

(2.) *Oamaru Series*.—The beds which have been classed in this series occur throughout the greater portion of the subdivision, forming as they do the “upland region,” and extending through the graben valley of Stormy Range to the valley of the Kakapo River. They also make their appearance at a considerable elevation in the extreme south-east of the subdivision, where denudation has not effected their entire removal. The upper members of this series have their greatest development in the north-west of the subdivision; the lower members in the south-east and extreme south-west. The beds consist, in ascending order, of breccias, more or less calcareous claystones, with bands of grit, shelly arenaceous limestones, soft fine-grained sandstones (frequently argillaceous), followed by beds of loosely consolidated conglomerate with carbonaceous seams, and coarse granite sandstones. The beds are as a rule but slightly inclined from the horizontal except near the boundary of the “old land,” where the strata are faulted and sharply upturned. Fossils are abundant except in the uppermost beds of the series.

(3.) *Beach and River Débris, Talus Slopes*.—From the mouth of Little Wanganui River northwards the littoral deposits consist almost entirely of sands and muds, the coarser river debris having been deposited before reaching the coast. South of the river, however, the high escarpments of Tertiary rocks have covered the beaches with boulders, while at the extreme southern point granite debris derived from the underlying basement rock, which here makes its appearance, is strongly in evidence. Recent deposits also appear in the beds, flood-plains, and terraces of all the streams, and in the talus slopes common on the mountain-sides.

(4.) *Igneous Rocks*.—The uplifted mountainous interior of the subdivision consists of granite overlain in places by unaltered rocks of the Oamaru Series. The same rock also appears at Kongahu Point, the most southerly headland on the coast of the subdivision. The granite is found intruding the rocks of the Aorere Series, and hence in point of age it is post-Ordovician and pre-Miocene. The prevalent type is a dark-grey porphyritic biotite granite; but bands of dark basic segregations are common, while pegmatite dykes are not infrequently encountered. Particular attention is drawn to these rocks, on account of the metalliferous veins occurring in them.

Economic Geology.

Occurrences within the subdivision of minerals of economic interest may now be briefly discussed under the headings of (1) Copper and Molybdenum, (2) Lead and Zinc, (3) Alluvial Gold, (4) Coal, (5) Materials for Lime and Cement, and (6) Petroleum. Owing, however, to the fact that the results of sample analyses are yet not to hand, definite conclusions regarding the economic values of the various occurrences cannot be announced.

(1.) **COPPER AND MOLYBDENUM**.—Veins carrying ores of copper and molybdenum appear to be practically confined within the subdivision to the Mount Radiant Range and its southern continuation, Mount Scarlett.

Of those veins of which mention was made in the last annual report little need be said. No further visit has been paid to any of these veins, with the exception of the New Anaconda reef, upon which a more elaborate sampling was undertaken by the Survey, about two tons of ore being removed in the process. In doing so a better exposure was made of the vein, and some fresh light thrown on its structure.

New Anaconda Reef.—The vein shows a maximum width of 19 ft., its western wall being well-defined, with a strike of 165° (true), and an apparent steep easterly dip. Its eastern or hanging wall presents a series of veinlets and stringers roughly parallel to the main vein, and hence is not so well defined. The main ore-streak has a strike coincident with that of the vein, and is well exposed at the southern end of the outcrop, where its width varies from 2 ft. 8 in. to 6 ft. 4 in. The vein has recently been rendered more accessible by the construction of a well-graded foot-track from the mouth of Specimen Creek.

Johnson River.—Indications of copper and molybdenum were observed in Johnson River above Fugel Creek. Here, at an altitude of 2,230 ft., a vein formation 5 ft. 3 in. in width shows a number of 2 in. parallel stringers crossing the river-bed with a north-easterly strike and steep south-easterly dip. Several of the stringers carry small branches of pyrite and chalcopyrite, with traces of molybdenite. Lower down the river as far as Fugel Creek similar veinlets are occasionally encountered.

Fugel Creek.—At the mouth of Fugel Creek, at an elevation of 2,150 ft. above sea-level, a 6 in. to 9 in. vein with north-easterly strike and dip of 40° to the south-east is exposed for a distance of 15 ft., and is highly impregnated with pyrite, chalcopyrite, and molybdenite, and their oxidation products. The metalliferous contents are fairly constant in quantity throughout the whole length of the exposure.

Gold Creek.—Near the head of Gold Creek, a left-hand branch of Fugel Creek, at an elevation of 3,560 ft., a vein of 2 ft. 3 in. in width is exposed along its strike for 16 ft. It strikes 76° true, and dips steeply north. The quartz gangue is of a flinty appearance, frequently stained rusty, and carries a little chalcopyrite and pyrite both finely disseminated and in small bunches an inch in thickness. Traces of molybdenite were also observed. Lower down, at an elevation of 2,530 ft., a vertical vein 18 in. wide with strike of 26° true outcrops in the stream-bed. Throughout the quartz gangue chalcopyrite with a little molybdenite is disseminated along fracture planes parallel to the strike of the vein. Melanconite and bornite are also present.

(2.) **LEAD AND ZINC**.—On the crest and slope of Mount Gorgeous, a lateral range from Mount Radiant that flanks Johnson River on its south-western side, a well-defined vein was noted by the Survey. It has a northerly strike, with a dip of about 30° to the west, its well-defined hanging-wall showing down the mountain-side for 30 ft. The width at the top is 18 in., increasing to 7 ft. at the bottom of the outcrop. It is said to carry large bunches of galena and zinc-blende. Samples taken by the Survey showed small amounts of these minerals.