.: Tollie 4105 and heifers 114, 142, 169, and 172. At 9.30 a.m. the cattle were put into the paddock, including the cow 2968 with her calf. The cattle of the old herd assembled as usual at the old place. At first the new cattle kept at some distance. Cow 2844 was the first to pick a bone, and she chewed as long as the observation lasted (10.15 a.m.). Heifer 3905 also chewed for some time. Heifer 3910 picked a bone, but dropped it after a while. Subsequently two of the new-comers, heifers 169 and 172, picked bones and chewed them very eagerly. Some animals returned to the salt-box (heifer 3900, heifer 3910, tollie 4105, heifer 114). Tollie 4105 had been sniffing at the bones for some time before it finally picked one, and then chewed it for a short while; heifer 142 had also been sniffing about, but did not pick any bones. Tollie 3903 went down soon after its arrival. Another animal disturbed it; it rose and grazed for a while. Tollie 4029 was the next animal to settle down. Heifer 3856 and tollie 3930 lay down at the same time. The rest of the cattle settled somewhat later.

24.6.19: The cattle were placed in the paddock after 9 a.m. Tollie 3903 settled down directly after arrival and remained in sterno-costal position all the time. The diagnosis lamsiekte was made, the animal suffering from a light attack. This animal had contracted the disease from eating the new lot of rotten bones. Heifer 3905 picked a bone and chewed it for a while. After some time the majority of the cattle settled down. Cow 2968 (whose calf was kept back) returned to the salt-box. Some of the cattle were sniffing at the bones without picking any.

25.6.19: At 9.15 a.m. the herd entered the paddock. Tollies 4029 and 4105 were soon noticed to pick bones and to chew them during the whole period of the observation. Cow 2968 picked a rib and chewed it for some time. She then dropped it, and a little later picked another one chewing again for a short while. She then dropped it and went off to the salt-box. The heifer 3905 sniffed for some time in the old-bone place, but apparently could not find anything; she then settled down. Tollie 3903 was the first animal to lie down, followed shortly afterwards by heifer 3910. Cow 2844 was the third animal to go to rest. Heifers 3856 and 3905 went to the salt-box.

26.6.19: This morning heifer 142 was found outside the paddock. She was suffering from lamsiekte, and since she had not been seen eating bones in the paddock she must have contracted the disease from eating bones from the troughs in the former experiment (discontinued 22.6.19). Since, however, the cattle were not under observation during the whole period when in the paddock, it might be that she had picked bones at a time unnoticed by us. It was, however, more likely that the disease was contracted whilst she was in the trough experiment, and the case was accordingly dealt

with there in more detail. Tollie 3903 was also found in sterno-costal position outside the paddock in a patch of ploughed lands, looking bright and attentive. It rose with care and accompanied the cattle into the paddock and to the bone place, but went down directly after arrival. It literally dropped into sterno-costal position. Subsequently it was noted to be ruminating. Cows 2968 and 2844 picked bones, but dropped them almost immediately. Heifer 172 approached the old-bone place and there found what looked like a small piece of biltong; she picked and chewed it for a short while and then swallowed it. By 10 a.m. most of the cattle had gone to rest. Heifer 3856 was the last one to settle down. Tollie 3930 did not lie down; it made for the salt-box. The salt had not been renewed yesterday, but there were still some left over.

27.6.19: The cattle were driven up to the bones at 9.20 a.m. Cow 2844 at the moment of arrival picked a bone. She had some difficulty to grip it with the mouth and then dropped it, subsequently she left all bones alone. Tollie 4105 chewed a bone for about twenty minutes. Cow 2968 picked a bone soon after arrival, and was still chewing it at the conclusion of the observation. Tollie 3903 went down immediately after arrival. The next to lie down was heifer 3905. Subsequently the animals settled down one by one. At 10 a.m. only the bone-eaters were standing. Heifers 169 and 172 sniffed for a while at the old-bone place and were able to find something which they chewed and swallowed. In one instance it was a piece of dry flesh.

28.6.19: The herd was turned into the paddock at 9.30 a.m. Tollie 3903 went down as soon as it arrived at the bones. It was followed a few minutes later by heifer 3905. The conduct of heifer 3905 was decidedly suspicious of lamsiekte. The rest of the cattle went down later. With the exception of three that went to the salt-box, all animals settled down before 10 a.m. Cow 2968 was the first to go to the salt-box, the others were heifers 3936 and 3910. The salt had been renewed the previous day.

29.6.19: The cattle entered the paddock at 9.20 a.m. Tollie 3903 lay down as soon as it approached the bones. This animal was noted to have a somewhat clumsy gait, the front legs were somehow moved in a semicircle inwards and placed in distinct abduction. The head was carried low. There was no doubt about the diagnosis lamsiekte. Heifer 3905 picked a bone and chewed it during the whole time of the observation. Cow 2968 took a bone and chewed very eagerly; she dropped it and picked another one, and was still chewing at 10 a.m.

