

Nature of the Work carried out.

Maps compiled on a scale of 20 chains to 1 in., from information obtained from the Lands and Survey Department, have been prepared and supplied by the draughting staff of the Department for use as a basis for the plotting of field-work.

Since the watercourses afford by far the best sections of the rocks in which their valleys have been eroded, and at the same time contain specimens of rocks and mineral-deposits, which have gravitated from the ridges or have been transported by water, the greater part of the work consists in the examination and survey of the stream-beds. An examination of the ridges and spurs is also undertaken, but these do not as a rule show good rock-outcrops.

The disposition and lithological character of all exposures of strata have been noted and mapped with a view to indicating the anticlines of the area, so important in connection with a petroliferous area.

General Geology.

The following classification of the formations occurring within the area already examined, is tentatively submitted pending further palæontological and petrographical work on the numerous specimens collected:—

Formation.	Age.
(a.) Whatatutu Series ...	Probably Miocene (lower beds possibly older).
(b.) Waipaoa Beds ...	Pliocene.
(c.) River and terrace gravels ...	Pleistocene and Recent.

Mr. Alexander McKay, who has traversed a much larger area than that now being described, gives a more detailed classification in a report "On the Petroleum-bearing Rocks of the Poverty Bay and East Cape Districts."*

The following table, indicating the various formations mapped by Mr. McKay as occurring within the Whatatutu Subdivision, together with their lithological character and typical localities of occurrence, has been compiled from the above report:—

Age.	Petrological Character.	Typical Localities of Occurrence.
Middle Cretaceous	Sandstones, dark shales, and calcareous concretions. Bands of limestone of yellow tint	Upper Waitangi Stream.
Upper Cretaceous ...	Green sandstones, siliceous shales. Indurated chalky limestones alternating with greensands. Marly-limestones or calcareous sandstone	Waitangi River to oil-springs. Along Oilspring Creek to near its junction with the Waipaoa. From Oilspring Creek to Mangatu River.
Lower Tertiary ...	Coarse conglomerate or breccia. Sandy marly clays, with beds of brown sandstone, including foraminiferal limestone	Waipaoa River Valley. Oilspring Creek, Waipaoa River. Eastern basin of Upper Waingaromia River.
Pliocene ...	Sandy clay. Pumiceous sands, limestones	Terraces east side of Waipaoa River above Te Karaka.
Recent ...	Beach-deposits; blown sands; alluvial (river) deposits.	

(a.) *Whatatutu Series*.—Almost the whole of the formations occurring in the area examined up to the present time have been classed under this head, for the reason that stratigraphical unconformities are by no means apparent, and such palæontological evidence as is at present available does not appear to warrant their being referred to more than one series. Mr. Alexander McKay, however, considers the lower beds to be unconformably older, and of probable Cretaceous age.

Certain beds, from their general mode of occurrence, appear to be associated, and thus the series admits of subdivision in ascending order as follows:—

- (1.) Chalky limestones; glauconitic sandstones.
- (2.) Coralline limestone.
- (3.) Claystones, with calcareous concretions; argillaceous limestone.
- (4.) Argillaceous sandstones, coarse conglomerates, sandstones, and claystones; concretionary bands; fine shelly conglomerates; sandstone.

(1.) *Chalky limestones and Glauconitic Sandstones*. The chalky limestones occur in broken outcrops along a line extending in a north-east direction from a point in the Waipaoa River about a mile above the confluence with the Mangatu, across the Mangataikapua to the heads of the Waitangi and Makara streams. The chalky limestone formation is for the most part of whitish appearance, but is often tinged pale green or brown, probably by ferruginous minerals. The rock frequently breaks into small fragments, but where numerous veinlets of calcite occur is more compact. In places it is highly friable and even slickensided.

The glauconitic sandstone is a fairly well-compacted rock, green in colour, appearing dun-coloured on weathered surfaces. It occurs in the vicinity of the main oil-spring, in branches of the Te Hau-o-te-Atua and Mangataikapua streams and elsewhere

* Mines Report, 1901, C.—10, pp. 21–25.