

REPORT BY DIRECTOR (DR. L. I. GRANGE).

The Soil Survey Division was occupied during the greater part of the year in detailed surveys in North Auckland and Hawke's Bay. In North Auckland soil types were delineated in Hobson and Otamatea counties.

The mapping of soils in Hawke's Bay Province was completed with the exception of about 150 square miles at the southern end and that portion which lies to the east of Wairoa in northern Hawke's Bay.

The mapping of soils was continued in the Waikato lowlands between Hamilton and Morrinsville. Aerial photographs have been used as topographic maps, and these have expedited the work. Samples of soil types for determination of nitrogen and ammonia were forwarded regularly to Wellington.

A report was made on the soils of Matakaoa County. The survey indicates that several of the soil types on the hilly country have a natural fertility greater than that of the average of New Zealand hill soils.

Information on the market-garden soils of Lower Hutt and all the districts between Waikanae and Feilding and Ohakune, as well as the general soil types in the Manawatu, was obtained. This survey has value in that the analyses indicate the effects on fertility of continuous cropping. It is evident that the pedologist can co-operate usefully with the horticulture officer in the field of fertilizer requirements. This aspect of the survey needs expanding when opportunity permits.

Reports were made on the Mission Block, Manakau Harbour, and Ruakaka area south of Whangarei, and on Wairakei, Taupo blocks, for the Lands and Survey Department.

Late in the year the programme of the Division was radically changed in that detailed surveys were discontinued for the time being and a start made on a general survey of the soils of the North Island and South Island. Data rapidly obtained of the whole of our soils were considered to be much more useful during the present emergency than intense knowledge of isolated districts. Fortunately, it happens that the detailed surveys already in existence include practically all the main soil types in New Zealand, with the consequence that general mapping can proceed with some confidence and reasonable speed. In this task the pedologists are keeping in close contact with the Agricultural Instructors in order to tie in with their observational fertilizer trials and to ensure that useful soil types are marked out. Soil maps of both Islands on a scale of four miles to the inch will be compiled and can be then used by officers of the Fields Division as a basis for extending their information for farmers on top-dressing and for the general problem of the utilization of various classes of land. As mentioned in the reports which follow, a considerable area has been mapped in North Auckland, the east coast of the North Island, and the Manawatu.

The chemists at the laboratories at Cawthron Institute and at Wellington have continued to supply analyses of the plant foods, &c., of the soils and to interpret results for field officers. Besides maintaining this service they have improved their methods of analysis (*e.g.*, for magnesia and for total nitrogen) and have made substantial progress on soil problems (*e.g.*, wilting-point of soils, magnesia in relation to fertility, and phosphate fixation).

The magnesia content of soils is well worthy of attention in intensively developed districts, since fertilizers now contain only small amounts, and the usual programme of top-dressing tends to hasten the leaching of this compound. Values on the low side have been obtained in Waihi and the Waikato.

The standard tests show high phosphate fixation for Waikato and Taranaki soils, and this is usually ascribed to the iron and aluminium compounds in the soil; but this cannot be the case for these types, for they are in general only slightly acid. Whether or not the clay itself is an agent in fixation is being investigated.

NORTH AUCKLAND SOIL SURVEY: PROGRESS REPORT.

NORTH AUCKLAND: DETAILED SURVEYS.

During the 1939-40 season 290 square miles were mapped in detail in Hobson and Otamatea counties.

Co-operative work with other Departments was continued. For the Public Works Department, an aerodrome-site was mapped in detail and the drainage qualities of the various soils reported on. A report and soil maps were also prepared on a landing-ground. For the Lands and Survey Department an investigation was made of the soils of the Mission Block at Matakawau and of the Ruakaka area south of Whangarei.

NORTH AUCKLAND PENINSULA: GENERAL SURVEY.

In previous annual reports the properties of the chief soil types and their relation to the climate, vegetation, lithology, and topography have been noted. In this summary the 5,200 square miles of the peninsula surveyed is divided into four topographic land types, the flats which cover approximately 500 square miles, the easy and rolling land which covers 2,100 square miles, the moderately steep hill country of 2,000 square miles, and the steep hill country amounting to 600 square miles. The distribution of these types is shown in simplified form in the accompanying sketch map.