NICOLA PROJECT – MERRITT AREA
(92I/2)

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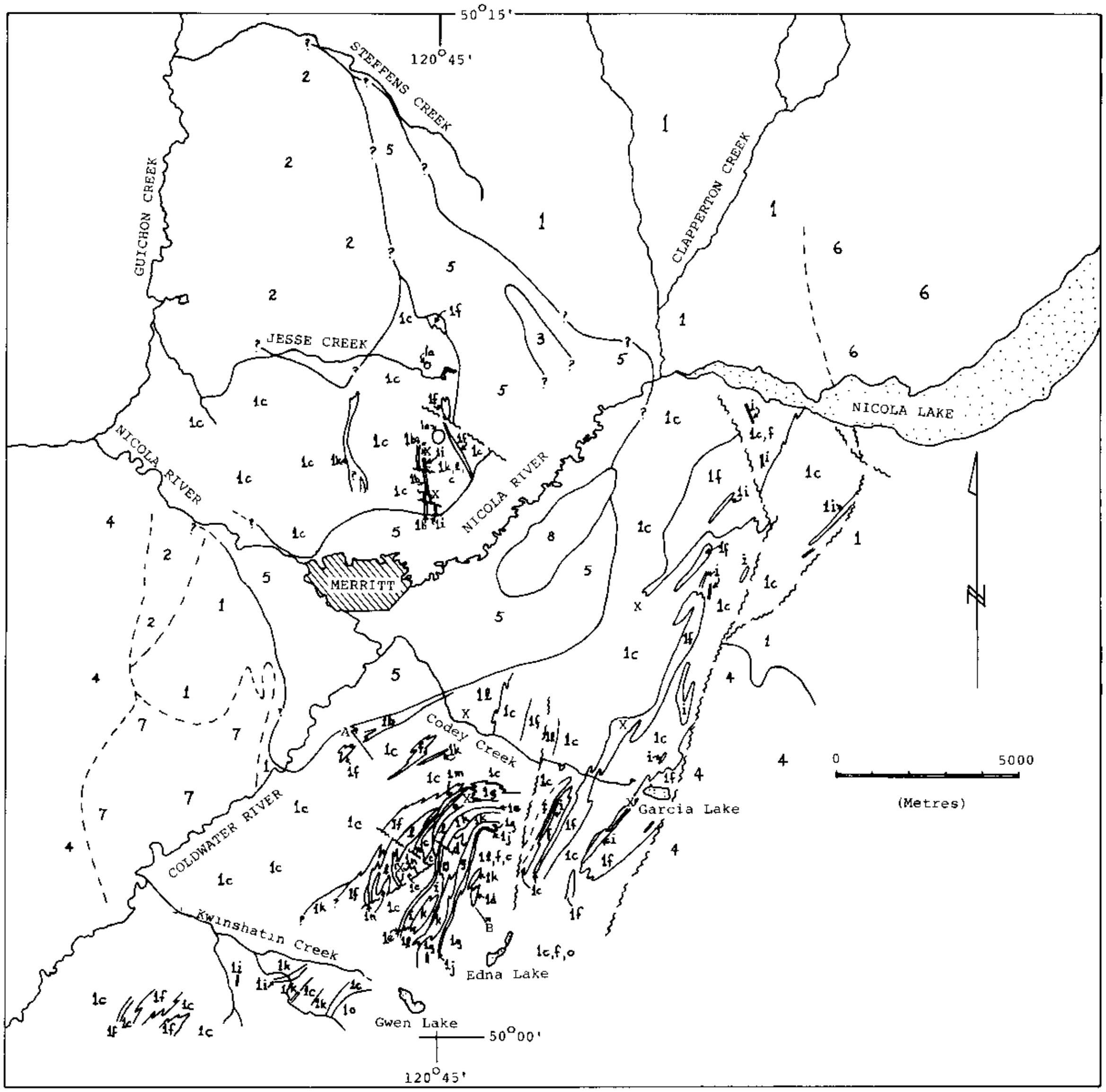
Mapping at scale 1:15 840 was continued in rocks of the Nicola Group both south and north of the town of Merritt.

South of town, on Iron Mountain, considerable time was spent unravelling the tectonic and stratigraphic picture (Fig. 13). An excellent section is exposed which is roughly 5 000 metres thick. 'Way up' or 'tops' were well defined by crossbedding, scouring, and graded beds. Because outcrops are relatively abundant, it was possible to document lateral facies variations which otherwise would undoubtedly have been attributed to faulting. The following description concentrates on the section exposed on Iron Mountain, other areas studied will be described in notes accompany preliminary maps which are in preparation.

