

At the present time two other bulletins, one entitled "The Geology of the Dun Mountain Subdivision, Nelson," and the other "The Geology of the Greymouth Subdivision, North Westland," are in the press.

FIELD-WORK IN THE BULLER-MOKIHINUI SUBDIVISION.

INTRODUCTION.

The Buller-Mokihinui Subdivision contains the very important Buller Coalfield, which lies between the Buller and Mokihinui Rivers. Between thirty-five and forty years ago the greater part of the coalfield was topographically surveyed, under the direction of Sir James Hector, by Mr. W. M. Cooper. Mr. S. H. Cox (now Professor of Mining in the Imperial College of Science and Technology, London) reported on the geology of the area, and the late Mr. R. B. Denniston described the coal outcrops with considerable minuteness. A topographical map of the surveyed area which showed coal outcrops, &c., was prepared, on a scale of 20 chains to the inch, and published about 1878. Very few copies of this map are now in existence, so that the information it contains is practically inaccessible to the general public.

Two portions of the Buller Coalfield, however, were not surveyed in detail. These are the areas to the north and to the south-east, known respectively as the Mokihinui and the Mackley Coalfields. The former of these has been visited several times by Sir James Hector and Mr. Alex. McKay, but concerning the latter area very little is known. The chief objects of the detailed survey of the Buller-Mokihinui Subdivision now being made are to ascertain the coal-bearing potentialities of these two districts, to collect further information regarding the main area, and to investigate the possibility of coal being found in a down-faulted block seaward of the plateau on which the principal mines are situated.

During the past few months field-work has been almost entirely confined to the valleys of the Ngakawau and Mokihinui Rivers. In this district is situated the whole of the so-called Mokihinui Coalfield. Since this coalfield is merely the northern continuation of the Buller Coalfield, it will in this report be sometimes termed the Mokihinui section, or as an alternative name, the Seddonville-Charming Creek coal-area.

Coal has been mined in the Seddonville district for many years with not altogether profitable results, at first by private companies and latterly by the State. During the past two years prospecting operations in search of coal have been under way in the valley of Charming Creek, a tributary of the Ngakawau River. In view of the importance of determining whether or not a block of coal sufficiently large to justify the opening-out of a mine is present between the workings of the State coal-mine and the southern border of the Charming Creek watershed, a somewhat full description of the area will be given in connection with the following account of the geology and mineral resources of the area surveyed. This will be arranged under the headings of (I) Physiography, (II) General Geology, (III) Economic Geology.

I. PHYSIOGRAPHY.

Physiographically the Mokihinui section of the Buller Coalfield and the adjoining country may be divided into three parts—the coastal plain, the foothill country, and the mountainous background. These features are largely determined by two great faults, presently to be mentioned.

The coastal plain is part of a much larger area of lowland that extends some distance to the south of Westport. As seen in the area under description, it is a narrow strip of flat and, in places, swampy land extending from the mouth of the Ngakawau River to a short distance north of the Mokihinui River. At one point (Torea Rocks) the *débris* of a slip from the neighbouring hills reaches the coast, and thus the coastal plain is locally obliterated.

The surface of the coastal plain consists of marine gravels and sands deposited upon a down-faulted block of Miocene, Eocene, and older rocks.

The foothill country is a belt from four to seven miles in width, which reaches from the coastal plain or, north of the Mokihinui, from the shore-line to the foot of the Marina Mountains. It may be regarded as the northern extension of the so-called Denniston plateau, but, owing to erosion and other factors, has a more varied relief than the country to the south. The highest part of the foothill country is formed by a ridge that rises steeply from the coastal plain to heights of from 1,300 ft. to almost 1,750 ft. Inland of this coastal range is a succession of irregular ridges, some of which are decidedly flat-topped. In the Upper Ngakawau Valley terraces of varying height have been carved by stream-action in the soft mudstone of the coal-measures. Coarse gravels cover these terraces more or less, and become prominent as the foot of the mountains is approached. Here also talus-deposits are in evidence.

Structurally the foothill country is a block bounded east and west by great faults, each of which has downthrow to the west. In the area under notice this block is in a general way slightly tilted to the east. It is, moreover, warped along a north-and-south line in such a way that the beds dip northward from the Ngakawau Gorge to the valley of Charming Creek, and thence to near Chasm Creek dip southward. The northerly dip is then renewed. Numerous minor faults, folds, and crumplings complicate the structure thus described.

The rugged Marina Range, which forms the hinterland of the foothill country, rises to heights of 4,700 ft. or more. It thus follows that it represents an upthrow of well over 3,000 ft. as compared with the neighbouring foothill country. There is no permanent snow on the range, but former glaciation is evidenced by cirque-like valleys at the heads of the streams, and by a tarn, Lake Boyle, that apparently occupies a rock-basin high on the eastern slope of the range. The ancient glaciers, however, were small, and probably did not extend beyond the mountain valleys.