

General Geology.

The rocks of the Mikonui Subdivision have been classified according to the following table:—

Formation or Series.	Content.	Age.
Arahura Series	Gneisses, mica - schists, grauwackes, argillites, &c.	Probably Carboniferous and older.
Greenland (Maitai) Series	Grauwackes and argillites.	Probably Carboniferous.
Koiterangi Series	Conglomerates, grits, shales with coal-seams, limestones	? Eocene-Oligocene.
Upper Miocene Beds	Conglomerates, grauwackes, grits, sandstones, clays.	
Pliocene, Pleistocene, and Recent Beds	Older and younger river-gravels, morainic gravels, marine gravels, &c.	
Pounamu Formation	Dunite, serpentine and allied rocks	? Early Eocene.
Tuhua Formation	Biotite-granites and allied rocks	? Early Eocene.
Basic Dykes	Many varieties of basic dyke rocks	Middle or Early Miocene.

With reference to the ages of the various formations it should be explained that, with the exception of the fossils already mentioned, there is no palæontological evidence by which to fix the age of the Paleozoic formations. The Koiterangi Series may be correlated with the coal-measures of the Grey and Buller valleys, but in the absence of satisfactory age-proof of the latter beds it is not certain that the age of the Koiterangi Series has been accurately determined.

The age of the Tuhua and Pounamu formations is considered to be substantially the same as that of the first major uplift of the Alps, which probably immediately preceded the deposition of the Koiterangi rocks. An older date is possible, but no real evidence of such could be obtained.

Distribution.—The Arahura Series forms nearly the whole of the alpine range, whilst the Greenland Series forms most of the foothill country between the Hokitika and Kakapotahi (Little Waitaha) rivers. The Koiterangi and Upper Miocene beds occur in small patches in or bordering the foothill country, whilst the Pliocene and younger beds form the lowlands. The rocks of the Pounamu Formation exhibit sills or dykes in the horizon of the middle schists (Arahura Series), whilst those of the Tuhua Formation occur as large bosses penetrating the Arahura gneisses and the rocks of the foothill area. The basic dykes occur chiefly in the granitic and gneissic rocks.

Structure and other Features.—It is needless here to describe the structural and other general features of the various formations, for these have already been dealt with in the Hokitika Bulletin,* and, as regards the Mikonui area, will be further elaborated in Bulletin No. 6, which is now in the press, and will shortly be published.

Near the Mungo Saddle many silicified tubes of *Torlessia mackayi* were seen in the talus, and a short distance to the north I found this fossil annelid in solid argillite on both sides of the alpine divide. Associated with it were the curved and ribbed silicified tubes of probably a species of *Dentalium*.

Economic Geology.

The economic geology of the country examined during the period covered by this report may be briefly considered under the headings of (1) Metalliferous Veins of the Arahura and Greenland Series; (2) Asbestos and Talc; (3) Building and Ornamental Stones, Clay, &c.; (4) Alluvial Gold.

(1.) *Metalliferous Veins of the Arahura and Greenland Series.*—In the rocks of the Arahura Series very few metalliferous veins were noted during the year. With the exception of the lodes on the Whitcombe Pass track mentioned in my last report, all the quartz veins examined proved worthless, but it is interesting to note that pyritic veins and segregations occurring in the vicinity of the Pounamu Formation were found to contain gold, silver, platinum, and copper, though in less than payable quantity.

The rocks of the Greenland Series which occur in the neighbourhood of Mount Rangitoto were carefully examined, and several small lodes carrying traces of gold and copper were located. As close an inspection was made of the workings of the old Rangitoto Silver-mining Company as their condition would admit. The vein opened up by this company is at the outcrop less than 6 in. thick, and dips flatly to the north-north-west. The enclosing rock is grauwacke, but the dip observed would carry the lode into granite at no great distance from the outcrop. The lode-matter is quartz, densely impregnated with pyrite, and carrying also some galena. Samples taken from the outcrop and from a heap of loose ore near the mouth of the main adit assayed as follows:—

	Outcrop.	Ore-heap.
Gold .. ..	.. 1 oz. 5 dwt. 5 gr.	1 oz. 3 dwt. 22 gr. per ton.
Silver .. ..	.. 4 oz. 16 dwt. 9 gr.	1 oz. 5 dwt. 23 gr. „
Lead .. ..	.. 1.37 per cent. ..	0.23 per cent.
Copper .. ..	.. Nil	Nil.
Zinc .. ..	.. Nil	Nil.
Value of gold and silver	.. £5 12s. 6d. ..	£5 1s 2d. per ton.

* Bulletin No. 1 (New Series), N.Z. G.S., 1906.