

Lead-Zinc-Silver

Code (Julian Mining Co. Ltd.)*

1965

(54° 127° S.E.) Company office, Britannia Beach; Vancouver office, 122, 744 West Hastings Street. The 20 Code recorded claims are on Fenton Creek, 20 miles southwest of Houston. For a two-month period during the summer five men under R. S. Adamson, chief geologist, did geochemical sampling over an area 7,500 by 4,500 feet. An access road was built by a bulldozer tractor, and the property can be reached with a four-wheel-drive vehicle. The property was not visited.

Lead-Zinc

Code

Anaconda American Brass Limited
By W. G. Clarke

1967

(54° 126° S.W.) Company office, Britannia Beach. The Code group of 13 claims, owned by Anaconda American Brass Limited, is near Owen Lake, 26 miles by road from Houston. Six men spent three weeks under the supervision of G. D. Bysouth, geologist, making induced polarization and seismic surveys.

Code

1968

LOCATION: (54° 126° S.W.) On Fenton Creek 2 miles south of Morice River.
CLAIMS: Code 1 to 15, Code 21 to 30.
ACCESS: By the Morice River road a distance of 26 miles from Houston.
OWNER: Anaconda American Brass Limited, Britannia Beach; T. Conto, geophysicist.
WORK DONE: Electromagnetic, inducted polarization, and magnetometer surveys were made. Four men spent 1½ months on the property.
REFERENCES: *Minister of Mines, B.C., Ann. Rept., 1967, p. 109; Assessment Report No. 1229.*

1970

CODE (No. 120, Fig. C)

By B. N. Church

LOCATION: Lat. 54°10.2' Long. 126°57' (93L/2W)

The property is located immediately northwest of Nadina Mountain and south of Morice River at the headwaters of Fenton Creek.

CLAIMS: A total of 198 claims, including 30 CODE claims and fractions.

ACCESS: The property is approximately 21 miles southwest of Houston and is serviced by two short access roads branching south from the main Morice River road.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METALS: Silver, lead, zinc.

DESCRIPTION:

Bedrock exposures are generally scarce, the area being well forested and covered locally with a thick mantle of glacial drift.

The mineralized zone is in the north central part of the property. Fine-grained pyrite and dark specks of sphalerite are disseminated throughout a wide area of bleached and highly altered acid volcanic rocks.

The mineralized rocks appear to be overlain by andesite and are cut by glassy dykes. The dykes probably emanate from a dome of vitric rhyolite in the east part of the property, and the andesites appear to be related to unmineralized andesites cropping out to the south.

The age of the mineralized acid volcanics is unknown; however, these rocks are possibly related to zones of Early Mesozoic rhyolite cropping out in the Tsalit Mountain area to the east. The andesite cover is probably correlative with the Late Mesozoic or Early Tertiary Tip Top Hill volcanic rocks of the Owen Lake area. The vitric rhyolite is a local deposit of almost certain Pliocene age.

WORK DONE: Access roads were generally improved, the west road being extended about 4½ miles to the centre of the property. Also, the old grid system was extended. A total of about 35 miles of cut-line and 680 feet of bulldozer trenching was completed. Approximately 2,200 silt, soil, and muskeg samples were collected and analysed for molybdenum, copper, lead, zinc, silver, iron, and manganese. Induced polarization and magnetometer surveys were performed on the property and a geological map was made on the scale of 400 feet to 1 inch.

REFERENCES: *Minister of Mines, B.C., Ann. Repts., 1965, p. 81; 1967, p. 109; 1968, p. 139; Assessment Reports 799, 1229, 2734.*

1971

CODE, FEN (No. 70, Fig. D)

LOCATION: Lat. 54° 10.2' Long. 126° 57' (93L/2W)

OMINECA M.D. Immediately northwest of Nadina Mountain and south of the Morice River, 21 miles southwest of Houston.

CLAIMS: CODE, FEN, totalling 201.

