

Christchurch and Loopline Road. Between this ridge and the marine gravels on the Kapitea Hill there are the remains of a lake filled up with glacial mud-deposit, extending up the Kapitea Valley for some distance.

The present runs of gold worked at Kumara are entirely due to the concentration of the morainic deposits, by the action of a running stream carrying away the light material, and leaving the denser deposits behind; and, from the direction in which these runs or leads of auriferous wash-drift are found, going at an angle across the flat towards the Kapitea Hill, they indicate that the original channel of the river or deep ground is not a great distance from the northern side of the Kapitea Hill. We had ample evidence that gold is found in the morainic deposits in small quantities. Some shafts at the head of Larrikins' have been sunk in this material, where nothing but sharp angular stones are found, and in each of these gold is found, although not in sufficient quantities to pay for working. That being the case, the water from the lake that had been formed by the morainic barrier at length managed to cut away a small channel, and commenced to sluice away the material in the same manner as the miners do at the present day, only on a gigantic scale, concentrating it, and leaving the gold in layers where the concentration took place. The deep ground being towards the Kapitea Hill, the stream would naturally trend slightly in that direction, and then gradually break up into several branches as it got into the flat. This would account for the runs of gold tailing out in a fan-like shape.

How long the river might have flowed over the high barrier is a question that cannot be determined, it is like unknown quantities in an equation; but we can, by the rounded character of the stones in the workings lower down the terrace near the river, see that the water must have brought them some distance from the place where they were first deposited by glacial action. From the direction in which the glacier has travelled it would seem to have come from the mountains between the Arahura and Taipo Rivers. Boulders of the same character are found at Kumara as are seen in the bed of the Taipo River, but there is no olivine rock found at Kumara which Mr. McKay states exists in the watershed of the Arahura.

The inference to be drawn from this is that it is not likely that the leads or runs of auriferous wash-drift found on Larrikins' and Dunedin Flat will be traced on the east side of the morainic ridge; but there is a probability of leads of gold being found between Larrikins' Flat and the ocean-beach. If a rich lead of auriferous drift is found across the ridge from Larrikins' in an eastward direction, it is likely to be of a much older formation, and in the same character of drift that may be expected to be found in the deep run of ground, on the blue bottom, where the prospecting shaft is being sunk.

The leads or runs of auriferous wash-drift in the Kumara field are the Larrikins', which is the most southerly one; next comes the Mignonette, the Scandinavian, the Ross Terrace, the Dunedin Flat, the Shamrock, and, lastly, Shallow Lead. The general trend of these leads are nearly parallel with each other, but all crossing the flat at a slight angle, and finally tailing out in the shape of a fan; the greatest width between the most southerly one and the most northerly being not more than about 60 chains.

The site selected for the prospecting shaft was on the Larrikins' Lead, in Williams and party's claim, that being, as far as we could ascertain and determine, somewhere about the deepest ground on the flat. We do not pretend to have fixed the site of the shaft accurately as being in the deepest run of ground, but as near thereto as possible, as far as the surface and other indications show; judging by the upper-drift strata, the shaft may possibly be very slightly more to the Kapitea Hill side of the deep ground; but as the drift on the slope of the bottom, dipping southwards towards the Larrikins' Lead as far as it had been followed, did not contain a great deal of auriferous wash, it would be better to sink the shaft in such a position that were it not in the deepest ground it would bottom on the opposite slope.

Whether there is sufficient gold to pay for working in the lower drifts is a question that no one can finally determine until after the drifts have been prospected, and although we have, after careful investigation, fixed the site for a shaft where there is a high probability of old auriferous drifts being found, it may, however, turn out that even if the lower drifts are auriferous, and will in places pay for working, the shaft may go down on a spot where there the gravel is poor in gold. There are rich and poor places in any run of auriferous drift that has hitherto been worked, and it cannot be expected that those worked in the future will be different in this respect.

In regard to the probabilities of a lower lead of payable auriferous drift on the Kumara field, all theoretical views with reference to the distribution of gold amongst the lower gravels point to this conclusion. It may safely be assumed that from time immemorial the melting of snow and the collection of rainwater in certain hollows have been the means of cutting away gorges in the mountains, causing large landslips to take place, and, by the concentrating action of the flowing stream, the less dense material got carried onwards to the ocean by the current, while the heaviest particles were partially left in the bed of the stream. It may also be taken for granted that, seeing that the morainic matter in the vicinity of Kumara all contains less or more gold, and that this deposit must have come from the adjoining high land, we may safely assume that previously to those large masses of material being brought down from the mountains, and forming barriers across the then flowing streams, the work of denudation had been going on, and that gold was deposited in the beds of the river from the material sluiced away with the action of the flowing water. In many instances it can be clearly shown that the rivers at one time flowed in a different direction from that in which they flow at the present period; taking also into account the work of denudation which has been and is continuously going on, as well as the large extent of country covered with morainic matter and material brought down by glacial action, subsequently being washed away, and covering large plains, two things are indicated: First, that the mountains must at one time have been at a much higher elevation than at present; and, secondly, that the rivers brought down larger quantities of material than they are capable of now doing. This really means that the streams contained a far larger quantity of water, and this would be a natural sequence if the mountains were at a