

During the field season, surveys apart from genetic surveys have been made for various objects. Mr. H. A. Hughes is carrying out a detailed soil survey of the Heretaunga Plains. Practically all the orchard areas have been examined, and Mr. Atkinson is now exploring the possibilities of correlation between orchard conditions and soil types. Messrs. Taylor and Sutherland made a detailed survey of the Kerikeri citrus block and a reconnaissance of some of the likely localities suitable for an extension of citrus orchards in North Auckland. Mr. Taylor finally co-operated with Messrs. L. Paynter and W. M. Hamilton in compiling a comprehensive report on a selected area. He also mapped the soils on the coastal belt near Dargaville, and his report (with map) will be in Mr. E. B. Glanville's article on the development of the district to be published shortly in the *Journal of Agriculture*.

Representative soil-samples were collected during the progress of the surveys and forwarded to the Dominion Laboratory and Cawthron Institute. At the Dominion Laboratory the work undertaken by Messrs. F. T. Seelye and L. H. Davis consisted chiefly of analysing the clay fractions which were obtained by repeated sedimentation in water. The silica/sesquioxide ratios of the clays are used to obtain a clearer picture of the soil processes operating. At the Cawthron Institute analyses were made under the general direction of Mr. T. Rigg by Dr. J. K. Dixon and Messrs. A. C. Harris and L. Hodgson, for pH, available phosphoric acid and potash in order to make comparisons in natural fertility. Mainly for the purposes of classification and to ascertain the degree of leaching, the base exchange capacity and percentage base saturation were determined.

Other activities of the chemical workers at the Cawthron Institute include chemical reports by Dr. J. K. Dixon on the soils of Levels and Red Cliff areas (which will shortly be irrigated) and on certain soils of Central Otago; and a report by Mr. T. Rigg and Miss E. B. Kidson on the cobalt status of some New Zealand soils. At the time of writing, the pasture and farm management surveys, which have so far been confined to Hawke's Bay, were not sufficiently far advanced for a report to be incorporated here.

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FIELD-WORK ON SOILS OF HAWKE'S BAY.

(By L. I. GRANGE, I. J. POHLEN, and A. M. QUENNEL.)

INTRODUCTION.

The mapping of the genetic soil types in the Hawke's Bay Province was commenced in November, 1935. Soil types have been delineated on the lowlands extending west to the ranges from the railway between Napier and Ormondville and in the coastal area lying between Waipukurau and Porangahau—a total area of about 1,400 square miles.

RAINFALL AND VEGETATION.

The rainfall in the area surveyed ranges from less than 30 in. to 60 in. per annum. A low-rainfall belt (up to 35 in.) extends south-west from Napier to Waipukurau. Westward to the ranges the rainfall gradually increases, and the bulk of the soils there examined come within the area receiving less than 50 in. Towards the coast from Waipukurau the rainfall ranges between 35 in. and 50 in., with the exception of a small strip extending south from Wanstead, where the fall is less than 35 in. Pastures dry out in the summer on all types of soil where the rainfall is less than 40 in.

When the first settlers arrived forest, in the area dealt with, was almost entirely confined to the Norsewood and Ashley Clinton districts. The remainder was in fern, &c., but, on the evidence of the soil profile, it is thought that up till very late times forest covered practically the whole area.

SOILS.

In Hawke's Bay parent material determines to a large extent the nature of the soil, and for the present report can be used as the basis of classification. The final classification, however, will be truly genetic, the series being grouped according to the characteristics of the soil profile.

The soils are derived from—

- (1) Tertiary mudstones and muddy sandstones;
- (2) Tertiary limestones;
- (3) Cretaceous argillites, mudstones, and sandy mudstones;
- (4) Alluvial deposits; and
- (5) Volcanic ash.

(1) *Soils derived from Tertiary Mudstones and Muddy Sandstones.*—The profile developed on these sediments depends on the topography. On rolling and flat country the soils are stable, and a podsol profile has developed. Such profiles occur over a considerable area west of the railway between Hastings and Waipukurau, the largest area occurring in the Matapiro, Sherenden, and Crownthorpe districts, north-west of Hastings. A typical profile is—

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| A | { | 9 in. black-grey free sandy loam ;
6 in. light-grey free sandy loam ;
3 in. lighter grey free sandy loam. |
| B | { | 12 in. light-brown compact clay loam ;
$\frac{1}{2}$ in. dark-grey pan ;
24 in. light-brown cemented sandy loam ;
On mudstone. |