

east or north-west faces of the higher peaks standing back from the river. The main river-valley has nearly a straight course from the Otira junction to where it takes its rise on the saddle between this and the Hurunui watershed.

*Kapitea Creek.*—This stream has its main source a little to the west of the Christchurch-Hokitika Road, near the junction of the Loop-line Road. The stream flows west-north-west, and reaches the sea four miles to the south of the mouth of the Teremakau River. In the upper part of its course it drains the south-western side of the eastern part of the line of hills formed by the lateral moraines of the Taupo-Teremakau and Kawhaka-Arahura glaciers. Part of its course lies along the bed of an ancient ice-stream belonging to the latter-mentioned system of glacier-ice, which, finding its way into the low grounds from between Turiwhate and Island Hill, tended towards the main body of ice occupying the low grounds to the south-west; but this, unaffected by the lesser mass, and itself tending to the northward, the Kawhaka-Arahura branch was forced to the north, and a line of medial moraines was formed, less in bulk, but similar in character to those that extend from Dillmanstown to the Christchurch Road, and the source of Waimea Creek at the western base of Turiwhate. This ice-stream had its terminal face at the head of Larrikin's Flat, near Kumara, but the present Kapitea Creek does not follow the depression of its bed thus far. Below the crossing of the Loop-line Road and the Big Dam of the Kumara Water-race, it breaks through the line of morainic hills to the west, and holds the course described to its junction with Little Kapitea Creek. Entering the area occupied by the ice of the main body of the Arahura glacier, towards the northern limits of this it is joined by the Little Kapitea, draining the country to the south and west covered with morainic deposits, or the silt deposits of pre-existing lakes. Such tributaries to the main stream as Italian, Callaghan's, and Maori Gully Creeks, drain the northern and eastern slopes of the Waimea Hills north of the Waimea River, while Duffer's and Greek's Creeks drain the northern slopes of the east part of the Waimea Hills south of the Waimea Valley. Though but a small stream, draining but a limited area, the watershed of the Kapitea is of great geological interest and of no little consequence in connection with the development of mining in the surrounding district.

*Waimea Creek.*—The Waimea of the present day is confined to the block of hilly country that lies between the Kapitea watershed and the lower valley of the Arahura River. Three streams, the middle, right, and left-hand branches, unite at Goldsbrough, to form the main stream of the Waimea, which thence pursues a nearly west course to the sea. The right and left-hand branches have their sources in the hilly country to the north and south of the middle branch. The middle branch, however, passes right through the block of Tertiary hills, and takes its rise from the lower lands that lie to the east of the Greenstone-Hokitika Road. Three miles below Goldsbrough, the most important branch from the south, Liverpool Bill's Creek, makes junction opposite the Township of Stafford. The drainage of German Gully and Sandy Creek, though uniting with the Waimea before it enters the sea, scarcely belongs to that of the Waimea Valley, since not very long ago each constituted an independent watershed, and the slightest depression of the coast-line would again bring them to the same condition. The Waimea has been celebrated on account of the extent and richness of its gold deposits. In dealing with the origin of these deposits in the case of the principal stream, and the middle branch, to its source, it will have to be shown that the auriferous gravels are not only foreign to the watershed, but that under no circumstances could they have been produced and arranged as they are by the action of such a small stream as that of the Waimea at the present day.

*Arahura Valley.*—The Arahura River takes its rise from Browning's Pass, between Mount Harman and Twin Peak, situated on the main water-divide between Canterbury and the West Coast. The immediate source of the river is Lake Browning, a small sheet of water on the summit of the saddle leading into the Rakaia watershed. The outlet from the lake is to the north; but the river immediately assumes a westerly course, and within the first three miles it receives several considerable tributaries, fed by the snows of Twin Peak. Below the junction of Harman's Creek the river turns to the north-west, and again to the west, before reaching opposite the saddle leading into the valley of the Browning River, forming part of the Hokitika watershed. Below this its course is along a narrow valley, with grassy flats on each side of the river; and to the west and east this valley is confined between high mountains, devoid of forest vegetation. About ten miles from its source the river receives a large tributary from the north-east. This drains the high bare country of the dividing range between this watershed and that of the Taipo River. The Arahura is now a considerable stream, and its banks and the adjoining mountain slopes in their lower part begin to be clothed with stunted forest growth. It has now passed from the sandstone country of the main range and crossed the belt of semi-metamorphic rocks introductory to the triple series of the mica-schist belt; and, with this, a sudden change in the aspect of the Arahura Valley takes place. The river plunges into a deep gorge, the walls of which, whether rock or gravel, are such that it is barely possible to leave this part of the river-bed, except by following the stream upwards or downwards, and thus escape from the close confinement of the Crowbar Gorge. This forms the upper end of the second or Upper Gorge of the Arahura. About the middle of the Crowbar Gorge, the course of the stream alters from north-west to south-west agreeably to the direction of the mountain ranges between which it flows. It continues its course in this direction, when at the foot of the second gorge it again alters to a north-westerly course, and enters on the low grounds of the Old Lake Basin that, surrounded by mountains, lies between the first and second gorges of the river. The middle part of the second gorge is more accessible than the upper part; and on the high terraces of the south side there are some small areas of comparatively flat land, where some attempts have been made to reclaim the wilderness. How far this has been successful may be judged by the condition of the homestead. From the sloping table-land, on which this is built, the terrace on its northern side descends sheer to the river-bed, causing the waters to be deflected against the opposite mountain, and at a level of 250ft. below the track. Throughout