

These extend back to the foot of the mountains, and obscure the northern continuation of the quartz drifts. These sandstone gravels correspond to the "Maori bottom" in the Maniototo basin and the Manuherikia Valley.

Awakino Valley.—Beneath the coal-measures stretching from the Kurow River to the Little Awakino there are at places a considerable development of quartz drifts. These, with the other strata belonging to the same series, form a syncline where they cross the valley of the Big Awakino, and, a larger area of grits being exposed than is in the Kurow or the Little Awakino, the partial destruction of these has yielded gold to the recent gravels of the stream. Gold was found, and a rush to the Awakino took place, but the amount of gold in the creek-gravels was not considered payable, and soon the place was deserted, without giving the quartz drifts and rusty cements anything like a fair trial.

Switzer's.—At Switzer's the bulk of the gold-workings are in coarse gravels that resemble the "Maori bottom" of the interior, but underneath these are beds of brown sands quartz drifts, clays, and lignite-seams that correspond with the similar rocks of the Upper Manuherikia and Maniototo basins. A ridge of older rocks on the east bank of the Wakaia River, above the township, confines the quartz drifts to the valley between this ridge and the western slopes of the Argyle Hill Range, but both to the north and the south the grits extend beyond the barrier of older rocks, and consequently dip into the main valley. Towards the northern end of this exposure of the quartz drifts several claims have been worked in them, but it would appear that either a patch has been worked out or that the ground was too poor to pay for working. Further south, near the middle of the valley, is situated another considerable working in the quartz drifts, and towards the southern end the beds have been worked in some four or five claims, and were still being worked by Chinamen at the time of my last visit. As both the upper sandstone gravels and these, the lower or quartz-drift series, are auriferous at Switzer's, it seems to me that the main requirement of this field, to make it again prosperous, is an abundant supply of water, capable of commanding the drifts at the higher levels.

Muddy Creek.—This lies on the opposite or western side of the valley from Switzer's, and scarcely deserves to be considered apart, other than to note that in the beds associated with the quartz drifts concretionary masses of lime cement-stone are found containing large shells (oysters) and a considerable variety of smaller size, which thus will aid in proving the age of the beds at both places and in this part of the district generally.

Waikaka.—The diggings at this place are of great interest, since there are no sandstone gravels or rubbly creek-wash covering the quartz drifts. The denudation of these has afforded the material of the superficial wash in the low grounds along the creek and on the terraces on each side. Quartz detritus is, therefore, the only wash; along the creek flats this is free from earthy matter, and occurs as a well-rolled gravel. On the terraces a variable depth of loam, from 3ft. to 10ft., overlies the auriferous wash, which also contained earthy matter. Highly-inclined strata of quartz, gravel and banks of white clay underlies the upper wash. These lower quartz-drifts, it was ascertained, are gold-bearing; and at the back of the township a deep prospecting shaft was put down in the gravel-beds. It could not be learned what the depth of this shaft really is, but it has been sunk to considerably more than 100ft. from the surface. A gold-bearing layer was struck, or, at least, a good-looking quartz wash, and a quantity of this was sluiced, since which work has, for lack of funds, been discontinued. In the east branch of the creek a considerable area of ground has been worked under like conditions, proving that the gold in the superficial wash was not derived from the ranges towards the source of the Waikaka, but from the quartz drifts adjoining and under-foot.

Mackenzie.—The line of quartz-drift outcrops along a range of hills forming the water-parting between the Wakaka and Pomahaka Rivers, and on this line Mackenzie is situated. Gold-workings to some extent have been carried on at this place, but the locality was not visited.

Landslip Hill.—Here also the quartz drifts are developed. They are overlain by hard quartz cement stone, in which are numerous finely-preserved imprints of dicotyledonous leaves and ferns. Gold was found here by Gabriel Reid during the time he was prospecting for the Otago Government; but it does not appear that then or since then has payable ground been found.

Knapdale (McNab's Run).—Gold is found at many places amongst the hills between the Mataura and the Waikaka Valley, on McNab's Run, and at places within the Waikaka watershed a considerable amount of work has been done. Generally the gold is found in a rewash of the quartz drifts, under conditions similar to those obtaining at Waikaka Diggings.

CLASSIFICATION AND SECTIONAL RELATIONSHIP OF THE STRATA EXAMINED.

The map accompanying shows the different formations that are present within the Otago gold-fields. The scale of the map prevents the minuter subdivisions of the Tertiary and Cretaceo-tertiary formations being shown, and for the purposes of this report it has not been considered necessary nor advisable to subdivide the schists or the unaltered Palæozoic formations. For the map, therefore, the following classification has been adopted:—

1. Recent and Post Pliocene.
2. Pliocene and Upper Miocene.
- 2A. Auriferous breccias and quartz drifts of probable Upper Miocene age, lower part of 2.
3. Lower Miocene and Upper Eocene. (The area of the Upper Eocene is so small that this, occurring only near Oamaru and in the Waitaki Valley, has not been distinguished.)
4. Cretaceo-tertiary: Upper beds.
- 4A. Cretaceo-tertiary: Middle and lower beds.
5. Carboniferous and Devonian formations.
6. Metamorphic schists, probably of Silurian age.
7. Basic volcanic rocks.