

"The supply of oil has not proved over-abundant, and the temporary abandonment of the different localities and particular bores that have engaged the present company's attention are certainly discouraging facts. Meantime the New Plymouth Petroleum Company has located and is proceeding with their No. 6 bore at a moderate distance from their former bores, Nos. 3 and 4, and it is to be hoped they will be able in this to reach the stratum equal to 915 ft. in No. 3 bore, at which depth, should oil not be struck, it might be matter for consideration whether boring should be continued."

In 1866, Dr. Hector examined the district along the coast to the White Cliffs, and the following description has been taken from his report on the progress of the Geological Survey of New Zealand during 1866-67:—

"The geology of this interesting locality can only be understood by following the natural section shown along the sea-coast for thirty miles north of New Plymouth, . . . which gives the succession of the strata from the White Cliffs to the Waitara River. The White Cliffs (600 ft. to 700 ft. high) are composed of Older Tertiary marls containing a few marine shells and corals, and marked by lines of calcareous septaria dipping to the south-west, and visible along the coast as the lower part of the sea-cliffs* as far south as Omera, which is five miles north of the Waitara River. At this point they are overlaid unconformably by Newer Tertiary clays, the junction being marked by a stratum of rolled septaria derived from the older marls, intermixed with quartz-gravel and broken shells. As the overlying clays differ only very slightly from the older marls, if this conglomerate bed were not present, it would be very difficult to detect that a different and newer formation had been entered upon. The newer clay (Pliocene Tertiary) rests horizontally on the bed of conglomerate, and in the course of a few miles from where they first appear, they acquire a brecciated structure from the presence in them of angular fragments of volcanic rocks, indicating that the deposition of these clays was contemporaneous with volcanic eruptions in the neighbourhood, which, judging from the interposition among the angular breccias of beds of rolled conglomerate, were evidently of an intermittent character. . . . South of the Waitara, this clay breccia passes into a tufaceous agglomerate, in which both the matrix and the embedded fragments are of volcanic origin, probably indicating a near approach to the centre from which the eruptions took place.

"At Sugar Loaf Point a break occurs in the section, owing to the intrusion of a dyke-like mass of trachyte porphyry. This dyke, which is 300 ft. wide, lies in the magnetic meridian, and forms the main Sugar Loaf and the Island of Moturoa. It appears to be of earlier date than the tufaceous agglomerates, having probably stood as an island ridge in the sea in which the latter were deposited. South of the Sugar Loaf the agglomerates again prevail, but at Fort George they form only the lower part of the cliff, being overlaid by newer volcanic tufas from the Mount Egmont centre, which are probably the equivalents in that locality of the beds next to be described.

"There are Pleistocene deposits consisting of stratified gravels and sandrock (not hard enough to be termed sandstone) with beds of lignite. This formation, corresponding in age and stratigraphical position with certain of the auriferous gravels in the South Island, is highly charged with oxide of iron, forms the upper part of all the cliffs along the coast north of the Waitara, and is readily distinguishable by its deep red colour. These gravels do not extend far inland nor to a greater altitude above the sea than 150 ft., so that they must be regarded as in some way connected with an ancient coast-line, and from the circumstance that at the base of this formation in many places, and underneath the lignite seams, there is a layer of rolled broken shells of existing species, we may infer that these gravels have been deposited in lagoons parallel with the coast-line during a gradual elevation of the land, and that they have been overtaken, as it were, by the encroachment of the sea, and exposed in sea-cliffs after they are 80 ft. to 100 ft. above the present level of the tide. As, during the interval which must have elapsed, there was time for the formation of beds of lignite 8 ft. to 10 ft. thick, we have thus an indication of the extreme slowness with which changes of level are taking place, even in an area of such marked volcanic action as that around Mount Egmont. . . . The only other formations observed are superficial deposits still in progress, such as a rich brown loam in the district around Mount Egmont, derived from the decomposition of volcanic tufas and sand-dunes along the coast, which latter are sometimes extremely consolidated by the infiltration of iron as to resemble a sandstone formation of much higher antiquity. In the foregoing section [and as here described] we may safely conclude, owing to the deposition of the strata, that we have somewhat the same succession of formations which would be encountered in a vertical line in the Sugar Loaves, namely: (a) volcanic breccia, 250 to 350 ft.; (b) newer tertiary clays, 400 ft.; (c) conglomerate and quartz cement,† 100 ft.; (d) older tertiary marlstones, 900 ft. The foregoing estimates of the thickness of the strata to be passed through are taken from the coast sections, and are therefore only very approximate.

"The rock in which the borings for petroleum are in progress is the breccia in the above section. This breccia or agglomerate consists of a variety of trachyte and basaltic fragments, cemented by a tufaceous clay and calcareous marl or ash of various shades of red, yellow, and green colours, but sometimes there occurs a thick bed of tufaceous clay of green tint with but few included fragments. Between the innermost island and the north headland the fragments of this breccia, where the stratum has been denuded by the sea, form a natural causeway, which is dry at low water, and it is on this causeway principally, but also round the shore of the headland, that the indications of the presence of petroleum are found. Masses and seams of a ferruginous

* The balance of opinion is in favour of a somewhat younger age for these beds, and Park, in his classification of the rocks of the district, places them as not of greater age than the Upper Miocene period. I am inclined to agree with Mr. Park in this matter.

† Local.