

SOIL INVESTIGATIONS.

Inquiries into certain types of soil have been continued, and the following have received attention, a number of analyses of samples having been personally collected with care.

Littoral (sea-coastal) soils have been investigated in connection with the Live-stock Division and its improvement of the soils of the quarantine islands, Motuili (Hauraki Gulf) and Somes Island (Wellington Harbour), also in connection with the Lands Department on reserves (Kapiti Island). This information, added to much already acquired, will, it is hoped, hasten the preparation of a report on this type.

Another type under investigation is the swamp soils of Waikato, and an article is in preparation describing a successful method of treatment.

The Marlborough soils, possessing great diversity in climate and composition, have engaged my attention at some length. The Director of the Dominion Museum has been closely associated with me in this, and a number of rocks (limestones, dolomites, banded flints, and reputed phosphates) and soils derived from these are in course of examination. One of the samples collected has already proved to be a rich phosphate. A soft useful limestone has been located in the Awatere Valley. I am convinced that the Marlborough Province, where suitable for lucerne-growing, will take great strides in closer settlement within the next few years; in spite of liability to drought it has marvellous recuperative power, and there is no part of New Zealand which scientific advice could be productive of better results.

FIELD EXPERIMENTS.

The Director of the Fields Division has been supplied with all the information in my power to aid him in drawing up schemes for experimental work. A comprehensive scheme, on similar lines to the Cockle Park experiments in England, was submitted and approved for the purpose of ascertaining the effect of variously top-dressing pastures on the live weight of sheep. Although intended to be carried out in several districts, it was only found possible to institute the scheme at the Wallaceville Laboratory farm, but owing to the dry summer of 1915-16 little information is expected to result therefrom this year. As however, the experiments are to be carried on for several years, valuable results may be looked for in the future. One of the most important results expected will be the effect of basic slag, which is now unobtainable on account of the war, compared with substitutes such as Ephos and other phosphates to which lime has been added. The soils of the Wallaceville farm have personally been carefully sampled and analysed.

FERTILIZERS AND THE FERTILIZERS ACT.

During the year, as the result of analyses of twenty-two samples of imported bonedust collected at the wharf, four were found to be deficient in nitrogen compared with the analysis forwarded with them. There was evidence that the standard of bonedust sent was being lowered. Exporters in other countries sending fertilizers to New Zealand should be warned that although their wares are up to guarantee, any attempt to excessively dilute them and so trade on the ignorance of the farmer may be met with publication of complete analyses in such manner as the Secretary for Agriculture may think fit. The attention of farmers should be drawn to the fact that there is nothing in the Fertilizers Act to prevent the excessive dilution of fertilizers by such substances as limestone, sand, gypsum, and other rocks if the percentage of the fertilizer constituent (nitrogen, phosphoric anhydride, and potash) are correctly stated in the invoice certificate. Farmers should therefore study closely the percentages of these fertilizer constituents before purchasing a fertilizer.

The advisability of amending the Fertilizers Act has been considered and a report submitted.

Several fertilizer manufacturers have sought advice, which has been freely given, as to the source of supplies or methods of manufacture.

DEFICIENCY DISEASES.

Chemical research in these obscure stock-diseases has progressed but slowly, owing to the increasing difficulty of visiting areas, remote from Wellington, where the outbreaks from time to time occur.

At the Mamaku Experimental Farm the work of experimenting with various pasture top-dressings and medicinal treatment of animals goes steadily forward on lines already indicated. There has been a fair demand from the public for the medicinal bricks supplied by the Department. Some farmers are reported to be putting sulphate of iron in the drinking-water with encouraging results. A cheap preparation of phosphate of iron made in this laboratory for application in this manner is now being experimented with. The iron-deficiency theory of the disease has received further confirmation by the fact that eight ewes have remained healthy for eighteen months and become fat on pasture which has only been dressed with spent iron oxide from gasworks. From a letter received from a farmer there appears to be some ground for the opinion current in the district that if cattle have access to tutu-bushes (*Coriaria ruscifolia*), which contains a powerful poison, they do not suffer from bush sickness.

Several visits have been paid to the experimental farm at Mamaku, and verbal and written reports have been furnished to the Director of the Live-stock Division on the results of the visits. A district in the South Island where a curious form of deficiency disease has developed has also been visited at the request of the Director and a report furnished.