

GEOLOGY AND MINERAL DEPOSITS OF THE ADAMS PLATEAU-CLEARWATER REGION

TRIP 16

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INTRODUCTION

This field trip examines the geology and mineral deposits of the western part of the Omineca Crystalline Belt as exposed in the Adams Plateau-Clearwater region and represented by the Fennell and Eagle Bay Formations.

The Eagle Bay Formation was named and described by Jones (1959) as part of the Mount Ida Group, and considered to be Precambrian. The Fennell Formation, another major map unit in the area, was first named by Uglow (1922, pp. 77A) and more recently described by Campbell and Tipper (1971) who correlated it with the Slide Mountain Group and considered it to be Mississippian or later.

More recently, Okulitch (1979) revised the geology of the region and, on the basis of radiometric and paleontologic dating and re-interpretation of rock assemblages, correlated part of the Eagle Bay (units EBF, EBA, EBM, EBK, EBS, EBG and SDQ of this report) with the Cambro-Ordovician Lardeau Group of the Kootenay Arc, and part (unit EBP of this report) with the Upper Mississippian to Pennsylvanian Milford Group, thus postulating a major unconformity or disconformity between these two parts of the Eagle Bay Formation. In a subsequent paper, Okulitch (1984) described the fault between the Fennell and Eagle Bay Formations as the suture between the allochthonous Slide Mountains Terrane (part of Quesnel Terrane) and continental North America.

Detailed mapping by the B.C. Ministry of Energy, Mines and Petroleum Resources in the Adams Plateau-Clearwater area, under the direction of V.A. Preto was carried out between 1978 and 1981. The main results of this work have been published recently (Schiarizza, 1983; Schiarizza and Preto, 1984) and are summarized in the accompanying geological map and correlation chart (Figs. 1 and 2).

This work focused on the nature and setting of stratabound precious and base metal deposits. Specifically it led to the recognition of four partly related tectonic slices representing distinct environments of deposition ranging from shelf to volcanic arc and ocean floor, and characterized by their own type of mineral deposit (Fig. 4; Table 1).

LOCATION AND ACCESS

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The Adams Plateau-Clearwater area covers about 2700 square km from Lat 51°00'N, Long 119°30'W to Lat 51°45'N, Long 120°15'W. It's western boundary is the Louis Creek Fault (Fig. 1) which in this region follows the Louis Creek, Thompson River and Lemieux Creek Valleys and marks the boundary between the Omineca Crystalline Belt to the east and the Intermontane Belt on the west.

Easy access is provided northward from Kamloops to Louis Creek, Barriere and Clearwater by Highway 5 and thence to most parts of the area by an excellent network of major and secondary access and logging roads. Access may also be gained from Highway 1 by crossing the South Thompson River at Squilax and proceeding northward along the west shore of Adams Lake or north-eastward to Adams Plateau.

GEOLOGICAL SYNOPSIS

The map area is along the western flank of the Shuswap Metamorphic Complex, a major tectonic element which dominates the geology of South-Central British Columbia, North-eastern Washington and Northwestern Idaho (Okulitch, 1984). Southeast and east of Barriere (Fig. 1) the area is underlain by rocks of the Eagle Bay Formation of Devonian-Mississippian and older(?) age and by strata of the Spapilem Creek-Deadfall Creek Succession of Lower Cambrian(?) and/or Hadrynian(?) age. North of Barriere the geology is dominated by rocks of the Fennell Formation of Devonian to Permian age, which are faulted against Devonian-Mississippian Eagle Bay strata to the east (see Fig. 1).

All of these rocks were complexly deformed and metamorphosed during the Jura-Cretaceous Columbian orogeny and are cut by post-tectonic granitic rocks of the Mid-Cretaceous Baldy Batholith. The metamorphic grade is lower greenschist through most of the area, but increases sharply to amphibolite facies in the northeast corner.

Structurally the area is subdivided into three distinct easterly derived parautochthonous slices, some internally imbricated, separated by two northeasterly dipping thrusts. A fourth allochthonous westerly derived and internally imbricated package of oceanic rocks, the Fennell Formation, is