As can be seen on the section (Fig. 14), the basal unit exposed is microdiorite of unknown thickness which is overlain by a unit roughly 1 500 metres thick comprised predominantly of basaltic andesite. The andesitic unit contains zones dominated by flow breccia and mappable zones of andesitic volcanic breccia. Uncommon interlayers of dacitic tuff and welded tuff occur. Near the top of the unit andesitic breccias become widespread and in many areas give way upward to andesitic breccias carrying some acid volcanic clasts. These 'rhyolite' andesite breccias are overlain by, and interfingered with, rhyolitic breccias, dark-coloured relatively potassium-rich rhyolitic lavas, and lesser amounts of distinctive chloritic fragment acid breccias (ash flow tuffs ?) and andesitic breccia. Further south andesitic flows give way up-section to K-rhyolites with no intervening breccias. Generally, K-rhyolitic flows overlie the mixed breccias or are separated from them by thin to thick chloritic fragment acid breccias. Preliminary chemical analyses indicate compositions ranging from rhyolite to dacite for rocks mapped as K-rhyolite in the field.

The acid lava and acid breccia zone is overlain and wedges out southward into basaltic andesite flows. That is, the acidic zone comprises a composite domal body which has basic flow rocks both above and interfingering with it. Within the basic flows periods of quiescence were marked by deposition of argillaceous limestone and periods of explosive activity by felsic tuffs and breccias. To the northeast the basic flows pinch out and the rhyolitic zone is overlain by a sequence of sandy to pebbly volcano-sedimentary rocks with areas of limestone breccia which in turn is overlain by a thin but persistent impure limestone. Further northeast, both the rhyolitic succession and overlying sedimentary rocks abut against an andesitic lapilli to bomb breccia unit which forms a large, irregularly lensoid body in andesitic to basaltic country rock. Overlying the breccia is the same thin persistent limestone that overlies the adjoining rocks. Volcanic breccias with predominantly acid clasts overlie the limestone. These volcanic breccias appear to be of both pyroclastic and reworked pyroclastic origin.

An excellent marker unit consists of variably feldspathic, often quartz-bearing, red accretionary lapilli tuff. It has been reworked locally but persists along a strike length of at least 8 kilometres. To the south it overlies basic volcanic rocks and is overlain by limestone bodies; to the north it is overlain by mixed andesitic to acidic volcano-sedimentary rocks and breccias containing fossiliferous, locally crossbedded,



LEGEND

QUATERNARY OR YOUNGER PLATEAU BASALTS (585 000±350 000 YEARS)
8 BASALT
EOCENE (?) KAMLOOPS GROUP (?)
7 VOLCANIC FLOW AND FRAGMENTAL ROCKS
PALEOCENE TO EOCENE NICOLA BATHOLITH
6 QUARTZ DIORITE TO QUARTZ MONZONITE
CRETACEOUS TO EOCENE COLDWATER SERIES
5 CONGLOMERATE, SANDSTONE, SHALE, COAL
CRETACEOUS KINGSVALE GROUP
4 VOLCANIC FLOWS AND PYROCLASTIC ROCKS, ARKOSE, CONGLOMERATE
JURASSIC (?) CONGLOMERATE
3 CHERT PEBBLE CONGLOMERATE
TRIASSIC/JURASSIC INTRUSIVE ROCKS
2 GRANODIORITE, QUARTZ DIORITE, QUARTZ MONZONITE
LATE TRIASSIC NICOLA GROUP (NOT LISTED IN AGE SEQUENCE)
1 UNDIVIDED
1o VOLCANIC SEDIMENTARY ROCKS AND TUFFS
1n K RICH ACIDIC LAVA AND BRECCIA
1m LAPILLI TO ASH CHLORITIC CLAST ACIDIC BRECCIA (ASH FLOW TUFF ?)
1l ACIDIC VOLCANIC BRECCIA, SOME WITH ANDESITIC CLASTS
1k K–POOR ACIDIC LAVAS, BRECCIA, AND TUFF
1j REEFOID FERRUGINOUS CEMENTED LIMESTONE
1i MASSIVE TO BEDDED OFTEN FOSSILIFEROUS LIMESTONE
1h INTERLAYERED ARGILLITE, IMPURE TO PURE LIMESTONE, SILTSTONE SHARPSTONE VOLCANIC CONGLOMERATE, AND ACIDIC VOLCANIC BRECCIA
1g RED TO PURPLE ANDESITIC BRECCIA
1f GREY TO GREEN ANDESITIC BRECCIA
1e QUARTZOFELDSPATHIC ACCRETIONARY LAPILLI TUFF, GENERALLY HAS A RED MATRIX
1d GREEN TO GREY–GREEN PLAGIOCLASE LITHIC LAPILLI TO ASH TUFF AND BRECCIA
1c DARK–COLOURED ANDESITIC TO BASALTIC FLOWS AND FLOW BRECCIAS
1b MICRODIORITE
1a DIORITE

SYMBOLS

GEOLOGICAL CONTACT MAPPED, PROJECTED
GEOLOGICAL CONTACT IN AREAS NOT YET EXAMINED*
FAULT
METALLIC MINERAL SHOWING X

*After Cockfield (1948) or Schau (1968).

