

## REPORTS OF FIELD OFFICERS.

DR. J. HENDERSON, MINING GEOLOGIST.

Dr. Henderson, Mining Geologist, submits the following report on his work during the last twelve months :—

### INTRODUCTION.

During the months of June and July, and also during part of August, 1911, I was engaged in the preparation of an index to the Geological Survey Reports (Old Series). Since leaving Wellington in August, field-work in the Aroha Subdivision engaged the whole of my attention until the end of May, 1912. In this work I had associated with me Mr. J. A. Bartrum, Assistant Geologist. Before my arrival in the field Mr. K. M. Graham, late of this Department, had completed a topographical survey of the Waitawheta River and its branches, and also of the Waiorongomai and several of the less-important streams near Te Aroha.

### COUNTRY EXAMINED.

The area which constitutes the Aroha Subdivision of the Hauraki Division, comprises the Survey Districts of Waitoa, Aroha, Katikati North, Katikati, Matakana, Wairere, Aongatete, and Tauranga, and contains in all 672.6 square miles. Of this area 422.3 square miles are of low relief, and the whole country is readily accessible by numerous roads, tracks, and tramways.

### PHYSIOGRAPHY.

The chief physiographical feature of the area under review is the southern continuation of the Cape Colville Range, which here runs in general in a N.N.W.—S.S.E. direction. The general appearance and structure of this range is most reasonably explained by considering it a block mountain-range separated from the lowlands on either side by powerful fault-complexes. The range is comparatively rugged and broken. The highest point in the subdivision—and, indeed, of the whole range—is Mount Te Aroha (3,126 ft.). North of this, within the subdivision, the most prominent peak, Karangahake Mountain (1,785 ft.), is conspicuous rather from its isolation than from its height. Connected with Te Aroha Mountain by the saddle between the Mangakino and Waiorongomai Streams is a large block of high country (about 2,700 ft.), in which the Waitawheta, Tuapiro, and Wharawhara have their sources. South of this, the range drops and narrows to a single ridge, but rises suddenly again in Ngatamahinerua (2,749 ft.). An approximation to this height is maintained for three miles, when a drop to the Whakamarama Plateau of half this height occurs. This plateau rises gradually to a height of 2,527 ft. in Te Weraiti, beyond the southern limits of the subdivision.

It would seem that the Whakamarama Plateau was, during elevation, tilted towards the east. The bulk of its drainage is in that direction. The Wairoa, Te Puna, Waipapa, Wainui, and Whatakao flow in relatively straight V-shaped valleys to Tauranga Harbour; while the Waiteariki and Wairere, branching streams, after short winding courses on the plateau, plunge over the western scarp by great falls (Waiteariki, 260 ft.; Wairere, 450 ft.), to continue their brief tempestuous way to the Hauraki Plains. North of the Whakamarama Plateau the tilt of the elevated region still seems to be eastward, though the western fault-scarp is more deeply incised, and the streams draining westward partake more of the nature of ordinary mountain torrents than do the Wairere and Waiteariki. Northward of the Wharawhara the character of the range changes; it ceases to consist of a single ridge with diverging streams. The great longitudinal valley of the Waitawheta and the smaller one of the Mangakino divide the range into parallel watersheds, which, dropping northward, diverge on either side of the Waihi Plain.

This hill-encircled plain presents some unusual features, of which the most reasonable explanation appears to be that the tilt to the E. and S.E., general over the whole of the Hauraki Division, has forced the antecedent Ohinemuri and Waitawheta Rivers to cut deep cañons along their lower courses.

The Katikati lowlands, to the east of the Cape Colville Range, attain a width of about five miles at Tauranga. They taper out towards the north at Waihi Beach, while three miles east of Tauranga rhyolitic hills reach the sea. These lowlands rise gradually from sea-level to a height of 1,000 ft. on the hill-border.

The Hauraki or Piako Plains to the west of the range occupy a well-marked *graben* ten miles in width. This great depression stretches far beyond the northern and southern limits of the subdivision.

### GENERAL GEOLOGY.

The oldest rocks in the area under consideration are argillites and grauwackes, which form the western boundary of the Hauraki Plains. These rocks are of doubtful age, but are certainly not younger than the Jurassic. They are overlain, with great unconformity, by volcanic rocks of the Second Period (Beeson's Island Group).

The oldest rocks of the Cape Colville Range, as developed within the subdivision, are dacitic and andesitic volcanics occurring on the western flank of the range from Karangahake to Te Aroha. These are the rocks of the First Period of Fraser.

Overlying these unconformably is a great series of flow and fragmental rocks of andesitic facies. They form the bulk of the range in the subdivision, and are the volcanic rocks of the Second Period.

Rhyolitic rocks, or rocks of the Third Period, occur on the eastern flank of the range as isolated exposures at Hikurangi Mountain and Minden Peak. The edge of the great rhyolite plateau (which stretches as far as Rotorua) reaches the south-eastern corner of Tauranga Survey District, and its former greater extension is shown by the isolated fragments Maunganui and Te Karewa.

Rhyolitic tuffs, mudstones, &c., with occasional beds of poor lignite, form the Katikati lowlands. These beds are probably of Pleistocene age.

Towards Tauranga they are overlain by pumiceous deposits of somewhat later age. It is tempting to correlate these beds with the pumiceous sands, &c., of the Piako Plains.