CANTERBURY.

Dr. HECTOR to the UNDER SECRETARY, Public Works.

SIR,— Geological Survey Office, Wellington, 6th July, 1872.

I have the honor to enclose a letter from Dr. Haast, informing me that Mr. Hill has succeeded in reaching a 7-foot seam of coal, at a depth of 106 feet, in the shaft which he has sunk on his property in the Malvern Hills. He has also forwarded a sample for analysis, the result of which I now furnish, as it has an important bearing on a report which I furnished on 13th May. The sample proves to be a common brown coal, not a pitch coal, and is exactly similar to that which exists in the church reserve farther down the Selwyn River, and to the coal which has been for many years mined on the Hawkins River by Mr. Jebson. The chief interest in this discovery is the change in the quality of the coal which it discloses, from that previously found in the same close vicinity, which was of very superior quality.

I append for comparison, along with the analysis of the last specimen sent, the composition of the coal from two seams cut in a drive two chains distant, and which I suppose to correspond with the seams marked A and B in Dr. Haast's section. This comparison clearly shows that no rule can be applied in this district as an indication of the value of the coal founded on the age of the formation in which it occurs, or on the depth at which the seam is struck; and that the improvement in quality observed in some seams, is entirely due to the manner in which they have been affected by volcanic rocks subsequent to their deposition.

	A.	B.	C.
Fixed carbon	67·49	53·30	41·22
Gas and oil	17·89	33·97	31·69
Water	2·12	9.98	20·74
Ash	12·50	2·75	6·35
	100·00	100·00	100·00

A is a compact, lustrous coal, quite black, and approaching an anthracite in appearance, and is in contact with volcanic rock.

B is a massive and less friable coal, and of rather duller lustre, except where traversed by laminæ of jet, and was separated by about 8 feet of shales from the overlying volcanic rock.

C, the coal now sent from the newly discovered 7-foot seam, is a dull brown coal, without lustre, and cracks into fragments on exposure to dry air.

The comparative value, for steam purposes, of these coals is as follows:—

A. 8·77 ... B. 6·92 ... C. 4·83

These figures representing the pounds of water which a pound of each coal will evaporate.

The upper seams have, therefore, undergone a process like that of coking; the lowest seam, which is 23 feet below the lava, not having been influenced by it. I therefore anticipate that only portions of the coal in the Upper Selwyn Valley will be found to be of the superior quality, and that a large extent of the seams still remain unaltered; so that the result of Mr. Hill's exploration requires a material diminution of the estimated amount of steam coal in this area, which was stated in the previous report by Dr. Haast, although it is at the same satisfactory to find that the brown coal has considerable extent.

I have, &c.,

The Under Secretary, Public Works, Wellington. JAMES HECTOR.

Enclosure.

Dr. HAAST to Dr. HECTOR.

SIR,— Canterbury Museum, 20th March, 1872.

I have the honor to inform you that Mr. Hill has at last succeeded to master the water in his pit, and has now laid open a fine seam containing 7 feet of coal, of which I have sent you a specimen by the book-post. You will observe that this seam contains a fine pitch coal, in which the altering agency of the dolerite stream has had much less influence than in the seams opened up in the drive. Will you be good enough to have this coal analyzed at your earliest convenience, as Mr. Hill is very anxious to know the result. That gentleman tells me that this coal welds iron very well.

Here are some of the details of his shaft:—

Depth to lava stream,—	Ft.	In.
Clay and shales	58	0
Dolerite stream	26	0
Shales	8	0
Coal, very much altered	0	8
Shale	6	0
A. Coal, less altered	1	6
Shales	3	0
B. Coal, fine pitchstone	1	0
Shale	2	6
C. Seam of pitch coal	7	0
	113	8