

On the opposite or north side of the gorge the mineral belt could easily be traced by the eye, but the river, for the most part, was too high to ford, and was at all times dangerous, so that on one occasion only could this part of the belt be approached or examined. The indications of copper and various forms of iron, according to Mr. R. A. Harcourt, who accompanied me as field-assistant, are on this side of the river much stronger than on Lone Peak Range. The third or higher division of the schists occupy the upper end of the gorge, and, gradually losing the character of metamorphic rock, are traceable as far as the Styx Saddle leading from the Upper Arahura into the valley of the Browning River; the dip of the strata being to the eastward, the mountains high, and the valleys narrow mountain gorges. The unaltered sandstone formation is found on the top of Lone Peak, west of where schist rock appears on the Styx Saddle. This, however, does not imply unconformity between the sandstones and the mica-schist series, but is accounted for by the rugged surface features which have just been indicated.

The middle division of the mica-schist series (actinolite schists) was examined near the junction with the olivine rocks for indications of ruby-rock, but without success. Gold can be obtained to the source creek of the river, but not in paying quantities. The absence of quartz from the rocks of the Arahura Valley is very remarkable. Below the junction of Mount Brown Creek some large blocks of white quartz were noted, but higher up the valley none seemed to be present. At least, no reefs were discovered, and scarcely any quartz boulders appeared in the terrace gravels or shingle of the river-bed. Thin bands of quartz are met with on the Styx Saddle. From the above account it will be seen that the beaches and banks of the Arahura get gradually richer in gold as the river is followed from its source seawards, and that paying deposits only begin after the river has passed through the upper and entered the low grounds between this and the first gorge, and that the best and richest deposits occurred below the first gorge. Above the first gorge none of the tributaries of the main stream afford gold in anything like paying quantities. Throughout the whole of the valley there is a remarkable absence of reefs of vein quartz. These facts led me to the conclusion that the gold is widely disseminated through the schist rocks, and, to some extent, also in the sandstone rocks near the source of the river; and that the sluicing of the great terraces in the second gorge affords the gold which is found between the first and second gorges. The denudation of the great moraine extending across the valley from the eastern slopes of Island Hill to Mount Tuhua, by which the first gorge was formed, resulted in the sifting and re-assortment of a vast body of slightly auriferous material, which yielded gold to the beaches and lower flats of the valley nearer the sea. Morainic accumulations, 200ft. to 300ft. feet above the level of the river, yielding gold are found on both sides of the river below the first gorge. On the south side of the valley, about midway between Olderog's Bluff and the junction of Caledonian Creek, a considerable amount of ground has been worked for gold. The material worked is re-arranged morainic matter resting on older Pliocene gravels (Old Man bottom). Higher on the range massive blocks of sandstone and hard schistose rocks indicate the presence of glacier moraines, now almost destroyed. These moraines and the older Pliocene gravels of the Humphrey's Gully Range, it would appear, have supplied gold to the terraces at lower levels.

The extensive sluicing operations carried on at Humphrey's Gully operate solely on the older gravels of Pliocene date, and a thin remnant of glacier-deposit resting on the surface of these. The source of these older gravels are a problem difficult to make out; unlike the younger gravels of the Arahura Valley, they contain no blocks of olivine, serpentine, or greenstone rock. And it is hardly conceivable that, since the deposit was accumulated, these could have decomposed beyond recognition. Otherwise, there is much granite, and the harder varieties of schist rock mixed with the predominating sandstones of the deposit.

At Fox's, the auriferous gravels are re-assorted glacier-material, resting on blue sandy clays of Miocene date, or as at Stony Hill, on "Old Man bottom." The upper part of Hatter's Gully, Red Jack's, was not visited; but the gold here is, from the position, clearly either in the Old Man bottom, or a re-wash from it.

On the north side of the Blue Spur, facing the Arahura Valley, rich deposits consisted of morainic matter resting on a steep slope, consisting of blue Miocene bottom. This is the bottom also on the opposite side of the spur, drained by the Three-mile Creek.

Just at the neck or saddle by which the road from the Arahura Crossing reaches to the Blue Spur Township, the marine beds of the Houhou Lead begin, and Simeon's Claim, opposite Boy's Hotel, is being worked at a height of 200ft. above the sea in these marine beds.

From the Arahura I went to the Kokatahi Plain, and from thence examined the lower part of the Browning, Kokatahi and Toaroa Rivers, which, by their union, form the Lower Kokatahi. Rocks from the olivine and serpentine belt proved comparatively scarce in all of these river-beds. Granite is met with on the north bank of the Browning, between where it enters the plain and the opening between the mountains leading to Lake Kanieri. The outer mountains bounding the valleys of the other two rivers are formed of schist. Through the mountains the Kokatahi and Toaroa have cut deep gorges. Beyond these schistose mountains, by a number of source-streams in each valley, the sandstone country of the main range is drained. In all of these streams quartz as boulders in the river-bed is rare; and I had with me a miner who prospected the valley of the Browning for some considerable time without raising more than the colour of gold. On the spurs between the Kokatahi, above the junction of the Browning and the upper part of the Kokatahi Plain, towards the Hokitika Gorge, a quartz-reef was discovered many years ago. It was opened out to some extent, and a trial crushing made, but without satisfactory results.

From the Kokatahi I went to the gorge of the Hokitika. The rocks at the lower end of the gorge are granite, the schist rocks beginning at about two miles along the banks of the river from the lower end of the gorge. Schist continues up the gorge to the lower slopes of Mount Meta, between the Hokitika River to the north and the Pass River to the south. Along Frew's Creek and in the upper third of the schist series the olivine and serpentine rocks have a great development, and from this large quantities of material are carried through the gorge, and form the coarse