coal; 7 ft. higher up is a 3 ft. seam of fair coal, which is, however, quite rusty at the outcrop. Just above this 3 ft. seam are two thin seams 6 in. and 4 in. thick respectively. The coal is usually bituminous in quality, and is for the most part apparently of fair grade. The seams lie with a very gradual inclination to the west. Analyses of representative specimens of the lower 3 ft. 6 in. seam (No. 1), and of the upper 3 ft. seam (No. 2), are as follows:—

	No. 1 Seam.	No. 2 Seam.
Fixed carbon	35·88	50·29
Volatile hydrocarbons	34·70	39·96
Water	1·32	2·61
Ash	28·10	7·14
	100·00	100·00
Total sulphur	0·31 per cent.	0·64 per cent.

Each of these coals gives a dense hard coke.

On the hillside forming the slope descending to the left bank of the Otemataura, coal is exposed in a number of places. The lower outcrops are apparently the same as those seen in the creek-bed, but the uppermost is a distinct seam. This seam—which is some 5 ft. 6 in. thick, though not all coal—was traced for about 250 ft.

The coal at present being mined in the Pakawau Mine is from a seam about 3 ft. 3 in. thick, which dips at about 1 in 6. The coal is of good quality, bituminous in grade, and distinctly coking. In many places the whole thickness of the seam consists of good coal, but elsewhere some stone is intermixed, especially, so the miners say, when a gritty sandstone intervenes between the coal and the overlying conglomerate. A representative section of the coal-seam is as follows:—

	Ft.	in.
Coal	1	0
Stone	0	1
Coal	1	9
Stone	0	5
Coal	0	6

The seam of coal which outcrops at West Wanganui Inlet, on the Bassett property, dips at about 10° to the north-west, and is under- and over-lain by sandy shale. The seam is only 22 in. thick: the upper 6 in. is a compact coal high in ash, while the lower 16 in. forms a soft friable coal.

Work at the Franz Josef Glacier.

For the last two seasons the Geological Survey has been conducting work of a somewhat special character at the Franz Josef Glacier and in the immediate neighbourhood. It has been our object to make an accurate topographical survey of this great ice feature, and to this end accurate measurement was made of the great snowfields, of the height of the peaks, of the position of the frontal face, &c., &c. All this topographical detail was obtained by Mr. R. P. Greville—then Topographer on the Geological Survey—during the summer of 1908, while such geological data as were necessary for the preparation of a report on the glacier were collected by the writer in the course of a brief visit during the season just passed.

From the camp at the frontal face expeditions were made in the ranges on either side, and to the great snowfields at the head of the glacier. The Franz Josef Glacier forms at once one of the most magnificent and one of the most interesting sights in this land of scenic wonders. Its source lies in the numerous fields of *névé* formed by the union of the rivers from the main Alpine divide, and from the subsidiary ranges which border the Franz Josef to east and west. From this source it descends now gradually, now in great ice cataracts, to the frontal face at about 692 ft. above sea-level. As Dr. Von Hochstetter remarked many years ago, one would have to travel as far north as northern Norway to get a glacier so near to the sea-level as the frontal face of the Franz Josef. That frontal face has steadily advanced within the last few years, and is now farther forward than at any other time in the memory of the oldest inhabitant. However, formerly the glacier deployed on the plain and stretched seaward, uniting with many other glaciers to the north and south to form the great piedmont glacier of Westland. Within the last year the glacier has made a maximum advance of 162 ft., smashing down a gallery on the eastern side at the frontal face, and pushing itself up on to the smooth rock beyond. Glacial striæ and ice gouging are splendidly shown at the Franz Josef, being especially observable on the several *roches moutonnées* at the frontal face and on the eastern side of the glacier near Pipe Creek.

The stratigraphical side of the geology of the neighbourhood of the Franz Josef Glacier presents little of interest. The rocks bordering the upper part of the glacier consist of argillites and grauwackes which have been complexly folded. Underlying these, towards the lower part of the glacier, are much-corrugated biotite and chlorite-quartz schists of a general light greenish colour and with lenses of calcite. The latter are often rusty, owing to the oxidation of contained iron pyrites. All these rocks are considerably faulted. Below the frontal face these old rocks are shrouded in morainic débris. Both the schists and the less metamorphic argillites and grauwackes contain quartz stringers, though these are more common in the argillites and grauwackes than in the schists. Some rusty quartz containing pyrite from a stringer above the Unser Fritz Fall gave an assay,—

	Dwt.	gr.
Gold	5	1
Silver	3	18