

REPORTS OF FIELD OFFICERS.

MR. P. G. MORGAN, GENERAL GEOLOGIST.

Mr. P. G. Morgan, General Geologist, who has been at work throughout the year in the Greymouth Subdivision, presents the following preliminary report on the results of his examinations. Since he is now preparing a detailed bulletin on the area, this report is in most respects of a general character.

GENERAL NARRATIVE.

From the 1st to the 20th June, 1909, I was engaged in field-work in the Greymouth Subdivision. Mr. J. A. Bartrum, Assistant Geologist, who was then associated with me, continued field-work until the end of the month, when he left for Nelson. Leaving Greymouth on the 21st June, I arrived in Wellington next day, and from that date until the 15th October, with the exception of a fortnight's holiday leave, was occupied in general office-work. On the 16th October I left for Greymouth, and from the time of my arrival in Westland until the middle of April, 1910, field-work in the Greymouth Subdivision occupied the whole of my attention.

The necessary data for the preparation of a detailed report on the subdivision having then been accumulated, short visits to the Reefton and Westport districts were made, in order that the gold-bearing rocks and the coal-measures of those areas might be compared with the corresponding rocks of the Greymouth Subdivision.

On the 24th April I returned to Wellington, and from that date until the end of May was occupied chiefly in compiling a detailed report on the Greymouth Subdivision. This report, which will yet require some time for its completion, besides describing the general geology of the area, will deal exhaustively with the economic geology. More especially will the deposits of alluvial gold and coal, and the possibility of an oilfield being developed at Kotuku, be discussed.

SUMMARY OF FIELD-WORK IN THE GREYMOUTH SUBDIVISION.

During the past season field-work was almost entirely confined to the survey districts of Mawheranui and Cobden, which contain almost the whole of the Grey coalfield. The exploration of this area, well provided as it is with roads and tracks, presented few difficulties. The geology of the coalfield, however, is of an intricate character, owing to the severe and irregular folding of the strata and the complications introduced by numerous faults.

The plan of conducting field-work was in all essential respects the same as that employed in other areas that have been geologically surveyed during the last few years. For the coalfield a larger scale for the field maps than that employed—namely, 1 in. to 20 chains—would have been desirable had an accurately contoured topographical map been available. In the absence of such a map, field-work in the coal-bearing areas was executed with as much detail as possible.

A brief summary of the results of the season's work may be given under the headings of (I) Physiography, (II) General Geology, (III) Economic Geology, and (IV) Miscellaneous Resources.

I. *Physiography.*

The two most important physiographic features of the area to be described are the southern part of the Paparoa Range and the broad valley of the Grey River east of the Paparoa Range. They are also very important from an economic point of view. Had the Paparoa Range not undergone elevation, no outcrops of coal would have been seen, and the existence of workable coal-seams would probably be a matter of mere speculation. Again, a proper understanding of the tectonic movements that have been the deciding factor in the formation of the Grey Valley will be decidedly helpful in arriving at a conclusion as to the origin and probable distribution of the petroleum found in the Kotuku district.

The Rapahoe or Twelve Apostles Range, that runs northward for about five miles from Cobden to the neighbourhood of Point Elizabeth, is a comparatively low and narrow ridge that would be considered part of the Paparoa Range but for the somewhat broad, low valley that intervenes. This valley has been considered to represent an old channel of the Grey River.*

The drainage of the area under consideration is effected mainly by the Grey River and its tributaries, chief among which are the Ahaura and Arnold rivers, and Nelson, Moonlight, and Blackball creeks. The only other streams requiring reference are those entering the ocean north of Point Elizabeth—namely, the Seven-, Nine-, and Ten-mile creeks.

II. *General Geology.*

In the area examined during the past year the oldest rocks known are certain argillites and graywackes that have been referred to the Greenland Series of Bulletin No. 6, which is equivalent to the Kanieri Series of Bulletin No. 1. These rocks, which are locally known as "slates," near the northern boundary of the subdivision form the main part of the Paparoa Range. They also form Montgomery Ridge, near Blackball; and a narrow belt of these rocks, probably not continuous on the surface, extends southward from near Roa to the head of Langdon Creek.

* McLeod, H. N.: "Some Caves and Water-passages in the Greymouth District," Trans. N.Z., Inst., Vol. xxxvi, 1903, p. 480.