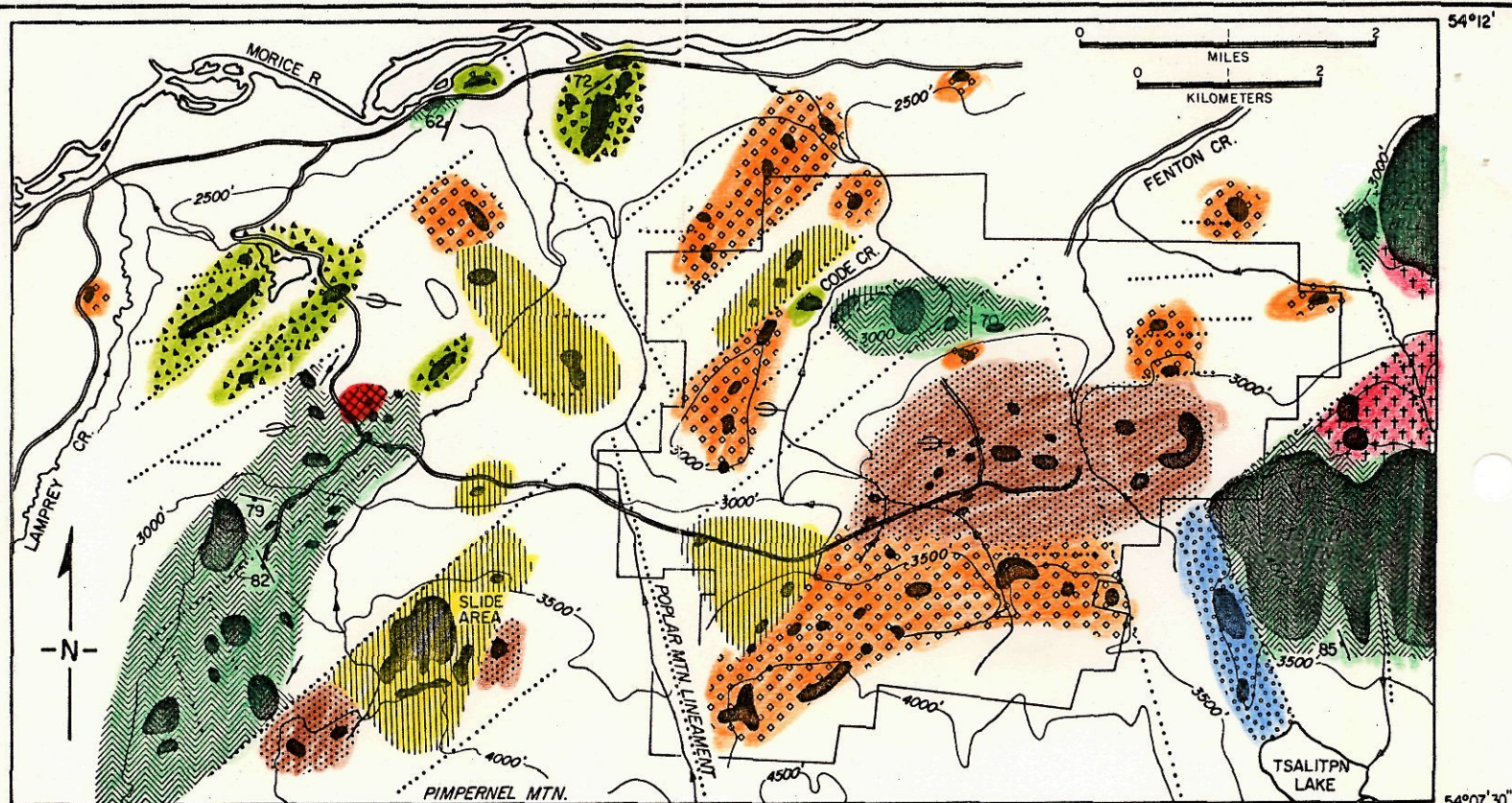
ACCESS: By two logging roads leading off the Morice River road.

OWNER: ANACONDA AMERICAN BRASS LIMITED, Britannia Beach.

METALS: Silver, lead, zinc.

