

The volcanic agglomerate which occurs immediately below the soil and subsoil of the district surrounding New Plymouth contains numerous boulders of andesite up to 10 ft. in diameter. These have accumulated at the base of sea-cliffs—for instance, between Oakura and the Sugarloaves—and in the stream-beds. They are suitable for breakwater-construction, but the cost of collection and transport would be prohibitive.

There are some inland quarries—for example, Hawk's Hill, on Frankley Road—which could furnish large blocks of stone. In all cases, however, the supply at any one spot is small, and the cost of transport to the breakwater would be prohibitive.

Unlimited supplies of large-dimension stone of splendid quality can be obtained from various parts of Mount Egmont and the Pouakai Range. The only deposit of this nature near a railway-line is some distance west from the present terminus of the Mount Egmont Branch Railway (Public Works Department), which runs a little south of west from Waipuku Railway-station to the lower slopes of Mount Egmont. At its terminus, 2,160 ft. above sea-level (barometric observation), is a quarry in volcanic agglomerate. The massive outcrop of andesite said to be two miles to the westward of this point has not been visited by any officer of the Geological Survey, but as a report by Mr. G. W. B. Lowson, Engineer to the New Plymouth Harbour Board (published in the *Taranaki Herald*, 21st January, 1921) states that the stone is in unlimited quantity and obtainable in large blocks, I do not doubt that the stone here is highly suitable for harbour-construction. Mr. Lowson states that the stone will be supplied by the Public Works Department on trucks at 5s. per ton, and that the cost of railage to Moturoa will be 5s. 7d. per ton, making the total cost per ton 10s. 7d.

The rock outcrop on the Pouakai Range inspected by me is situated on a high spur between Kiri and Momoma creeks, tributaries of the Oakura River, within the Mount Egmont Reserve. The rock-face actually seen is at an estimated height of 2,800 ft. above sea-level. It consists of massive horn-blende-andesite, which is of excellent quality and can be broken in blocks of any size. According to Mr. R. W. Davies, of New Plymouth, who was my guide to this spot, there is a high cliff on the Momoma Creek (south) side, from which the stone could be shot down into the creek to a point accessible by tram-line. The distance from this point to Moturoa or to New Plymouth is between eleven and twelve miles as the crow flies, and a railway of, say, thirteen miles in length would have to be constructed before stone could be delivered to the harbour-works. Owing to the cost of making such a railway, and the time necessarily involved, the suggestion that the deposit between Kiri and Momoma creeks can be used seems at present impracticable.

Under present conditions the only source of stone for the New Plymouth harbour-works that enters into competition with Paritutu is the deposit two miles beyond the present terminus of the Mount Egmont Branch Railway. This stone, there is reason to believe, is of better quality than the Paritutu stone, but it will cost much more per ton landed at the harbour-works. Moreover, it cannot be supplied at all until the railway (or a tramway) is extended to the quarry-site. It is possible that the railage (5s. 7d. per ton) can be considerably reduced; if so, the higher quality of the Mount Egmont stone as compared with the Paritutu stone, and the fact that its quarrying will not involve the destruction of a monument of great natural and historical interest, may well compensate for a somewhat higher first cost.

In concluding I would like to observe that the question of whether Paritutu is to be destroyed or not is only in small measure a matter for a geological report. It happens that the hill is so situated that it appeals to the Harbour Board and its engineers as a probable source of cheap material for harbour-works, whilst, on the other hand, its destruction will cause regret to every one who has an artistic sense and is able to realize that there is something more in life than mere utilitarianism. Under the circumstances it appears to be desirable that the Harbour Board and its engineers, before proceeding further with the destruction of Paritutu, should show that this course is absolutely necessary and that there is no practical alternative.

## 10. SUPPOSED LIGNITE AT UMUTAOROA, NEAR DANNEVIRKE.

(By P. G. MORGAN.)

In accordance with instructions I visited a supposed lignite-outcrop at Umutaoroa, near Dannevirke, on the 15th September, 1920. The outcrop is situated on Section 29, Block 13, Norsewood Survey District, the property of Mr. D. Barry. The locality is about seven miles north of Dannevirke. Here, at a barometric height of roughly 1,050 ft., on the east bank of a small tributary of the Mangatera Stream, a thick band of dark-coloured material is visible. In the main this consists of rather poorly carbonaceous shale, enclosing small masses and layers of carbonized wood or lignite. The layers strike 254°, and dip at about 25° to the west of north.

Containing, as it does, only a small percentage of combustible matter, the supposed lignite is of no commercial value.

The following analysis of a sample forwarded some time ago by Mr. Barry to the Dominion Laboratory represents material that is useless as a fuel, and yet is certainly much higher in combustible matter than the average of the deposit inspected by me:—

<i>Lignite from Umutaoroa Block, Dannevirke.</i>						
Fixed carbon	..	..	..	..	..	20.5
Volatile hydrocarbons	..	..	..	..	..	25.5
Water	..	..	..	..	..	20.7
Ash	..	..	..	..	..	33.3

100.0

Dr. MacLaurin remarks: "This is a lignite of poor quality, containing an excessive amount of ash."