

IV. Experiments with Bone-meal "Licks."

In view of the striking deficiencies of both lime and phosphate found in the pastures of certain soils of the Waimea County, and of the difficulties associated with liming or manuring somewhat inaccessible hill country, experiments have been commenced with the use of bone-meal "licks." On a number of farms on poor country where deficiencies of minerals occur no great difficulty has been experienced in getting stock to eat a "lick" of bone-meal and rock-salt. In certain cases large quantities have been greedily eaten by both sheep and cattle. A noticeable improvement in the condition of stock has resulted from the use of the bone-meal "lick." Cattle, in particular, have improved wonderfully in appearance, losing their rough coats and listlessness. More carefully controlled experiments are now in progress, and exact information should be available at the conclusion of the present season concerning the value of bone-meal "licks" on a typical mineral-deficient pasture.

V. Effect of Season and Manuring on the Mineral Composition of Pastures.

The analyses of pasture-samples which have already been made have shown that a considerable variation in the amounts of iron and other minerals may occur in certain pastures at different times of the year. With a view to collecting more information on the seasonal variation in typical Nelson pastures, and to studying more closely the influence of manurial treatment on the mineral composition, samples of green growth have been collected from three selected pasture areas throughout the whole of the growing season. In one case mowings of a series of plots treated in different ways have been made at fortnightly intervals throughout the season. Dry weight determinations in addition to hay and aftermath weights have been made in connection with this experiment. The chemical analyses of the pasture-samples are now being undertaken, and much valuable information should be secured from the investigation.

In concluding this report of the mineral contents of pastures investigation at the Cawthron Institute, mention must be made of the assistance which has been given by farmers throughout the district in supplying information in connection with stock ailments. Much valuable help on various aspects of the investigations has been given by Professor Easterfield, the Director of the Institute. Mr. L. Bishop has assisted in the collection of pasture-samples, and Mr. W. C. Davies has supplied excellent photographs illustrative of the work in progress.

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APPENDIX TO REPORT OF MINERAL CONTENT OF PASTURES INVESTIGATION.

The Mineral Contents of Lucerne and the Value of Sulphur for its Fertilization.

In conjunction with the Plant Station at Palmerston North, an investigation of the mineral contents of lucerne and of the value of sulphur for manuring of this crop has been carried out by Mr. B. W. Doak, who has been temporarily attached to the Cawthron Institute for this work. The investigation has shown that an increase in the sulphur content of lucerne frequently takes place when different sulphur-containing compounds are used for manuring. On two soils an increase in yield was obtained by the use of sulphur fertilizers, indicating that sulphur was required as a plant-food on these soils. It seems probable that the wonderful improvement effected by superphosphate when used for top-dressing lucerne and pastures results in part from the large percentage of gypsum contained in this manure. It would appear probable that direct sulphur fertilization of the crop is seldom required if superphosphate is used for top-dressing.

Analyses of lucerne cut at the hay stage show that very large quantities of plant-food are removed from the soil by its growth. The following shows the extent of the annual removal of plant-foods from the soil in the case of a lucerne crop on a stony loam in the Nelson District.

The crop was top-dressed with a mixture of lime, superphosphate, and sulphate of potash, and gave a yield of 84.6 cwt. of hay per acre. This crop removed per acre the following amounts:—

Lime (CaO), 212 lb., equivalent to 380 lb. calcium carbonate; phosphoric acid (P_2O_5), 59 lb., equivalent to 246 lb. 44–46 per cent. superphosphate; potash (K_2O), 147 lb., equivalent to 272 lb. sulphate of potash; sulphur (S) = 35 lb.

The investigations have shown that the mineral content of lucerne is considerably affected by treatment with fertilizers. The mineral composition is profoundly influenced by seasonal conditions. Very dry weather has increased greatly the percentage of lime in the leaves and has caused a reduction in the amount of phosphoric acid in comparison with the quantities present in a season of normal rainfall.

Lucerne in the young growth stage has been compared with good pasture at approximately the same stage of growth-development. The lucerne has been found to be little superior to pasture either in protein or carbohydrates. Lucerne contained less potash, chlorine, and insoluble ash than pasture. As far as bone-forming materials were concerned, lucerne was superior to good green pasture solely in its high content of lime (1.91 per cent. against 0.87 per cent. found as the average for good Nelson pastures).

PHORMIUM RESEARCH.

Advisory Committee: Mr. A. Seifert (Chairman), Mr. H. A. Seifert, Mr. H. Greig, Mr. E. Frost, Professor G. S. Peren, Mr. A. H. Cockayne, Mr. H. Vickerman, Dr. J. S. MacLaurin, Professor T. H. Easterfield.

Investigations connected with phormium research were placed on an established basis during the year, when the committee was constituted and arrangements made to secure funds by placing a levy of 2d. per bale on hemp and 1d. per bale on tow exported. The estimated revenue from this source amounts to about £740 per annum, which is supplemented by a grant of £1 for £1 by the Department. Additional contributions are being arranged from flax-planting companies and organizations at a rate of 1s. per acre upon all established areas until such time as these reach maturity.