tional beds are probably the deposits of a large stream that existed in these parts during the early stages of activity of the Taranaki Volcano.

Buried Forest.—Well-sinkings in the country near, and especially to the north of, the old military settlement of Tikorangi (as well as in many parts of the Paritutu Survey District) usually pass at a depth of 20 ft. to 40 ft. through a notable layer of vegetable débris consisting of carbonized trees, creepers, &c., apparently identical with species at present growing in the forests of Taranaki. It could not be definitely ascertained whether this buried forest always lies on a surface of Miocene Rocks, but it seems probable that the deposits in question are the remains of the vegetation that grew on the land-surface of Miocene Rocks, and was buried under the ejecta of the Taranaki Volcano.

Lignitic Beds.—In the extreme south-west corner of the Waitara Survey District a rectangle measuring about two miles from east to west and one mile and a half from north to south contains post-Miocene deposits of a type differing from those just described. These deposits consist of 12 ft. to 20 ft. of alternating layers of sand and impure peaty lignite. The sand is made up of fragmentary crystals of ferro-magnesian minerals and of feldspar, the latter much decomposed. In the upper layers the bands of sand are thicker, whereas towards the base the lignite layers become predominant. These beds are most probably underlain by volcanic débris of the ordinary type; but direct proof of this has not been obtained.

The most plausible explanation of the origin of the lignitic beds is that during the period of activity of the Taranaki Volcano one or more lakes were formed in this part of the Waitara Survey District, and that in these lakes the deposits described above accumulated during alternate periods of volcanic activity and quiescence.

Bog-iron Ore.—Small beds of bog-iron ore resulting from the decomposition of the volcanic débris are found in various places, but appear to be of no consequence.

Pleistocene and Recent Deposits.—On the Mokau Road, in the cuttings on the north bank of the Mimi Stream, loosely consolidated sands containing a considerable proportion of "ironsand" are seen. The same sands are found on the Tupari Road about three-quarters of a mile beyond its junction with the Okoke Road, and, overlying the Miocene Rocks in apparent unconformity, on the sea-coast in the north-east corner of the Waitara Survey District. The relation of these sands to the Miocene Rocks is not quite certain, but may be elucidated in the future by the study of sections further to the north. It seems probable that the sands in question are unconformable to the Miocene Rocks, and since, if they are beach deposits, elevation must have intervened between their deposition and the laying-down of the recent deposits (to be described immediately), they may be temporarily classed as Pleistocene. It must here be mentioned, however, that they bear a strong resemblance to the so-called petrolaceous sands that, interbedded with Miocene Rocks, occur in one of the bores near New Plymouth.

Under the heading of "Recent Deposits" may be classed the marine sands of the sea-front, the fluvio-marine deposits of sand and silt at the mouths of the streams, and the silts deposited in the river-valleys. Sand-dunes, which have a small development in the Paritutu Survey District near the coast-line between Waitara and New Plymouth, are not found in the Waitara Survey District.

The beach-sands of the Waitara Survey District are the black "ironsands" for which Taranaki is well known. An examination of the sand during the summer of 1909 showed that the proportion of iron-ores in it was small. The iron-ore grains, being heavier than the other components of the sand, are dropped first by the waves of each falling tide, and form at low water a covering over the more heterogeneous material that has not been affected by that particular tide. This covering, however, is on an average only about ½ in. thick, and in places is absent altogether. It is thus evident that the iron-ores of the Waitara Survey District are of little importance, unless during certain weather-conditions much greater amounts of "ironsand" than were seen by the writer are brought up by the action of the waves.

The sand of the sea-beaches is derived mainly from the erosion of the volcanic débris described in the previous section, though smaller quantities of the more durable constituents of the Miocene Rocks may usually be detected. The most abundant constituents of the beach-sands will probably prove to be ferro-magnesian minerals.

The silts of the river-valleys in the Waitara Survey District are derived mainly from the Miocene Rocks, and contain a variable percentage of "ironsand" from the volcanics. The silts are of importance from an agricultural point of view, but call for no further description here.

Possibilities of Payable Oil in the Waitara Survey District.

Oil has been obtained in considerable quantities at Moturoa in the Paritutu Survey District, and near the Town of New Plymouth. Any explanation of the occurrence of oil at Moturoa may therefore reasonably be applied to the Waitara Survey District with the object of determining whether or not payable oil-wells may be located in that area. Unfortunately it is impossible at present to decide which of the several theories of oil origin and accumulation is most applicable to the New Plymouth oilfield. Whether, for example, the oil has originated from the decomposition of organic remains in the Miocene Rocks, or whether it has been formed by inorganic chemical processes (a theory little favoured at the present day) connected with the igneous rocks of the Taranaki Volcano, there is as yet little evidence to decide.

Again, if the oil had an organic origin, it might be supposed that the distillation by which it was formed was due to the intrusion of the igneous rocks of the Taranaki Volcano, in which case it would probably be useless to bore for oil except in the neighbourhood of these rocks. Further, the occurrence of payable oil-pools may have been determined either by folds in the Miocene Rocks, or by fissures caused by the igneous intrusions, or by some factor that at present is altogether obscure. In this preliminary report it is possible merely to summarize the facts obtained during the course of the present survey, and to draw tentative conclusions as to the probable future of the Waitara Survey District as an oilfield.