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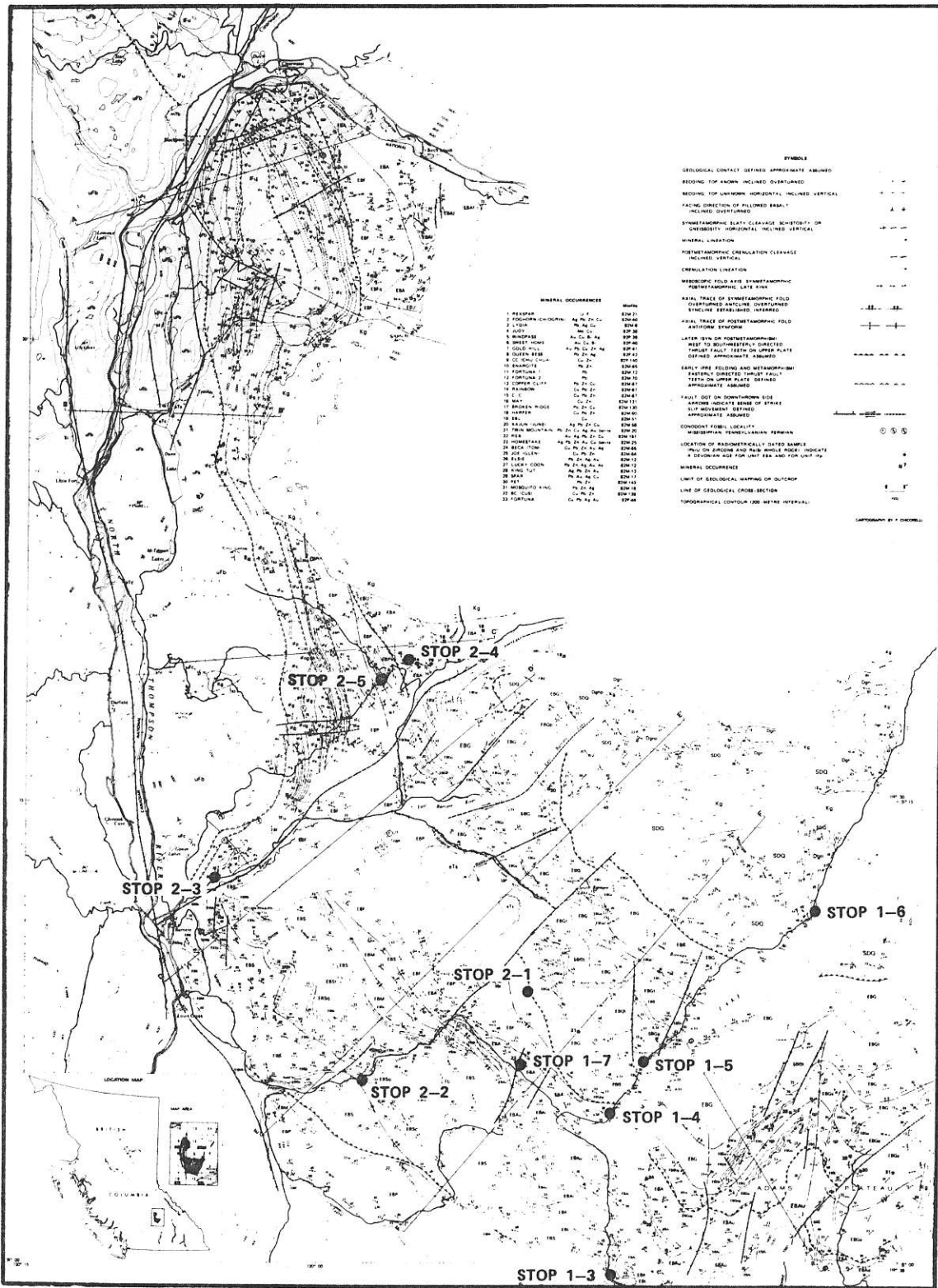


Figure 1. Geological map.



separated from Mississippian clastic rocks of the Eagle Bay Formation (unit EBP) by an earlier thrust fault which has been deformed and overridden by later westerly verging structures. It now has a subvertical orientation through most of the area. Each of these structural packages consists of a different, internally coherent rock association which represents a distinct environment of deposition and is characterized by its own type(s) of mineral deposits, or lack thereof.

Progressing in a southwesterly direction from older to younger and from interpreted shelf to ocean floor these structural elements, and the deposition environments they represent, are (see Figs. 1 and 4):

1) SPAPILEM CREEK-DEADFALL CREEK SUCCESSION, UNIT SDQ

This package is composed mainly of light to dark grey quartzite, micaceous quartzite, and phyllite, with lesser amounts of calcareous and chloritic clastic sediments. The northeastern part of the unit includes staurolite-garnet-mica schist, calc-silicate some marble, and amphibolite. These rocks represent a shelf depositional environment and are devoid of important mineral deposits. Their age is unknown, but a Lower Cambrian to Hadrynian age is considered possible in view of lithological and stratigraphic similarities with the lower part of the Snowshoe Group mapped by Struik

(in press) in the Wells area, and with Hadrynian-Cambrian strata of Kootenay Arc.

Rocks of unit SDQ are cut by a Late Devonian orthogneiss (unit Dgn Fig. 1) (Okulitch, Wanless and Loveridge, 1975; Okulitch, 1979) and by post-tectonic quartz monzonite of the Cretaceous Baldy Batholith (unit Kg).

2) EAGLE BAY FORMATION, UNIT EBG

Unit EBG is dominated by medium to dark green calcareous chlorite schist derived from mafic and intermediate volcanic and volcanoclastic rocks. It includes a major carbonate member, the Tshinakin limestone-dolomite, as well as widespread and locally dominant intercalations of dark to light grey siliceous and graphitic phyllite, calcareous phyllite, limestone, dolostone, marble, calc-silicate, cherty quartzite and other metasedimentary rocks. On structural and lithologic grounds the unit is considered part of the Eagle Bay Formation and is thus assigned a Devonian(?) and/or older(?) age. On Adams Plateau unit EBG is cut by northerly trending, post-tectonic quartz-feldspar porphyry dykes (unit qp) of Cretaceous or Tertiary age.

