is lighter than water and does not mix with it the oil will be buoyed or forced upward towards the anticlines, whilst the water will sink through the porous strata towards the base of the synclines. Effective water-pressure may be more particularly expected if these porous beds outcrop and form a sponge for water falling on the surface. Again, the gas confined in the petroliferous strata in many cases aids the oil in rising towards the crest of the anticline. Of course, it must be understood that there may be several successive beds of porous and impervious strata with one or more niveaux of petroliferous country.

In general it may be said that ideal conditions exist where a relatively thick porous stratum, known to be petroliferous, is overlain by a gently folded impervious stratum showing no pronounced faulting; but whether these ideal conditions obtain or not at Waitangi Hill cannot at present be stated. There are abundant surface indications of oil, as shown by natural petroleum-springs and by petroleum seepage in test-pits. From investigation up to the present time it is not clear whether the petroliferous strata are exposed at the surface at this point, or whether the presence of these indications is not due to the petroliferous strata having been tapped at some distance below the surface by a fault plane or break. It must be stated that the folding in the subdivision is most irregular and erratic, and that faulting in various parts is distinctly conspicuous. Also, it is noteworthy that the several petroleum-springs in this locality appear in general along a more or less definite line, which would suggest that they are along a fault.

In summing up it may be said that there are fair chances of discovering a reservoir of petroleum in porous strata in the locality of Waitangi Hill, though, owing to the possibility of faults in the folds having allowed much of the petroleum originally present to escape, there can be no absolute certainty on this point. The map accompanying this report indicates the point in the part of the Whatatutu Subdivision so far surveyed which we consider most suitable for a borehole. This point has been chosen for the following reasons:—

(1.) Because it lies at or near the crest of a longitudinal anticlinal fold, and near the point of transverse folding on that longitudinal fold—in other words, at or near a point of doming in the strata.

(2.) Because it is apparently removed from "slip" country, so prevalent in this locality.

(3.) Because it appears to be removed from the possible line of fault along the petroleum-springs.

This suitable position is somewhat unfortunately at a high altitude, but lower points in the immediate locality are prohibited by the broken and "slip" nature of the country.

It must be definitely understood that the point now chosen for a borehole is preliminary, though from the present state of our observations we consider it to be settled. After the further investigations, however, which will precede the publication of the bulletin on the Whatatutu Subdivision, it may be found necessary to slightly change its position.

Thames Subdivision.

I arrived in the Hauraki Division late in April, and worked in that portion of the Dominion till the end of May. My work was limited to a reconnaissance from Thames to Coromandel, thence to Mercury Bay and the goldfields of the Tairua Valley; and to detailed investigations of the gold-mines in the immediate neighbourhood of the Town of Thames. On the reconnaissance trip I was accompanied by Mr. Colin Fraser, Mining Geologist, who for some months past had been conducting detailed investigations in the Thames Subdivision, which includes the survey districts of Hastings and Thames. Mr. Fraser also co-operated with me in the work at the mines of the Town of Thames. As he is submitting a report concerning the Thames work on a later page, it is unnecessary for me to describe in detail the state and character of the operations in that locality.

Tairua Goldfield.

Since the Tairua Goldfield lies to the eastward of the Thames Subdivision, and since a detailed report on its geology will not appear for some time, a few remarks on this locality will be of interest.

Physical Geography.—The Tairua Goldfield is situated in a hilly, almost mountainous country, rapidly increasing in altitude from the shores of Tairua Harbour to the mountain-peak of Pakirarahi (2,578 ft.), on the water-divide of the peninsula, and lying near the south-western limit of the field. The hills, being cloaked by a thick covering of creeping waste derived from the decay of the various volcanics, which form the subjacent rocks, are generally smooth in outline. It is only along the crest of the very highest hills, or in close proximity to the various streams which have deeply incised and dissected the area, that ledges of solid rock are conspicuous or prominent.

A natural highway into the goldfield is afforded by the Tairua Harbour and river. The former represents a typical sunken river-mouth, and shows the former extensions of the Tairua Valley proper. Owing to this depression, boats of small draught are enabled to carry supplies to the settlement of Upper Tairua, fully six miles from the sea. From this point a rough road extends up the flood plains of the Tairua Stream for several miles, and then a corduroy or log track leads over the hills past the various mines down into the valley of the Puriri, on the western side of the divide.

The area is in great part still forest-clad, the magnificent kauri-pine growing in great luxuriance, and yielding excellent mining-timber.

General Geology.—In broad outline the geology of the area is not complicated. The solid rocks exposed consist entirely of Tertiary volcanics, the earliest having been ejected and poured forth upon an old land-surface of argillites and grauwackes, completely covered in the area now