

Mueller.

Marked stones first observed on the 29th March, 1889, and again on the 14th November. 1890.

				Total Movement.	Average Daily Rate.	Remarks.
				Ft.	In.	
Station	1	239.3	4.8	} See other reports.
Station	2	...	...	271.7	5.5
Station	4	...	...	262.6	5.3
Station	5	...	...	359.6	7.3
Station	6	...	...	398.0	8.0
Station	7	...	...	611.0	12.3
Station	8	...	...	506.0	10.2
Station	9	...	...	409.0	8.2
Station	10	...	...	388.6	7.8
Station	11	...	...	146.1	2.9

Tasman Glacier.—In accordance with your instructions, I ranged the two lines drawn on the tracing across this glacier, first on the 5th December, 1890, and again on the 7th January, 1891; the average rate per day is as follows: Line from the lateral moraine of the Ball Glacier—Station 1, 9.9in.; station 2, 14.9in.; station 3, 17.3in.; station 4, 17.6in.; station 5, 18.0in.; station 6, 17.0in.; station 7, 16.1in.; station 8, 13.9in. Line from point of Malte Brun Spur near Trig. V.—Station 2, 2.4in.; station 3, 9.4in.; station 4, 10.4in.; station 5, 11.8in.; station 6, 13.3in.; station 7, 12.3in.; station 8, 12.5in.; station 9, 10.5in.; station 10, 9.2in.; station 11, 5.0in. In the imperfect state of the survey of this glacier, it is perhaps better not to try to describe it, so I will only remark that the widening out of the glacier into the Murchison Valley is very ancient; the lateral moraine there is covered with grass and scrub, and that the glacier seems inclined to break through the lateral moraine along its western side in several places.

The Murchison Glacier.—The terminal face of this glacier is situated about five miles north-east of the lateral moraine of the Tasman Glacier, is 3,308ft. above sea-level, and the ice face above the outlet of the river is 193ft. high. The Murchison river-bed is a very smooth one, with a fall of about 100ft. to a mile, whilst the average fall of the Tasman Glacier, of which the Murchison is an affluent, to the Pukaki Lake is only 23ft. per mile. In the valley vegetation grows at an altitude of about 6,000ft., and dense scrub at 4,000ft. In its present state the country, even were it accessible to stock, which it is not, is valueless, though on patches which had been burnt a fine native grass, resembling Italian rye, was growing luxuriantly. No plants were found which are not common to other parts of the mountains, except an Alpine variety of anise, which I do not remember having seen before. A stratum of bright red rock crops up in several places along the Liebig Range. I have shown it by a red mark in five different places; the first just opposite the terminal face of the Murchison, the last high on the range, nearly in line with the northern portion of the “bulge” of the Tasman Glacier. It is also visible between Mount Blackburn and Trig. T. The speed of the Murchison was obtained by ranging the line marked on tracing from the spur above the Dixon Glacier. The numbers along the line represent the rods set. They were put in on the 29th of December, and were reset two days afterwards. The average rate for twenty-four hours was—No. 78, .5in.; No. 79, 3.5in.; No. 80, 8.0in.; No. 81, 8.7in.; No. 82, 7.0in.; No. 83, 4.5in.; No. 92, 4.6in.; No. 93, 2.6in.

I have now been over all the most important glaciers in Canterbury, and a great many of the smaller ones as well; but I should say that the Murchison, for reasons which I shall try to enumerate, is the best field for scientific research. To begin with, its moraine is composed of different coloured stones, lying in sections, the most conspicuous of which I have drawn on the plan. From the many views I had of the glacier from points on the hills surrounding it, I was always able to distinguish the particular features which I have shown, and they are placed by observations taken with the theodolite from fixed points. We had such bad weather while we were on this glacier that I could not afford to waste any time, or I might have marked the line of larger hillocks forming the medial moraine between the main and the Malte Brun Glaciers as far as the red band. The two semi-crescent shaped patches shown in red and burnt sienna are most distinct and of the form represented on the tracing. The red evidently came from the Cascade Glacier, for its moraine is of the same coloured rock. The burnt sienna either came from the same place or from the Baker Glacier; the latter, I think, for a small quantity of the same kind of rock is scattered along the northern moraine of the Baker. The large medial moraine (sepia) is smoother than any I have seen on other glaciers, and from (84) to (86) a horse might be ridden along it. The stones are in general small: there is also a large quantity of mud on it. The height is from 60ft. to 90ft. The general appearance of a section would be like that of a formed road—that is, a gradual rise to and slightly flattened crown. Between this moraine and the spur north of the Dixon Glacier a large surface stream often runs, finding its way under the glacier, but by no fixed opening, just below No. 78. There is also a small stream on the other side of the moraine; but it is to the first mentioned I would draw your attention. It is swift, and many perfectly water-worn stones are in its bed. Water-worn stones are to be found throughout the whole length of the main moraine, but, so far as I could see, only on the eastern side. The first pile of them is lying a little below Station 80 on the ranged line; they are not to be found north of that point—at least I looked for but could not find any. To get from the bed of the creek to the place I have indicated the stones would have to be lifted about 100ft.; yet I believe that is the place they came from, and I think the