

distributed sulphides. With these wolfram is associated, but in discouragingly small amount.* Some prospecting-work has been carried out, but much more will be necessary before the value of the deposit can be estimated.

13. NOTES ON THE GEOLOGY OF THE WEBER DISTRICT.

(By J. HENDERSON, Mining Geologist.)

While on his way to Gisborne last February the writer took the opportunity of spending a day or two at Weber and Herbertville, in order to compare the rocks there exposed with those of the Poverty Bay district. This region has been examined in a general way by several geologists, and a complete bibliography, prepared by Dr. J. A. Thomson, was published in last year's annual report. The geological formations exposed in the district are in ascending order: (1) Early Secondary; (2) Late Secondary; (3) Late Tertiary; (4) Quaternary. Both groups of Secondary rocks are strongly folded, but the Tertiaries, although often steeply tilted, have not been plicated. This is a condition which seems to prevail throughout New Zealand in respect to the Tertiary formations, and sufficient data have now accumulated to permit of the generalization that during and since Tertiary times crustal stresses have found relief, as a rule, by radial dislocations and not by foldings.

The whole district is one of physiographic youth. An elevation of several hundreds of feet during Quaternary times initiated a new erosion cycle, which has now reached a stage at which the main streams flow nearly at grade in narrow channels deeply entrenched below their ancient valley-floors. The interfluvial blocks have not yet been maturely sculptured, and for this reason the tendency is for the arterial roads to follow the ridges and upland plateaux. There is evidence of a later and considerable depression, but the most recent movement has been one of uplift. This brought about the elevation to the extent of perhaps 20 ft. of the estuarine deposits of the drowned valleys.

Structurally the region consists of earthblocks separated by belts of dislocation and differentially elevated. Along the Dannevirke-Herbertville Road the three principal fault-zones noted by the writer occur respectively near the Mangatoro valley, Weber, and Wimbledon. The strikes of these zones, as far as could be determined, are between north and north-north-east. The Mangatoro fault may be studied on the Waitahora Road, where, at a distance of three miles from the junction with the main road, soft Tertiary sandstone butts against weathered greywackes and argillites. These rocks, which are much contorted, probably belong to the Trias-Jura, but may be Lower Cretaceous. The scarp of these old rocks is an important feature for several miles southward along the western side of the Mangatoro valley. Northward it is not so prominent, and the writer passing by coach to and from Weber saw nothing on the main road to indicate the point of crossing of the fault.

The township of Weber is situated on the old flood-plain of the Akitio, and dropping down to the river the road is cut in gently inclined calcareous claystone, probably of Tertiary age. Across the bridge on the Herbertville Road are chalky limestones of totally different appearance and vertical attitude. With them are associated glauconitic sandstones, and the formation is considered to belong to the Cretaceous. The width of exposure is under a mile, the beds on the plateau across the Akitio being masked by alternating layers of Tertiary sandstone and claystone, which exhibit steep dips and variable strikes for more than a mile. Down the river the chalky limestones and glauconitic sandstones shortly disappear, giving place to disturbed Tertiary strata. Down Wainui valley from the plateau Cretaceous rocks make their appearance before the stream is reached, and continue to about half a mile beyond Wimbledon, thus forming an exposure at least four miles in width. The beds are much contorted, and are traversed by several powerful faults. A mile below Wimbledon Tertiary rocks make their appearance, and continue to the coast and to Cape Turnagain, which shows a high cliff of claystone capped by a layer of hard shell limestone.

14. PATEA IRONSAND.

(By W. GIBSON, Assistant Geologist.)

Acting under instructions, I left the Te Wera camp on the 28th September, 1914, in order to visit Patea for the purpose of collecting samples of ironsand from various parts of that district, and also of furnishing a report on the possibilities connected with the ironsand-deposits themselves. Five days were spent in the district, and the coast-line was traversed for a distance of five miles west of the Patea River mouth, and for two miles to the east.

To the west of Patea perpendicular cliffs 60 ft. in height, and extending beyond Kakaramea, five miles distant, form the barrier against which the spring tides beat. The cliffs afford no access to the beach beyond Schnapper Point, which is three-quarters of a mile west of the Patea breakwater, and is impassable even at low tide. Sand-dunes, more or less dark in colour owing to the presence of ironsand, but now partly covered by vegetation, extend at intervals on top of the cliffs from Patea to Kakaramea, and in some places reach a quarter of a mile inland. On the cliff-edges the ironsand in the dunes has been transformed to a ferric hydrate, and some iron having found its way by solution or mechanically into the underlying sandy beds, these latter are cemented to an average depth of about 6 ft.

The accessible part of the beach, extending from the breakwater to Schnapper Point, is approached from Taranaki Road, a continuation of Egmont Road, the main street of Patea. At low water the width of beach exposed may be as much as 70 yards. Ironsand is present along the whole length of beach, but the thickness and quality of the deposits vary from time to time, owing to the action of the sea.

East of the Patea River for about 15 chains the coast, in contrast to that west of Patea, is low, and presents a somewhat wide blacksand beach to the ocean. Then cliffs, passable only at or near

* Two samples analysed in the Dominion Laboratory in 1912 (see 46th Ann. Rep., 1913, p. 24) contained 10.50 and 9.90 per cent. of tungstic trioxide; these results indicate much better material than that seen by the writer.