

Phosphate is low, and the percentage base saturation indicates a rather low reserve of bases, especially as the lower depths are noticeably deficient.

As shown by the following analyses, the fertility of the easy country is somewhat similar to that of the steep country. According to the analyses both lime and phosphate dressings are required :—

Sample.	Locality.	Depth (In.).	Topography.	Horizon.	Stage and Parent Rock.	pH.	Available		Percentage Base Saturation.
							Phos- phate.	Potash.	
1869 ..	Yarrow Stream Road	0-6	Rolling	..	Semi-mature (derived from ancient grey- wacke alluvium)	5.8	0.008	0.031	16.16
1870A ..		12-18				5.7	0.0005	0.036	29.48
1870B ..		19-25				6.2	Trace	0.013	35.65
1870C ..		29-34				6.3	0.00	0.009	56.23

PUMICE SOILS.

The pumice volcanic ash bush-sick soils which were grouped with the immature brown loams in the last annual report are here simply described as pumice soils. Most important in extent is the Taupo pumice series which occupies about 350 square miles of forest, fern, or stunted scrub country in the western area. Two-thirds of this area is occupied by rugged, steep, or moderately steep, unploughable slopes, much of which was formerly in forest. These forest types have a good natural fertility, but the fern and scrub soils are very poor. Only a few square miles are in good pasture and, as with all these light volcanic soils, particularly on steep slopes, great caution must be exercised in their management lest wind or water erosion should gain a hold. The rolling Taupo pumice soils, which occupy about 70 square miles, half of which was formerly in forest, resemble in fertility the steeper types. The topsoils pH figures lie between 5.0 and 6.0, while the base saturation is low, indicating a need for liming. A profile of the forest type is :—

6 in. sandy silt to sandy silt loam, blackish-grey, fluffy.
8 in. fine pumice sand, greyish-buff, free.
12 in. gravelly sandy loam, dark grey or blackish-brown with light-yellow pumice gravel, free.
12 in. heavy silt loam, pale yellowish-brown.
On heavy silt loam, compact, greyish-brown.

The Gisborne pumice shower covers the central rolling country of the Napier-Wairoa district, a belt of about 200 square miles trending north-east, about eight miles wide, and centred on the Tutira-Mohaka main road. About 130 square miles is mapped as rolling ploughable country; the rest is moderately steep and unploughable. A profile on the rolling country is :—

6 in. coarse pumice sandy loam, greyish-black, free.
8 in. gravelly pumice sandy loam, creamy-yellowish-brown, very free.
4 in. gravelly pumice sand, yellowish-cream, very free.
On heavy silt loam, golden-brown, compact.

As the texture indicates, this type dries out badly. Like the Taupo ash, it is low in cobalt and is reputed to be bush sick. The pH is near 6.0 and there is about 40 per cent. base saturation. Its vegetation is fern or tall scrub, indicating a slightly better fertility than the Taupo ash, and the great bulk of this soil type is still under its natural cover. Though subject to wind-erosion under certain conditions, this type is not as severely affected as the Taupo ash. The moderately steep Gisborne soil is very similar to the rolling type as regards soil properties.

Eastwards the ash showers become thinner and give place to a zone where the ash is less than 2 ft. thick and rests upon an older soil derived from marine mudstones, sandstones, or limestones. The resulting soils are not as fertile as the underlying ones which are exposed nearer the coast, but are a great deal better than the true ash soils. Flat and rolling types are well developed near the mouths of the Mohaka and Waikare rivers. A profile is :—

8 in. silty sandy loam, dark brownish-black.
10 in. very sandy loam, chocolate-brown, free.
10 in. coarse loamy sands, white, loose.
12 in. heavy sandy loam, white, with yellow streaks, compact.
On fine muddy sandstone, creamy-yellow.

The plant-roots appear to be able to derive a portion of their food supply from the buried soil, and it is perhaps for this reason that these soils are not bush sick. They do not dry out as badly as true ash soils because they are not as well drained. Similar soil types are developed on steep or moderately steep country and are better drained though unploughable.

SOIL CONSERVATION.

A description of the wind and water erosion on light volcanic soils has been given. During the past season a good deal of attention has been paid to the more common types of erosion, these being :—

- (1) Sheet erosion.
- (2) Slipping and slumping.
- (3) Gullying.

(1) *Sheet erosion* is the progressive removal of topsoil over wide areas under favourable conditions of run-off and open vegetative cover. It is of relatively great importance on the Hawke's Bay hill country, and is indicated by an open sward and a bare appearance of the pastures on steeper slopes in dry weather. Sheet erosion must continue on an open sward,