47 C.—4.

The same thing happened in the Wanaka district. The high-level terraces of the old lake are 1,600ft. above the present level of Lake Wanaka, as seen on the north-east slopes of Mount Criffel, at Frenchman's, and at Mid Run; but no morainic matter reaches within 500ft. of this level. The moraines lie in comparatively low ground around Mount Iron, and in the peninsular area between the Lower Cardrona, the lake, and the Clutha River. The Hawea side of the depression was not so fully explored, but the evidence there must be of the same character. A distinct moraine lies on the left bank of the Clutha, between Tarras Creek and Long Gully. This is in comparatively low ground, and, so far as noted, is the furthest extended and lowest moraine connected with the Wanaka-Hawea former extension of glacier-ice. Further down the valley there is no evidence of the presence of glaciers till reaching the Kawarau Gorge, at which place the evidence in favour of the presence of glaciers, such as it is, is not more than what might be expected as having come through the gorge from snow-fields on the neighbouring mountains. There are no evidences of the presence of glaciers at the Bannockburn Diggings, nor anywhere within the Bannockburn Valley. The high-level terraces proving that the waters of the united and greatly extended Wanaka-Hawea Lake stood far above the level to which glacier-ice at any time attained is shown by the presence of the old beach-gravels still resting on the northern slope of the Dunstan Mountains, at a height of 1,000ft, above the level of the Clutha Valley, below the Lindis Junction.

1,000ft. above the level of the Clutha Valley, below the Lindis Junction.

The high terraces opposite Cromwell, on the western side of the valley, appear to be laketerraces such as are met with along the Lower Lindis. At Bannockburn the middle and lower terraces are river-gravels. The "mountain wash" is a rough creek-rubble or slope-deposit, and could not be referred to the action of ice as glacier-ice. Terrace-gravels rest on the slopes of the Dunstan Mountains at the upper end of the Dunstan Gorge, directly opposite the Township of Cromwell. These are some 500ft. above the level of the junction of the Clutha and Kawarau branches of the Molyneux, and may indicate the height of the old rim or lip-barrier that prevented the waters of the Molyneux making their way through the Dunstan Gorge, though probably the barrier was at a greater height than this. Before the cutting-down of the Dunstan Gorge it is barrier was at a greater height than this. Before the cutting-down of the Dunstan Gorge it is perfectly evident that the Molyneux found its way into the lower valley below Clyde by way of the Bannockburn Valley, and thence into that of what is now the Fraser River, at what different levels may be judged by a study of the contours of hill and valley as these are at the present time. Professor Hutton is of the opinion here expressed, that the Molyneux escaped from the Upper Clutha Valley by way of the valley of the Bannockburn and the Fraser River.* It has already been pointed out that the Dunstan Gorge lies nearly in the line of the north-west extension of the Tuapeka fault (Fault No. 13), and it may fairly be inferred that due to action along that line the Wanaka-Hawea Lake was first tapped, so as to drain through the Dunstan Gorge. The fall of the bed of the river, which in thirteen miles is only 65ft., would be ten times greater, or nearly so, while the volume of water would probably be very much larger than at present, the cutting-down of the gorge and the gradual tapping of a very large lake adding not a little to the volume of water passing through the gorge. This great volume of water must have cleared every obstruction in its way that was not solid rock, and hence the terraces of large angular blocks and river-shingle on the left bank of the river at Clyde and thence extending to and beyond Waikerikeri Creek. probably the last great alteration in the course of the Molyneux River. If ever it passed from Moa Flat west of Spylaw into the Pomahaka and Mataura watersheds the change to its present course

was probably effected at a date prior to the cutting-down of the Dunstan Gorge.

The high-level lake-terraces of the united Wanaka-Hawea Lake in its extension to Cromwell and Bannockburn have been worked at several places, as, for instance, at Bannockburn and along the high terraces on the north-west side of the Clutha Valley to Lochar Burn; also on the opposite side of the valley to nearly as far. Mid Run and Frenchman's, on the Luggate Burn, are the only other important localities where goldmining is carried on in these beds within the Upper Clutha Valley. In the Kawarau-Wakatipu district the Crown Terrace is the most important, if not the only,

locality.

Conclusion.

A perusal of the foregoing parts of this report will show that, with respect to the older brecciaconglomerate beds, these are not confined to the neighbourhood of Gabriel's Gully, Weatherstone's, and Waitahuna,—that they may be looked for, and prove auriferous, along the lower hill-slopes to the south-east, along the borders of the Tokomairiro Plain and over parts of the Kaitangata Coalfield, where the lower beds of the Cretaceo-tertiary series are exposed. Also, as has been shown, there is a large development of the same beds in the Horse Range, from the downs on the southwest side of the range to South Peak, north-east of the gorge of Trotter's Creek. The same beds also appear in Mount Vulcan, on the north side of the Shag River, at its mouth. At Blue Spur, Weatherstone's, and Waitahuna the beds are known to be auriferous, and also in the Horse Range. They should be prospected wherever prospecting can be carried on at a moderate cost, since it can hardly be that the three localities which have been worked are the only places where these beds are auriferous.

With respect to the older quartz drifts, they have been the great source from which gold was set free to enrich the more modern gravels at a great number of places on the Otago goldfields. An endeavour has been made to make it clear that these beds have not their auriferous parts arranged like leads along an old river-bed, nor in fan-shaped deposits, such as might have accumulated at the mouths of rivers or lesser streams falling into a lake. It has been shown that the gold is found in a particular stratum or strata, which, as in the case of the Maraewhenua goldfield, extends over its entire area, or the gold may be more concentrated in particular areas of lesser extent; but, still, in every case it has to be considered that we are dealing with a gold-bearing stratum which has to be prospected after the manner of a coal-seam. Where the beds are tilted so as to stand