

organic matter (measured by the loss on ignition) reached the high figure of 61 per cent. for one of the peaty samples, which contained also over 1 per cent. of nitrogen. The reaction of the peaty soils was markedly acid (pH 4.3 to pH 4.5), and the lime requirement consequently very high. The other samples varied from pH 5.0 to pH 6.1. Plant-food was present in from average to high amounts, although available lime tended to be low in some samples.

The exchangeable base and degree of saturation of some typical virgin pumice soils were determined with a view to throwing some light on the problem of the unfavourable results attending the use of lime on pumice soils. The soils were all taken from undeveloped country, and were representative of both "sick" and "healthy" types. As would be expected in coarse soils subjected to intensive leaching, the exchangeable bases were very low, particularly in the Kaharoa soil, which is the worst type from the point of view of bush sickness. Determinations of exchangeable hydrogen and lime requirement by different methods showed that the amount of lime absorbed depended on the pH at the end point of the reaction. A marked degree of unsaturation with regard to calcium was found to exist in all the soils, but there was no apparent correlation between this value and the occurrence of bush sickness. The soils dealt with in this work were all from land which has never been cultivated or manured, and consequently there has been no opportunity for replacement of exchangeable hydrogen by calcium from the phosphatic fertilizers, the use of which is a pre-requisite to farming bush-sick country. Different results might be obtained if samples from phosphate-top-dressed paddocks which, however, were still bush-sick, were analysed by the same methods, and it is hoped to extend the investigation to such a series.

The occurrence of mortality in young stock and the difficulty in rearing lambs and calves on a Tuakau farm led to chemical analysis of typical soils, which revealed a deficiency of available phosphoric acid. It was suggested that the soils would respond well to phosphatic manuring, and a phosphate lick was also recommended.

Sheep sickness on parts of the Government Tapuwae Estate was on the basis of mechanical analysis and oxalic-soluble iron in the soils, considered to be identifiable with bush sickness. The soils were classified as sandy silts, while the percentage of iron soluble in oxalic acid in the "sick" soil was not only considerably lower than that in the "healthy" soil but also comparable with the amounts found in typical "bush-sick" soils.

A sample of soil from the Tairua Plantation, Coromandel Peninsula, was examined for the Forestry Department. It proved to be a sandy silt similar to other pumice soils on the volcanic plateau—very poor in available phosphoric acid and potash. The soil appeared to be air deposited and very little compacted, its great porosity leading to low water-holding capacity, which was suggested as a possible cause for the poor growth of seedling trees.

Some soils from a property in the Motu district, Poverty Bay, on which sheep are affected with a condition resembling bush sickness were shown to be sandy silts, while samples from adjacent healthy areas were sandy loams except in one case where the soil was also a sandy silt. It is possible that in this case the sheep had access to some outcrop of soil containing more clay or iron-bearing material.

A sample of so-called "Makasea" soil was analysed for the Resident Commissioner, Niue Island, to determine the possibility of converting it to a fertile medium for the growth of crops. It was simply a very pure communited coral rock. The incorporation of any vegetable matter to give rise to humus was suggested, and especially the growing of green manure crops with the aid of phosphatic fertilizers.

LIMING MATERIALS.

A sample of commercial lime, stated on an accompanying circular to contain 25 per cent. burnt shell, 15 per cent. burnt carbonate, and 60 per cent. carbonate of lime was found to contain 77.3 per cent. carbonate of lime, and 1.8 per cent. calcium oxide present as burnt and slaked lime. Representations were made to the firm to amend the description of the material.

Samples of ground limestone from a works in the Auckland District were found to vary from 48 per cent. to 72 per cent. carbonate of lime content, and it was suggested that an inquiry be made at the works as to how such discrepancies arose, so as to suggest steps to ensure the production of a more uniform material. A sample of burnt lime from Rarotonga (probably derived from coral rock) contained 76.5 per cent. hydrated lime and 21.4 per cent. carbonate of lime.

Numerous samples of limestone rock, commercial lime, and ground limestone, were analysed and reported on for farmers.

The analysis of pasture samples for the Plant Research Station was continued as in previous years.

MISCELLANEOUS.

The problem of weed control in the indigenous forest reserves of the Wanganui River was reported on. It was considered that small-scale experiments on forest regeneration and competition with introduced weeds in enclosed areas should be carried out before any measures such as the planting of exotic trees (conifers) were embarked upon. Chemical methods were impracticable in the special conditions obtaining.

One commercial weed-killer was found to consist chiefly of an emulsion of naphthalene and tar oil. It contained no thiocyanate or other potent weedicide. Another widely advertised weed-killer was found to be very variable in composition. It consisted chiefly of common salt (sodium chloride), with small amounts of sodium carbonate, caustic soda, and sodium chlorate. The sodium chlorate was probably the only potent weedicide in the mixture, and was present only to the extent of about 1 per cent.

Samples of alleged pollard sold in the Auckland District which appeared to consist largely of barley husks, bran, and chaff, and has a similar composition, were submitted to a feeding test at Wallaceville.