

Fault No. 18 (the Manuherikia Fault).—This line of fault runs along the base of the Dunstan Mountains from the Molyneux Valley at Clyde to the Dunstan Creek near St. Bathans, in the upper part of the Manuherikia Valley. The line of fault is usually very well marked, and the involved beds are commonly in a vertical or an inverted position. There are many localities along this line whereat gold-workings have been and are in progress. To the tilting and denudation of the newer breccias and auriferous quartz drifts along this line are due the diggings at Waikerikeri, Devonshire Diggings, Tinker's, Cambrian's, Vinegar Hill, &c. Had the auriferous beds along the fault not been tilted, they must have been so buried beneath the "Maori bottom" and younger gravels that even to the present time they would have been hidden from view. The inversion of the beds along the fault-line causing the schist to overhang the loose auriferous gravels renders the working of the drifts a matter of difficulty and some danger, especially in those claims where the auriferous drifts have been washed away to a considerable depth.

Fault No. 19 (Hill's Creek Fault).—This line of fault is very clearly seen on the north-east side of the saddle between Blackstone Hill Range and the south-western part of the Hawkdun Home Hills. The fault is of very modern date, and the latest displacements can still be traced at the surface. At some places the younger strata strike in an easterly direction towards the fault, and are suddenly terminated at the line of fault, the opposite wall being schist. At some places, as described by Mr. Gordon, the schist is quite overturned, and found resting on the quartz drift. The north-west and south-east extension of this line has not been traced, but it or another fault passes to the eastward of the coal-mine east of the main road across Ida Valley, and thence across the saddle at the north-eastern end of Rough Ridge into the Wetherburn watershed. The line between these two points, if prolonged to the north-west, passes close to St. Bathans's gold-workings, and, following generally the line of Dunstan Creek, crosses the Dunstan Pass into the Lindis watershed. The same line continued to the south-east passes close to Hamilton's and Hyde, and, south-east of the Taieri, passes close to Horse Flat, Deep Dell, and Macrae's, at all of which places quartz drifts are present, more or less involved amongst the older rocks. It is not maintained that the Hill's Creek line of fault can be traced to the extremities of the line described, but it is something more than a coincidence that so many features indicating the probable presence of a fault are to be found along the line.

Fault No. 20 (Blackstone Hill Fault).—The manner in which the quartz drifts lie in against the south-east lower slopes of Blackstone Hill Range is sufficiently indicative of the presence of a fault from the vicinity of Hill's Creek Township to the Pool-Burn Gorge, and at Black's No. 3 the evidence of a continuation south-west of the same line is not to be doubted. This line runs nearly parallel to that along the south-east base of the Dunstan Mountains, and both lines have on the opposite side of the valley an outcrop of quartz drifts dipping at a lower angle in a north-west direction, or away from the range that bounds the valley on the south-east side. The Pipeclay line, on the north-west side of Blackstone Hill, is an exception, the beds there standing at high angles.

Fault No. 21 (Hawkdun Fault).—This line runs along the whole length of the Hawkdun Mountains, or from the head of the Mount Ida Water-race to the upper part of the Wether Burn, the line being apparently terminated at the foot of Little Mount Ida. Clear sections, showing the contact of the younger series with the old rocks of the Hawkdun Mountains, are not of frequent occurrence, but the dip of the quartz drifts and associated rocks is generally towards the mountain, and at a few places it is seen that the junction of the two formations must be along a line of fault.

Fault No. 11 (the Kyeburn Fault).—This runs along the east side of the Maniototo Plain, from the Swin Burn to the western base of Kyeburn Peak and the east end of the Mount Ida Range. Along this line auriferous quartz drifts are found at 1,300ft. along the bed of the Kye Burn, and at 4,000ft. above the sea five or six miles further to the north. To the north the rocks on both sides of the fracture have been elevated, but south of the Upper Kyeburn Township and diggings the displacement has been a downthrow on the western side. This line can be traced as far to the north as the gorge of the Ahuriri, above where that river joins the Waitaki. Continued to the south the line passes near to Macrae's Diggings, along the Upper Stone Burn and Silver Peak Range to Blueskin Bay, involving Cretaceous-tertiary rocks at various places along this part of the line.

Fault No. 12 (Waikemo Fault).—This runs along Shag Valley and the south-western slopes of the Kakanui Mountains and the Horse Range to the sea at Shag Point. The fault-line runs out to sea immediately to the south of the mouth of the Shag River, and along the lower part of Shag Valley the amount of displacement can be ascertained by comparing different strata of Cretaceous-tertiary age on the opposing sides of the fault-line. Near the sea there must be a displacement of not less than 2,000ft., but this amount is considerably lessened as the line is followed up Shag Valley.

THE AURIFEROUS DRIFTS CONSIDERED IN RELATION TO THE CHANGES OF LEVEL AND DISTURBANCES BY FAULTING THAT HAVE TAKEN PLACE SINCE THEIR DEPOSITION.

Whether on Manukau Hill or Mount Criffel, at Waikaka, or on Mount Buster, one and the same is the character of the older quartz drift; and the many localities of occurrence which have been cited show that at one time the drifts were all but universal over the surface of south-eastern, interior, and north-eastern Otago. Both the breccia conglomerates and the older quartz drifts, having resulted from the causes indicated and in the manner described, appear to have remained comparatively undisturbed up to and during Middle Miocene times. During later Miocene times they were denuded to a considerable extent, and in the neighbourhood of areas where schist was exposed there was a mingling of detritus from the older quartz drifts, with less rounded material, derived from the schists, &c. These materials now form the newer breccia conglomerate found along Criffel Face, in the Cardrona watershed; at Devonshire Diggings, Tinker's, and Drybread, in the Manuherikia Valley; and probably in the northern end of the range of hills east of Little Kye-Burn.