

and in the tawa-rimu-mangeao forest beyond and *below* this terrace land. Has this terrace land ever borne any primitive vegetation larger than scrub which has been removed by the aboriginal owners, or is it that the water content of the soil has not been sufficient for the development of forest? In the forest below, the soil is moister and the trees unusually tall. There is no difference in the mechanical or chemical composition of the soil, save possibly the water content, and this may be the factor which has determined the quality of the natural vegetation, the water draining out readily from the high terrace—a large catchment area—on to the lower slopes now densely forested.

A similar condition of things exists on the area known as the Kapakapa Road, 400 ft. above Rotorua. This road runs along a high slope north of the latter site. The soil is similar to sample R 976, and bush sickness is more prevalent here, the stock having to be changed perhaps oftener than in any other part. At the end of the road, which falls to about 150 ft. above Rotorua, there is some fine land which is much moister and on which the sickness is never experienced. This carries very tall forest similar to that on R 976. Springs are in evidence in many places in the lower area, but are entirely absent on the higher portions of the slope. A similar instance is found on the Kaharoa Road, a forested area; where there are no springs the trouble appears, but where there is plenty of spring or creek water the stock are said to be perfectly healthy. Thus at the extremity and lower portion of these two blind roads the cattle-sickness is unknown. The writer considers this as being a parallel to the well-known case of the lake-side paddocks (see p. 370, December, 1924, *Journal*) and the bush-sick areas up on the hills. Where the soil is kept well saturated with water by seepage from springs or surface water there is no sickness, and where the soil is dependent on rainfall the soil-water so soon drains away that there is not sufficient to act as a carrier of mineral plant-food from the soil to the plant-roots. An analogous case occurred once in the Norsewood district (Hawke's Bay). Here cows suffered in a droughty season from bone malnutrition, although there was chemical evidence that phosphates were not deficient in the soil. The water was probably the limiting factor, the natural pasture being insufficiently nutritious to keep the stock healthy.

In the chemical analyses of these fine gravelly sands there is little to distinguish them from the Rotorua Basin soils save a slightly higher lime content and a slightly lower available iron content. Available and total phosphoric acid, as in all pumice soils, is deficient.

On traversing the Kapakapa, Kaharoa, and the main Rotorua-Tauranga roads in the vicinity of Te Pu the extreme coarseness of the soil is readily discernible to the traveller in the road cuttings. One may, with the aid of mechanical analyses, unhesitatingly affirm that a large extent of country at the north end of the lake is marked by such a coarseness of texture that the student of soil science would be put on his guard and naturally look for untoward results in farming such country; but where the physiography of the country is such that the surface soil is supplied with the optimum requirement of water he would come to lands which unite in the highest degree two essential conditions of fertility—porosity and a constant supply of water.