This volcanic-sedimentary succession is characterized by Type 1 (Table 1) deposits, stratiform sulphides containing silver, lead and zinc in predominantly metasedimentary sequences, and by Type 2 deposits, strata-

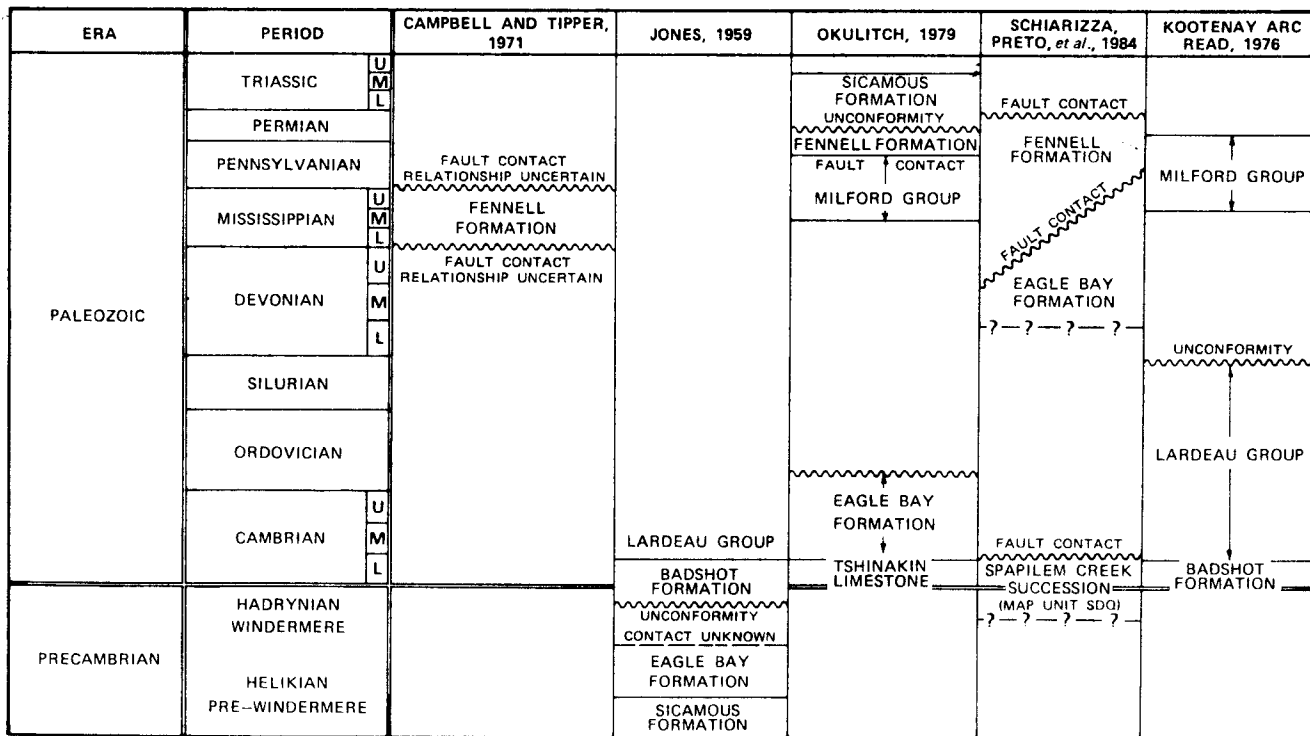


Figure 2. Regional correlation chart.

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TABLE 1  
MINERAL DEPOSITS OF THE ADAMS LAKE - BARRIERE AREA

	<u>Deposit type</u>	<u>Prospects</u>	<u>Commodities</u>	<u>Rock Association</u>	<u>Probable Age</u>
TYPE 1	Stratiform sulphides	Lucky Coon Mosquito King-Spar June	Ag-Pb-Zn	clastic sediments in a mafic volcanic succession: graphitic and siliceous phyllite, phyllitic limestone	Devonian
TYPE 2	Stratabound disseminations of sulphides	EBL Harper Creek Bowler Creek	Cu-Pb-Ag	mafic volcanics: greenschist, chloritic phyllite, sericite quartz phyllite	Devonian
TYPE 3	Massive sulphides	Hilton Homestake Birk Creek Beca Lydia Foghorn	Au-Ag-Cu Zn-Pb-Ba	felsic to intermediate volcanics: micaceous phyllite, pyritic schist	Devonian to Mississippian
TYPE 4	Pyrite-fluorite replacement	Rexspar	U-F	felsic to intermediate volcanics and intrusives: pyritic schist, micaceous phyllite	Devonian to Mississippian
TYPE 5	Massive sulphides	Chu Chua	Cu-Co	basic volcanics: pillow basalts chert	Pennsylvanian-Permian

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Table 1. Mineral deposits of the Adams Lake-Barriere area.

bound disseminations of sulphides containing copper, lead and silver in mafic volcanics and chlorite-sericite-quartz-phyllite. The unit may represent an arc or (rift?)-basin depositional environment.

3) **EAGLE BAY FORMATION, UNITS EBP, EBF, EBA, EBM, EBK, EBL, AND EBS**

The above units of the Eagle Bay comprise a single parautochthonous slice, containing two major imbrications: one provided by the easterly dipping thrust which separates units EBA and EBF from unit EBP between North Barriere River and Clearwater, and the other provided by the thrust separating units EBS and EBP between Sinmax and Fadear Creek in the southwestern corner of the area. The assemblage is in fault contact to the northeast with unit EBG, to the west with the Fennell Formation and, south of Barriere, with the Intermontane Belt (across the Louis Creek Fault).

The assemblage comprises two main subdivisions. The structurally (and presumably stratigraphically) lower division consists of metasediments and mafic volcanics (mainly Unit EBS) of uncertain age. This is over-

lain by a Devono-Mississippian package of felsic to intermediate metavolcanic rocks (Units EBA and EBF) intercalated with, and overlain by, dark gray phyllite, sandstone and grit (Unit EBP).