WORK DONE: An electromagnetic survey was done on Fen 1-16 and 223-229.

REFERENCES: *B.C. Dept. of Mines & Pet. Res., G.E.M., 1970, p. 149; Assessment Report 3257.*



127°05'

126°52'

BEDDED ROCKS

TERTIARY

FENTON CREEK VOLCANIC ROCKS: RHYOLITE AND TRACHYTE BRECCIA AND GLASSY LAVA

BUCK CREEK VOLCANIC ROCKS?: MAINLY FRESH BROWN APHANITIC ANDESITE

UPPER MESOZOIC

TIP TOP HILL VOLCANIC ROCKS?: DACITIC PYROCLASTIC ROCKS AND LAVAS

SEDIMENTARY ROCKS; MAINLY SANDSTONE, LOCALLY RUST-COLOURED

LOWER OR MIDDLE MESOZOIC

HAZELTON GROUP: MAINLY MAROON AND BROWN ANDESITIC AND DACITIC PYROCLASTIC ROCKS AND/EPIDOTE-BEARING MOTTLED GREY-GREENISH ANDESITE AND BASALT AND MINOR RHYOLITE

IGNEOUS INTRUSIONS

TERTIARY

OWEN HILL GRANITE

MESOZOIC

SMALL GABBRO STOCK

SYMBOLS

BEDROCK EXPOSURE

BEDDING ATTITUDE

MAIN JOINT SET; VERTICAL, INCLINED

GLACIAL STRIAE

TOPOGRAPHIC LINEAMENT

BOUNDARY-CODE-FEN CLAIM BLOCK

TOPOGRAPHIC CONTOUR

SMALL STREAM

ROAD

Figure 40
GEOLOGY
OF THE
CODE CREEK AREA

1972

CODE, FEN (No. 89, Fig. D)

By B. N. Ch

LOCATION: Lat. 54° 10.2' Long. 126° 57' (93L/2W)

OMINECA M.D. At approximately 3,000 feet elevation northwest of Nadina Mountain, 2 to 4 miles south of Morice River.

CLAIMS: CODE, FEN, COF, totalling 148.

ACCESS: By road from Houston, 25 miles.

OWNER: Anaconda American Brass Limited.

OPERATOR: HELICON EXPLORATIONS LIMITED, 1520 Alberni Street, Vancouver 5.

METALS: Silver, lead, zinc.

DESCRIPTION:

INTRODUCTION: A study of the geology of the Tsalit Mountain and the Code property, described in Geology, Exploration, and Mining in British Columbia, 1970, has been extended westward in response to an increase in exploration activity in the area. This report concerns the results of field work completed by the writer in the latter part of July and early August 1971 plus a brief visit to the area in the summer of 1972.

PHYSIOGRAPHY: The map-area is a 50-square-mile strip of sloping terrain of modest relief lying just south of Morice River (elevation about 2,200 feet) and east of Lamprey Creek (Fig. 40).

Code Creek, a small tributary of the Morice, springs from the low marshy central section of the map-area, the area of recent and current prospecting interest. This stream is paralleled just to the east by Fenton Creek which drains the westerly slopes of Owen Hill and Tsalit Mountain near the east boundary of the map-area. Tributaries of an unnamed stream drain the area west of Code Creek including the north slope of Pimpernel Mountain near the south boundary (the highest topographic feature with an elevation of about 5,000 feet).

The last pulse of regional Pleistocene glaciation moved easterly across the area scraping the high bedrock exposures leaving a mean striation direction of 094 degrees. Blankets of morainal debris accumulated in numerous small valleys and depressions. Granite boulders

strewn westward from Owen Hill and Tsalit Mountain are believed to be the product of a period of local valley glaciation which postdated the last regional ice advance. Residual valley glaciers on the northerly slopes of Nadina and Tsalit Mountains at first drained westerly, as recorded by esker-like sand and gravel deposits near the headwaters of Code Creek, then northerly where meltwaters eventually carved a deep gully into outwash sands along the course of Fenton Creek.

