reservoirs, that seem to yield an inexhaustible supply, of a quality that can be purified by an inexpensive process, in districts where its presence had not been previously expected. The occurrence of mineral oil in New Zealand must not, therefore, be looked upon as an exceptional and uncommon phenomenon, but as one of the productions natural to a country where extensive deposits of carbonaceous matter have been involved in volcanic disturbances.

Whether mineral oil of fine quality has been accumulated in accessible positions and in sufficient quantity to exert a marked influence on the future prosperity of this country, is the problem now being solved, and even if the boring now carried on at Taranaki should not prove successful, the question will not be set at rest.

The presence of petroleum has been reported, and may be expected, in many other parts of New Zealand; and now that attention has been directed to the subject I have no doubt it will be found, at least in small quantities, throughout both islands, wherever volcanic disturbances have affected deep basins containing tertiary strata overlying the brown coal formation.

Mention should not be omitted, however, of the circumstance that in the lower secondary rocks of New Zealand, which consist of sandstones and shales that have undergone great mechanical disturbance and chemical change, there are thin seams of graphite and anthracitic coal, and probably from these also there has been produced a certain amount of bituminous oils.

These beds, as yet discovered, are of very insignificant extent and cannot have yielded a large quantity of oil in their conversion to their present state.

As I intended in the present report merely to furnish general information respecting the origin and mode of occurrence of the petroleum at Taranaki, and to give the results of the chemical examination which has been made of it, I have deferred attempting to give any detailed description of the workings or the immediate locality where they are being carried on, as all the information I possess regarding what is to be seen on the spot since the workings were commenced has been gathered from the newspapers or from Mr. Grayling's letter (copy herewith enclosed) forwarded for my information along with a box of specimens which were only received a few days since.

I have also to acknowledge with thanks information which I have received verbally from Mr. Balfour, C.E., and Mr. James Hacket, both competent observers, who have recently visited the locality of the oil wells.

I have, &c.,
JAMES HECTOR, M.D., F.G.S.,
Director of New Zealand Geological Survey.

The Hon. the Colonial Secretary, &c.

Copy of a Letter from Mr. Grayling.

SIR,— Taranaki, 30th May, 1866.

Having been requested by Mr. Hacket to forward you a box of specimens from the neighbourhood of the Sugarloaves, I write to inform you that a small box has been placed in the hands of the agent, with directions to forward the same by the first vessel, and should the weather moderate it will in all probability reach you by the "Storm Bird."

You will see by the enclosed index that oil is to be met with on the eastern side of the Sugarloaves, for some half-a-mile in distance, wherever a fissure is perceptible. At such a spot, a blow from the hammer will cause water, when poured on the fractured portion immediately to be coated with a film of petroleum, which is easily recognized by its smell.

I would particularly ask your attention to the fact that the more solid portions of the reef yields no appearance of oil. This, coupled with the fact that out at sea, where the water is upwards of 100 feet in depth, large bubbles of the diameter of an ordinary tumbler, are constantly bursting on the surface, induces the belief that petroleum is to be found in large quantities by deep boring. I might ask your attention to another significant fact. Carter, prior to boring, sunk a shaft between fifty and sixty feet in depth, this is now nearly filled with water, from which gas is constantly evolved, some thousands of cubic feet being daily given off, whilst the surface of the water has a layer of oil some inches in thickness.

Again, during the time the men were engaged in sinking, the gas at times disenabled them from continuing operations.

Another point worthy of record is, that the quantity of oil in the tube down which the boring rods work varies with the weather. I have only found surface indications where the rocks are exposed to view, by being protected from the prevailing winds which would otherwise cover them with sand.

On the westward side of the Sugarloaves the reef is covered with several feet of sand.

In an unstratified country such as Taranaki actual experiment alone can throw light on the lay of the rock.

It will give me great pleasure to send you at any time specimens of rocks; and would it be of any service to send you a gallon or more of oil.

I have, &c.,
W. E. GRAYLING.

The specimens referred to in Mr. Grayling's letter were found to be as follows:—

No. 1. Gray trachyte breccia, containing fragments of gray and blue trachyte, with crystals of feldspar and hornblende imbedded in a feldspathic ash. Some of the surfaces were stained with petroleum.

Nos. 2, 3, and 4. Decomposed feldspathic sand containing rolled gravel, evidently from superficial deposits.

No. 5. Fragments of trachytic breccia from the bottom of the deep bore, contains fragments of crystals of hornblende.

Nos. 6, 7, and 8. All trachyte fragments from the breccia rocks.

These rocks, with the exception of 2, 3, and 4, are of volcanic origin.

JAMES HECTOR.