The lower, undated, portion of package 3 is exposed between Barriere River and Adams Lake in the southwest part of the area. It is dominated by unit EBS consisting of phyllitic sandstone, grit, phyllite, quartzite and discontinuous but locally prominent carbonate. Chloritic schist and greenstone of mafic volcanic origin are present at some places and a distinctive metabasalt horizon (Unit EBM) occurs locally at its top. Unit EBS is lithologically similar to, and may correlate with, parts of the Lardeau Group within Kootenay Arc (Read and Wheeler, 1976; Okulitch, 1979) and with parts of Struik's Barkerville terrane within Cariboo Mountains (Struik, in prep.).

Unit EBA forming the upper division, consists largely of sericite-quartz phyllite and sericite-chlorite-quartz phyllite of felsic volcanic origin. It overlies Unit EBS metasediments west of Adams Lake, but is locally separated from them by two units comprising epidote-actinolite-quartz schist,

garnet-epidote skarn and chloritic schist (Unit EBK) and dark grey calcareous phyllite and limestone (Unit EBL). Zircons extracted from felsic metavolcanics of Unit EBA on the east shore of Adams Lake yield Pb/U radiometric ages of about  $387 \pm 4$  Ma (see Fig. 3). Rusty weathering feldspathic phyllite and fragmental phyllite derived largely from intermediate tuff and volcanic breccia (Unit EBF) overlies Unit EBA in the Johnson Creek area, and is overlain by dark grey phyllite, siltstone, sandstone and grit of Unit EBP between Johnson Creek and Barriere River. Conodonts extracted from two separate limestone lenses within Unit EBP south of the Barriere River are Upper Mississippian in age (Orchard, pers. comm.).

North of Barriere River Fault (Fig. 1) the distinctive feldspathic and fragmental phyllites of Unit EBF again overlie sericite-quartz phyllite and schist of Unit EBA. The clastic rocks of Unit EBP in this area have yielded lower Mississippian conodonts and are in fault contact with Unit EBA and the Fennell Formation. They are lithologically similar to and correlate with the Guyet and Black Stuart Formations in the Cariboo Mountains (Struik, 1981), and with Devonian-Mississippian clastic rocks of the Earn Group and "Black Clastic Unit" within the northern Cordillera (Gordey, 1979; Gordey et al., 1982). The felsic to intermediate volcanics of Units EBA and EBF have no apparent counterpart within the southern and central Omineca Belt, but felsic volcanics (trachytes and rhyolites) locally occur with Devonian-Mississippian clastics in the Yukon where they may be related to Devonian-Mississippian rifting (Tempelman-Kluit, 1979; Gordey, 1979; Mortensen, 1982). The Devonian-Mississippian clastics and volcanics of the Eagle Bay Formation may, similarly, comprise a rift-related assemblage; alternatively, they may comprise a volcanic arc built on, or in close proximity to, the North American continental margin.

The most important mineral deposits within this assemblage (type 3) are volcanogenic precious and base-metal massive sulphides, commonly with barite, within the mainly felsic to intermediate metavolcanic rocks of Units EBA and EBF. A further type (Type 4) comprises uranium-thorium bearing pyrite-fluorite replacements associated with trachytic and rhyolitic rocks within a Unit EBA volcanic centre at Rexspar.

#### 4) FENNEL FORMATION, UNITS uF AND lF

The Fennell Formation is an internally imbricated allochthonous assemblage of oceanic rocks which was thrust eastward over Mississippian clastic rocks of the Eagle Bay Formation (Unit EBP) prior to the main period of westerly directed folding and thrusting within the area. The thrust contact between the Fennell Formation and Unit EBP marks the eastern boundary of the

Fennell Formation in the area south of the Baldy Batholith, as well as within a small fault-bounded block directly south of Clearwater. The subvertical orientation of the fault results from later deformation. Elsewhere along its eastern boundary the Fennell Formation is overridden by Devonian-Mississippian intermediate to felsic metavolcanic rocks of the Eagle Bay Formation (Units EBP and EBA) along a later westerly directed thrust fault.

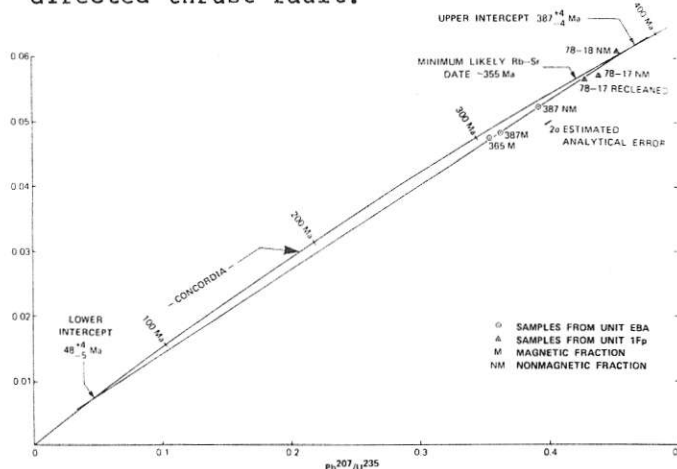


FIGURE 3. CONCORDIA PLOT FOR ZIRCONS FROM MAP UNITS EBA AND lFp. THE UPPER INTERCEPT OF  $387.4$  Ma INDICATES A LATE, DEVONIAN AGE FOR THE ZIRCONS EXTRACTED FROM MAP UNITS EBA AND lFp.

Figure 3. Concordia plot for zircons from map units EBA and lFp. The upper intercept of  $387.4$  Ma indicates a late Devonian age for the zircons. Extracted from map units EBA and lFp

The Fennell Formation is bounded to the south by the Barriere River strike slip fault, and is separated from Intermontane Belt strata to the west by the Louis Creek Fault. To the north, just outside the map area, it is intruded by Cretaceous granitic rocks of the Raft Batholith.

