

The description already given should be sufficient to give a clear idea of the mode of the occurrence of the beds at Waikaka, the creek- and terrace-gravels there resting on the upturned edges of the quartz drifts being all that could be shown in section. At Switzer's the section there seen between the hills bordering the river-bank, on the east side of the valley, and the western slopes of the Argyle Hill Range, is illustrated by Fig. 11, in which A is the position of the Wakaia River; B, Round Hill; X, old rock; 5, the older quartz drifts, containing thick seams of lignite; 10, "Maori bottom," forming the principal gold-wash at Switzer's; 12, Recent.

Gold-workings have been carried on in the quartz drifts near the northern end of the middle part, and at the southern end of the auriferous area east of the Wakaia shown on the map, and illustrated by section in Fig. 11. The beds (10), however, are, and have been, the principal source of gold at Switzer's. These beds, from the saddle between the southern spurs of Argyle Hill and Round Hill, extend down the hill-slopes to within a short distance of the river-bank near to the township.

Fig. 12 is a sketch of the beds shown in section as they appear on the shore of the cross arm of Lake Wakatipu at Bob's Cove: 1, schist rocks of the Otago goldfields; 2, Devonian rocks, belonging to the Te Anau series; 4, breccia conglomerates; 5, older quartz drifts; 6, middle part of the Cretaceo-tertiary formation; 7, upper part of the Cretaceo-tertiary formation; 8, Pareora beds (Lower Miocene). At Moke Creek, and thence across the slopes of Ben More Mountain to the Moonlight Gorge, beds 4, 5, and 6 are seen deeply involved; and in the Moonlight Gorge the limestones (7) are also present.

Fig. 13 shows the mode of occurrence of these beds on the eastern slopes of Ben More between Moke and Moonlight Creeks: A, Ben More, B, Moke Creek; 1, schist; 5, old quartz drift; 6, middle beds of the Cretaceo-tertiary formation; 7, upper part of the Cretaceo-tertiary formation; 12, Recent.

Neither at Stony nor at Skipper's Creek were these beds examined *in situ*, the line of fault on the east side of which they occur running along rough and inaccessible country towards the sources of those streams. From prospectors and old residents the information was gleaned that the limestone forms a big reef like a quartz reef where it is seen to cross Stony Creek, three to four miles above the junction of the creek with the Shotover. Between Stony Creek and the different branches of Skipper's, the limestone and associated beds do not appear to have been traced, but masses of quartz grit and cement stone are brought down every tributary of Skipper's Creek that rises on the southern slopes of Mount Aurum. As Stony Creek has cut deep into the slopes of the Richardson Mountains where the limestone is seen to cross its bed, the position of the limestone above sea is not higher than the terraces at Maori Point, or from 1,600ft. to 1,800ft. At the head of the right-hand branch of Skipper's, and across the intervening spurs to the south-west, the beds involved along the fault must reach to a height of nearly 4,000ft. It would have taken longer time than, under the circumstances, could be afforded to examine closely this line of grits, limestones, &c., and that it existed was considered sufficient for the present purpose.

Returning to the eastern part of the district. At Macrae's the quartz drifts lie at a lower level than they appear at on Station Hill, and this difference of level is considerably greater in the intermediate space where the drifts appear at the surface, near Deep Dell Station. There is also a considerable difference of the levels between the upper part of Mare Burn and Fullerton's, and also between the higher and lower levels at Hyde; but, although the flexures are considerable, there is no evidence of actual faulting. In the upper part of Shag Valley, and from the Swin Burn along the foot of Mount Pisgah, the beds dip towards the range, and are suddenly terminated against the older rocks:

At the Upper Kyeburn the lowest grits are nearly vertical, and are followed by greensands, with Miocene fossils, which, associated with quartz drifts, are overlain by white clays and heavy beds of lignite. Younger Miocene or older Pliocene gravels overlying the lignite series form hills between the Kye Burn main stream and the lower part of the Little Kye Burn. The lower quartz drifts are found at the foot of Mount Buster and Kyeburn Peak, at elevations about 2,000ft. above the sea; while on the high saddle to the north, at Clark's, the height is not less than 4,000ft. This difference of level takes place within a horizontal distance of less than two miles. At the Hogburn the quartz drifts dip to the south at high angles, and are, south of their outcrop, shortly obscured by "Maori bottom" and beds of recent wash, derived in part from the "Maori bottom" and in part from the quartz drifts. Fig. 14 shows the relation of the different beds to each other: X, old rock; 5, older quartz drift; 10, "Maori bottom" (sandstone gravels); 12, Recent gravels, formed of a mixture of quartz drift, schist fragments, and sandstone gravels, with many large boulders of cement stone, derived from the older quartz drifts.

As the superficial gravels are to a considerable extent formed of detritus from the quartz drift, either as well-rolled pebbles of quartz, or as boulders of white or yellowish-brown quartz cement, the probabilities are that a large part of the gold obtained from the surface-wash in the vicinity of Naseby has been derived from the destruction of quartz drifts existing in the neighbourhood.

At the Government dam the gritty fossiliferous greensands are overlain by white clays and lignite, and associated with these are beds of quartz drift, which, as at the Kyeburn, may belong to the freshwater series, which would thus seem to have been present over the area of the Maniototo Basin.

The section from Hamilton's to the Taieri Bridge is of interest as showing the possibility of gold-bearing quartz drifts under the basaltic sheet. Fig. 15 shows the disposition of the different rocks: A, Taieri River; B, Hamilton's Diggings; 1, schist old rock; 5, older quartz drift; 5a, white clays overlying the quartz drifts; 5b, thick sheet of basaltic rock; 12, Recent deposits near the banks of the Taieri River.

The quartz drifts at the Sow Burn, and as far as the Taieri River, at Patearoa, evidently belong to the line of outcrop on which Hyde and Hamilton's are situated, and to the lower series of quartz drifts.