MEMORANDUM by Dr. HECTOR relative to Mount Rochfort District.

THIS coal field, the general features of which were explained in my report of last year, includes a large area extending parallel with the coast from the Buller to West Wanganui, and is about eight miles in breadth. It is probably the most important coal field in New Zealand, on account of the large extent of coal of fine quality which it contains, in addition to which many seams of coal of inferior quality are found in the district. As a general rule, which applies not only to this field but to all others on the west coast of the South Island, the coal that is at a high level above the sea, or which lies at a steeply inclined angle, is of the best quality, the low-lying coal being usually of the inferior varieties.

It must not be thought, however, that the coal is continuous throughout the above area, as it occupies detached basins and trough-like depressions on the undulating surface of the older rocks. Computations of the amount of coal available are therefore not to be depended upon, unless the extension of the seam can be absolutely traced, particularly in the more broken parts of the district, where large areas of the coal formation have been removed by the denudation of the valleys, which generally are cut right through the coal-bearing strata into the underlying rock.

During the past year, additional information has been obtained (1) by the works in progress at the Ngakawau Mine, (2) by explorations undertaken for the Department, and (3) by chance discoveries.

1.—*The Ngakawau Mine.*

As no facilities exist for shipping the coal at the Ngakawau River at the present time, nor for conveying it to the Buller River, the workings are still restricted to supply small shipments by the little steamer "Result," which plies to the Buller when the weather and bar are favourable. So far, they completely bear out my former estimate of the value of this coal seam. The main drive has been carried forward 230 feet, with a height of 18 feet, and the coal has decidedly improved in quality. Only one small drop of 4 feet has been encountered in the roof, and the seam is less steeply inclined than it was at the face where first opened. The thickness has also increased to 20 feet.

Besides the main drive, an air-shaft has been carried up at an angle of 40° to the outcrop of the seam, and it has been proposed to work the mine by a horse-wir from this incline.

The present level of the mine, if carried forward, would cut out into Mine Creek, so that it would be necessary to sink to a lower level to enable the coal to be followed under the creek, and from there rise into the block of coal formation that has now been proved to rise on the east side of the valley, as I shall afterwards describe. To reach the lower level thus required, it has been suggested that the steep incline from the outcrop should be carried down in the coal to the necessary depth, and a level drift then set off under the creek. This will, however, involve much handling and hauling of the coal; and I would recommend that, instead of this method of working, a gentle incline be carried from the mouth of the present drive at such an angle that horses will be able to drag the waggons out to the shoots direct from the face. This drive, where it passes under the creek, should be made as small as possible, with a good coal roof; and as Mine Creek, where the coal crosses it, is considerably above the level of the main river, this deep drive will be easily drained by a water level carried out, also in the coal to the river below the shoots.

The only other work that has been done by the Company towards proving the extent of the mine has been the tracing of the outcrop of the seam on the east side of Mine Creek, to the height of about 200 feet, and the direction obtained shows that the coal measures are remarkably steady for at least that distance.

As observations of the changes which take place at the outlet of a river may be useful in considering the erection of improvements, I enclose marine reports by Captain Leech, Harbour Master at Westport, and may state that, at the time of my last visit, on 11th April, the width of the channel at high water was considerably decreased from that shown on the plan attached to my report of last year; and at low water, where it crosses the beach, the channel of the stream was turned more to the north than formerly.

The bank which used to be exposed at low water on the north side had disappeared, but these changes appear to be due rather to rearrangement of the material than to any fresh accumulation. The inside channel, leading up to the mine, had been to a great extent cleared of the boulders that formerly obstructed it, but, probably in consequence of this, a considerable scour had taken place on the south bank, where it is formed of fine shingle.

2.—*Exploration.*

Lines have been cut through the bush from the sea across Mine Creek, and up on to the level of the plateau, and several fresh outcrops of the coal have been discovered by this means, as already reported in my memorandum of 19th February, and in the enclosed letter from Mr. Dobson, under whose direction the work was performed.

The position of these lines and outcrops is shown on the attached plan.

The area explored extends for three miles south of Mine Creek, with a width of two miles between granite of Mount Frederick on the west, and a wooded range on the east, that divides the south branch of the Ngakawau River from the valley of the Orakaka. This ridge is probably slate, but this has not been determined.

The area may be divided into (1) the Lower Mine Creek, which is a steep declivity on the east side of the valley, the west side being formed by long ridges of argillaceous sandstones overlying the coal-measures. The whole of this portion is included in the Coal Company's leasehold. (2.) The terraces, which are a succession of steps, lying east and west, by which the ground rises from 1,000 to 1,800 feet above the sea level. (3.) The plateau, which is from 1,800 to 2,500 feet above the sea level.

I have not been able to satisfy myself that there are several distinct coal seams, as has been reported, but rather that the coal varies in thickness from 3 feet on the eastern boundary to 20 feet in the middle, decreasing to 16 feet in the west, where it is cut off on the slopes of Mount Frederick. This is also the character of the seams at Coalbrookdale and on Mount William, which favours the view that the seam is continuous in that direction.