The Fennell Formation outcrops as a steeply dipping, west-facing assemblage which in large part comprises the forelimb of a major west verging fold system (Fig. 1a, section C-C'). It has been divided into two structural divisions. The Lower (eastern) division is a heterogeneous assemblage of dominantly bedded chert, gabbro, diabase, and pillowed basalt, which also includes units of sandstone and phyllite, Devonian aged quartz-feldspar porphyry rhyolite, and intraformational conglomerate. The Upper (western) structural division comprises a monotonous west facing succession of pillowed and massive basalt with minor amounts of bedded chert, gabbro, basaltic breccia and tuff.

Bedded cherts within the lower division of the Fennell Formation have yielded several collections of conodonts identified by M.J. Orchard of the Geological Survey of Canada as ranging in age from Lower Mississippian to Middle Permian. This paleontological



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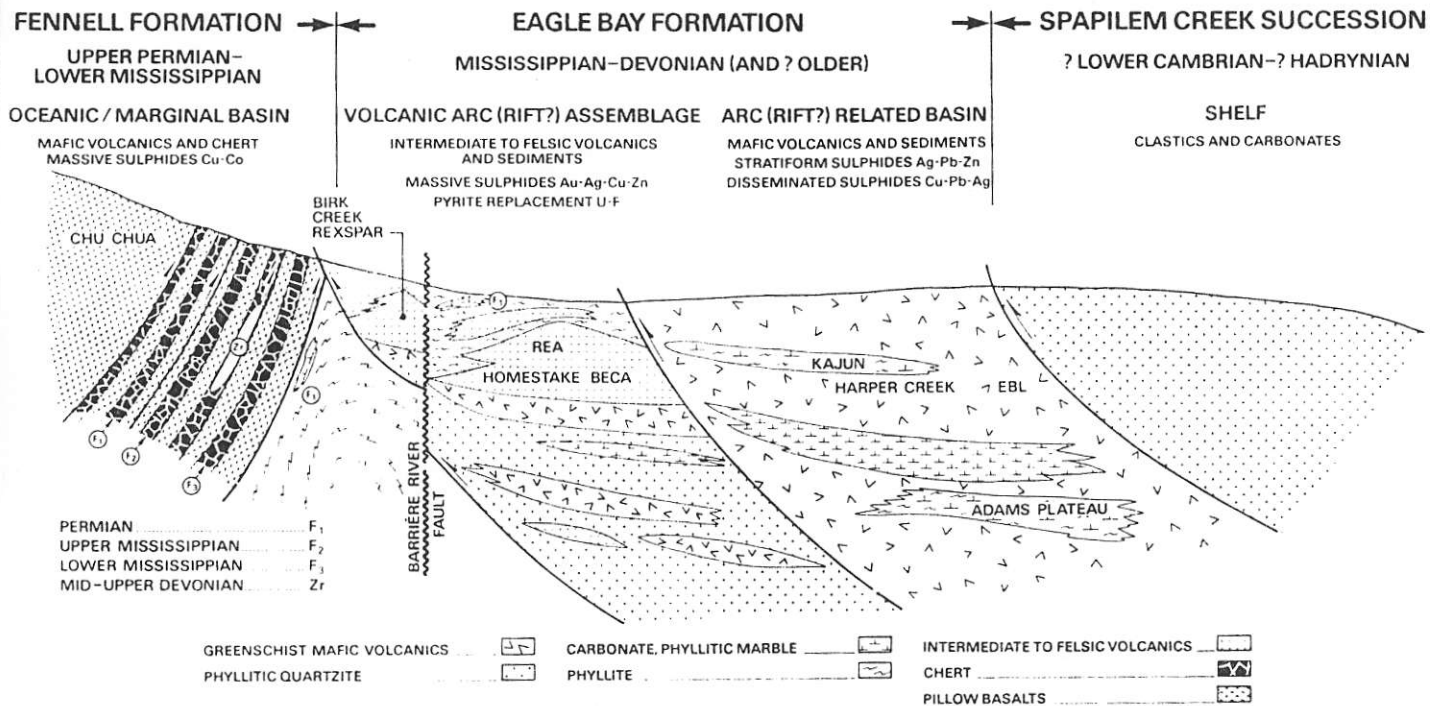


Figure 4. Generalized geological synopses.

data, combined with a Devonian radiometric age on quartz-feldspar porphyry rhyolite, indicates that the lower division of the Fennell Formation comprises at least four westerly facing imbricate fault slices. Only two paleontological age dates are provided by the sparse horizons of bedded chert within the upper division of the Fennell. These are Lower (?) Pennsylvanian and Middle Permian respectively, and indicate that the upper division occupies the same time span as at least the younger known rocks of the lower division. The two divisions are therefore inferred to be separated by a thrust fault similar in nature and age to the imbricate thrusts within the lower division and to the thrust which separates the Fennell Formation from Mississippian clastic rocks of the Eagle Bay Formation.

