

chlorotic (free from green colouring-matter) in calcareous soils with ordinary percentages of water, it will grow normally in certain calcareous soils if the soil is submerged. Many of the Rotorua lake-side soils for a great part of the year may be so saturated with water that they can be described as nearly submerged. Chlorosis in plants is a condition which Gile attributes to a depression in the availability of iron in the soil, and he concludes that rice may be expected to make practically a normal growth if the soils are submerged. This point of view is extremely interesting as affecting bush-sick country. One may reason that as coarse pumice soil at lake-level is free from bush sickness, although derived from the same class of material as that at Mamaku, the proportion of the water in the soil is the great factor in effecting the change for the better. It is, of course, impossible to submerge the bush-sick lands, but their water-holding capacity may be increased by cultivating, compacting, and green-manuring. By such means may the pumice-particles be made to decompose and yield up their stores of plant-food—particularly iron—which are so obstinately held. As showing how readily under favourable conditions, with the aid of stagnant water and decaying plant-remains, the iron and manganese may be liberated from coarse pumice soils, the photograph, Fig. 4, may be studied. At the Railway quarry near the Rotorua Railway-station, at some quite recent date geologically, marshy conditions must have prevailed, the result being that a large amount of the iron and manganese was leached out of the first few feet of pumice and redeposited where the subsoil became much coarser. The dark nature of the underlying stratum is caused by the coating of the pumice gravel with oxides of iron (brown) and manganese (black) which have been leached out of the top soil.

(3.) River-terraces are comparatively rare, and, being of small acreage, are unimportant, but are often lands of high fertility.

NATURAL VEGETATION.

Hall and Russell (vol. 4, *Journal of Agricultural Science*) lay stress on the fact that coarseness of soil must be studied in connection with climate (particularly rainfall and temperature). Exact meteorological data for comparison of the Rotorua series of soil with the Mamaku series are, unfortunately, not available. Climatically those stations are different, Mamaku being some 800 ft. above Lake Rotorua and the temperature being lower. The rainfall may be heavier. These climatic differences may have had their effect in the great difference to be found in the natural plant covering of the two areas. At Mamaku it is all forest, but at Rotorua there is a very puzzling vegetation. With the exception of the Te Ngae lands on the east side of the lake, there is nothing like the Mamaku forest until the hill forests are reached at some 500-600 ft. above the lake. Swampy forest is developing in wet places round the lake, white-pine-pukatea forest at Te Ngae, and pure white-pine at Ngongotaha. When, however, one leaves the swampy shores only manuka or fern is encountered. Dieffenbach ("Travels in New Zealand"), in 1843, was puzzled by the curious distribution of the woods, and his solution, deduced from the presence of charred stumps, is perhaps partially true, that the great absence of forest within the Rotorua crateriform depression is due to the activity of