

this stream as a source of water-power are discussed in a special departmental report entitled "Electrical Power for Mining Machinery at Kuaotunu and Thames," by Thomas Perham.*

The Waikawau Stream and the Te Mata Stream, both on the western side of the peninsula, were gauged when each ran at its minimum volume. The points selected were in each case just below the junction of the lowest large tributary with the main stream. The Waikawau showed a discharge of 330 and the Te Mata of 135 cubic feet per minute. It is proposed to ascertain under comparable conditions the volumes of all the major streams on the western side of the peninsula from the Manaia to the Kauaeranga. The volume of two representative streams at the end of a period of drought having been ascertained, the minimum discharges of the others may be approximately calculated on a proportional basis.

Conclusion.

Field-work will be continued in the Thames Subdivision throughout the winter, and should be completed about the end of the present year, when the preparation of a bulletin giving in detail the results of our investigations will be undertaken.

MR. EDWARD CLARKE, ASSISTANT GEOLOGIST.

During the early part of 1907 Mr. Clarke assisted me in the field-work then being conducted in the Parapara Subdivision. From the 12th April to the end of June Mr. Clarke was engaged in assisting in the preparation of Bulletin No. 3. He then accompanied me in a reconnaissance of the Whangaroa Subdivision, North Auckland. Thereafter Mr. Clarke began a detailed survey of that subdivision, and continued operations in the area until the end of May, 1908. He has completed the survey of the greater part of the subdivision, and hopes to bring out a bulletin thereon by the close of the year. Meanwhile he presents the following summary of the work accomplished:—

Work in the Whangaroa Subdivision.

Introduction.—The Whangaroa Subdivision comprises the survey districts of Whangaroa, Kao, and Omapere, and extends southward as a strip $12\frac{1}{2}$ miles wide from Stevenson Island, at the mouth of the Whangaroa Harbour, to the settlement of Kaikohe.

Operations have been completed in the Whangaroa and Kao survey districts, and in the Omapere Survey District only forty-seven square miles remain to be investigated. Altogether, since the beginning of August, 1907, an area of about 260 square miles has been examined.

Chain-and-compass traverses have been made of all roads, tracks, and streams affording outcrops. Much light is thrown on the geological structure of the northern part of the subdivision by the extensive rock-exposures found along the sea-margin. A careful chain traverse was therefore made of the coast-line of Stevenson Island, and of the shores of Whangaroa Harbour.

The results of these surveys have been transferred on a scale of 20 chains to the inch to large sheets, on which all the data obtainable from the Lands and Survey Department had previously been placed by the departmental draughtsman.

Physiographic Notes.

The Whangaroa Subdivision is in the main an area of mild relief. Only at their headwaters do any of the streams have a steep gradient, and in many cases they are swampy to their sources.

The most striking physiographic features of the area are the deeply indented coast-line and the extensive table-land, known as the Kerikeri Plains, which occupies most of the eastern portion of the subdivision.

The rugged coast, fringed with reefs and islets, and the landlocked harbour of Whangaroa, which, reaching far into the land, is evidently a drowned river-valley, clearly indicate that subsidence has taken place within geologically recent times.

The Kerikeri Plains occupy nearly a third of the subdivision, and extend far beyond its eastern limits. They are traversed by several broad, deep valleys, and above their general level rise a number of hills. Some of these elevations are possibly the highest points of an old land-surface which has been obliterated by lava-flows, while others may be the stumps of the volcanoes from which the lavas issued.

General Geology.

General Classification.—Pending a microscopic examination of the rocks exposed in the area under review, the following classification is tentatively submitted:—

- (1.) The Kiriwha Series: Cherty argillites and grauwackes: cherts and agglomerates.
- (2.) The Waipapa Series: Argillites and grauwackes.
- (3.) The Kao Series: Argillites, sandstones, mudstones, and limestones.
- (4.) Tertiary volcanics: Agglomerates, tuffs, and lava-flows, chiefly basic.
- (5.) Post-Tertiary rocks: Flows and puy, chiefly basic; alluvial deposits.

(1.) *The Kiriwha Series.*—These, apparently the oldest rocks exposed in the subdivision, are exhibited along the coast and on Stevenson or Kiriwha Island in a belt about two miles wide, which is interrupted for about three miles in the neighbourhood of Whangaroa Heads by an outlier of Tertiary volcanic rocks. The rocks of the Kiriwha Series are well-stratified cherty argillites and