rock-material and to the superficial layers that form the soil upon which so much of the prosperity of the Dominion depends. The geological map forms the best basis for a soil survey of New Zealand, so it has been necessary to prepare a geological map in advance of a soil map in order adequately to describe and classify the soils with special reference to their full profile. This classification has been called for in order to trace the connection between soils and the incidence of malnutrition in stock.

In the area recently examined to the west of Mairoa, soil types similar to those at Mairoa occur. Taylor (1930 A) has established a causal connection between the intensity of sheep-sickness and some of the soil-types, and endeavours to show that leaching is primarily the cause of the Mairoa farms being unhealthy for stock. Grazing tests on patches of soils of the different types are required to confirm this hypothesis. In this connection, the presence of a thin coating of Taupo pumice and the work of Bruce Levy (1925) on the relation between pasture grasses and soils, should be borne in mind. It may be that the soils are inherently too poor to support pasture that gives a balanced ration in the absence of fertilizers (*Cf.* Orr, p. 52), as is the case on Waikato dairy-farms. The pedological survey now in progress must thus precede pasture research.

In the Kopaki district, where the soils and subsoils largely consist of pumice, malnutrition of sheep is prevalent, though cattle thrive where ragwort is held in check. The farmer, however, is on the horns of a dilemma, for he must keep sheep to eat down the ragwort. Where the pumice deposits are thin and mixed with older sedimentary rock material sheep remain healthy (Taylor, 1930 B), but such areas are small and steep. These healthy tracts will be delineated as the survey extends over wider areas. On the flat tops of the greywacke fault-blocks, on the rhyolite sheets, and on river-terraces the pumice deposits are thick and virtually form the soil and subsoil. These tracts, though easily farmed, are unhealthy. The alluvial flats in that part of the Kopaki district that has been examined are of small extent and are partly or wholly waterlogged, typical "pakihi" vegetation being visible in many places. The soils consist largely of resorted pumiceous material that improves in value with increase of distance from the sources of the alluviating streams.

In the Tiroa-Maraeroa district the soils consist almost entirely of pumice, though on its eastern and western margins, areas as yet unsurveyed, older sedimentary rocks introduce variations. Notable features of the Maraeroa area are the open tussock-covered plains similar to the well-known Waimarino Plain. Where the gradient of the land is appreciable apparently sound crops can be grown, but where the gradient is small, run-off of rain-water is reduced and tussock-grass gives place to an uninviting mossy sward. Stream-terraces, on the contrary, are drier; but farmers in neighbouring districts find these easily cultivated tracts lack humus, and active leaching causes a rapid loss of artificial fertilizer. As at Rotorua (see Grimmett and Simpson, 1928) so here, the situation factor seems to be of more importance than the textural.

The following lists of herbs, &c. (identified by Dr. H. H. Allan, of the Department of Scientific and Industrial Research), and of mosses (identified by Mr. G. O. K. Sainsbury, of Hawke's Bay), obtained from sods about one square foot in area, cut from well-grazed patches, show the nature of the vegetation that finds congenial environment on these volcanic soils and upon which stock are sometimes forced to subsist.

1.	2.	3.
Yorkshire fog (*Holcus lanatus*).	Cocksfoot (*Dactylis glomerata*).	Danthonia (*D. semiannularis* [5].
Self-heal (*Prunella vulgaris*).	Crested dogstail (*Cynosurus cristatus*).	Fescue tussock (*Festuca novae-zelandiae* [4].
Hawkbit (*Crepis capillaris*).	Yorkshire fog (*Holcus lanatus*).	Yorkshire fog (*Holcus lanatus*) [3].
Bracken-fern (*Pteridium esculentum*).	Catsear (*Hypochaeris radicata*).	Catsear (*Hypochaeris radicata*) [3].
A lichen (*Cladonia* sp.)	Meadow-grass (*Poa pratensis*).	Meadow-grass (*Poa pratensis*) [2].
Thuidium furfurosum.	Rib-grass (*Plantago lanceolata*).	White clover (*Trifolium repens*) [2].
Brachythecium salebrosum.	Suckling clover (*Trifolium dubium*).	Suckling clover (*Trifolium dubium*) [2]
Stereodon cupressiforme.	(?) Birdsfoot trefoil (*Lotus corniculatus*).	Hawkbit (*Leontodon hispidus*) [2].
Tortella calycina.	Self-heal (*Prunella vulgaris*).	Bracken-fern (*Pteridium esculentum*) [1]
Polytrichum juniperinum.	Hawkbit (*Crepis capillaris*).	—— *Leucopogon frazeri* [1].
	Chickweed (*Cerastium vulgatum*).	*Thuidium furfurosum.*
	Thuidium furfurosum.	*Hypnum cupressiforme.*
	Brachythecium salebrosum.	
	Stereodon cupressiforme.	
	Tortella calycina.	

1. From bracken-covered area in the Ngapaenga Road Reserve, Mairoa district.
2. From paddock of an abandoned farm, Mairoa district.
3. From tussock grassland, Tiroa-Maraeroa district. The figures in brackets denote the number of plants of each species found in the sod.

In the Tiroa-Maraeroa district, monoao (*Dracophyllum sublatum*) and manuka (*Leptospermum scoparium*) scrub cover much open country, and in the scrub common plants are koromiko (*Hebe salicifolia*), ragwort (*Senecio jacobaea*), Strathmore weed (*Pimelea prostrata*), tar-weed (*Bartsia viscosa*), *Helichrysum filicaule*, and *Lycopodium fastigiatum*. Mosses and lichens, such as *Dicranoloma pungentella, Campylopus clavatus, Cladonia aggregata, C. retepora, C. rangiferina, C. pyxidata, Parmelia physodes*, and *Usnea barbata*, growing abundantly on the shady faces of terraces, show that the "soil-climate" of the district is cold and damp.

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