off. This is believed to occur in the majority of bulls, so was not unexpected, but the sperm morphology of the bull was up to the time of death damaged. The young Jersey bull put to the first heifer subsequently served four heifers, only one of which held to him. None of these four heifers reacted to the agglutination test for contagious abortion. When the Taranaki and young Jersey bulls were killed no streptococci were obtained from their genital tracts on cooked blood agar—an excellent medium for the growth of the streptococcus—yet all the heifers have numerous streptococci (of the alpha type) lying in the cervix.

A second bull was procured in Taranaki with a particularly bad history, a very poor sperm morphology, and streptococci in culture from his seminal fluid. This bull served three heifers, all of which returned, two at three weeks and one at four weeks. Two were again served by him and six weeks later had not returned, and the third was served by an Ayrshire bull. All by palpation would appear to be in calf, but as it is believed that the return at fairly long intervals is due to abortion induced by streptococcic infection it is yet too early to be sure of the results. At *post mortem* the second Taranaki bull showed a streptococcic infection throughout his genital tract. It is yet too early to say whether the Ayrshire bull has been able to put the defaulting heifer in calf, but this bull is being tried on a further series of heifers to see whether he, in turn, has become infected.

The experiment up to the present suggests that the infection is temporary in both bull and cow, thus bearing out field observation and the view that one bull becomes infected from another through service. It is yet too early to reply to (2), but field experience suggests that it depends largely on how long the cows have been infected—that is, whether the infection is declining, whether cows regularly hold to a new bull or not. How long bulls carry infection is not yet known, but a bull used in an affected herd one season and transferred to a clean herd the following season frequently causes trouble, although if kept in the original herd he gives fair (not good) returns.

Contagious Abortion.

No great advance has been made for the year in this disease. 2,884 blood-samples were put through at Wallaceville, 898 of those being positive to the agglutination test; while 386 were tested at Hamilton, with 95 positive. As with mastitis, farmers are encouraged to send in samples from the whole herd rather than single samples. There have been several cases referred to us from the Health Department where undulant fever has occurred and milk has been obtained from definite herds. In such cases, the blood of all the cows is put through an agglutination test. The milk of positive reactors is then cultured to find the cows voiding Bacillus abortus in the milk. Further action is impossible under the existing legislation, the farmer merely being advised of the position. The result of such cultural examination is very variable.

The intradermal method of preventive vaccination of heifers carried out in December, 1930, in Taranaki has been quite unsuccessful. Where records have been obtainable the following are the results: Vaccinated heifers, 20 aborted, 88 calved normally; controls, 12 aborted, 52 calved normally.

A point of interest obtained from herd composite samples for examination for tubercle bacilli was the amount of abortion infection appearing in guinea-pigs at *post mortem* six weeks following inoculation. Of 217 milk-samples inoculated, 190 sera of guinea-pigs were examined. Number of positive sera, 77=40 per cent. of total; number of positive lesions, 63=33 per cent. of total; result of cultural tests on gentian violet media of 217 milks=2 positive. Since January, 1931, of 281 guinea-pigs examined, sera, negative, 176; sera, positive, 105. Abortus lesions in spleen, 86; abortus lesions in testicle, 4; abortus lesions in spleen and testicle, 1. Number of macroscopic lesions, 14.

Biological Test for Tubercle Bacilli in Composite Milk-samples from Town Supplies.

Two hundred and thirty such samples were inoculated into guinea-pigs during the year, and two guinea-pigs became tuberculous. The loss in guinea-pigs has been very greatly reduced during the year by having milk-samples collected into bottles containing boric acid, the final solution being 1 per cent. Such samples carry very well and give no dimunition in numbers of organisms, nor do they lose such organisms as B. abortus and the tubercle bacillus. Boric acid enables samples to be sent from either end of New Zealand without souring and without subsequently killing guinea-pigs with peritonitis, &c.

Grass Staggers or so-called Bovine Eclampsia.

This condition is exercising the minds of both laboratory and field workers. The etiology is apparently of dietetic origin. Curiously enough, grass staggers occurs mainly in the Waikato and Rangitaiki, though odd cases are found in the Manawatu and the Wairarapa. Taranaki is apparently free from trouble, or, if cases occur, they have not yet been definitely diagnosed. Analyses of pastures and of blood and urine samples have shown that the pasture grasses are exceedingly rich in protein and that the animals' blood is deficient in calcium and magnesium, and the urine shows a certain amount of albumen and sugar.

The blood calcium deficiency is not sufficient to cause coma as in milk-fever, but possibly the hyperæsthesia is due to the magnesium deficiency. Intravenous injection of magnesium salts has, so far, not proved beneficial, but further trials will be made.

In view of the calcium and magnesium deficiency associated with the consumption of young quickly growing protein-rich pastures forced by superphosphate, one is inclined to speculate as to the possibility that excess of protein degradation products may effect a removal of calcium and magnesium from the animals' system. We have no direct chemical evidence to support this suggestion, and while so little is known about the altered metabolism of the affected animals little more than speculation can be indulged in.

Work in New Zealand on grass staggers agrees with that of Sjollema in finding a calcium deficiency and decrease of magnesium, but we differ from him in his suggestion of excess intake of nitrate from the young grass tips, which would produce methæmoglobin bands in the spectroscopic picture of the blood, a condition which does not occur. As regards Sjollema's statement that calcium salts give beneficial results, this is not the case in our experience. Our only method of treatment as yet is by rectal chloral hydrate to control the hyperæsthesia.

Blackleg.

Since the change-over to formalinized fluid vaccine last year, there have been no known deaths of calves from blackleg after one week following vaccination. This is very satisfactory. 46,160 doses have been supplied to field officers.

Field officers sent in 69 portions of muscle for identification for blackleg. Of these, 48 were positive by guinea-pig and cultural tests, 7 negative, and 14 were proved to be malignant oedema.

Jöhne's Disease.

Of 15 samples received for diagnosis for Jöhne's disease, 7 were proved positive and 8 negative. One particular case is worth quoting, where a 5-year bull was found affected, and on inquiry it was found that the bull was bought from a farm where the disease was present four years previously. A further trial is being made, under difficult conditions, with Johnin kindly supplied by Mr. Dunkin from his laboratory at Mill Hill, England.