

situation. The basin lies on the western side of a long spur running south from Mount St. Bathans, having Muddy Creek and the Manuherikia River at its eastern foot, and Dunstan Creek on the opposite side. The crest of this spur as far as St. Bathans is formed of indurated sandstones and shales belonging to the Te Anau series (Devonian). To the east the ridge of older rocks is flanked by the auriferous quartz drifts of Muddy Creek, and to the south a short distance beyond St. Bathans the continuation of the spur to its termination shows heavy beds of the sandstone gravels known in the district, and here described, as "Maori bottom." These sandstone gravels are continued north along the west side of the spur to the outlet of the St. Bathans basin, and form the ridge between the township and Dunstan Creek. These gravels thus form one side of the basin. The basin is triangular in outline, gradually widening from south to north, towards which it is bounded by a steep slope running east-and-west. The greatest length is short of three-quarters of a mile, and the greatest width about a quarter of a mile. Resting on the older rocks of the east side of the basin are beds of quartz drift dipping at considerable angles to the westward in the southern part of the basin, but lessening in amount and altering in direction (*i.e.*, more to the west and south) as the northern part is reached. In the centre of the basin the strata of drift "dip at varying angles, sometimes reaching 35° S.W." (Hutton); but towards the southern end of the basin the dip is at higher angles. The richest gold-bearing stratum lies near the base of the quartz-drift series, and always under the lignite or leaf-bed. The wash being elevated from the deepest ground in Mr. Ewing's claim is about 12ft. in thickness, and this is seen 70ft. below the level of the old working, or, in all, about 130ft. to 140ft. below the level of the original surface. The face and sections of the works at this level show moderately fine-grained quartz gravel, with a sprinkling of slaty schistose material through it. The colour of the wash is bluish-grey, but on exposure to the atmosphere the surfaces of the parts not being worked become coated with an efflorescence of sulphur, and where long exposed the sands become light-grey or white.

In the deeper ground of the centre of the basin the dip shows no appearance of lessening in amount; but this must eventually be at a lower angle, since towards the north the basin is limited by a bar of hard rock belonging to the Palæozoic series, seen in the cuttings of the road from the township to Dunstan Creek; and also to the west of the township the drifts underlying the "Maori bottom" show in the banks of the Dunstan Creek. In the northern end of the basin the dip is flatter and more to the south, and along the sludge-channel brought in from Dunstan Creek the upper sands are seen to be overlain by beds of grey or bluish-green marly clays corresponding in character with the beds that overlie the stratum of gold-bearing wash at Vinegar Hill. These clay-beds form the floor of the present workings to the north of the deeper part of the race, and do not anywhere appear inside the basin. In the broader northern part of the basin a considerable amount of work has been done, but towards the western side in this part a block of country has not been worked down to the lower level. In the face of this can be seen a stratum of the cement stone, "Chinaman," or "white Maori," as boulders of it are called indifferently by the miners in different parts. The cement band occurs at a considerable distance above the richest gold-bearing stratum, and when, as is often the case, scattered boulders of this rock appear without gravels between them and the bed-rock, in almost every case the sheet has been broken up and the underlying gravels removed. A curious instance of this is to be seen between Butcher's Creek (Bald Hill Flat) and Conroy's Gully, where a large mass of cement stone is poised on a pillar of schist little more than one-third the diameter of the cement-stone flag.

In his report of last year Mr. Gordon says, "Although this goldfield has been worked for the last twenty years there is still a large quantity of gold being got from the old quartz drift, or what is locally known as the granite-wash. . . . There is a layer about 5ft. in thickness, composed of a bed of leaves, amongst the quartz drift at St. Bathans, and this layer lies at about the same inclination as the face of the schist rock against which the quartz drift is lying. This shows conclusively that the leaves at the time they were deposited had a horizontal bed, and that there could not have been a rapid current near the place where such deposition took place. The manner in which the layers have been tilted up shows that an upheaval took place which altered the topographical features of the country. . . . There is only a very small area of gold-workings in the vicinity of St. Bathans, but a very large quantity of gold has been obtained. Over 100,000oz. have been purchased by one of the banks there, and the quantity of gold in the quartz drift does not appear to diminish as it gets down. The deepest workings yield about as much as those near the surface, and the way that it is being traced has the appearance of its being continued along the foot of the range between Vinegar Hill and the main range." In the St. Bathans Sludge-channel Company's claim "the character of the ground is quite different from that in the claims in St. Bathans basin, and to a great extent resembles the consolidated clay found in Mr. Ewing's claim at Vinegar Hill. This material seems to abut on the old quartz-drift wash which is seen higher up [to the north] on the face of the terrace, and gives one the impression that there is a deep run of this drift between the place where they are working and the terrace; and very likely a greater portion of the ground that has been stripped by the company will be worked again to a greater depth when the tail-race or channel is constructed to the proper level,"\* which was intended to admit of working water free to a further depth of 75ft.

*Muddy Creek.*—Quartz drifts lie on the eastern slope of the St. Bathans ridge from the junction of Muddy Creek with the Manuherikia to the Scandinavian Company's claim, and the point where the creek leaves the higher part of the St. Bathans Range and assumes a southerly course. On the eastern bank, terraces and terrace-flats of sandstone gravel are present, between Muddy Creek and the Manuherikia, above the gorge; and beyond Muddy Creek, between a continuation of these terraces and the foot of the St. Bathans Range, lies a narrow strip of quartz gravels

\* Reports on the Goldfields of New Zealand, 1893, pp. 119, 120.