Structure.—As already noticed, the streams in the Waitara Survey District flow nearly to their head-waters through alluvial deposits, and therefore no outcrops of the Miocene Rocks are to be found in the actual watercourses except near their sources. It thus follows that the great majority of the strikes and dips recorded had to be obtained on the sides of spurs some distance from the streams, on faces exposed by landslips, in road-cuttings, quarries, and similar places. Though care was taken to record only those observations made in strata undisturbed by slipping, it seems probable that a certain amount of sagging would take place along exposed faces of such soft strata as those under consideration. When the prevailing low angle of dip is also remembered it becomes evident that, however much care may have been exercised in the field, the liability to error in recording the direction of strikes and dips is great.

A careful plotting of the most reliable strikes and dips has failed to reveal the existence of any persistent anticlines and synclines. The strata under consideration dip to all points of the compass, but on summarizing it will be found that the westerly dips outnumber the easterly in the proportion of three to one. The directions of the westerly dips are divided almost equally between south-west, west, and north-west, but in the south-east portion of the Waitara Survey District the dips show a slight preponderance to the south-west, whilst in the north-east portion the dip is more usually to the north-west.

The dips are always at low angles, usually less than 10°, while only ten or twelve instances of dips of 15° or more and about the same number of dips at angles between 10° and 15° were observed. Of these higher dips a few more are westerly than easterly.

It thus appears that the Miocene Rocks are arranged in gently undulating fashion, but are in general dipping in a westerly direction, and that there is some faint indication that they form the western end of a westerly pitching anticlinorium, the axis of which runs in a north-west and south-east direction.

No evidence of faulting was found in any of the exposures of the Miocene Rocks, but in six localities the topography seems to indicate that local subsidence of the Miocene Rocks has occurred. These localities are (1) in the acute angle formed by the junction of the Richmond and Ackworth roads, (2) on the west side of the Richmond Road about half a mile beyond its junction with York Road, (3) near the Mangohewa Road line about half a mile from its junction with the Otaraoa Road, (4) at the head-waters of the Maugaonga Stream, (5) near the head-waters of the Mangapoua Stream, and (6) just outside the eastern boundary of the Waitara Survey District about half a mile north of the Junction Road. It must be remarked that no outcrops of Miocene Rocks have been found near the first two of the six localities mentioned, and the depressions may be due to subsidences in the overlying volcanic débris alone. In the other four localities there can be little reasonable doubt that local basin-faulting of the Miocene Rocks has occurred. In each case basin-like areas bounded by more or less steep-sided edges have been produced. In the case of the two "graben" in the south-east portion of the area the ground is traversed by ditches and mounds which are probably the remains of minor fault-scarps. It must be added here that the possibility of the ditches and mounds being the remains of Maori fortifications was fully considered, and found untenable.

It was hoped that some connection between these graben, the main structural features of the Miocene Rocks, and the occurrence of oil-indications would be established; but the facts so far collected are not sufficient for the drawing of general conclusions.

Palæontology, Age, and Correlation.—Large numbers of fossils were collected from many outcrops of the Miocene Rocks. No more than field identifications are at present available, but there is little doubt that the rocks in question are more or less homotaxial with the Miocene (Oamaru and Jenkins Hill) rocks of Nelson.*

North-east of the area under review lie the coal-bearing rocks of the Mokau district, which are generally regarded as conformable to the Miocene Rocks of this report. To the south lie the rocks of the Wanganui Series, which are usually considered to be Pliocene. A careful study of critical sections in the field and of large collections of fossils from the Mokau, Waitara, and Wanganui rocks would be of interest both as throwing more light on the interrelationships of New Zealand Tertiaries and as indicating the probability or otherwise of the westerly continuation of the Mokau coal-bearing rocks towards New Plymouth and Wanganui.

VOLCANIC DÉBRIS.—*Distribution.*—As already explained, practically the whole of the Waitara Survey District is covered to a varying extent with débris derived from the ancient Taranaki Volcano. The thickness of the Volcanic Débris is of course very variable, since it was deposited on a previously dissected land-surface. Except in the western portion of the Waitara Survey District the thickness of the Volcanic Débris rarely exceeds 50 ft., but to the west, and almost throughout the Paritutu Survey District, the thickness increases to the entire exclusion at the surface of the Miocene Rocks.

Petrology.—No microscopic sections or chemical analyses of the rocks in question are yet available. It seems likely, however, that the Volcanic Débris will prove to be made up of andesites of various types. Hornblende-augite-andesites have already been described from Mount Egmont and the neighbourhood of New Plymouth.†

Structure.—In general, the boulders of the Volcanic Débris are loosely aggregated, and show little assorting as to size. In the Waitara River, however, about one mile and a half above the mouth of the Manganui River, the rocks under discussion are found in the form of slightly waterworn pebbles unconformably overlying the Miocene Rocks, and showing distinct, rather inclined bedding. These excep-

* See Bull. No. 3 (New Series) N.Z.G.S., p. 49, &c.; and Bull. No. 12 (in course of publication).

† Marshall, P.: "Distribution of the Igneous Rocks of New Zealand"; Rep. Aust. Ass. Adv. Sci., Vol. xi, 1908, p. 375. See also Hutton, F. W.: "Corrections in the Names of some New Zealand Rocks"; Trans. N.Z. Inst., Vol. xxxi, 1898, p. 484.