

places along the Buller River. They also outcrop in the Te Wiriki Valley, a tributary of the upper Mangles, and in the headwaters of the Glengarry. Fluvio-glacial greywacke boulders are scattered from the Tiraumea-Mole saddle to and beyond the Mangles-Nuggety Creek saddle. Fluvial gravels are found from the present drainage-level to a height of 1,200 ft. above it.

IGNEOUS ROCKS.

Granite forms a great part of the mass of the highlands in the western portion of the subdivision. The granite of the Lyell Range and Mount Newton, north of the Buller, extends south of that river and covers nearly the whole of Maruia Survey District. In the Big Deepdale Valley the granite is gneissic. Basic dykes and schlieren, as well as veins of pegmatite and quartz, are common. In the basins of Lyell and New creeks the Ordovician sediments intruded by this granite contain basic dykes, no doubt derived from the same magma.

Mount Murchison is formed of the granite that extends across the Buller from the Hope Range. This granite is not the same as that of the western mountains.

More basic plutonic rocks, consisting of diorite, quartz diorite, and basis granite, outcrop over much of the western part of Rotoroa Survey District.

ECONOMIC GEOLOGY.

Coal.—Coal outcrops in several localities, and has been worked to a small extent near Longford and in the lower Maruia Valley. The Longford coal, which forms a friable coke, is excellent for household purposes and for steam-raising. The local demand is small, but when gold-dredges were at work in the district several thousand tons were mined yearly. Now that the railway from Nelson has reached the Buller, coal is likely to be regularly mined to supply that market.

In all about eight seams are known, but some of these are crushed or are too thin to work. The coal-measures extend from the Matakita-Glenroy junction northward to the Owen, but it is in the locality from Owen to Longford that the coal appears to offer the best prospects.

Gold.—Since about the year 1862 gold has been obtained in the Murchison and Lyell districts. The richly auriferous gravels of Lyell Creek derived their gold from the quartz veins outcropping in its basin. About 1870 quartz-mining here became an important industry, and several rich leaders and ore-shoots were discovered. The most noteworthy mine was the Alpine which, for a period, paid handsome dividends, returning to the shareholders £74,267 to the end of 1896. The Little Wonder, Tyrconnel, and other leader claims were exceptionally rich; the first-mentioned from October, 1872, to January, 1873, yielded 1,573 oz. of gold from 185 tons of stone. Gold-production fell off in 1889 and continued to decrease till 1910, when mining ceased. The bedded reefs are similar to those of Reefton, but the area is perhaps most noteworthy for the extremely rich leaders.

The beaches and terraces of the Buller, Matakita, Maruia, and Mangles rivers, and of some of the tributaries of these rivers have been worked from time to time, and from 1892 till 1904 dredging operations were in progress on the two first-mentioned rivers. There are still a few old alluvial miners in the district who eke out their pensions by occasionally washing for gold.

Mineral Oil.—Oil seeps from mudstone near Mr. McAuliffe's house in the Mangles-Grassy valley, and from sandstone near the Blackwater-Mangles junction. Distinct traces of oil can be obtained at several other localities, and gas emanations are not uncommon. The mudstones of the Lower Oamaruan and Kaiata beds at places smell strongly of oil on fresh fracturing.

The Murchison Oil Co. has drilled a hole to 4,085 ft. in the Mangles Valley, but so far has been unsuccessful in producing oil, though traces have from time to time been obtained.

Limestone.—Lime for agricultural uses is crushed at Brown Creek, on the main road from Murchison to the West Coast. The stone is tough and has a high lime content. Other outcrops of similar stone occur within the subdivision, but are difficult of access.

Roadmaking-materials.—Granites, greywackes, and allied rocks, plentiful within the area, yield excellent roadmaking-material, but the terrace-gravels and river-shingles are chiefly used on the roads.

6. PALÆONTOLOGICAL WORK, 1927-28.

(By J. MARWICK.)

During the past year work has been continued on the Tertiary Mollusca. Many collections have been examined from Gisborne-East Cape districts, also from Hawke's Bay and Wairarapa. The description of many new species is necessary for the discussion of the faunal relations of the different formations involved, and this work is being proceeded with as opportunity offers.

In January a visit was paid to the Frasertown-Waikaremoana district. Collections were obtained from a number of localities, but unfortunately no good ones could be got from the lower beds. The fauna of the upper limestone along the Mangapoike strongly resembles that of the Te Aute Limestone of Hawke's Bay, and also agrees with the Waitotaran stage of the Wanganuiian—i.e., Lower Pliocene.

Other collections were made in the Mangawhero Valley. The fossils appear to be somewhat younger than those in the Waikare-Taheke Valley, but they are not a typical Petane assemblage.

The policy of building up a collection of foreign mollusca has been continued, and last year collections were exchanged with Ceylon and with Western Australia.

Publications: "The Tertiary Mollusca of the Chatham Islands, including a Generic Revision of the New Zealand Pectenidæ" (Trans. N.Z. Inst., vol. 58).

Since the 5th March I have been on leave from the Geological Survey, relieving Dr. Cotton at Victoria College.