

Well's land, four cuts, numbered 1-4, have been made in what is undoubtedly the same band of limestone as that prospected on Mr. J. Wall's property. Various samples qualitatively tested by me in Wellington all seemed low in phosphate content. The best of these, from cut No. 2, when analysed yielded less than 0.1 per cent. of P_2O_5 (Lab. No. W860).

Analyses of the five main samples taken by me from Messrs. Newton King and Wall's properties were made in the Agricultural Department's Laboratory, and are as follows:—

Field Number.	Analyst's Number.	Calcium Carbonate ($CaCO_3$).	Insoluble (Siliceous Matter).	Phosphoric Anhydride (P_2O_5).	Moisture at 100° C.
1	W/817	98.6	0.18	0.05	0.05
2	W/818	98.3	0.23	0.04	0.04
3	W/819	98.3	0.26	0.03	0.10
4	W/820	98.5	0.31	0.03	0.04
5	W/821	98.3	0.25	0.03	0.02

1-4. From cuts 1-4 on Mr. Newton King's property, "Puketiti."

5. From cut on "Puketiti No. 3," Mr. J. Wall's property.

These results show that the limestone is of no account whatever as a source of phosphate, but that it is of remarkably good quality as an agricultural limestone. Being fairly soft, it can easily be pulverized by a small portable crushing plant, and is therefore of value for local use. Elsewhere the Te Kuiti limestone is usually hard throughout.

A few "spotting" tests with ammonium molybdate were made upon samples of hard limestone obtained near Mr. Wall's homestead and near Piopio. In all cases the tests showed that very little phosphoric anhydride was present.

The soil of the Piopio and adjoining districts is light, but when top-dressed with phosphate in any form becomes wonderfully good pasture-land. Much of the land is broken, and top-dressing is therefore expensive. The soil, except in valley-bottoms, is for the most part a brown loam, derived largely from andesitic erupted ash. A sample of loamy subsoil taken in a cutting on the main road half a mile east of Piopio had the following composition:—

Silica (SiO_2)	41.65
Alumina (Al_2O_3)	22.50
Ferric oxide (Fe_2O_3)	9.32
Magnesia (MgO)	1.06
Lime (CaO)	1.02
Soda (Na_2O)	0.99
Potash (K_2O)	0.83
Titanium dioxide (TiO_2)	1.12
Manganous oxide (MnO)	0.13
Phosphorus pentoxide (P_2O_5)	0.29
Water lost at 105° C.	10.34
Combined water and organic matter	10.98

100.23

This subsoil seems to be almost all altered andesitic ash. It rests on limestone.

The discovery of phosphate rock or of limestone sufficiently phosphatic to be used as a fertilizer would be of great value to the adjoining district, but of this there seems to be no prospect. The Tertiary limestones that occur over large areas in Waitomo County (including the old Awakino County) are of such a character that little hope of their being associated with workable deposits of phosphate rock can be entertained. The soft band examined by me on Messrs. King and Wall's properties consists mainly of the remains of Bryozoa, organisms that usually contain little more than a trace of phosphoric anhydride.

Of interest is the occurrence of pilolite, a curious leathery clay-like mineral, pointed out to me by Mr. J. Wall in veinlets cutting the loamy subsoil exposed in a track-cutting a little to the west of his homestead ("Waitoru"). I saw traces of the same mineral along the road east of the homestead. Pilolite in New Zealand was first observed by Dr. J. Henderson near Mahoenui (N.Z. Jour. Sci. & Tech., vol. 3, pp. 79-80; 1921), a few miles south-west of Mr. Wall's, and the mode of occurrence is similar.

8. ROTORUA DISTRICT.

(By P. G. MORGAN.)

The visit made by me last January and February to the Rotorua district impressed me more vividly than ever before with the great amount of useful geological and geophysical work that can be done in the thermal region of the North Island. Physiographically this region is of great interest. The surface features are determined largely by faulting, a condition that seems to have escaped the attention of most previous observers. The numerous lakes are of complex origin. Mount Tarawera was considered by Hochstetter—who, however, did not climb it—to be part of a high-level plateau, and S. Percy Smith was of a similar opinion. A. P. W. Thomas, on the other hand, describes Tarawera as an old volcano, and his observations have been confirmed by Mr. Grange. Nevertheless, there is much to lead one to think that Tarawera is a mountain of complex history, and that to regard it as merely a volcanic cone coated by lava-