Rotorua and Adjoining Counties.

The experiments in the coarse-pumice area involved the usual treatment of animals with pellet, lick, and drench, the collection of pasture-samples, the treatment of the soil by manuring and by top-dressing with fertilizers, and the collection and analysing of drainage-water. Mr. Taylor, a skilled Country Analyst's assistant, has been stationed at Rotorua in order to further these experiments. It is satisfactory to note that no evidence can be obtained of any leaching of phosphates from the soil when they are applied as superphosphates in the area of coarse soil and heavy rainfall (60–70 in.). Mr. Taylor also supervised experiments with various chemical compounds and mixtures on the eradication of ragwort by chemical means, and these provide evidence that ragwort, which is considered locally a great danger and cumulative with bush sickness in preventing the settlement of the pumice lands, need no longer be feared.

The writer of this report has previously remarked on the fact that soils formed from volcanic air-borne showers of material when coarse in texture give rise to malnutrition or deficiency diseases in ruminants, whereas adjacent or near-by sedimentary soils, even although principally derived from similar materials as the air-borne showers, are free from such diseases. There has been the inevitable tendency to confuse similar deficiency diseases, and the hypothesis has been advanced that the Mairoa "dopiness" in sheep is the same as "bush sickness" in spite of veterinary advice to the contrary. The exact definition of these two diseases is, of course, work for an animal pathologist; but it may be remarked that a typical bush-sick animal, even at death, has healthy well-developed bones, the repository of phosphate of lime in the animal, whereas Mairoa "dopiness" animals have light bones. It does not seem possible that a bush-sick animal should be suffering from a deficiency of phosphates and lime, when, at all stages of its growth, it is able to develop such good bones as do the animals on typical bush-sick country. Further, there is the experience acquired at the Mamaku Farm, and elsewhere, of several direct experiments that top-dressing the pasture with phosphates or with lime does not eliminate the disease. At Mairoa, on the contrary, there is gradually accumulating evidence that phosphates and lime, and even lime by itself, are curative when applied to the soil. Veterinary authorities assert, moreover, that the symptoms of these diseases are sufficiently distinct for them to be separated.

There seems to be still a desire in some quarters to attribute the sole cause of bush sickness to a possible poison, but the enthusiastic theorist in this search must face the initial difficulty of finding or even suggesting a possible mineral poison which will poison ruminants and not horses, which will remain healthy for twenty years on pasture which will kill a ruminant in nine months.

Mineral Contents of Pastures Investigation at the Cawthron Institute.—Second Annual Report, for the Year ended 31st March, 1930.

In the period under review the general survey of the mineral status of Nelson pastures, which formed a special feature of the programme during the first year, has been continued, and samples from the Rainy River, Sherry Valley, and Tui localities of the Waimea County have been analysed.

Much time has been devoted to an intensive study of the effect of season and fertilizer on the yield and composition of a typical dairying-pasture at Richmond, Nelson. On this pasture plots are available which have had specific but different fertilizer treatment during the last six years. It was anticipated that a careful study of the chemical composition of the pasture during the whole of the season would bring out many points of fundamental interest in pasture deficiency studies. Owing to the paucity of data in New Zealand bearing on the composition of pastures in different localities under different manurial programmes, it is extraordinarily difficult to interpret the analytical data of pasture-samples collected in mineral-deficient areas. The above investigation has revealed the great differences which occur in the mineral composition of pastures during the season and the importance of analysing samples from the same pasture at different periods before interpreting the results.

Investigations on the causes of xanthin-calculi formation in the kidneys of sheep have been continued. Samples of pasture from three typical farms located on the Moutere Hills soil-type associated with this trouble have been collected regularly throughout the season and analysed. The analytical data have revealed the great changes in composition which occur on these pastures during the season, and point clearly to great deficiencies in some constituents occurring at certain times. The field-work in connection with studies of xanthin-calculi formation has been extended, and considerable evidence has been obtained showing that lime and phosphatic treatment of the land greatly improves the pasture for stock and reduces greatly the incidence of calculi-formation.

Experiments have been continued concerning the value of bone-meal and other "licks" for stock on the poor Moutere Hills country, which is known to be deficient in both lime and phosphate. Cattle, particularly cows in milk and young stock, eat the bone-meal greedily, and great improvement in the health of stock has resulted. In the case of sheep considerable quantities of bone-meal have been eaten by ewes in the winter and early spring period, but more difficulty has been experienced in estimating the value of the "lick."

1. Mineral Content of Nelson Pastures.

In the last annual report data were presented showing the great variations in composition which occur in Nelson pastures in different localities. It was pointed out that, owing to the varied geology of the district, striking differences in soil-properties occurred, and that in a number of cases the composition of the pasture reflected the characteristic properties of the soils.