Rocks of the Fennell Formation accumulated in an ocean basin an unspecified distance west of co-eval rocks of the Eagle Bay Formation. Sandstone within the Fennell, along with siltstone and phyllite intercalated with bedded chert, is very similar to Mississippian sandstone within the Eagle Bay Formation and may have been derived from it. Similarly, Devonian aged quartz-feldspar porphyry rhyolite within the Fennell is like Devonian felsic volcanic rocks within the Eagle Bay Formation and may be a more westerly expression of the same igneous activity. It appears probable, therefore, that the Fennell accumulated in an oceanic, probably marginal, basin directly outboard from the Eagle Bay Formation and that subsequent tectonic

juxtaposition of the two assemblages did not involve the extreme amount of telescoping that is indicated by divergent faunal assemblages and paleomagnetic data for terranes accreted more outboard in the western Cordillera (eg Cache Creek) (Monger, 1977; Monger and Ross, 1971; Monger and Irving, 1980).

The Chu Chua (Type 5) massive sulphide deposit occurs within upper division basalts of the Fennell Formation just east of Chu Chua Mountain. This deposit consists of semi-massive to massive lenses of cupriferous pyrite, with minor chalcopyrite and magnetite, with an average grade of 2% copper and 0.1% cobalt. These lenses are associated with massive to finely laminated pyritic cherty rock which may be of exhalative origin. They are underlain by altered, fractured, silicified and sparsely mineralized basalt and are sharply overlain by relatively fresh and barren pillowed basalt.

ROAD LOG

DAY 1

Day 1 will be devoted to the examination of geological units along Adams River and Adams Lake. Because of snow cover the geology and mineral deposits on Adams Plateau cannot be visited at this time of the year. From Kamloops the tour will proceed eastward along Trans Canada Highway approximately 69 km to Squilax, then north along the west shore of Adams River and Adams Lake.

**km 0 - Squilax Bridge across Thompson River.** The bluffs to the south are of schist of the Silver Creek Formation.

**STOP 1-1, km 6.9 Tsalkom Formation along Adams River.** This roadside exposure of Tsalkom Formation greenstone is along the western shore of Adams River and outside the map area (Fig. 1). These rocks, though not as foliated as those of Eagle Bay Formation display considerable deformation and few, if any, original structures. Massive and fragmental greenstone are the dominant rock types in Tsalkom Formation. Some pillow structures and intercalated shale and limestone beds have been mapped. The age of the Tsalkom Formation is unknown, though tentative correlations have been made by some with the Fennell Formation or with parts of the Kaslo Group of Permian age.

**STOP 1-2, km 10.6 Sicamous Formation along Adams River.** Typical exposure of Sicamous Formation. Black phyllitic limestone and calcareous argillite are the dominant Sicamous rock types. The age and external relationships of the Sicamous Formation remain unclear. It has been extensively sampled for conodonts (Okulitch and Cameron, 1976) and sampled again by Orchard and Preto in 1980, with nor positive results. Jones (1959) considered the Sicamous to be of Precambrian Age, while Okulitch (1979) correlated it with the Upper Triassic Slocan Group on the basis of similar lithology. To allow for this correlation, Okulitch (1979) postulated a fault contact with the Eagle Bay. The Sicamous-Eagle Bay contact, however, has been drilled in the area between Scotch Creek and Sicamous during the course of mineral exploration (K.L. Daughtry, pers. comm., 1980) and appears unfaulted. Within the map area (Fig. 1) unit EBL is similar to the Sicamous as exposed south of Adams Lake. This unit is considered part of the Eagle Bay Formation as it lies in apparent structural conformity and continuity with units EBS and EBK.

**STOP 1-3, km 17.6 Bush Creek on West Adams access road.** The contact between calcareous phyllite and argillaceous limestone of unit EBL (possibly correlative with the Sicamous Formation) and sharply layered tuff of unit EBK is exposed on an old logging road. The contact is one of gradual change and conformity with no structural or stratigraphic breaks apparent. At the contact between the two units, skarn alteration and sparse sulphide mineralization is well developed and has been traced intermittently for more than 15 km to the northwest together with these two distinctive lithologies.

Early fold axes in unit EBL plunge to the northeast. Later folds show a south-westerly vergence and plunge to the north-

west. Post-tectonic, east trending dykes of porphyritic quartz monzonite cut both unit EBL and EBK. The stratabound nature of the mineralization and its association with unit EBK, probably an altered intermediate to mafic tuff, allow speculation as to a possible syngenetic origin of the sulphides and, even more tenuously, the possible structural overturning of the section.

**Km 19.1 Viewpoint.** Approximately 1.5 km north of STOP 1-3, a viewpoint along the main access road offers an unrestricted view of Adams Lake. Units EBL and EBK with the accompanying mineralization as seen at STOP 1-3 are also exposed at this point. Directly across the lake are steep wooded slopes and cliffs underlain by felsic metavolcanics of unit EBA and containing a number of Type 3 (Table 1) massive sulphide occurrences (Beca showings). Exposures of sericite quartzo-feldspathic schist and gneiss occur on the lakeshore below the viewpoint and again along the main road a short distance north of the viewpoint.

**STOP 1-4, km 30.2, 2.7 km east of Squaam Bay on West Adams access road.** Phyllite and fine grained schist derived from intermediate to felsic metavolcanic rocks of unit EBA are exposed at this stop and a short distance north are structurally overlain by massive and fragmental basic metavolcanic rocks of unit EBA. The foliation, extreme shearing and internal faulting displayed at this stop are characteristic of this belt of mainly felsic metavolcanic rocks which continues to the northwest for 10 km and to the southeast across Adams Lake. Folds are rarely seen in these highly sheared rocks. Fragmental members display an extreme flattening of clast. Zircons from felsic metavolcanic rocks of this unit on the east shore of Adams Lake have yielded ages of 387 +/- 4 Ma (Fig. 3).