A peculiar area of hummocky terrain noted near the 3,500 feet contour of Pimpnel Mountain does not appear to be due to glacial activity. This may be a side deposit resulting from a seismic event centred somewhere on the extensive fracture system known to traverse the region.

The area once heavily wooded below the 4,000-foot elevation level has been extensively logged in recent years. As a result the west-central and northeastern parts are clear cut in places and now provide excellent summer grazing land for wild animals.

PROSPECTING HISTORY: In June 1965 Julian Mining Co. Ltd. located a block of 20 claims in response to the discovery of a silver-lead-zinc geochemical anomaly on Code Creek. After some preliminary work the company was joined by Anaconda American Brass Limited, in the years 1966 to 1971, in an intensive investigation which included induced polarization and magnetometer surveys, a silt-soil geochemical programme, and geological mapping. Other supporting work includes line-cutting, bulldozer trenching, and construction of an extensive system of access roads.

In 1972 Helicon Explorations Limited resumed this investigation with detailed induced polarization and Afmag surveys and more geochemical sampling. This concluded with a diamond-drill programme of 25 holes totalling 11,000 feet in a target area in the north-central part of the property.

GENERAL GEOLOGY: The bedded units are mainly volcanic comprising rocks thought to be part of the Hazelton assemblage, and cover rocks equivalent to the Tip Top Hill, Buck Creek, and younger Tertiary formations. Igneous intrusions consist of a granite stock, a small gabbroic intrusion, and an assortment of dykes.

Bedded Rocks: Rocks believed to be part of the Hazelton Group crop out near the east boundary, mainly on Tsalit Mountain, in the west and northwest parts, and locally in the north-central part of the map-area. Most of these rocks are mottled greenish grey and epidote bearing. They display vestiges of primary volcanic structures such as amygdales and breccia textures. A distinctive brownish maroon pyroclastic phase, commonly charged with small feldspar laths was found on the ridges east of Lamprey Creek and near the main access roads in the northwest part of the map-area.

A frequency plot of artificially prepared glass from representative samples shows a broad composition range consisting of 35 per cent basalt, 20 per cent andesite, 20 per cent dacite, and 15 per cent rhyolite (Fig. 41).

Some shaly beds, apparently intercalations in the Hazelton volcanic pile, were reportedly intersected by drilling in the central area. On the whole, however, these sedimentary facies are rarely exposed.

Rocks thought to be the equivalent of Tip Top Hill lavas and pyroclastics (Upper Cretaceous) are seen on the bluffs and ridges in the south part of the Code-Fen property, on numerous knolls and low ridges near the northwest corner of the claim block, and to lesser extent on the northeast claims.