Figure 13. Geology of the Nicola Group near Merritt (92I/2b, 2c, 2f, 2g).

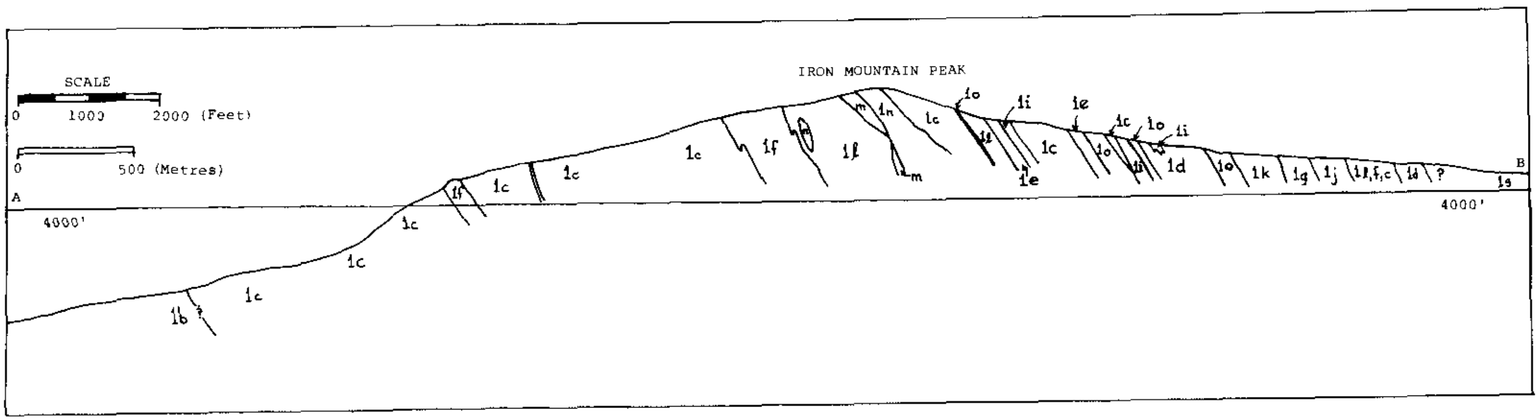


Figure 14. Geological cross-section A–B, Iron Mountain (for location *see* Fig. 13).

limestone layers. In the northeast the top of this sedimentary unit is a distinctive golden brown-weathering argillite-shale-sandstone succession, ranging in thickness from a few to about 10 metres. Abundant halobid pelecypod and a few poorly preserved ammonite impressions were collected in the silty shale beds.

Above the sedimentary unit to the northeast and within the limestones to the south are lensoid bodies of green to dark grey, potassium-poor, siliceous volcanic rocks. A single chemical analysis indicates that the rock is dacite but more analyses are needed to define its range in composition. East of Iron Mountain peak, the dacite interfingers with dark green, massive to bedded to fragmental plagioclase-bearing crystal lithic tuffs and flows (?). Relationships between the dacite and the feldspathic volcanic rocks are obscured by faulting but they appear to be interlayered. The feldspathic volcanic rocks appear to be largely of pyroclastic origin but, because they contain lenses of limestone, they were evidently deposited in a submarine environment. The rock type variations resemble those of subaerial cinder cones; perhaps this unit formed a shallow marine cinder cone. Many porphyritic dykes cut the underlying rocks, fewer cut rocks of the 'cinder cone.'

Red sandstones which give way to red to purple volcanic breccias overlie the dacite/feldspathic volcanic zone. Bombs and broken bombs are recognizable in the red to purple andesitic breccias. These give way up section to a calcareous reefoid unit in which calcareous organic remains lie in a dark hematite red matrix. Fossils comprise corals, bryozoa, crinoid columnals, brachiopods, and pelecypods. Thickness of the reefoid unit varies considerably but it is laterally persistent along a strike length of about 4 kilometres. The rocks up section are a mixed assemblage of acidic breccias, grey to purple andesitic breccias, andesitic flows and tuffs, acid tuffs, some dacitic rocks as well as an area of dark green feldspathic volcanic rocks like those in the supposed cinder cone. Outcrop is poor above the reefoid unit but in some outcrops there are interlayers of the acid and basic members on a scale of several metres.

Rocks to the south on the north flank of Selish Mountain are in structural discontinuity with those of Iron Mountain. Drift cover at lower elevations masks the inferred fault zone and correlation of rock types on either side is uncertain, therefore the sense of movement on the fault could not be determined. Rocks east of Iron Mountain are also structurally discordant. For the same reasons, the sense of movement on the fault or faults is not known.

