NICOLA PROJECT

(92I/2b, c, g, h)

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INTRODUCTION

The early part of the 1977 field season was spent mapping an area west of Craigmont mine in Promontory Hills at scale 1:12 000. Later mapping at scale 1:15 840 was begun to tie on to previous work done by Preto (1974, 1975a, 1975b, 1976). Much of the area south of Nicola Lake and the highway from Quilchena to Merritt, including part of Iron Mountain, was completed. This was previously mapped by Cockfield (1948) and Schau (1968).

MAP SHEET 92I/2h

Along Nicola Lake, working westward from Quilchena (Fig. 5), outcrops are amygdaloidal to massive grey lavas. These are generally porphyritic with 20 to 40 per cent medium-grained augite phenocrysts in a matrix of felted very fine-grained plagioclase laths. Both are set in a chilled groundmass which is either K-feldspar rich or K-feldspar free. Near Quilchena, there are local areas of moderate to intense epidote alteration but rock textures frequently survived. Westward the rocks are massive to well-foliated greenstones grading to green schists. Small areas are flooded by epidote alteration. Remnant augite crystals and textures in less altered and deformed areas indicate that the country rock was augite porphyry with rare augite crystal tuff layers. Amygdaloidal and vesiculated flows appear to have been uncommon. About 8 kilometres west of Quilchena, a narrow fault wedge carries a mixed assemblage of fragmental volcanic rocks and volcaniclastic grits with local argillaceous limestone lenses. For approximately 0.8 kilometre west of the fault wedge, mixed volcanic sandstones, grits, and argillites are interbedded with volcanic breccias and andesitic lavas. This sequence gives way westward to a series of massive to porphyritic andesitic lavas with scattered breccia zones.

Southward, up the slope overlooking Nicola Lake, in fault block A, the sequence is more complex. A zone of similar amygdaloidal augite porphyritic flows comprise the easternmost outcrops but they have brick red matrices and probably represent subaerial flows. Westward, amygdaloidal flows similar to those seen on the highway occur. These are affected by a zone of moderate to intense epidote veining and 'flooding' which appears to trend northeast across the area to roughly coincide with the transition zone from grey to red augite porphyry. Further to the west there is another narrow zone of red, often amygdaloidal, massive to foliated augite porphyry, then massive to foliated grey augite porphyry. These in turn give way to relatively acidic flows and fragmental volcanic rocks which continue to the bounding fault. Reliable strike and dip measurements are lacking but lithologic units seem to have northerly trends.

In contrast, near the bounding fault foliation surfaces and bedding, where seen, typically strike southeast subparallel to the fault. The foliation appears to be of tectonic origin and, locally, kink folds are well developed.

In fault block B, massive red and grey augite porphyries, which are intruded by narrow bodies of diorite, give way westward to a mixed assemblage of intermediate volcanic breccias and augite porphyry flows (?) with occasional limestone layers. Westward again are augite porphyry, andesitic volcanic rocks, and relatively acid massive to fragmental volcanic rocks. The acid and more basic members appear to intertongue. Layers of sandy to silty volcaniclastic rocks and crystal tuff within the andesitic members indicate that the sequence has a northerly to northeasterly strike with steep dips. Intrusions of diorite and porphyritic microdiorite cut the acid and intermediate rocks. Finer grained parts of the intrusions strongly resemble associated andesitic flows, consequently the two are not always distinguishable. The intrusions appear to crosscut the lithology and may represent volcanic feeder dykes.

West of fault block B is a unit composed dominantly of interlayered andesitic flows and volcanic breccias. Two major and one minor reefoid limestone members crop out within this unit and are excellent marker beds, although they are discontinuous on a regional scale. Fragmental rocks vary from grey to red in colour and include sedimentary, flow, and pyroclastic breccias. One breccia which has proven to be useful in mapping has scattered limestone lenses and clasts as well as volcanic clasts. When the unit is traced northward, the limestones pinch out, the relative proportion of andesitic flows decreases, and there are significant thicknesses of volcanic sandstone, grit, and some argillite. Westward, to the edge of the map sheet are dark coloured massive andesite to plagioclase porphyry lavas and volcanic breccias. Breccias in this unit are often monomictic, carrying plagioclase andesite fragments which resemble adjacent flows. Polymictic volcanic breccias form discontinuous layers locally and are useful marker beds.

Interpretation of faults in the area south of Nicola Lake is based on lineaments, changes of lithology, and changes in orientation of lithologic layering (Fig. 5). Along the fault bounding blocks A and B, changes in strikes suggest a right lateral offset. Judging from the regional setting, younger reverse or normal movement is also likely.

