

(3) The *light-brown* phase covers about 400 acres of flattish land lying mainly to the north of Kerikeri River.

A typical profile is :—

 6 in. blackish granular clay;
12 in. compact light-brown clay;
On 48 in. + compact bright-brown crumbly clay with many plates of alumina and fragments of bluish and reddish decomposed basalt.

In some places the layer of alumina nodules is not so well developed and the overlying clay is deeper. This soil is slower-draining than the other phases of Kerikeri clay, especially where the alumina layer is well developed. In parts of one orchard visited, two days after rains, water was lying a foot below the surface on top of the compact subsoil. In these wetter patches the citrus-trees were much smaller than were those in the remainder of the orchard. Attention should be paid to the drainage of this soil before it is planted in citrus-trees.

The note appearing on the accompanying map, to the effect that this soil should grow citrus if the drainage is improved, applies to the soil phase as a whole; there are localities where the drainage appears to be satisfactory.

(4) The *mid-brown* phase covers about 300 acres of gently rolling and flattish land. Nodules of alumina and fragments of decomposed basalt are commonly encountered in the subsoil. The soils are transitions between the other three phases and appear to be generally suitable for citrus. Erosion is likely to be troublesome in places, but not to the same extent as on the "shallower phase."

Kerikeri bouldery clay, &c., covers the steep slopes. Most, although not all, of the slopes are strewn with basalt boulders. Small areas of bouldery flats are also included in this soil type. Although isolated citrus-trees grow remarkably well on this soil, the steepness of the slopes and the boulder-strewn surface make it unsuitable for commercial orchards.

ANNUAL REPORT OF THE CHEMICAL WORK AT THE CAWTHRON INSTITUTE FOR 1935-36.

(By T. Rigg, Officer in Charge.)

The past year has been marked by great development in the work of the chemical section of the Soil Survey as a result of the decision of the Soil Survey Committee to prosecute land-utilization surveys in the Hawke's Bay and North Auckland territories.

The chemical staff has been greatly strengthened by the secondment of Dr. J. K. Dixon to act as Senior Soil Chemist at the Cawthron Institute. It was found necessary, owing to the great increase in the chemical work, to appoint Mr. A. C. Harris, M.Sc., as an Assistant Soil Chemist. Mr. K. Frater was appointed as Laboratory Assistant to facilitate the preparation of samples for analysis.

During the year a wide range of work has been covered in the chemical laboratory. This work has comprised the completion of the soil examinations in connection with the Levels and Redcliff irrigation areas, the examination of a large number of soil samples from the Hawke's Bay land-utilization survey, a special study of Central Otago fruit soils, a preliminary examination of fruit soils in North Auckland, and a survey of the cobalt status of a large number of New Zealand type soils.

SOILS OF THE LEVELS IRRIGATION SCHEME, SOUTH CANTERBURY.

The examinations have dealt with the texture, nutrition status, and water relationships of soils in the Levels area. All the soils appear to be suitable for irrigation. No striking deficiencies in connection with plant-food supply have been revealed by the examinations, but the phosphate status of the Levels soil type is low, and top-dressing experiments with phosphatic manures should be conducted in order to ascertain the amounts of phosphate which are required to give optimum returns under irrigation. Many of the Levels soils show rather low pH values and a low lime status. Lime treatment appears to be desirable for many farm crops in the Levels area.

SOIL SURVEY OF THE REDCLIFF IRRIGATION AREA.

The survey has shown that the three major soil types in the Redcliff area are silt loam, stony silt loam, and gravelly or sandy loam. The field capacities for water of the Redcliff soils resemble those in the Levels area. The chemical characteristics in regard to phosphate and lime status likewise resemble closely those of the Levels district.

CHEMICAL STUDIES OF HAWKE'S BAY SOILS.

The work has comprised the usual mechanical and chemical analyses for the characterization of the soils, but, in addition, special studies have been made to determine the degree of podsolization on a selected range of soils where the leaching process is clearly observable in the profile. The chemical studies have shown that the leaching process is developed over a fairly wide range of soils, but the chemical data do not show such marked difference in pH values and percentage base saturation as might have been expected from the profile data recorded by the field workers.