

## PALÆOZOIC ROCKS.

*Lower Aorere Series.*—Rocks probably of Lower Ordovician age cover a considerable area in the western part of the subdivision and also a small area near the north boundary. Near Lyell a thick series of greywacke, argillite, phyllite, and slate, in places altered by granite to hornfels, outcrops over the greater part of the basins of Lyell and New creeks. The rocks, which are much jointed, strike meridionally and dip steeply east and west. In place they contain bedded quartz veins, some of which are payably auriferous. The quartz veins and the containing country of Lyell and Reefton are closely similar, and all writers have correlated them.

Greywackes and finely banded argillites on the Matiri-Wangapeka divide strike north-north-east, and dip east and west at angles up to 75°. They contain quartz veins and, together with similar rocks at Lyell, are correlated with the Aorere Series of Lower Ordovician age.

*Rocks of Doubtful Age.*—Thick beds of altered sediments consisting of thin bands of quartzite and semi-phyllite outcrop in the basin of Mole River, a branch of the Matakitaiki draining the south-west corner of Rotoroa Survey District. These rocks, which contain no internal evidence of their age, do not resemble those of Raglan and Ben Nevis ranges, or those of the Aorere, Mount Arthur, and Haupiri series of the Motueka Subdivision.

## TERTIARY ROCKS.

The subdivisions of the Tertiary described in Bulletin No. 17 are applicable to the present area, though the thicknesses of the individual groups differ considerably in the two areas.

*Hawk's Crag Breccia.*—On the divide between the Wangapeka and the Matiri rivers one mile north-north-west of Trig. W, is a small outlier of a breccia resembling the Hawk's Crag breccia, and consisting of angular and subangular fragments, pebbles, and boulders (up to 4 ft. 6 in. diameter) of greywacke, argillite, quartz, and schistose rocks, set in a gritty matrix, the whole resting on greywacke and argillite. Interbedded with the breccia are minor bands of shale, carbonaceous shale, and sandstone. Half a mile south of Trig. W, the breccia again outcrops, and here is about 150 ft. thick. Grits, sandstones, shale, and a thin seam of sub-bituminous coal of the Brunner beds overlie the breccia.

*Brunner Beds.*—The Brunner beds are poorly represented in the area here considered, and from an economic point of view are here regarded as valueless. They outcrop near Trig. W and again six miles due south in a tributary of the Matiri flowing from Trent Peak. Here a succession of strata rests on granite, the lowest beds consisting of about 15 ft. of arkositic grits and fine conglomerate, with angular, and subangular granite and quartz pebbles, occasionally as much as 12 in. in diameter. An indurated sandstone, 1 ft. thick, rests on the above, and is overlain by sub-bituminous coal 2 in. thick, followed by shale and arkositic sandstones. The total thickness of the Brunner beds is here about 35 ft., but a mile and a half south-west of Mount Murchison Trig. these beds are 700 ft. thick, including perhaps some of the overlying Kaiata beds. In this locality the Brunner beds consist of a series of conglomerates, sandstones, arkositic grits, and carbonaceous shales.

*Kaiata Beds.*—Overlying the Brunner beds in the above-mentioned tributary of the Matiri River are carbonaceous mudstones 700 ft. thick, concretionary in the lower portion, and smelling distinctly of oil on fresh fractures. The mudstone yielded a few Eocene fossils. Mottled, slightly calcareous mudstone, 1,000 ft. thick, overlies and is followed by a band of conglomerate containing well-rounded pebbles, up to 1½ in. in diameter, of sandstone, mudstone, quartz, and granite. This horizon is considered to represent a mild disconformity at the close of the Eocene.

*Lower and Middle Oamaruan Beds.*—Gritty sandstones containing quartz and granite pebbles rest with disconformity on the Kaiata beds. Above them are sandstones, followed by claystones and marl, passing into a limestone band containing fragmentary fossils as well as mudstone pebbles. In the upper Matiri basin these beds are 2,000 ft. thick, and are followed by 1,500 ft. of mudstone and banded sandstone, all more or less calcareous, and capped with a limestone band. Some of these beds show subaqueous gliding. The limestone outcropping at the limestone-crusher site a mile west of Murchison is considered contemporaneous with this upper limestone band. Here it overlies some 6,000 ft. of mudstones and argillaceous sandstones, all more or less calcareous. This sequence appears to be unbroken, but there are faults in the locality and some of the beds may be repeated. Mudstones probably of this age outcrop in the Mangles-Grassy valley near Mr. McAuliffe's house, in the Blackwater Valley, and in the Matiri Valley near the Sandstone Creek junction. Limestones of Middle Oamaruan age outcrop at the bridge across the Buller two miles below Lyell, at Brown Creek, at a point two miles up the Glengarry from its junction with the Maruia, in Taylor Creek, and at the bluffs at Trig. G in the Tutaki Survey District. Most of these limestones contain angular granitic pebbles and boulders. Though the limestones are represented in many localities, elsewhere in beds of the same age they are absent.

*Upper Oamaruan Beds.*—The beds of this age consist of banded sandstones, argillaceous sandstones, and mudstones, followed by arkositic sandstones, grits, and conglomerates, with shale and coal-seams. The banded sandstones are exposed close to Murchison in the hills west of the Matakitaiki. Here they overlie the limestone of the Middle Oamaruan Series. They outcrop in the Mangles Valley up-stream from the Blackwater, and again in the upper Mangles Valley, where they are 4,000 ft. thick and overlain by conglomerates. The conglomerates, with the associated sandstones, grits, shales, and coal-seams, are thickest north of the Buller from Murchison to Longford; 6,000 ft. of strata are exposed, but faulting may have increased the apparent thickness of these beds.

*Pleistocene and Recent.*—The deposits of Pleistocene age consist of varved clays and silts and fluvio-glacial and fluvial gravels. Varved clays are common near Murchison, outcropping at various