**STOP 1.5, km 34.3 Somatosum Creek, 6.8 km along west Adams access road northeast of Squaam Bay.** STOP 1.5 offers good exposures of massive and fragmental greenschist of unit EBG and a good view to the north and east of the Tshinakin limestone-dolomite. This major carbonate is at least 1000 m thick and is structurally underlain and overlain by basic metavolcanic rocks. The Tshinakin carbonate has been continuously traced from South Barriere Lake to the eastern boundary of the map area, and is known to continue for many kilometres to the east. Its northern termination at south Barriere Lake is probably an original pinchout and not due to folding or faulting. A thick lens of similar carbonate, also associated with greenschist, occurs just southwest of North Barriere Lake, and again near Vavenby, east of Clearwater some 35 km to the north. On Adams Plateau the Nikwikaia Lake Synform (Fig. 1) a large apparently rootless early structure outlined



by a thin micaceous quartzite in greenschist was overridden by the Tshinakin. Although internally deformed, the carbonate appears externally to have been only slightly warped. The entire package was later gently refolded.

**STOP 1.6, km 42.2 Spapilem Creek, 21.7 km northeast of Squam Bay along West Adams access road.** Orthogneiss of unit Dgn, considered to be part of the Late Devonian Mt. Fowler Batholith, intrudes amphibolite along the shore of Adams Lake, a short distance north of Spapilem Creek. From Spapilem Creek the excursion returns to Squam Bay and proceeds northwestward along Sinmax Creek Road.

**STOP 1-7, km 61.0 Homestake Mine.** This past producer of silver is presently under re-assessment, due to the recent increase in exploration for precious metals. The deposit occurs in intensely sheared pyrite-sericite-quartz phyllite of unit EBA. Mineralization consists of pyrite, tetrahedrite, galena, sphalerite and argentite with quartz and barite. Underground workings are not presently accessible. The deposit is a highly deformed, possibly remobilized massive sulphide (Type 3, Table 1) associated with altered felsic to intermediate metavolcanic rocks of unit EBA. After this stop the tour will return to Kamloops.

## DAY 2

From Kamloops the tour will follow Highway 5 to Louis Creek, a distance of 55 km, then proceed east to Squam Bay via the Sinmax Creek Road, and on to the Rea Gold deposit. A presentation of the geology and setting of this deposit will be given by geologists of Corporation Falconbridge Copper.

**km 0 Junction of Sinmax Creek road with West Adams road at Squam Bay.**

**STOP 2-1, km 32.5 Rea Gold Deposit.** Massive sulphide lenses (Fig. 5 and 6) occur at the contact between altered mafic pyroclastics and debris flows. The section is overturned, with strata dipping to the northeast and facing southwest. The massive sulphides are stratigraphically underlain by stockwork mineralization in altered and silicified mafic pyroclastics and are overlain by massive barite and/or chert. Chert and chert breccia mark the sulphide horizon between known lenses and beyond, thus marking a target for further exploration. Massive sulphide mineralization mainly consists of pyrite, arsenopyrite, sphalerite, galena, chalcopyrite and tetrahedrite. Gold occurs mainly in the massive sulphides, but

values are also found in barite, stockwork mineralization and even fault gouge. Silver is mainly associated with barite and massive sulphides while zinc, lead and copper occur exclusively as massive sulphides. Drill indicated reserves in two lenses are 120,000 tonnes grading 18.2 grams of gold per tonne, 141.2 grams of silver per tonne, 0.85% copper, 4.11% zinc, and 3.67% lead. Further details on the geology of the Rea deposit will be given on site by Corporation Falconbridge Copper staff.

The tour will return to Squam Bay and proceed westward along Sinmax Creek road.

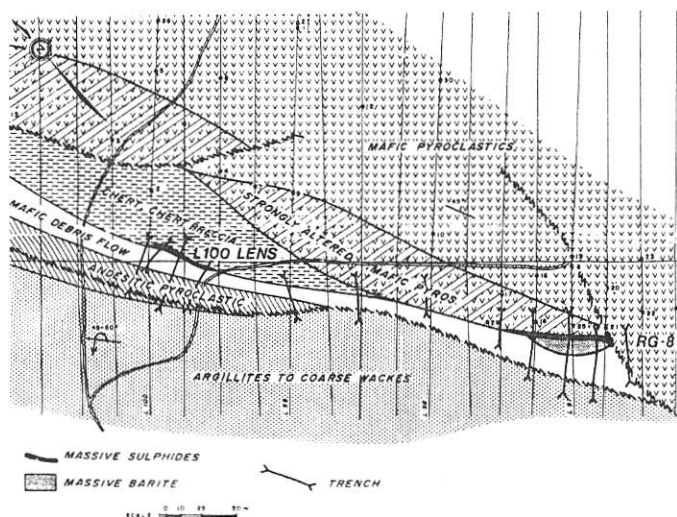


Figure 5. Surface geology - Rea Gold.

**STOP 2-2, km 73.7 Forest Lake.** Roadside exposures at Stop 2-2 display tight isoclinal early folds in quartzite, calcareous quartzite and other metasediments of unit EBS. These exposures afford a good example of the degree and style of deformation in this area and show the general southwesterly vergence of the folds, though fold axes here trend more easterly than the usual northerly to northwesterly regional average.

