NATIVE BLOCKS FOR DEVELOPMENT.

The blocks surveyed are Horohoro, Parekarangi, Te Peka, Tihiotonga, Wharenui, Puketawhero, Tikitere, Mourea, and Taheke in the Rotorua district; Maketu and Rangiuru in the Bay of Plenty; Rangitahi in the Rangitaiki valley; and Ruatahuna in the Urewera country. Soil types were mapped over a total area of about 60,000 acres.

In general it has been found that the soils on each block are closely dependent on the topography—soils on steep slopes form one type, those on rolling and flat country another, and valley-bottom flats still another. Thus the soil-maps show the class of topographic relief, and this should aid in the cutting-up of the blocks into sections and mark out areas not well suited for dairying.

The blocks to be developed may be divided into the three following groups, according to the origin of the volcanic ash deposit from which the soil is mainly derived:—

(1) Horohoro, Parekarangi, Te Peka, and Tihiotonga, on which the soil is derived from the Taupo shower.
(2) Rangiuru, Maketu, Ruatahuna, Rangitahi, and Waerenga, on which the soil is derived from the Kaharoa shower.
(3) Wharenui, Puketawhero, Tikitere, and Taheke, on which the soil is derived from Rotomahana ash.

Group (1).—Horohoro and Tihiotonga consist chiefly of rolling and flat country; on Parekarangi a quarter is classed as steep, and on Te Peka half is steep.

Rotorua district, in which these areas are located, has a generous rainfall, which is fairly well distributed throughout the year. Summer temperatures are high, winter temperatures low, and ground frosts are fairly common between April and November. Owing to low temperatures, pasture-growth is small till after October.

Much the greater area of the soils on group (1) are formed from subaerially deposited Taupo pumice (rhyolitic in composition). The deposit is in general about 22 in. thick on Horohoro, 13 in. on Parekarangi, and 9 in. on Te Peka and Tihiotonga. Underlying the Taupo pumice on all these areas is the Mamaku shower. Two soil types are mapped on the subaerial deposits—(*a*) Taupo sandy silt on rolling and flat country, and (*b*) Taupo free sandy silt on steep slopes. In many places on the steep slopes the Mamaku medium sands are mixed with the Taupo pumice. On well-defined terraces bordering the main streams on Horohoro the parent material of the soil is water-sorted Taupo pumice. The textures are those of sands, sandy silt, and silt. These water-sorted sands cover a relatively small area. Small patches of loam, usually swampy, occur in many of the valley-bottoms.

Taupo sandy silt after a period of dry weather contains more than four times as much moisture as the Rotomahana sand and the Kaharoa gravelly sands at Tikitere—as much as, indeed, the loams of the Waikato. This high moisture content is no doubt largely due to the silt fraction, which packs closely together. Taupo pumice soils will not dry out badly during a prolonged dry spell.

In several districts stock depastured entirely on Taupo pumice soils are liable to develop an anæmia which is usually called "bush sickness." On those farms on which the sickness is definitely reported the soil is low in "available" iron. Soils belonging to group (1) are quite as low in "available" iron as those on which sickness has been reported, so that farmers have to be prepared for a certain amount of trouble. It must be said, however, that farmers to the south of Horohoro state that none of their dairy cows have become anæmic. The safest way to prevent any occurrence of bush sickness on the blocks examined is by means of a mineral lick, composed of equal parts of limonite and salt, which the Department of Agriculture have found so efficacious at Messrs. Hill and Son's farm at Atiamuri. Other means of preventing or curing bush sickness in the early stages are (1) use of subsoil licks, (2) grazing on drained-swamp areas, and (3) grazing on native vegetation. A trial of a lick made from a mixture of salt and Rotorua sandy loam which underlies the Mamaku medium sands is suggested. Mr. Rigg has found that at Glenhope (Nelson) a soil lick high in "available" iron is helpful. Swampy areas are too small to be important in this connection. Native vegetation will be grazed to a very limited extent when the blocks are well developed. Aston* records that at Atiamuri on water-sorted Taupo pumice bush sickness is worse than on the subaerial deposits. A striking difference between these two types is the very low nitrogen content of the former. It seems desirable, then, to aim at building up the nitrogen content of the pumice soils.

Group (2).—Blocks belonging to group (2) show so many differences that it is advisable to describe each separately. On Rangiuru (near Te Puke), which is classed as flat, Kaharoa ash (rhyolitic in composition) is a soil-forming shower over an area of 70 acres out of a total of 200 acres. The profile is—

7 in. dark, fairly loose, coarse sands (Kaharoa).
9 in. dull brown, moderately compacted, coarse sands.
18 in. light brown, compacted, coarse sands.

The remainder of the area, which borders the Kaituna River, is covered with loam, peaty loam, and sands, derived from alluvium deposited by the river. Loam and peaty loam predominate.

Kaharoa coarse sands, similar to those on Rangiuru, form the soil on 1,240 acres of the Maketu Block (total area, 1,662 acres). On the steep slopes (258 acres) the Kaharoa sands are thin. Water sorted beds, which lie in the valley-bottoms and along the coast, are chiefly loams and peaty loams. At high tide, or when a strong wind is blowing from the sea, salt water covers the swampy land along the Maketu–Te Puke Road.

Rangitahi Block at Murupara on the Rotorua–Ruatahuna Road, is classed as flat land. Two-fifths of the total area (670 acres) is mapped as Kaharoa medium sands. The profile is—

5–6 in. medium sands, fairly compact at base (Kaharoa).
16 in. light-brown, loose, gravelly sand (Kaharoa).

The soils of the alluvium deposited by the Whirinaki River, which forms the eastern boundary, are gravels, stony sands, sands, and loams. Of these, loams make up much the smallest proportion.

* B. C. Aston: N.Z. Jour. Agri., Vol. 44, p. 11; 1932.