REPORT ON THE PETROLEUM FOUND AT TARANAKI:

BY DR. HECTOR.

Geological Survey of New Zealand,
Wellington, 18th June, 1866.

SIR,—

I have the honor to furnish the following information respecting the Rock oil, or Petroleum, that is found at Taranaki, various specimens of which, along with the associated rocks, have been sent to this Department for examination.

It appears that an exhalation of gas, and bubbles of bituminous matter, has been observed since the earliest days of the settlement, at about half-a-mile from high water mark, between the main-land and Moturoa, the highest of the Sugarloaf islands; and, according to Dieffenbach, "was whimsically attributed by the Maoris to the decomposition of an Atua, or spirit, who was drowned there."

It was not, however, until November last, that any attempt appears to have been made to search for this oil, by boring or sinking wells on land, and as these experiments have to a certain extent proved successful, much attention has been recently attracted to this natural production, which it is hoped may yet prove a valuable and important article for export.

The petroleum is described as oozing in small drops from cracks and fissures in the rock that forms the Sugarloaf promontory, but it does not appear that the solid rock itself contains any appreciable traces of oil.

All the rock specimens sent are either of the common superficial sand beds of the coast, or of a hard gray rock that proves to be the same trachytic breccia which forms the Sugarloaves, and which can be traced only a short distance inland towards Mount Egmont. This rock is of volcanic origin, being composed of fragments of still older igneous rocks, ejected under the sea in the tertiary period, and cemented together by the feldspathic mud which usually accompanies such eruptions.

Trachytic breccia of similar character is of frequent occurrence in other parts of New Zealand, encircling the districts where energetic volcanic action once prevailed, either as rudely stratified masses of immense thickness, which overlie the deposits that were forming in the sea at the time of their eruption, or as massive dykes that have pierced through and consolidated among these same strata.

When the nature and origin of this rock is taken into consideration, it is evident that the petroleum it contains can be only accidentally present having been originally derived from some distant source, and indeed it is probable that this rock has only acted as a condenser and absorber of gaseous vapour produced by the natural distillation of deep-seated strata of carbonaceous matter.

It should be remarked that among the recent superficial deposits along the same coast, there are found considerable beds of lignite and decomposing vegetable matter, and though such deposits cannot account for the dissemination of the oil in the rock to a depth of 115 feet (at which depth I understand decided indications of its presence have been obtained), still it is well to bear in mind the existence of such superficial deposits, as it is quite possible that they may give rise to small quantities of bituminous oil, and to other indications that might tend to mislead explorers in searching for true oil wells.

The real source of the oil is most probably to be looked for in the coal seams that belong to the Brown Coal Formation, that is believed to form the base of the series of tertiary strata that extends under Mount Egmont, and the valleys of the Wanganui and other rivers which enter the sea along the coast between Mokau and Otaki.

This coal formation, which is probably not a continuous sheet but occupies issolated depressions in the Paleozoic rocks, is overlaid by marine strata of various kinds, comprising clay shales, sandstones, and limestones that were accumulated during a gradual depression of the land beneath the sea.

The volcanic eruptions seemed to have commenced at the period of the greatest depression, most probably with the eruption of volcanic rock, like that which forms trachytic breccia that now yields the petroleum.

The volcanic action, at first submarine, was continued with the re-emergence of the land, becoming gradually more feeble and more localized, until the great cone of Mount Egmont was piled up in the atmosphere.

The total thickness of the submarine strata which in the deepest part of the basin overlie the brown coal formation, cannot be less than 2,000 feet, and to this must be added at least an equal thickness of submarine volcanic formations, above which rises the true volcanic cone of Mount Egmont to a height of 8,270 feet, composed principally of lavas and scoria beds of recent date.

Under this immense accumulation any brown coal beds that exist in the deeper part of the basin must have been subject throughout a lengthened period of time to the combined action of heat from the frequent injection of igneous dykes, and moisture from the percolation of water to supply that which was carried off in the form of steam during the volcanic eruptions; and one of the most probable results of the chemical action produced would be the formation of bituminous vapours that would ascend through the strata along lines occupied by dykes and fissures until they reached rocks sufficiently cool to cause their condensation into the form of oil.

In the foregoing endeavour to account for the remarkable fact of the presence of petroleum in the volcanic rock at Taranaki, it has been necessary to rely greatly on the analogy of geological structure which may reasonably be expected to exist between the district in question and other