

Returning from Switzer's to Dunedin, the Taieri Valley to Middlemarch, at the foot of Strath-Taieri, was the field over which the last examinations for the purposes of this report were made.

During the latter part of February and the early part of March, 1894, while accompanying Messrs. R. A. F. Murray, Government Geologist of Victoria, and H. A. Gordon, Inspecting Engineer of the Mines Department, on a trip over Central and Northern Otago, opportunity was afforded for further examinations that have been useful in making this report. Reports of previous surveys by various workers, and my acquaintance with a number of localities that on this occasion were not visited, enable me to deal with and describe the beds at those places.

These examinations were chiefly made for the purpose of determining the origin, mode of occurrence, and distribution of the auriferous quartz-drifts that are found throughout Central and Eastern Otago and over a considerable part of the Southland District. At many places these beds are richly auriferous, and for a long time there has been an uncertainty as to their identity in different parts, their mutual relationship, and their position in the scale of geological formations. As the work progressed it became apparent that beds very similar to each other were not always of the same age, and that in many cases the older alluvial auriferous drifts, on being denuded, had yielded to the younger deposits a portion of their gold. Therefore, in order to show fully the importance of the more ancient deposits, it is necessary to describe those which contain gold derived from the older beds, and this involves generally a description of all the beds of Cretaceous or Post-cretaceous age occurring within the district examined.

DESCRIPTION OF THE BEDS AT LOCALITIES EXAMINED.

Gabriel's Gully and Evans's Flat.—Below the Township of Lawrence, Gabriel's Gully gradually widens, until it opens out on that part of the Tuapeka Valley called Evans's Flat. The surface alluviums of the river valley, which alone were worked in the early days of the rush, where they spread over a greater breadth, were less rich in gold than above Lawrence, where the valley is much narrowed, and where, from side to side, the width of the alluvial deposit was often not more than from 2 to 3 chains. Above a certain point (the Blue Spur) the gravels of Gabriel's Gully did not yield payable gold, and the lesser gullies, which, below the Blue Spur, are few and unimportant, were also poor in gold. The workings along Gabriel's Gully showed distinctly that the source of the gold lay in the Blue Spur, and, in due course, the southern margin of the Blue Spur deposit was prospected and proved gold-bearing.

Blue Spur.—The Blue Spur lies between the upper parts of Gabriel's and Monro's Gullies, and consists of a massive accumulation of breccias, gravels, sand, soft sandstone, and sandy clay, the latter often crowded with plant-remains and approaching the character of an impure lignite. From west to east this deposit fills what appears as a depression in the line of hills that bounds the right or northern side of Gabriel's Gully, and forms the water-parting between it and Monro's Gully.

The earliest detailed geological description of the cements of Blue Spur, Weatherstone's, and Waitahuna that has come under my notice is contained in a report on the Tuapeka Cements, dated 25th May, 1879,* by S. Herbert Cox, F.C.S., F.G.S., from which the following extract has been taken:—

"The deposits of cement which are at present known, and of which some are worked, follow a north-west and south-east line, the Blue Spur being the furthest to the north-west at present known. Between the Blue Spur, which is situated at the head of Gabriel's Gully and Weatherstone's, the next deposit to the south-east is a narrow ridge of the Kakanui schists, and it is here that the quartz reef mentioned above occurred.

"The next deposit of importance is Waitahuna, although a few patches of cement do occur between these points, and have received a certain amount of attention from prospectors. After passing Waitahuna in a south-easterly direction, no work of importance has been done on these beds.

"At the Blue Spur the cements are enclosed in a trough, or, perhaps, more correctly, a basin, as, in addition to the bed-rock on which they rest as in a trough, the schists to the north-west and south-east respectively rise to form hills of greater elevation than the cements themselves assume at the present time. The bed-rock on the north-east side of the basin or trough is very steep, while on the south-west side it is more shelving; the total thickness of the cement being certainly not less than 300ft.

"An enormous quantity of this spur has now been removed, and what is left is now cut by steep gutters, from which stone has been taken from time to time. Where the sluicing and other claims have been regularly at work great masses of the hill have been removed; so that the spur, which must in the old days have possessed a similar configuration to the rest of the surrounding country, presents now a series of pinnacles and steep cañons, bearing testimony to the large amount of work which has been done. . . . Although so much of the Blue Spur has been removed there yet remains many years' work before the place will be worked out; and if Weatherstone's deposit should prove as valuable as this has done, Lawrence will again be one of the most successful and thriving townships in the colony."

The deposit is carefully described by Mr. T. A. Rickard, in a paper on the Goldfields of Otago and the Geological Formation of the Blue Spur, read before the American Institute of Mining Engineers at Plattsburgh in June, 1892, an extract from which appears in the Goldfields and Mining Report of New Zealand, 1893, pp. 109–111, from which latter work the following description of the Blue Spur deposit has been taken, the original not being available:—

"The Blue Spur is perhaps the best-known and most interesting alluvial deposit in New Zealand. It is situated near the head of Gabriel's Gully, about two miles east of the Town of

* Geological Reports, 1878–79, p. 42.