

The green greywackes and schistose argillites that form the upper part of the Haupiri Series are interbedded with bands of black phyllite, which increase in number and thickness upward till they constitute the main mass of the strata. These black phyllites are the most characteristic rock of the Mount Arthur Series. They are usually calcareous, and at many points pass into thick bands of marble. In places they are strongly siliceous and grade into dark quartzite. The Mount Arthur rocks lie east of the belt occupied by Haupiri strata. They are much contorted and confusedly crumpled. In the southern part of the subdivision they form a syncline, of which, in the northern part, the western limb only is present. Graptolites were collected from the Mount Arthur rocks near the top of Lodestone Peak and on the track along Flora Stream, a headwater branch of Takaka River.

Most previous writers on Nelson geology have placed the rocks of the Mount Arthur Series below those of the Aorere Series, but they occupy a much higher stratigraphical position, as will be fully set out in the detailed report now being prepared.

The youngest Palæozoic rocks, the Baton River Series of McKay, in the typical section along the Baton River, are dark calcareous argillites. They grade downward into light-coloured blue and green argillites, more or less schistose, and these in turn are underlain by the black phyllites typical of the Mount Arthur Series. North and south from the Baton River the calcareous argillites grade laterally into calcareous quartzites and quartzites interbedded with bands of marble and dark argillite. The Baton River rocks occupy the trough of the syncline of Mount Arthur strata extending from the Wangapeka to the Baton River, north of which they are not known to occur. In the Wangapeka district they appear to rest unconformably on the Mount Arthur rocks. The fossils of the Baton River Series indicate a Middle Silurian (Wenlock) age.

The Tertiary rocks consist of arkositic grits and sandstones grading up into sandy limestones, which in turn are overlain by argillaceous sandstones and mudstones. There are several considerable areas of Tertiary strata in the western highlands preserved from denudation by occupying fault-angles or trough depressions. Tertiary rocks also outcrop along the western edge of the depressed eastern portion of the subdivision from the southern boundary north to within three miles of the junction of the Wangapeka with the Motueka River.

The Moutere gravels, a vast mass of river deposits occupying the relatively low eastern half of the subdivision, were laid down after the main block-faulting at the close of Tertiary times had ceased. These are now crossed by numerous valleys, of which the terraces and flood-plains, together with similar deposits along the mountain-valleys, form the Recent and younger Pleistocene deposits of the district.

Basic dykes occur at many points in the Palæozoic beds of the subdivision. They are especially numerous in the Haupiri Series, in which also are large intrusive masses of basic and ultrabasic rocks in part altered to serpentine. Two large patches of these rocks covering several square miles are exposed in Flora Survey District. Another mass of basic and ultrabasic rocks, elongated like a huge dyke, extends northward from the Baton Valley through the valleys of the Pearce, Graham, and Pokororo streams into that of Riwaka River. This mass is intruded in Mount Arthur strata.

Granitic rocks, intrusive into Palæozoic strata, occupy three separate areas. A batholith of grey granite lies along the western border of the subdivision. Another great batholith forms the eastern edge of the western highlands. A much smaller mass of granite containing large phenocrysts of pink feldspar occurs in the middle part of the basin of Crow River.

Economic Geology.

Alluvial gold was formerly obtained from the beds and terraces of many of the streams of the western highlands and the western edge of the lowlands. Its immediate source is either the gold of the quartz lodes traversing the ancient rocks, or the detrital gold contained in the basal Tertiary rocks, or both. Some of the quartz veins are known to be auriferous, a few have been prospected, but at present not one is being worked.

Grains of platinum or of alloys of the platinum metals occur with the alluvial gold in some localities.

Thin seams of coal are present in the basal Tertiary rocks of the middle part of the Baton Valley. They are much faulted and have no commercial value.

Chrysotile-asbestos occurs in quantity in the more northerly mass of ultrabasic rock present in Flora Survey District. The deposit has been known for many years, and from time to time has been prospected and even worked in a small way. At present it is reached by a sixteen-mile bridle-track through the mountains, but until much better access is given it cannot be profitably worked.

Talc and magnesite are associated with the ultrabasic rocks of the subdivision, chiefly in the large masses in Flora Survey District, where also chromite occurs in irregular segregations, streaks, and lenses.

In places the marble occurring in the subdivision contains too much sand for easy working as a building-stone, but there are large masses of light- and dark-grey marbles suitable for quarrying were they more readily accessible. The most easily reached deposit examined last season is that occurring along the south side of the south branch of Graham River and outcropping about a mile from the end of the road along that stream. It consists of light-coloured coarse-grained stone. Northward, in an area proposed to be examined next season, very large areas are covered by marble.

The other building-stones of the district are ultrabasic rocks, serpentines, and granites. The ultrabasic rocks are hard and dark-coloured, and the occurrences in the Baton and Graham valleys are readily accessible. Beautifully mottled serpentine occurs in Flora Survey District, and a fine granite with large pink feldspars in the valley of Crow River; both deposits are too difficult of access to be of commercial value. Grey granite outcrops at many points along the eastern edge of the highlands. Though it is generally deeply weathered, faces of fresh rock could readily be opened.