Tollie 4029 picked a bone after arrival, it chewed eagerly for some time, then the bone slipped from the mouth. The tollie did not seem to care for it any longer. It lay down. Heifer 169 was picking a small bone to judge from the munching movement; she continued munching after she had settled down. Towards the conclusion of the observation, cow 2844 picked a bone and continued chewing until after 10 a.m. Heifer 3900 went to the salt-box. She found a bone nearby and chewed it.

30.6.19: The herd was driven into the paddock at 9.20 a.m. Tollie 4105 and heifer 169 at once started picking bones. The former chewed bones during the whole time of the observation, the latter for the greater part of it. Heifers 3905 and 3936 were also seen to

pick bones, but dropped them almost immediately. Cow 2844 picked somewhat later, and was still chewing at 10 a.m. Heifer 3900 was near the gate and was apparently chewing the same bone as yesterday. Tollie 3903 walked up to the bones, sniffed for a while, picked a piece of dry flesh but soon dropped it and then lay down. Heifer 3856 was also seen to sniff at some dry flesh; she picked it but dropped it again. She was the second animal to lie down, and some considerable time after the tollie. No other cattle settled down by 10 a.m. Some assembled at the salt-box. Cow 2968 was seen licking salt.

Attention should be drawn to the fact that tollie 3903, whilst still suffering from lamsiekte, was picking rotten bones.

1.7.19: At 9.25 a.m. the cattle entered the paddock. Tollie 3903 was lying in the veld near the camp gate, and rose voluntarily after most of the cattle had passed. It walked with a somewhat clumsy gait, placing the front legs much in abduction and lagging gradually behind. As soon as it reached the bones it lay down. It was put up by heifer 3856, but a few minutes later lay down again, this time uttering a long drawn-out groan. Heifer 3905 was the next animal to lie down. She did so soon after the tollie. She was also put up by another animal and went down again after a while. The diagnosis lamsiekte was justified; the heifer was suffering from a very mild attack. This case must also have been contracted from eating new rotten bones. Meanwhile, none of the other animals had settled down. The first animals to pick bones were tollie 4029, heifer 169, heifer 172, tollie 4105. Tollie 4029 discontinued after a while and lay down. Heifer 169 discontinued chewing for a while but resumed it subsequently. Heifer 3910 commenced somewhat later; she dropped the bone at 10 a.m. and then lay down. By this time all the other animals had gone to rest except the bone-eaters, heifer 169, heifer 172, tollie 4105, which were very eagerly chewing. Cow 2968 nibbled at a bone, then left it alone and went to the salt-box. She was still licking salt at the conclusion of the observation (10 a.m.).

2.7.19: The cattle were driven into the paddock shortly after 9 a.m. Tollie 4029 and heifer 114 soon picked bones and chewed them; the former stopped after a while, but the latter continued during the whole time of the observation. Subsequently heifer 169 was noted to pick bones. She was still chewing at 10 a.m. Heifer 3900 chewed bones for a short while, then turned to the salt-box. Cow 2968 had also turned her attention to the salt. Tollie 3903, after arrival at the bones, sniffed about for a little while and then lay down, again uttering a long drawn-out moan when down. A little later, tollie 4105 settled down to rest. These were the only two animals in recumbent position at the conclusion of the observation (10 a.m.).

3.7.19: The cattle entered the paddock at 9.25 a.m., and all assembled at the bones. Heifer 172 was the first animal to pick and chew a bone. Subsequently she discontinued, and towards the end of the observation picked another one and continued to chew it. Directly after arrival tollie 4029 also picked a bone, which it chewed for a little while. Another bone was then taken but this was also dropped. Tollie 3903 arrived at the bones with a somewhat clumsy gait. It picked a bone to which some dry flesh was still hanging. It took up a position with front legs spread and never changed it. The tollie chewed bones very eagerly all the time until after 10 a.m.

Tollie 4105 also chewed bones during the whole time. Tollie 3930 chewed for a short time only. Cow 2844 commenced a little later and was still busy chewing at 10 a.m. The first animal to go down was heifer 3905; she went down soon after arrival. About 10 minutes later she was followed by heifer 3856. Then one by one settled. A minority remained standing, including the bone-eaters. Some cattle were at the salt-box. Cow 2968 took no notice of the bones or salt, but remained standing all the time and ruminating.

4.7.19: The cattle assembled directly over the bones after arrival at 9.25 a.m. Tollie 4029 was the first animal to pick a bone and the first to drop it. Cow 2844 and tollie 4105 picked bones and chewed them until after 10 a.m. Heifer 3900 had apparently picked a small bone and was munching this more than chewing. Cow 2968 picked bones on two occasions and each time chewed for a short while. Heifer 3900 went to the salt-box with the bone in the mouth and licked salt and continued to chew bones afterwards. The first animal to lie down was tollie 3903. After arrival at the bone place it sniffed at the bones for a while and even picked one, but dropped it again almost immediately. The second animal to lie down was heifer 3905. She lay down soon after the tollie. By 10 a.m. all animals were resting except the four bone-eaters, of which two were still chewing (4105 and 3900) and two were at the salt-box.