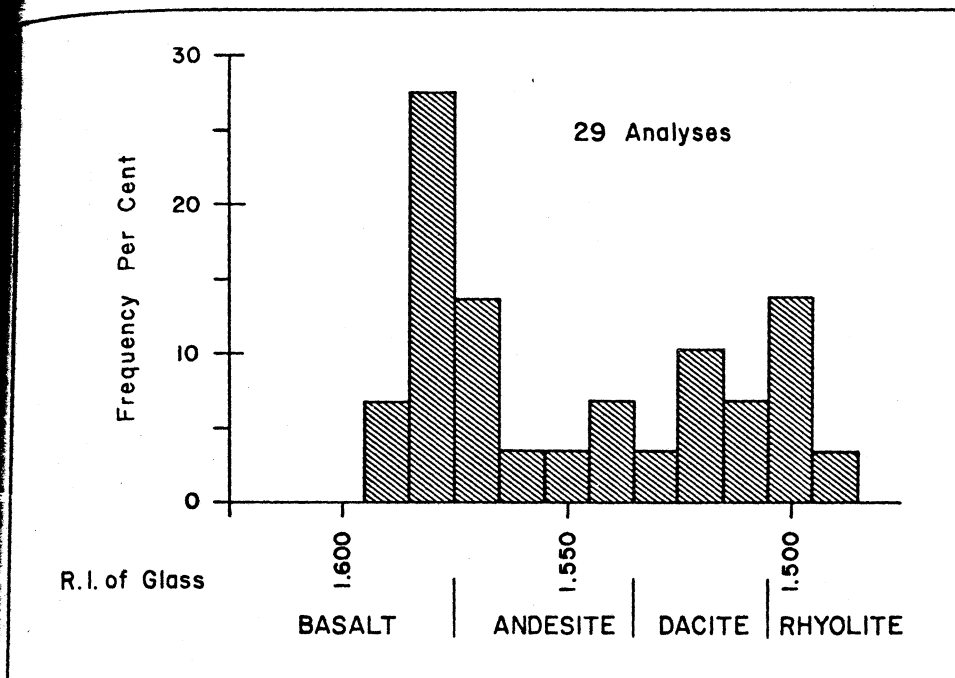


Figure 41. Frequency plot of refractive index determinations on fused Hazelton volcanic rocks from the Code Creek area.

Generally the rocks are light or medium brown, often somewhat rusted on weathered surfaces. The most common phase has numerous small feldspar laths 1 to 3 millimetres long mixed with a few hornblende prisms and biotite books. Arc fusion analysis performed on 15 samples shows that the rocks are essentially dacites having an average refractive index of 1.517.

A wedge of sedimentary rock, mainly brown quartz feldspar wacke, is exposed on a low ridge just northwest of Tsalitpn Lake at the western extremity of Tsalit Mountain. These rock are well indurated, however, unlike many Hazelton units there is little evidence of cataclasis. The relative stratigraphic position of these beds is in doubt. It appears that the material was initially deposited prior to the eruption of much volcanic debris in Late Cretaceous time. It seems clear from the petrography of this rock that the clastics were derived at least in part from a granitic provenance; a terrain soon to be covered with thick volcanic accumulations.

Tertiary volcanic rocks tentatively correlated with the Eocene Houston phase of the Buck Creek assemblage are exposed on scattered knolls in the central part of the map-area and on the slopes of Pimpernel Mountain to the south. These lavas and volcanic breccias are commonly medium or dark brown and aphanitic. In thin section the rocks are found to consist largely of tiny plagioclase microlites and clusters of small pyroxene crystals in a glassy matrix. X-ray analysis shows an average of less than 2 per cent quartz; this is in contrast with the older volcanic rocks of the area which range to as much as 40 per cent quartz in some cases. Arc fusion analysis of 10 samples shows that the rocks are typically andesitic having an average refractive index of 1.552.

TABLE OF CHEMICAL ANALYSES

Oxides Recalculated to 100 -			Oxides as Determined -	
	1	2		1
SiO ₂	78.08	74.4	SrO	0.13
TiO ₂	0.10	0.3	BaO	0.07
Al ₂ O ₃	13.78	13.7	H ₂ O+	9.80
Fe ₂ O ₃	0.49	1.5	H ₂ O-	5.48
FeO	0.08	0.9	CO ₂	0.02
MnO	0.04	0.1	P ₂ O ₅	0.02
MgO	0.56	0.4	SO ₃	0.01
CaO	2.32	1.2		
Na ₂ O	2.94	3.4		
K ₂ O	1.61	4.5		
	100.00	100.0		

1 - Glassy rhyolite from a road cut west of Fenton Creek; analysis by R. S. Young, British Columbia Department of Mines and Petroleum Resources.

2 - Daly's 1933 average rhyolite composition, Table 1, No. 5.

The youngest formation, here tentatively named 'Fenton Creek volcanic rocks,' is found mainly in a 1.5 by 2.5-mile laterally elongated zone in the east-central part of the map-area. This unit consists of volcanic breccias, lava, tuff, and dykes, that are very fresh and probably of post-Miocene age. In places, especially east of Fenton Creek, the unit is mostly glassy rhyolite lava and breccia (*see* the accompanying chemical analysis); immediately to the northwest this volcanic complex changes to predominantly feldspar porphyry trachyte and to the south to quartz porphyry rhyolite. Arc fusion analysis of three samples of trachyte gives an average refractive index of 1.492.

