

CHEMISTRY SECTION.

REPORT OF B. C. ASTON, F.I.C., CHEMIST.

Wellington, 26th June, 1917.

The Secretary of Agriculture, Industries, and Commerce.

I HEREBY transmit the annual report of this Section for the year ended 31st March, 1917.

B. C. ASTON, Chemist.

SOIL-SURVEY INVESTIGATIONS.

Primarily on account of certain deficiency diseases—*e.g.*, bush sickness—in live-stock pastured on some of the lighter soils a more extended examination of the types of soil on which these diseases occur has been authorized, and during the year 195 samples, representing 849 sub-samples, have been carefully collected under uniform conditions by the writer personally or under his direction. This work was performed mainly on holidays when the Laboratory was not open. In addition there remain from previous years 192 samples collected with similar care, most of which have been analysed but not reported on. The examination involves both chemical and mechanical analyses, and pot experiments conducted in a glasshouse which has been erected in the Laboratory precincts. It is hoped that some account of this work will be published during the coming year should no exigencies occur to occasion further delay.

Secondarily, when circumstances permitted, types of soils other than those on which these deficiency diseases develop have been collected with similar care with a view to future study and classification. Ultimately, when the types are known, the delimiting of the areas of each type may be commenced.

SOIL INVESTIGATIONS.

At the request of the Director of the Fields Division the cause of the so-called waterproof soils of the Ruakura Farm was investigated, and was determined to be probably due to wax. The matter was discussed, and our knowledge of the matter summarized, in an article by the writer on "Waterproof and Wax-bearing Soils," in the *Journal* for October, 1916. The results were most interesting, and showed that there was a field for research which gives hope of economic results.

For the past five years a number of soils have been analysed for various minor purposes, but the results had not been published. These were brought together and published in the *Journal* (July, 1916), under the heading, "Notes on Soils Analysed." Some further work has been done on the magnesia-sick soils of Nelson, and will be published later.

Several samples of diatomaceous or pure siliceous earths have been received, the origin of which in some cases is somewhat of a scientific puzzle. The quality is, however, often excellent, and samples have been submitted to one or two manufacturing firms who have intimated that they are prepared to adopt them in lieu of material which they have to import at present.

DEFICIENCY DISEASES OF LIVE-STOCK.

Further progress has been made in the research with a view to find the best composition for a stock-lick for use on the bush-sickness area. One may now say that the latest mixture is one that has given the best results and is most appreciated by stock, even calves taking it readily in the milk, and later, when on grass, going automatically to it when supplied in brick form. Some of this important research has had to stand over owing to more pressing calls on attention, but is being kept steadily in view.

TOXICOLOGICAL.

Numbers of valuable animals continue to be lost through being allowed access to poisons such as arsenical dipping fluids, lead paints, phosphorized pollard, &c. These cases, which are quite preventable and are due entirely to carelessness on some one's part, are in a different category from those caused by poisonous plants, when those in charge of stock are not so culpable. The instances which have been successfully investigated and the cause of death ascertained by chemical analysis are: From arsenical poisoning, forty young cattle at Mangamaire, four draught horses at Wairoa, and three cows at Ashley-Clinton; and from lead poisoning, five head of cattle at Feilding.

Attention has been drawn to the Wangaehu River, which rises in thermal waters in the Ruapehu crater, as a possible source of poisoning. One sample of water taken at Mangamaire yielded negative results, which, however, owing to the varying composition of the river-water, cannot be held to be conclusive. The melting of snow on Ruapehu, and the rainfall, probably cause this river to vary in composition of the dissolved bodies.

A case of suspected poisonous wine was investigated for the Horticulture Division with a negative result, which was borne out by the wine afterwards being successfully consumed.

POTASH.

Attention has become focussed on potash during the year, and various schemes have been publicly propounded with a view to the utilization of New Zealand resources in supplying any deficiency of potash salts owing to the war. A number of possible sources of potash for manuring