Proceeding westward, the route enters the valley of Louis Creek and crosses the Louis Creek Fault approximately 7 km west of Forest Lake. The Louis Creek Fault is a major, northerly trending fault system that has been traced for more than 200 km from near Vernon to the Quesnel Lake region where it merges with the Pinchi Fault system. In the Vernon and Bonaparte Lake map areas (Jones, 1959; Campbell and Tipper, 1971), the Louis Creek Fault marks the boundary between the Omineca Crystalline Belt and the Intermontane Belt.

**STOP 2-3, km 98.8 Fennell Formation along Barriere River.** Massive basalt and ribbon chert of the Lower Structural Division of the Fennell Formation (units 1Fb and 1Fc,

Fig. 1) are exposed at this locality. The cherts have yielded conodonts of Pennsylvanian age.

Barriere River marks the trace of the northeast trending Barriere River Fault. The wooded slopes on the southeast side of the valley are underlain by metasedimentary rocks of unit EBS. Movement along the Barriere River Fault appears to be greatest at the western end and lessens to the northeast, away from Louis Creek Fault.

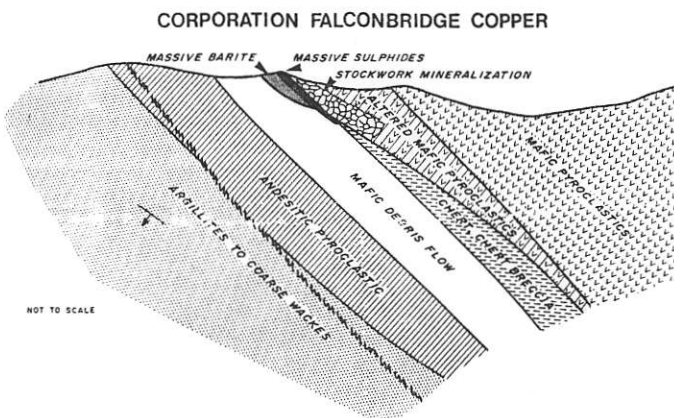


Figure 6. Idealized cross section - Rea Gold.

**STOP 2-4, Km 119.0 Massive sulphides at Birk Creek.** Visiting this locality requires leaving the vehicles at the new logging road bridge on Birk Creek and following an old trail along the north bank of the creek upstream for 1.2 to 1.7 km to the Rainbow and Anaconda Lynx showings. These showings were discovered in the 1920's and are marked by short adits and dumps (Goutier *et al.*, 1985). Stratabound lenses of semi-massive to massive pyrite locally in excess of 2 m thick and carrying values in gold, silver, copper, lead and zinc occur in sericite-quartz phyllite of unit EBA. Gray phyllite, calcareous phyllite and some limestone are interlayered with the sericite-quartz phyllite, indicating a mixture of metasedimentary and metavolcanic rocks in the section. Early recumbent isoclinal folds with axial planes parallel to the pronounced schistosity trend roughly east-west, parallel to the mineral lineation and probably account for the discontinuous nature of the pyrite lenses.

**STOP 2-5, Km 125.1 on main Birk Creek logging road at the fourth switchback.** A well bedded turbidite succession including grit, quartzite, siltstone and argillite of unit EBP is well exposed. Graded bedding and some channel scours indicate that the beds here are right-side-up and dip gently to the northeast in most of the outcrop. In the northern part of the exposure they are deformed by north trending, westerly verging

late folds which locally overturn and thicken the section. Approximately 4 km north of this stop, a lens of argillaceous bioclastic limestone interbedded with similar turbiditic sediments and very close to the Fennell contact has yielded an excellent collection of conodonts of Late Kinderhookian (Early Mississippian) age (M.J. Orchard, pers. comm., 1980). South of Barriere River a similar limestone within similar host rocks of unit EBP has yielded conodonts of Chesterian (Late Mississippian) age (M.J. Orchard, pers. comm., 1980). Felsic to intermediate volcaniclastic horizons are rarely intercalated with Unit EBP phyllite, while dark grey phyllite and siltstone similar to that of Unit EBP is commonly intercalated with the felsic to intermediate volcanic rocks of Units EBA and EBF. These relationships, combined with the Devonian radiometric age date for Unit EBA, suggest that these rocks are related stratigraphically and do not differ greatly in age. The Mississippian clastic rocks of Unit EBP are therefore not separated from other rocks within the Eagle Bay succession by a major unconformity such as that which separates Mississippian-aged Milford Group rocks from the underlying Cambro-Ordovician succession within the Kootenay Arc (see Okulitch, 1979). If a similar unconformity is present within the map area it occurs somewhere beneath Unit EBA.

From Stop 2-5 the excursion will return to Barriere and continue to Kamloops along Highway 5, a distance of approximately 60 km. Having crossed the Louis Creek Fault near Barriere, we shall view the section along the valley of the North Thompson River to Kamloops. This portion of the tour is entirely in the Intermontane Belt and is mostly underlain by Late Paleozoic volcanic, volcaniclastic and sedimentary rocks. The northern portion of this Late Paleozoic assemblage is poorly understood in its structure, stratigraphy and correlation. Farther to the south similar rocks contain pods of Mississippian, Pennsylvanian and Permian limestone and are part of the Harper Ranch assemblage. Eocene-Oligocene volcanic rocks of the Skull Hill Formation of the Kamloops Group cap the hill west of the highway at Fishtrap Rapids. Farther to the south, near Kamloops, an overturned succession of Upper Triassic argillite, shale and limestone, structurally underlies the Late Paleozoic assemblage.

## ADAMS PLATEAU-CLEARWATER

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FIELD GUIDES TO  
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GSA CORDILLERAN SECTION MEETING  
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