

Spur Deposit," some remark will be made further on. In his conception of the origin of the deposit Mr. Rickard generally agrees with the views put forward by Professor Hutton, and I will therefore quote what the latter says descriptive of this deposit :—

"Blue Spur, Tuapeka: In this locality a small patch of conglomerates are found occupying the top of the ridge between Munro's and Gabriel's Gully. These conglomerates are formed of pebbles of quartz, purple jasperoid slate, and fragments of schist, bound together in a blue clayey matrix. They occupy a cup-shaped depression in the schist rocks, and dip to the east.*

"Seated on the top of the saddle that divides Monro's from Gabriel's Gully is a deep cup-shaped hollow in the schist rocks which has been filled up much higher than the present lips of the cup by gravels cemented into a hard blue conglomerate. This is the Blue Spur, famous for the immense quantities of gold that have been derived from it. On close inspection this hollow is seen to have been an old mountain-tarn with smooth polished sides, which have, however, now decomposed into a blue clay to a variable depth of from 2in. to 6in. Although I could detect no striæ on the sides of the hollow I have no doubt but that it was excavated by a glacier. This old rock-basin is filled up with beds of conglomerate that dip to the east, and as a rule the stones get smaller towards the east, which, together with the direction of the dip, prove that the old tarn was filled up from the west. The conglomerates consist in great part of pebbles and subangular blocks of green quartzite, and a dark purple jasperoid slate with quartz veins, which rocks do not exist nearer than the Tapanui Mountains, west of the Clutha River."†

To these descriptions there has to be added the results of the recent examinations made. It was noted that on the western or Lawrence side there is an undoubted dip of the Blue Spur deposit to the eastward, but perhaps on account of the lapse of time, and the denudation that has taken place since the schist rock was laid bare, the extreme irregularity in the surface of the older rocks that has been described by Mr. Rickard was not noticed. At the lowest level at which workings are now carried on silt and water prevent the bed-rock from being seen, and at no point could the eastern slide-wall be observed to the level where it comes in contact with the schists directly underlying the conglomerates west of the smooth wall or surface of the slide. Therefore the descriptions given have to be accepted in so far as they apply to the condition of the under-surface west of the slide, and in the gutter where the slide undercuts the schist rock. Thus all except the lowest part of the conglomerate cement could be examined, and this consisted, immediately above the bottom, of an angular schistose breccia, such as might very well have been derived from the neighbouring country. The higher part of this was described as being relatively poor in, or devoid of, gold. Above this were rounded and subangular conglomerates extending upwards to the lignite seam. Against these, sluicing operations were being directed with, as was understood, paying results. Greyish-greenish sandy beds followed, and over these was an impure seam of lignite, the total thickness from the lowest gravels to this point being perhaps 120ft. All the beds below the lignite seam are purely or mainly formed of schistose material. In an estimate of the whole, sandstones occupy a very subordinate position, and in the lower or schistose part are found the great bulk of the jasperoid or dark-purple boulders that are so conspicuous in the tailings after the bulk of the lighter material has been washed away. These purple jasperoids have a crystalline structure, and abound in magnetite. It is very unlikely that they have been derived from the Tapanui Mountains, as they belong to the deeper-seated rocks of the crystalline axis running from Lake Wanaka to the Lower Waipori. As the beds are seen to dip both to the north-east, towards the smooth wall or slide, and to the south-east, or from Monro's to Gabriel's Gully, the true dip is between these points; but, in any case, there is a rise of the floor of the deposit from Gabriel's towards Monro's Gully. Following in this direction, and on the present greater height of the eastern part of the deposit being reached, coarse material, apparently belonging to an horizon below the lignite, is seen at the surface. Sluicing is carried on in these, the tailings being discharged into Monro's Gully. Between these and the deeper working discharging into Gabriel's Gully, and towards the western side, an old working-face exposes the higher beds of the deposit. The conglomerates here are well rounded, and consist mainly of sandstones, and there is at this place a comparative absence of jasperoid boulders, showing, as has already been hinted, that these have not been derived from a sandstone area. Mr. Rickard mentions a jump of 20ft. in the schist-floor in passing from Gabriel's to Monro's Gully, by which it is understood that the wall of rock faces the Gabriel's Gully side. There is also, between the present deeper workings and the part of Gabriel's Gully opposite, a ridge of underlying rock, which, from the westward, continues till it abuts against the slide. These may merely be irregularities of the old surface existing before any part of the Blue Spur deposit had been laid down, or they may be due to cross-faulting prior to the formation of the principal slide.

The great structural feature of the Blue Spur is the limitation of the conglomerate deposit on its north-east side by a remarkably well-defined fault, which is of such a character that it should be capable of being traced to considerable distances, both to the north-west and to the south-east, inducing the very decided plunge of the deposit to the south-east. The probable existence of cross-slides anterior to the formation of the main eastern slide has been mentioned. The 20ft. wall of rock indicated by Mr. Rickard, or the ridge separating the deeper ground from Gabriel's Gully, may of themselves not be evidences of this cross-faulting; but, as along Gabriel's Gully there is a yet deeper depression, and the schist rises high on to the hill-slopes to the south-east before reaching the Weatherstone area, having regard to the general dip of the beds, it seems almost a necessity that these peculiarities are best explained by supposing a fault or faults to be present. The schist-floor rising to the north-west, no auriferous breccia conglomerates have been traced on the northern side of Monro's Gully. Although, with other rocks, quartz is moderately abundant in the Blue Spur deposit, nowhere can this breccia conglomerate be said to approach the character of the auriferous-quartz drifts as seen at Mount Buster, Hamilton's, St. Bathans, and Criffel, in which localities

* "Geology of Otago": Dunedin, 1875, p. 49.

† "Geology of Otago": Dunedin, 1875, p. 93.