

"As to the position which these beds occupy, there can be no doubt that they are intermediate between the beds that immediately underlie the Cobden limestone and the blue micaceous marls overlying the Island sandstone in the Grey River opposite Dobson Bluff.\*

"The coal-conglomerate and sandstone beds lie along the western face of the range to the north of the upper part of Omotumotu Creek, and, as the slope of the range and the dip of the beds is not greatly different—15°—it (the sandstone) occupies the surface.

"The sources of Racecourse Creek on the east side of the range show masses of sandstone and occasional coal conglomerates associated, and from such source, or the rocks *in situ*, fragments of coal find their way down the creeks into the low grounds, where they are occasionally found, and lead to the assumption that solid coal-seams are to be found higher up.

"I have been informed that the pieces of pure coal are much larger near the north end of the range, and that the detached masses of sandstone are also larger in that direction. That this may be true receives confirmation on observation of the strike and dip of the beds. The strike is north 10° west in the left-hand branch of the Omotumotu, which, at an equal elevation, would bring the reported outcrop of these beds to where my informant describes it as present."†

Towards the northern end of the range, at the locality recently examined, the dip is east at an angle of 10°, and the rocks are such as have been described in the above extract.

The further light thrown on the relation of these beds to the coal-bearing series establishes unconformity between them, and removes the serious difficulty of having to account for the products of denudation of the lower beds appearing in the middle beds of the same sequence.

Due to palæontological considerations, Professor Hutton concludes that there ought to be unconformity between the Cobden limestone and the coal-measures of Brunnerton, and, while I had to admit in mid-section the presence of broken and rolled coal derived from the lower beds of the sequence, I was forced to admit that facts favoured that conclusion. Now, however, that the sandstones with coal conglomerate are referred to the lower beds of the Miocene formation the difficulty is removed, and the fossils of the Island sandstone, Mine Cliff (Brunnerton), and of the Ten-mile must, from a consideration of their Tertiary facies, be regarded as belonging to the same series as the Cobden limestone, their relative positions being the higher and lower parts of the same sequence.

ALEX. MCKAY.

7th December, 1900.

## REPORT ON COAL IN KOITERANGI (CAMEL-BACK HILL), KOKATAHI PLAIN, WESTLAND.

By ALEXANDER MCKAY, F.G.S., Government Geologist.

ON Tuesday, the 20th November, from Hokitika, I went to the Kokatahi for the purpose of examining exposures of coal-seams reported as occurring in Koiterangi, or Camel-back Hill.

Prior to my visit, which was anticipated, a committee of the Westland Agricultural and Pastoral Association undertook the clearing of overgrown tracks to outcrops formerly discovered, and such other work as might prove necessary to a knowledge of the geology of the mountain which constituted the field of investigation.

On reaching the locality it proved, unfortunately, that the works contemplated had not been done, and the track to the first-discovered outcrop, examined by Inspector Binns in 1886, had proved so broken and overgrown that it could not be followed. Some attempt had been and was being made to trace the outcrop of coal on the northern face of the mountain, and coal at one place was discovered, but owing to the broken character of the mountain-slope, the thick and impenetrable nature of the bush covering, and the neglect to blaze a line leading thereto, the more recent find could not again be located. In the attempt to do this a third outcrop was discovered, from which samples were brought, but these the prospectors experimented with to ascertain the quality of the coal, and were consumed before I had opportunity of seeing them.

I examined, as far as was needful, the northern, eastern, and southern lower slopes of the mountain sufficiently to give me an insight to its geological structure, and enable me to indicate the area over which coal-seams may be reasonably sought for.

### *Geology of Koiterangi Mountain.*

*Maitai Rocks.*—The western end of the mountain, and at low levels the whole of the southern face, is formed of rocks of the Maitai series of the New Zealand classification, corresponding to the Carboniferous formation of the Northern Hemisphere. These rocks are greenish slates and sandstones containing reefs of quartz. A reef of quartz is exposed at the east end of the southern face of the mountain on Mr. Bonar's property. This varies in thickness to a maximum of 2 ft., is said to contain gold, and is fairly good-looking quartz.

*Coal-bearing Series.*—Resting on the slate rocks, striking north to south and dipping east, the lowest member of the coal-bearing series is a coarse breccia, passing upwards into conglomerate at places, or retaining its subangular character throughout. This rock is largely of local origin, and is compacted and cemented so that it can only be removed or worked by aid of explosives. It

\* This conclusion was in error, as it can now be shown that the strikes in the two localities are nearly at right angles to each other, and there are no rocks in the section from the Island sandstone to the Cobden limestone that correspond with the coaly sandstones above described; while the latter appearing in the New River area at the base of the Tertiary sequence of Miocene date proves in this way an unconformity which is confirmed by the presence of rolled coal derived from the horizon of the Brunner seam.

† Geological Reports, 1873-74, pp. 78-79.