

SOIL SURVEY LABORATORY, WELLINGTON.

HAWKE'S BAY SOIL SURVEY.

Analyses of a number of the soil samples collected by the pedologists in Hawke's Bay have been made in this laboratory. The samples from the southern portion of the province show a generally lower fertility, as indicated by pH, available phosphate, and percentage saturation than those from the middle portion. For the southern soils total nitrogen values vary a great deal. A few soils have nitrogen values which can scarcely be considered adequate, while others, particularly those of the brown-yellow loam class, have given values which were surprisingly high (of the order of 0.8 per cent. to 0.9 per cent.). In these cases also the carbon figures are very high, sufficiently high in fact to give C/N ratios approaching 15. Exchangeable magnesium figures tend to be lower in the southern soils than in those from the mid-district, but are well above some values which have recently been obtained on some other North Island soils.

WAIKATO DISTRICT.

The studies of the fluctuation of soil nitrate and ammonia have been continued. On the Ohaupo and Kereone types high nitrate figures (reaching as much as 80 parts per million) were found during April and May, 1939. A series of low values of soil nitrate then set in with all types, and continued through the winter. Early in October some farms on the Ohaupo and Kereone types showed a slight rise in nitrate. At this stage it was decided to concentrate on the Ohaupo and Kereone soil types, and some additional sampling sites were chosen. Some Te Kowhai samples, however, were still taken, to afford a basis for comparison as this soil type had given consistently low soil nitrate figures all through. After the rise in nitrate figures in October, 1939, on the two types mentioned above, a period of low nitrate values set in and continued till the end of March, 1940. The main point about the nitrate analyses is that during the summer and late autumn there were no high figures like those found during these seasons of the previous year.

Soil ammonia values, while not showing any definite correlation with soil moisture, were fairly high all round for the period ending May, 1939, when some high nitrate figures were recorded. They continued fairly high during the winter and spring, but fell to a lower level in the early summer and have continued relatively low since then.

Some additional fertility samples from this district have been examined for plant foods and exchangeable bases, some new soil types being included.

GENERAL SURVEYS.

Samples collected during general surveys in the Taranaki, Rangitikei, and North Auckland districts have been examined. The salient features of the Taranaki soils are satisfactory available phosphate, high organic carbon and nitrogen, available potash low in some cases, pH values indicating only moderate acidity, but percentage base saturation definitely low. Exchangeable magnesium figures tend to be of a low order, the Stratford sandy loam type giving the lowest value. Phosphate-fixation is high on all types. These Taranaki soils closely resemble the andesite ash soils of the Ohakune district described under the heading of "Market-garden Soils," except that the latter give figures indicating a rather lower level of fertility.

The Rangitikei soils are low in phosphate and of low base saturation. The acidity seems more marked than in the Taranaki soils.

The North Auckland soils so far examined have shown with a few exceptions very definite acidity, very low phosphate, and average to low carbon and nitrogen. Some exchangeable magnesium figures must be regarded as relatively low.

DRAINAGE TESTS ON AERODROME SUBSOILS.

A complete examination was made of the subsoils of two proposed aerodrome-sites, with special reference to their expected drainage properties. In addition to the usual mechanical analyses of samples, water-stable aggregates were determined and tests made in the laboratory of the rate of passage of water through them under controlled conditions. On both sites tests have been made in the field with the Janert permeability meter (*Imperial Bureau of Soil Science Technical Communication No. 27*). This apparatus measures the rate of passage of water into the soil formation under uniform conditions. The figures which this apparatus has given are regarded as more reliable than laboratory tests, where the sample is unavoidably disturbed to some extent. The data can only be regarded as comparative, but by including soil types where drainage is already in operation and where its efficiency can be judged it is hoped that a useful basis of comparison can be made.

MARKET-GARDEN SOILS.

Soils from the following areas in which market gardens are located were examined: Hutt Valley, Ohau-Levin, Palmerston North, Ohakune. The quantities to which special attention was paid were available plant foods, acidity, carbon and nitrogen reserves, textures, and natural crumb-structure.

In the Hutt soils it was very evident that on the market-garden land phosphate had been built up to a very high figure and acidity had been generally reduced, but it appears that in some, potash has been depleted. It was not possible to confirm any very definite decrease in organic carbon or total nitrogen as a result of intensive cultivation, but a deterioration of natural crumb-structure was noticeable in some gardens. This was shown up by field aggregate and water-stable aggregate analyses of the samples from virgin and cultivated land.

The soils of the Ohau-Manawatu district bordering market gardens give figures similar to the Hutt soils. There is evidence of some build-up of available phosphate on the intensively cultivated areas, but not to an extent approaching that found with the Hutt soils.