

the Maungaraki Range. In these valleys the streams almost invariably cut through the rocks in deep trenches, varying from a few feet to deep cañons of 200 ft. and more in places. The consequence of this is the striking absence of alluvia in the district, and what there is is a fine pulpy mud, forming dangerous quicksands.

The river-system is very simple, and consists of two rivers with their tributaries: one, the Kaiwhata, rises to the north-east of the Brocken and flows south, taking on its right first the Te Maire Creek, the Waipapa and Haukawakawa streams, all draining the east side of the Brocken, while the Bismarck, as its chief confluent coming from the south-west, joins it about six miles from its mouth, and drains the country to the south of the Brocken. At a point about two miles and a half below the Bismarck Creek the Little Kaiwhata, from the western spurs of the coast range, joins the main stream. On the left bank is the Mangamouku and Prospectors' Creeks, both draining the western slopes of the Maungaraki.

After receiving the Little Kaiwhata, the main stream makes a turn from its prevailing southerly direction to an easterly one, and thus penetrates the coast range by a deep gorge some 800 ft. in depth. Debouching from the mountain range the river receives no further tributaries in a course of four miles to the sea, over which it passes along a broad bed with high banks in country that is hilly, rolling, and at places flat.

The Little Kaiwhata River and the Bismarck Creek both take their rise in the high mountainous ridge that forms the western development of the coast range, this spur being an important water-parting of the district under survey. It gives direction to the waters of the Pahaoa flowing south-west, and to the Kuamahanga flowing north-west to meet the Wainuioru; and although the range has nothing to do with the source of the Kaiwhata, yet it influences its final direction before it gains the coast.

The Pahaoa, rising on the north side of the East Coast Road, about three miles west of Wharau, after following a southerly direction for about three miles alters to a south-easterly. The general direction, as indicated, is very regular, yet along this line the river makes a very sinuous course, never proceeding any great distance without a turn. On both banks it receives small streams draining the western slopes of the Maungaraki with Deep Creek and others, flowing from the eastern flanks of the Taipo Range.

The Kuamahanga, a stream of no great volume, but of considerable length, rising not far from the source of the Pahou and Bismarck Creek, flows north-east to meet the Wainuioru. Almost from its source to the boundary of this survey it runs in a deep gorge between walls 100 ft. to 200 ft. in height, which, being bush-clad the whole way, gives a very picturesque appearance. Its bed is very uniform, which is characteristic of all the creeks and rivers in the district, notwithstanding the fact of the fall being very often considerable.

On the coast the streams are of necessity very short, the Maungaraki Range (the water-parting) being at no greater distance than two miles from the coast.

#### GENERAL GEOLOGY.

The main geological features consist of an underlying formation of Palæozoic rock, dipping in a westerly direction, upon which rests a formation containing coal and limestone of Upper Cretaceous age, forming in part synclines and anticlines, which ultimately disappear in the vicinity of Flat Point, leaving the main mass, dipping easterly, to continue south. These Cretaceous rocks appear usually underlying a series of clays and soft sandstones of Miocene age, which, for the most part, characterize themselves by keeping the low ground between the two parallel mountain ranges. They are generally of a low dip, and often horizontal. Over the coastal part of the district recent deposits, alluvial or æolian, have a moderate development. The only detailed material of any extent is in the lower reaches of the Kaiwhata, and a long strip of sand-dunes and other deposit on the coast, stretching from Flat Point to Glenburn, varying in width from a few hundred feet to a mile or more.

#### TABLE OF FORMATIONS.

1. Recent	...	...	...	Blown sands, river gravels.
2. Lower Miocene		...	...	Clays, soft sandstone, conglomerates.
3. Upper Cretaceous	{	(a.) Upper division	...	Limestone, glauconitic sandstone, shales, sandstones.
		(b.) Middle division	...	Micaceous sandstone with plant-remains and <i>Inoceramus</i> .
		(c.) Lower division	...	Coal-rocks with clays, conglomerates, grits and coal, shales and mudstones.
4. Triassic or Carboniferous		...	...	Sandstone, serpentinous sandstone.

#### 4. *Triassic or Carboniferous.*

This formation occurs in two separated areas, the one to the north of the Kuamahanga, the other to the south of the same stream. The general trend of the whole is in a north-east direction. In giving the boundaries, those to the west are omitted, on account of their being outside the block of country under survey.

Commencing with the southern area, and at its lowest extremity, its eastern boundary is found to conform with the general north-easterly direction of the Pahaoa River, on the right bank of which it keeps at a distance of about a mile. This direction is kept for about three miles, at which point it changes to due north, to again change to a north-west near Wharau, on the East Coast Road. The rocks wedge in at the confluence of the Pahaoa and Wainuioru, but nowhere cross the streams. The formation dips under the cover of two younger series of rocks. The Middle division of the Upper Cretaceous rocks, commencing on its boundary about two miles south of Wharau, overlies the beds for a distance of about three miles to the northward, when