

towards the northern part of the claim, and have caused no little trouble in the workings. As they all lie upon the surface it would be easy to remove them to one side before working the deeper part of the ground. Slowly, indeed, has this eastern side of the Criffel field been developed, but it must be admitted that the difficulties in the way have been very considerable; and, as Newman and party have but a poor supply of water, this lack of water has also retarded the development of the field. Yet it is evident that there are great possibilities along this, the Fat Boy, line of quartz drifts.

Mid Run, Luggate Burn.—This forms a ridge of hills between Luggate Burn and the northern slopes of Mount Pisa. Here, as at the Frenchman's, and on the north-east slope of Criffel itself, the wash is a coarse sandstone or schistose gravel which at one time has formed the beach of an extensive lake. The auriferous ground being situated at a lower level than at Criffel and Fat Boy, work can be started earlier in the spring and longer continued during the autumn months. At the time of my visit to Criffel there were eight or ten parties at work on Mid Run, and by report they were well satisfied with their earnings. The deposits of gravel are lodged along the side of the range, at a considerable elevation above the level of the creek, and gravels again appear on a level terrace-like plateau, and are developed at this height round the north-eastern end of Mount Criffel Range, past Frenchman's, to the track leading from Mount Barker to Criffel diggings.

Lower Luggate Burn.—There is little to be noticed in this part, and I may but mention the high terraces at the back of the schoolhouse and hotel, which close under the spurs of Mount Pisa appear to be promising ground for prospecting.

Tarras Creek and the Lower Lindis.—Heavy terraces of gravel are developed within the area of the Lower Lindis and Tarras Creek. It was reported to me that the white quartz drifts are present in Tarras Creek, but they were not noticed when the district was examined by me during 1880; and during my last examination this part of the district was not visited, because old lake-deposits must necessarily hide from view over all the lower grounds the lower beds of quartz drift, &c., as is the case along the western side of the Clutha Valley from the Kawarau Gorge to Locher Burn. Subsequently, while accompanying Messrs. Murray and Gordon to the Cromwell Reef, Bendigo, on the northern slope of the Dunstan Mountains, much could be noted proving an extensive destruction of the quartzose grits, cement boulders derived from them being scattered over the hill-slopes to 1,000ft. above the valley, but there was little evidence favouring the likelihood of the drifts being met with at the surface in the lower part of the Lindis Valley.

Clutha Valley along the Base of Mount Pisa Range.—As shown at Bannockburn, and thence to the northern bank of the Kawarau, there is a line of quartz drift continued to the north-east along the foot of the Mount Pisa Range across Low Burn, Park Burn, Tinwald Burn, &c., to the point where a secondary ridge of schist terminates the direct continuation of this line; but, as this part of the Clutha Valley is filled with heavy terraces of lake-gravels that cover the area between the points mentioned back to the foot of the range, the creeks cutting across these have not yet exposed the grit, &c., underlying the lake-gravels, except it be at the extremities of the line described. I am convinced as to the existence of these rocks, but have not shown their probable limits on the map accompanying, though they may be traceable over a part of the line described.

Clyde.—At Clyde there are none of the auriferous quartz drifts to be seen on the banks of the river, but that they cross the valley at this point is scarcely to be doubted. How far they have been a factor towards the enrichment of the recent gravels on the banks of the Molyneux at and below Clyde need not be here inquired into (since their highly auriferous character will appear when describing another locality), but with respect to their actual existence, and also their extensive destruction during the formation and cutting-down of the Dunstan Gorge, Professor Hutton remarks, "In the first place, the abruptness and narrowness of the entrance to the gorge at Cromwell shows that it has never been the outlet of a large body of ice; and in the second place, the lignite deposits under the township at Clyde must have been formed in still, shallow water, which could not have been the case if the Clutha then rolled through the gorge in the way it does now."*

Waikerikeri Creek rises on the Dunstan Mountains, near the Leaning Rock, and falls into the Molyneux a little below the Township of Clyde, north of the main road to Ophir and the upper part of the Manuherikia Valley. At first the valley of the creek is bounded by high gravel terraces, the upper parts of which show a great number of large angular blocks of schist, leading to the belief that the material of the higher part of these terraces has been deposited by glacier-action as morainic matter. Higher up, these terraces are confined to the east side of the valley, while rolling downs and higher hills slope from the western end of the Dunstan Mountains. These downs and lower hills are formed of well-rolled gravels in the lower grounds; and at greater heights, resting on the schist rocks, there is a development of clay, shales, lignite beds, and quartz grits. The visible western end of this line of grits, shales, &c., is at the coal-mine a mile inside the entrance to the Dunstan Gorge. The occurrence of lignite in the middle part of the Waikerikeri Valley has not been proved; but there is here, between the coarser sandstone gravels and the schists to the north, a development of quartz gravels, tilted so that it dips nearly vertical; and these beds it is that deserve special notice here. For a long time gold-workings have been carried on in the beds of the creeks, and on the sides of the lesser gullies intersecting the lower downs on the north side of the main stream, and at the time of my visit two or three parties were still at work sluicing the beds of the creeks formerly worked, or the heavy, but comparatively poor, wash formed by the sandstone gravels. Mr. Lindsay, an old resident miner, gave me what information he could, and accompanied me over the downs and hills to the foot of the slate range, thus necessarily passing over the outcrop of the quartz drifts. From what could be seen it was evident that much gold had been liberated from these, and had been entangled amongst the coarser wash of the creek-bottoms. Having expressed this opinion—my surprise that no prospecting had been done in the quartz-drift

* "Geology of Otago," p. 91.