

Experimental work has been continued. Abortion was produced on two occasions by introducing the organism of the disease into the udder of cows. Acute mastitis occurs without the streptococci usually seen in such cases, and abortion itself occurs two months later. This suggests that in all possibility abortion is spread by way of milking-machines, as in the case of streptococcal mastitis. Vaccination with killed culture tried for a third year has again proved without benefit as a preventive.

*Sterility in Bovines.*—Extensive work on sterility in laboratory and field has been carried out, particularly in Taranaki, but also in the Waikato. Results suggest that varying factors may be responsible for temporary sterility, as, for instance:—

- (1) Where there is a large amount of sterility in a herd in any one season the bull is at fault. The question of possible infectivity is being studied, and it may be that the bull becomes infected from certain carrier cows, and his genital organs do not recover for several months if at all. Cows become infected possibly in the cervix and pass infection on to clean bulls. The whole condition appears to clean up in varying times.
- (2) Where only a small percentage is showing sterility it is usual to find that the affected cows are the heaviest producers, that the farm is not the best, and the lime and phosphorus ratio in the pasture is wide.
- (3) To some extent as an after result of abortion.

Experimental feeding with the anti-sterility vitamine was unsuccessful. This work continues, and full proof should be obtained before long.

*Examination of Composite Milk-samples for Town Supplies for Tuberculosis Contamination.*—The total number of these samples examined during the last five years is 1,540, of which only 0.779 per cent. gave a positive result.

*Tumours.*—Tumours from stock sent in for identification numbered 122. A classification of these tumours is now being made annually for general comparative purposes.

*Blackleg.*—A number of recent cases of suspected blackleg have been proved to be due to the bacillus of malignant oedema. As such cases crop up in districts outside blackleg areas, some uneasiness has been experienced by farmers. However, a laboratory test is always available to discriminate between the two diseases.

Vaccination with a formalized vaccine is being arranged for in place of the old powdered-muscle vaccine used for so many years.

*Coccidiosis* was identified in blood scours in calves in several districts.

*Johne's disease* was encountered on two separate occasions during the year.

Vaccination of calves with the tubercle bacillus of Calmette and Guerin was again practised, and several of these calves were fed on natural tuberculous milk. Vaccination in such cases was not protective. The vaccine also failed to protect animals against virulent culture.

#### SHEEP-DISEASES.

Sheep-diseases as a whole are becoming better known, and our knowledge concerning them is increasing annually. The following report will show the volume of work performed, and with the biochemical aid which we may now command our knowledge should increase even more quickly. Deficiencies of minerals also come largely into sheep research work, and must always be guarded against. Work during this year has paved the way for a drive on ante-partum paralysis, rye-grass staggers, so-called circling of sheep, and also mortality in fat lambs.

*Lamb Mortality.*—This took premier position. The previous year's work had suggested a possible bacterial agent in the intestines setting up a toxæmic condition which killed the lamb. Consequently a trial was made with a Welchii toxoid to protect lambs by vaccination of ewes two months before lambing and lambs at birth. No good resulted from this, however. A laboratory was fitted up in Ranfurly, and material taken from Wallaceville to furnish it. In a report forwarded to the Director of Live-stock in March the main points noted were:—

- (1) Lambs affected could show a varying number of symptoms not always ending in death, but depending largely upon the position of congestion or hæmorrhage into tissue from blood-capillaries.
- (2) Analysis of ewes' milk was inclined to show increase in fat where deaths occurred.
- (3) Analysis and examination for iodine deficiency proved that there was quite sufficient iodine for the requirements of the animals.
- (4) Sections of organs gave a picture of capillary congestion similar to poisoning with histamine, and also showed that there was some degree of erosion of the mucosa of the intestines, with growth of a Welchii-like organism in that position.
- (5) Work with intestinal bacteria showed that the Welchii type of organism was able to produce a toxin in ewes' milk media which set up active peristalsis, and to a large extent prevented circulation of blood from stasis of blood in capillaries.
- (6) Pasture-analysis and a detailed history of each farm were appended. Death-rate for all causes approximated 8 per cent.
- (7) Tailing proved valueless. Yarding was effective in controlling the disease.

*Caseous Lymphadenitis.*—Work with sheep ticks as a possible carrying agent was negative, the sheep being in good condition and free from disease when killed. Glands from lambs killed at the works showed that in some cases the lambs were not affected with the usual causative organisms, but with other pus-producing groups. A small flock of affected sheep is now on the Laboratory farm for observation and for experimental purposes.

*Deformity in Lambs* formed an interesting investigation during the work on pulpy kidney. Lambs are borne dead with "seagull" heads—*i.e.*, the lower jaws were missing. Six flocks where this occurred in Central Otago were visited, and it was found that in each case Chewings fescue or blue tussock were the main