5.7.19: At 9 a.m. the cattle entered the paddock. Some walked up to the bone place. Tollie 4105 immediately picked a bone and chewed it until after 10 a.m. Tollie 3903 was the next to pick. It chewed for a while and then lay down. Heifer 169 picked somewhat later and cow 2844 was the last to pick. Both were still chewing at 10 a.m. The first animal to settle down to-day was heifer 3936, which hitherto had always been one of the last animals to lie down, frequently the very last one. The second animal to lie down was heifer 172; this animal was usually also one of the last to lie down. Tollie 3903 was third in order. Tollie 3900 was fourth and heifer 3905 fifth. Subsequently the rest settled, except the three bone-eaters and heifer 3910. Cow 2968 and heifer 3900 went to the salt-box.

6.7.19: The herd was driven into the paddock at 9.35 a.m. Tollie 4029 was seen eating bones during the whole time of the observation. Tollie 4105 and heifer 3910 picked bones, but dropped them again. Tollie 3903 was the first animal to lie down. By 10 a.m. practically the whole herd had settled down.

7.7.19: The cattle entered the paddock after 9 a.m. Tollies 4105 and 4029 picked bones and chewed them during the whole time of observation. Cows 2844 and 2968 commenced somewhat later and discontinued before 10 a.m. Tollie 3930 picked somewhat later but was still chewing at 10 a.m. Heifer 3856 licked at some bones and finished by yawning three times in succession. Soon after arrival heifer 169 went down. She was quickly followed by tollie 3903 which soon rose again on its own accord. When heifer 169 was disturbed she readily rose but lay down again. Tollie 3903 still showed a somewhat clumsy gait; it was slowly recovering from lamsiekte.

8.7.19: At 9.15 a.m. the cattle went into the paddock and were surprised by a shower of rain lasting for a few minutes; the cattle assembled over the bones and soon turned their backs to the rain

and wind which blew from the north-east. Subsequently the following commenced to pick and chew bones, viz., tollie 4105 and cow 2968. Both were still chewing at 10 a.m. Cow 2844 commenced somewhat later. Heifer 3910 and tollie 3903 chewed for a short while. Heifer 3905 at one moment was noticed to perform peculiar convulsive movements with head and neck, involving the front quarters, so that for a moment the equilibrium was lost, the animal staggered for a few steps and threw out a bone, which it subsequently licked. Heifer 169 was noted to be restless when standing and moving both hind and front legs at short intervals. She then moved forward in a very clumsy manner, placing the front legs in abduction; afterwards she lay down. When disturbed, after a while she rose with some difficulty in the hind quarters, moved in a clumsy manner and lay down again. It was evident that the animal had contracted lamsiekte.

Test with Sterilized Bones.—As a matter of routine the herd was submitted to the bone-eating test, with sterilized rotten bones, in the afternoon. The following animals were seen eating bones: heifer 114, heifer 169, heifer 172, heifer 3900, cow 2844, heifer 3936, heifer 4029, cow 2968, tollie 3903, heifer 3856, tollie 3930, heifer 3910. The following two animals did not pick bones: heifer 3905 and tollie 4105.

9.7.19: Heifer 169 was down in the hospital paddock, unable to rise. She was suffering from lamsiekte. She was killed *in extremis* on 19.7.19. (For details *vide* Appendix, page 1018.) *The bones were removed to-day when the cattle entered the paddock and were not replaced.* Tollie 4105 was able to pick one before all had been collected. Cow 2844 and tollie 3903 found something which they munched for a while. Tollie 3930 sniffed about the old place and also found small splinters to munch. Heifer 3910 was the first animal to lie down, but did so some time after arrival. She was succeeded by heifers 114 and 172. The latter stood aloof from the beginning.

At this junction of the experiment it was thought advisable to test the bones for toxicity. The bones had now been lying for some time in the paddock and had been freely picked by a number of animals. These bones had produced the disease thus far in at least three animals, viz., tollie 3903, heifer 3905, and heifer 169.

Red and white cow 3516 was drenched with 12 oz. of the dried rotten flesh [*vide* Expt. 12 (*m*)] but no disease followed.

Taking the fact into consideration that as recently as 8.7.19 one animal contracted the disease from eating bones of the same lot, it may be concluded that not all the rotten material was toxic, and that some had lost its toxicity.

10.7.19: Heifer 172 was lying in the hospital camp this morning and was unable to rise. She was suffering from lamsiekte. She was killed *in extremis* on 19.7.19. (For details *vide* Appendix, page 1019.)

This is the fourth case of lamsiekte of the new rotten bones.

The herd entered the paddock at 9 a.m. and collected near the bone place. Two animals were observed to find a bone which was left behind, viz., heifer 3910, which yawned after having had a sniff at it, but continued to lick it, and tollie 4105, which attempted to pick it. Both bones were removed. Subsequently some other animals sniffed about the place where the bones had been but were unable