MINERAL CONTENT OF PASTURES.

NINTH ANNUAL REPORT ON THE MINERAL CONTENT OF PASTURES INVESTIGATION AT THE CAWTHRON INSTITUTE, NELSON, PERIOD 1936–37.

(T. Rigg, Officer in Charge.)

During the past year the investigation of stock ailment at Glenhope, Nelson, and of lamb ailment in Southland has been continued. Dr. H. O. Askew has been in charge of work in the Nelson district, and Dr. J. K. Dixon has been responsible for the field experiments at Morton Mains, Southland. Dr. Muriel E. Bell, of the Otago Medical School, has given valuable assistance in connection with certain physiological studies of the sheep in the Morton Mains experiments, while Miss E. B. Kidson, M.Sc., has made an extensive survey of the cobalt content of the main soil types of New Zealand.

In last year's report mention was made of the outstanding results obtained both at Glenhope and at Morton Mains with cobalt chloride at the rate of 1 mg. cobalt (Co) per day. In both places cobalt chloride used in drench form proved completely successful in preventing the appearance of ailment and in curing affected sheep. Furthermore, analyses of drench materials showed definitely that a high content of cobalt was associated with all the beneficial drenches of past experiments, and a low cobalt content with unsuccessful drenches. During the past season the great value of cobalt in overcoming ailment at both Morton Mains and Glenhope has been confirmed, and much additional information is now available concerning the best method of supplying cobalt supplements to stock. Very considerable evidence has been accumulated which points definitely to an actual cobalt deficiency in connection with incidence of ailment, both at Glenhope and at Morton Mains.

The investigations during the period under review have comprised—

(1) Detailed studies of soils, pastures, and animal organs with a view to determining whether ailment of stock is actually caused by a deficiency of cobalt in the food of the animals.
(2) Field experiments designed to secure information concerning the value of cobalt licks, and of cobalt pasture top-dressing as alternative methods for the supply of cobalt supplements to stock.
(3) Animal studies with a view to securing information concerning the role of cobalt in animal nutrition.

Cobalt Deficiency.

The cobalt survey of the more important New Zealand soils has shown, for the most part, a fairly good correlation between low cobalt content of the soil and incidence of stock ailment. Several exceptions to this rule, however, were brought to light during the course of the survey. The Morton Mains soil was shown to have a considerably higher cobalt content than that of other soils associated with stock ailment either at Nelson or in the North Island. Furthermore, certain soils, such as the pakihi soil of Westport, which so far have been considered healthy for stock, have given unexpectedly low cobalt figures. The results which have been obtained suggest that further attention must be paid to methods for estimating availability of soil cobalt.

Analyses of animal organs from the Morton Mains and Glenhope experiments have given definite information concerning the very low cobalt status of sheep suffering from ailment. In certain cases the cobalt content of the liver of affected sheep was only one-eighth that of livers from healthy sheep killed at the freezing-works or of livers from healthy sheep which had been drenched with cobalt chloride. The analytical data suggest that the chemical examination of certain organs, particularly the liver, will prove very helpful in determining whether it is necessary to use cobalt supplements in districts where cobalt deficiency is suspected.

Analyses of pasture samples tend likewise to support a theory of cobalt deficiency as the direct cause of stock ailment at both Morton Mains and Glenhope. The figures for Glenhope show a very definite cobalt deficiency of the pasture in comparison with the data from healthy pastures in other parts of the Nelson district.

Supply of Cobalt Supplements.

Excellent results have been obtained at Morton Mains by the use of a cobalt-salt lick made by mixing 4 oz. of cobalt chloride per 1 ton of dairy salt. Ewes and lambs supplied with this lick have done extremely well, and results compare more than favourably with those obtained in the previous season using a drench of cobalt chloride. The success of the cobalt-salt lick suggests that this method of supplying cobalt will have a very extensive use in districts where ailments of the bush-sickness type are encountered.

Equal success has been obtained by the use of cobalt chloride top-dressings on affected pastures. At Morton Mains the use of 10 lb. of cobalt chloride per acre has been accompanied by very satisfactory weight increases and an entire absence of ailment. Excellent results are being obtained at Glenhope, using 2 lb. of cobalt chloride per acre.

Role of Cobalt in Animal Nutrition.

The blood studies made by Dr. Muriel Bell indicate that the anæmia so commonly associated with lamb ailment at Morton Mains does not run parallel with the severity of sickness. The data suggest that anæmia results from weakness of the animals and that the development of anæmia is secondary to poor nutrition. The blood studies show that obvious symptoms of sickness may develop prior to any considerable reduction in hæmoglobin content and red cell count.

Detailed reports covering the work in the Nelson district by Dr. H. O. Askew, in the Morton Mains field experiments by Dr. J. K. Dixon, and animal studies by Dr. Muriel E. Bell follow.