A few scattered outliers of similar rocks possibly related to the trachyte are found on Pimpernel Mountain.

Intrusive Igneous Rocks: The Owen Hill granite, the largest intrusion in the map-area, outcrops at the east boundary where it cuts Hazelton volcanic rocks. This is a medium-grained leucocratic stock probably correlative with the young (Tertiary) plutonic bodies on Nadina Mountain.

Modal analysis of seven samples shows the following composition:

Quartz	29 per cent
Perthitic orthoclase	27 per cent
Plagioclase (zoned, mainly oligoclase)	39 per cent
Biotite	} 5 per cent
Chlorite	
Magnetite	
Apatite	

It is noted that if the albite component of the plagioclase is removed it will combine in roughly equal proportions with the orthoclase and quartz with total residuals less than 20 per cent. According to Tuttle and Bowen (1958, pp. 127, 128) such rocks which approach eutectic or thermal minimum composition must be unequivocally classed as true granites as distinguished from other rocks of the granite clan.

The only other intrusion worthy of description is a small fine to medium-grained gabbroic rock, about one-quarter mile in diameter, found cropping out just northeast of the main access logging road in the west-central part of the map-area. Thin section study of two samples of a feldspathic phase of this rock shows an average of 85 per cent plagioclase (An₅₀ to An₅₅), 14 per cent pyroxene and equivalent alteration products, and 1 per cent magnetite and other accessories. A minor occurrence of chalcopyrite has been reported in the vicinity of this body.

STRUCTURAL GEOLOGY: The area is characterized by a reticulate pattern of small valleys and draws which evidently mark a system of important fractures. The so-called Poplar Mountain lineament which originates near the centre of the map-area is the most conspicuous regionally. This line can be traced approximately 15 miles to the southeast, striking about 165 degrees, to Tagetochlain Lake. It sharply defines the west side of Poplar Mountain which proves to be a large fault block. Somewhat weaker subparallel lineaments are observed near Tsalitpn Lake and Tsalit Mountain.

A second series of prominent lineaments coincides with a number of small but important faults trending about 050 degrees. Movement on these has chopped the geology in the northwest sector into a number of northeasterly elongated panels. Some offset in the northern extension of the Poplar Mountain lineament is also apparent.

Examination of the data gathered in the field shows the prevalence of minor fractures. The main attitudes are as follows:

Development	Attitude
(1) Very strong	strike 100 degrees, dip 90 degrees
(2) Strong	strike 140 degrees, dip 80 degrees southwest
(3) Intermediate	strike 025 degrees, dip 60 degrees northwest
(4) Weak	strike 065 degrees, dip 80 degrees northwest

The strongest direction (1) is parallel to a set of well-developed easterly trending lineaments. (These are readily confused with glacial grooves displayed by photographs.) The remaining fractures cannot be easily correlated with known lineament directions, possibly because of the extent of glacial cover in the area and limitations in photographic resolution.

MINERALIZATION: The zone of mineralization on the Code-Fen property is coincident with an elliptical window of Hazelton acid pyroclastic rocks about 0.5 mile wide extending 1.2 miles eastward from Mineral Hill and centred about 1.5 miles south of the Morice River road (Fig. 40). Owing to extensive till deposits in this region visible bedrock is restricted to trenches, a few areas near the crest of Mineral Hill, and along Code Creek. Where exposed the rocks are uniformly bleached dacitic tuffs and tuff breccias; these appear to be massive except just southeast of the gully on the east fork of Code Creek where a section of well-bedded tuff was found striking 005 degrees dipping 65 degrees easterly. Fine-grained pyrite and dark specks of sphalerite are widely disseminated accompanied by intense clay alteration, silicification in places, and manganese encrusta-

