14·25 lb. per head, while the increase for the nickel-cobalt group was 20·35 lb. per head. It appears from these figures that nickel may be of definite benefit to the lamb when given in addition to cobalt. This experiment is being continued to obtain confirmation of the beneficial properties of nickel when used in conjunction with cobalt.

Value of Cobalt Supplements for Dairy Cows.

Filmer and Underwood, in West Australian experiments on Denmark disease, have reported that cows, in addition to sheep, are affected, and that cobalt supplements are beneficial in increasing milk production even where no obvious symptoms of sickness occur. In the Southland district cows do not appear to be affected by the ailment, but it was considered desirable to test the value of a cobalt supplement on milk production.

Accordingly tests of cobalt supplements were made on two farms where lamb ailment in previous years had been pronounced. The results so far obtained are not significant, although the milk yield appears to have been maintained rather better in the case of the cows receiving cobalt drench treatment.

Cobalt Status of Animal Organs.

In addition to the field experiments given above, laboratory examinations have been made of different organs from the experimental lambs in the 1934–35 and 1935–36 experiments.

Analyses showed that cobalt was stored in the liver and to a less extent in the pancreas in lambs drenched regularly with cobalt. The extent of storage in the liver correspond with that attained in normal fat lambs from healthy areas in which no cobalt was given as a supplement. Other experiments with soil drenches which contain cobalt suggest that some degree of health may be attained without any marked storage taking place in the liver, and in these cases the dosage must be regarded only as a maintenance ration. Both from the field and laboratory examinations there are indications that cobalt fed to a pregnant ewe can be transmitted to the offspring, but further work is required.

PHYSIOLOGICAL INVESTIGATIONS AT MORTON MAINS.

(Muriel E. Bell, Otago Medical School.)

By arrangement with the Cawthron Institute certain physiological investigations have been conducted on the sheep in the Morton Mains field experiments by the Department of Physiology, Otago Medical School. During the past year four visits have been made to Morton Mains with the object of studying the animals from a physiological point of view. The studies comprised examinations of blood, urine, and animal organs.

Blood.

A very detailed examination of blood samples of both affected and healthy sheep was made. The results of the examinations have shown that an anæmia does accompany Southland lamb ailment, but this anæmia is only manifest as the season advances and the blood-counts do not necessarily accord with the degree of sickness. The administration of cobalt salts, moreover, does not appear to stimulate the production of red cells in abnormal numbers.

The blood studies show that obvious symptoms of sickness may develop prior to any considerable reduction in hæmoglobin content and red-cell count; and the severity of the sickness does not necessarily run parallel with the degree of anæmia. The data suggest that anæmia results from the weakness of the animals and that the development of anæmia is secondary to poor nutrition. It is more likely to supervene as the season advances and the nutritional impairment becomes more chronic.

It is interesting to note that sheep drenched with cobalt salts maintained very satisfactory hæmoglobin and red cell counts, in keeping with the absence of sickness in this group.

An attempt is now being made to determine the cobalt partition in sheep's blood.

Liver.

The presence of cobalt in livers has been confirmed, and studies are now in progress to ascertain whether cobalt is present in the ionized form. These studies should give information concerning the role of cobalt in animal nutrition and indicate whether cobalt is simply stored in the liver or whether it is in organic combination.

Urine.

Examinations of urine have been limited to samples from two moribund lambs. None of the more obvious types of pathological constituents was present. Urobilinogen was not increased. The lambs had the power of utilizing organic acids to neutralize bases. The organic acids, which included lactic acid, were determined by Van Slyke and Palmer's method (*Journ. Biol. Chem.*, *41*, p. 567; 1920). The sick lambs also were able to use glycuronic acid for neutralizing toxins, for the ether extract after hydrolysis reduced Fehling's solution.

The absence of sugar and acetone bodies from the urine shows that there is no lack of insulin. Creatinine appears to be in normal amounts. Indican is abundantly present as is expected in herbivorous urines.