

present in some part of the Kaweka Range, no trace of them is to be met with in the southern part, either in the Ngaruroro Gorge, the shingle of the river-bed, or anywhere along the road between Kuripapanga and the crossing of the Taruarau River. More to the south—west of Kereru—the flinty jasperoid rocks occur in the eastern part of the Ruahine Range, and they are practically continuous thence to the Manawatu Gorge. Towards the west, along the upper valley of the Taruarau, there and in the Upper Ngaruroro there is an absence of these red rocks, which is somewhat remarkable, seeing that they again make their appearance in Stony Creek, near Tarawera, on the Napier-Taupo Road.

In the Ruahine Range and farther south these red rocks and the massive bands of grey flinty quartz occur in the near vicinity of each other. North of the Ruahine Range they are separated by a considerable distance, or the red rocks are absent or but feebly developed in the Kaweka Range, and it is a question whether the jasperoid and grey quartz-rocks belong to the same formation. In the Kaweka Range the powdery-jointed sandstones and the plant-bearing beds are apparently distinct from the sandstones and black shales of the mountains farther to the west. Near Wellington the powdery-jointed sandstones are closely associated with rocks that yield the annelid of Mount Torlesse, and have hitherto been regarded as belonging to the Carboniferous formation. The plant-beds overlie to the eastward, and are well seen on the south shore of Porirua Harbour, at Ngahauranga, and in the north-east spur of Mount Victoria, Wellington.

I have described the rocks of the Kaweka Range as being of Triassic age, and as distinct from those of the Kaimanawa Range; and the evidence obtained in the locality will warrant this. How far the problem of their distinctiveness is borne out by evidence elsewhere obtainable must be judged by what is stated above.

Pliocene.

3, *e. Coarse Breccias and Conglomerates.*—The Tertiary rocks forming the high plateaux, downs, and hilly country of Inland Patea district, as a rule, have at their base a coarse breccia or more or less rounded conglomerate, usually derived from rocks in the vicinity of where such breccias occur. On the high grounds, 3,000 ft. above the sea, that lie between the Rangitikei and the Taruarau Rivers not a great thickness of sandy fossiliferous clays interpose between these beds and the overlying limestones (3, *c*), and it may fairly be inferred that the breccias and conglomerates are shore-line deposits derived from a mountainous country such as at present exist to the north and north-west of where the breccias have been deposited. At places, as in the Upper Taruarau Valley, the breccias and conglomerates are absent, the fossiliferous sandy clays resting direct on the slates and sandstones of Carboniferous age. Between the Taruarau and the western base of Gentle Annie these rocks are of great thickness, the upper part being a conglomerate, the lower a coarse breccia, and the rocks forming and represented in these are all derived from the older sandstones in the same neighbourhood. At places between Gentle Annie Saddle and the crossing of the Taruarau River these breccia conglomerates are some 200 ft. thick. On the table-land west of the Taruarau they have an elevation of 2,700 ft. above the sea. In the creek at the western foot of Gentle Annie they are about 1,700 ft. above the sea, but the same gravels occur on the Gentle Annie Saddle at a height of 2,250 ft.

These gravels follow the eastern slopes of the Kaweka Range, north and east of the Ngaruroro Gorge, and here assume the character of very coarse conglomerates. In this part they have a thickness even greater than to the west of Gentle Annie Saddle. They present the appearance of a very coarse river-gravel, and but for the fact that they clearly underlie the marine-beds next in the sequence they might be mistaken for river-gravels of Pleistocene or recent date.

From the Ngaruroro Gorge north-east along the eastern base of the Kaweka Range these beds are much disturbed, occupying nearly horizontal or nearly vertical positions within short distances. West of the Taruarau they are generally in a nearly horizontal position. On these beds between the Taruarau and the Rangitikei, Sir James Hector remarks: "Within a few miles of Mr. Birch's station, in the valley of the Rangitikei, the Tertiary strata can be observed to thin out against the mass of slate (*a*) rock [shown in section] at an altitude of 2,800 ft. above the sea-level. Gravel-beds occur with false-bedded layers and other characters that lead to the belief that there is preserved at this place the original shore-line of the Tertiary sea, the calcareous strata having been deposited among a group of slate islands, now represented by the Kaimanawa, Kaweka, Ruahine, and Tararua Mountains. Since the period of this deposit there must have been great inequality in vertical movement, as the same strata which round the last-mentioned range only reaches to less than 1,000 ft. above the sea are in the north found at more than twice that altitude."*

I have already referred to the disturbed state of these beds and the unequal heights at which they appear at localities not far removed from each other.

3, *d. Sands and Pebble-beds with Patches of Shelly Limestone.*—These beds appear both on the table-land west of the Taruarau and overlying the breccia conglomerates east of the Kaweka Range. In the latter locality they have a much greater development than in the western area, and cannot be short of 500 ft. thick. With the sands are pebble-beds, or fine conglomerates; and these are distinguished from the coarser breccia conglomerates that underlie by the presence of quartz pebbles and a bright-green slaty rock not found in the lower beds, nor known to occur in either the Kaweka or Kaimanawa Mountains. The sands are to some extent composed of pumiceous material, though no actual pieces of pumice are to be found in them. Patches and beds of shelly limestone, sometimes very impure, owing to contained pebbles, are found between the Blowhard and the eastern base of the Kaweka Range, and between Gentle Annie Saddle and the Taruarau River; and where the lower beds of the series are absent white sandy clay and patches

* Geological Reports, 1870-71, p. 161.