Correlating these rocks southward, all the rocks in fault block A would be placed in Preto's Central belt whereas those in fault block C would be Western belt. Rocks in fault block B are problematical because there are quartz-bearing acidic members but in view of the dioritic intrusions and red to grey augite porphyry flows, they most reasonably correlate with Central belt rocks.

SHEET 92I/2g

Continuing westward from sheet 2h to 2g, mixed andesite flows and breccias continue to a major northwest-striking fault. Marker beds and breccia-flow contacts generally trend north to north-northwest, east of the fault but consistently strike northeast, west of it. West of the fault, the southeast corner of the map sheet is dominated by polymictic and monomictic breccias. Northwestward, breccias become uncommon and there is a sequence of monotonous plagioclase porphyritic andesites with minor amounts of breccia, rare skarn lenses, and, near Nicola, argillite interlayers.

SHEETS 92I/2b, 2c

Mapping was continued near Garcia Lake west of the area studied previously by Preto and was extended westward to Iron Mountain. Work in this area was not completed during the field season. On sheet 2b,

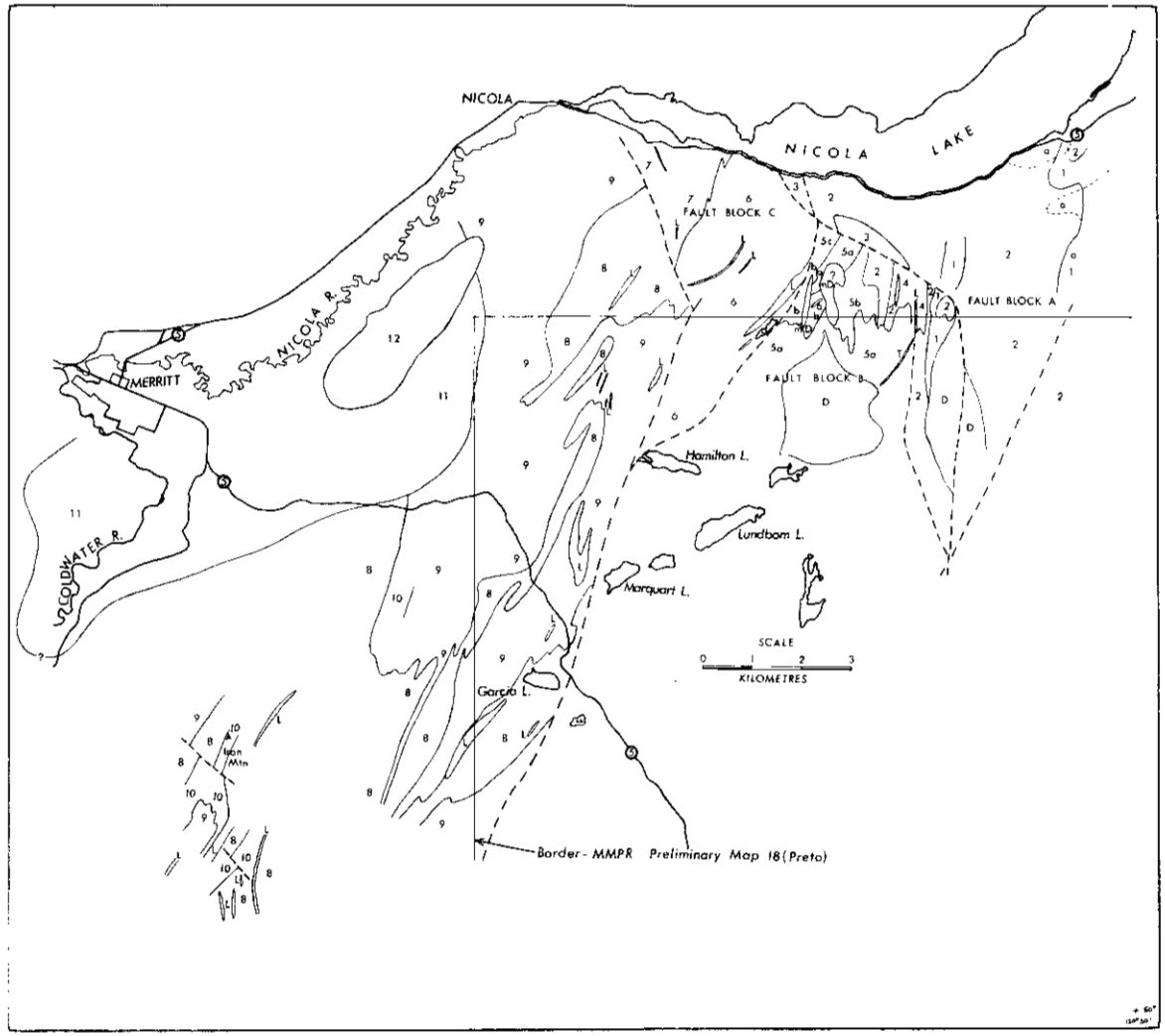

Figure 5. Geology of the Nicola Group south of Merritt (NTS 92I/2b, 2c, 2g, 2h)