Rocks on the north flank of Selish Mountain near Kwinshatin Creek are gently folded and strikes vary from northeast to southeast. Beds generally have relatively low southward dips. It appears that the average strike is northeastward. Assuming this strike and assuming that the section is upright, the basal unit, west of the south fork of Kwinshatin Creek, consists of basaltic andesites, grey andesitic breccias, and red to purple andesitic breccias. South of the map border this succession is cut by dioritic intrusions. The andesitic unit is overlain by dacitic breccias with interlayers of andesitic breccia, limestone, and sandstone. A thin limestone separates the 'dacitic' member from overlying grey to green basaltic andesite. The andesites are overlain by more dacitic rocks then green plagioclase porphyritic andesite then a volcano-sedimentary unit. The volcano-sedimentary rocks comprise pyritic acid ash tuff, lime-cemented acidic to feldspathic volcanic sandstone and conglomerate, dacitic tuffs, and limestone pods. This unit is overlain by red andesitic breccia which gives way 'up' section to andesitic volcanic rocks southwest of Gwen Lake.

Rocks east of Iron Mountain are predominantly andesitic and basaltic andesite flows and breccias. Sporadic episodes of acidic volcanic activity occurred and during periods of quiescence limestone or silty to conglomeratic sediments were deposited. Northwest of Garcia Lake many of the basic lavas are pyritic, consequently bleached and rusty weathering zones are widespread.

Triassic rocks north of Merritt are separated from those to the south by the Cretaceous (?) Merritt coal basin. Outcrops in the coal basin are uncommon and it will not be discussed here. Above elevation 1 000 metres along the north wall of Nicola River valley, rock exposures are moderately abundant, elsewhere they are sparse. Strikes of beds are approximately north/south and dips are steep. Opportunities to make top determinations were rare and not definitive but the rocks appear to become younger eastward. Livingstone (personal communication, 1978) also found poor evidence that tops are eastward. The section is not as well exposed as on Iron Mountain but again commenced with a thick outpouring of relatively basic lava with local episodes of acidic and pyroclastic activity. After a period of andesitic pyroclastic activity and emplacement of a distinctive microdiorite either as a flow or a sill there was a period of quiescence during which feldspathic volcano-sedimentary rocks, limy siltstones, and limestone were deposited. Above the limy zone are volcanic breccias with a marked acidic component followed by a thick series of green, dacitic flows, flow breccias, pyroclastic breccias, and lesser basic lava flows. Plagioclase porphyritic dykes are locally abundant throughout the section and small dioritic intrusions occur locally.

Nicola rocks north of Merritt are cut off by the composite Jesse Creek intrusions on the north and are unconformably overlain by, or in fault contact with, a tongue-shaped body of Coldwater (?) conglomeratic sedimentary rocks and Jurassic chert pebble conglomerates on the east. Nicola stratigraphy east of the younger rocks is not yet resolved.

METALLIC MINERAL SHOWINGS

Copper, copper-iron, iron, and lead-zinc±copper showings occur in Nicola Group rocks near Merritt. Most of the copper and iron-rich types are in limy host rocks associated with dioritic intrusions or porphyry dykes and would be classified as skarns. Most mineralization seen north of Merritt (Fig. 13) was of this type. South of Merritt, deposits are more varied in character. Skarns occur but also other types including: magnetite-pyrite veins in acidic fragmental volcanic host rocks with which they have both conformable and crosscutting relationships; specularite±chalcopyrite veins cut rhyolitic and acid volcanic breccia country rock on Iron Mountain; quartz-chalcopyrite veins cut volcanic country rock adjacent to plagioclase porphyry dykes; and there are galena-sphalerite-pyrite-barite-calcite showings. The lead-zinc-barite showings occur on Iron Mountain and are of two types. An inclined shaft sunk on a showing of the first type is now inaccessible but the character of the mineralization can be inferred from material in the dump. It comprises banded veins and possibly bedded mineralization in a flow-banded, K-rich acidic lava (rhyolite) country rock. The other type of showing consists of rotated blocks of bedded, impure barite carrying small amounts of sphalerite, galena, and minor amounts of grey copper (tetrahedrite ?). Bedding in the blocks is discontinuous and contorted. The country rock consists of disrupted cherty argillite, siltstone, and an unusual limestone breccia. The limestone breccia has many rounded limestone clasts but also carries quartz clasts which appear to be fragments of quartz veins. Veinlets of barite carrying small amounts of sulphides are associated with these showings. Both types of zinc-lead-barite showings were apparently formed contemporaneously. The first type formed in association with acid volcanism in rhyolitic 'domes.' The second type are interpreted to have been transported into sedimentary basins flanking the 'domes.'

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