LEGEND

NICOLA GROUP

FAULT BLOCK A

(LOCAL MODERATE TO INTENSE EPIDOTE ALTERATION)

1 RED, GENERALLY AMYGDALOIDAL (a) AUGITE PORPHYRY FLOWS

2 AMYGDALOIDAL (a) TO MASSIVE AUGITE PORPHYRY, CHLORITE SCHIST DERIVED FROM AUGITE PORPHYRY, RARE AUGITE CRYSTAL TUFF

3 FRAGMENTAL VOLCANIC ROCKS OF INTERMEDIATE COMPOSITION, MINOR ARGILLITE

FAULT BLOCK B

(LOCAL MODERATE EPIDOTE ALTERATION)

4 INTERMEDIATE VOLCANIC BRECCIA, INFREQUENT LIMESTONE (L) AND TUFF (T) LAYERS, AUGITE PORPHYRY (2)

5 AUGITE PORPHYRY, ANDESITIC FLOWS (a), ACID VOLCANIC ROCKS AND BRECCIA (b), LESSER CLASTIC VOLCANIC SEDIMENTARY ROCKS (c)

D DIORITE, MICRODIORITE (mD)

FAULT BLOCK C

6 INTERLAYERED ANDESITIC FLOWS AND INTERMEDIATE RED TO DARK GREY BRECCIAS, TUFFS, REEFOID LIMESTONE (L), VOLCANIC SANDSTONE TO GRIT

FAULT BLOCK C *(continued)*

7 INTERLAYERED ANDESITIC FLOWS AND INTERMEDIATE, OFTEN MONOMICTIC, VOLCANIC BRECCIAS

8 VARIABLY PORPHYRITIC PLAGIOCLASE ANDESITIC FLOWS; MINOR INTERLAYERS OF VOLCANIC BRECCIA, SKARN, AND ARGILLITE

NICOLA TO GARCIA LAKE TO IRON MOUNTAIN

8 VOLCANICLASTIC ROCKS AND VOLCANIC BRECCIA OF INTERMEDIATE COMPOSITION; LOCAL ANDESITIC FLOWS

9 ANDESITIC FLOWS; LOCAL BRECCIA, BLEACHING AND LIMESTONE PODS (SOME IS REEFOID), MINOR ARGILLITE

10 VOLCANIC ROCKS AND BRECCIAS OF ACIDIC COMPOSITION

COLDWATER SERIES

11 SANDSTONE, SHALE, COAL

PLATEAU LAVAS (MIOCENE ?)

12 BASALT

SYMBOLS

FAULT . . . . . 

GEOLOGICAL CONTACT . . . . . 

andesitic flows and intermediate volcanic breccias predominate but there are also pods and layers of barren to fossiliferous limestone and, in some areas, massive to brecciated acidic volcanic rocks. Local bleaching and epidote alteration of pyritic andesites can produce rocks which closely resemble these acidic members.

Close to Iron Mountain, there is an assemblage consisting of intermediate volcanic breccias, amygdaloidal andesitic flows, red to green flow-banded to brecciated acidic volcanic rocks and reefoid limestones.

In both these areas flow layering and bedding trend north-northeast (about 020 degrees).

COLDWATER SERIES

Coal-bearing sandstones and shales of the Cretaceous (?) Coldwater series form the Merritt coalfield which underlies Nicola River valley and laps onto the hills to the south in the area between Merritt and Nicola. Bedrock exposures in the coalfield are very limited but on the west at least the coal-bearing series appears to unconformably overlie oxidized Nicola volcanic rocks. No other outcrops were found near the coalfield border but work done by White 30 years ago (*Minister of Mines, B.C.,* Ann. Rept., 1946, pp. 250-280) suggests that it is locally faulted.

MIOCENE (?) LAVAS

Plateau basalts of Miocene (?) age unconformably overlie rocks of the Coldwater series south and west of the village of Nicola. The plateau basalts form a broad, flat-topped hill faced by a scarp along the southwest side of Nicola River valley. Apparently, the base of the basalts dips northwest and the basalt outcrop is probably wedge shaped in cross-section, thickening northwestward.

REFERENCES

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