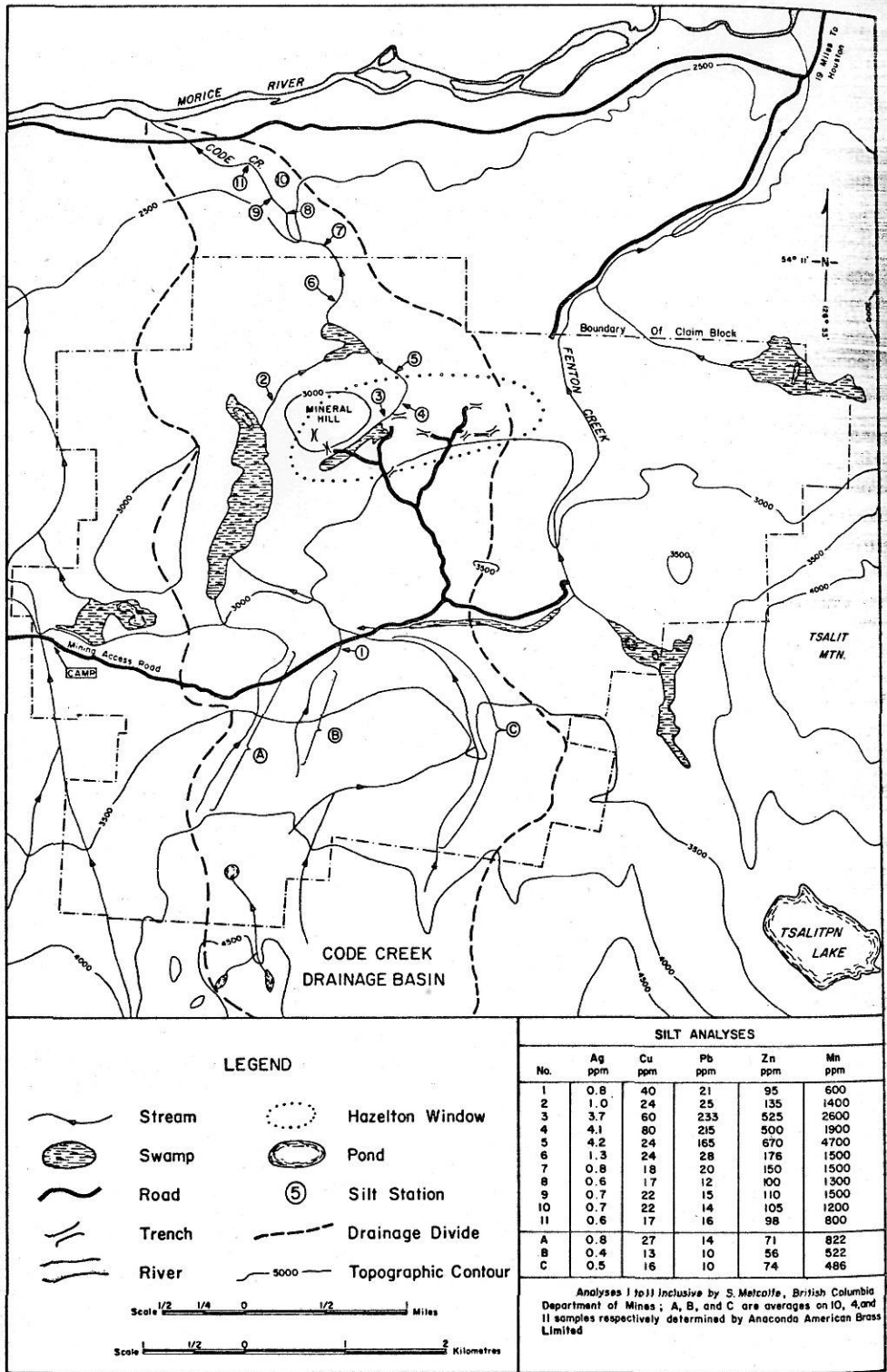


Figure 42. Analyses of silt samples taken in the Code Creek drainage basin.

tion on cracks. A few narrow veinlets of dark sphalerite and pyrite are visible in some samples.

Knowledge of the nature and origin of the mineralization is incomplete. No igneous intrusion has been found in the immediate area that could be attributed as being the source of metal-bearing solutions. In fact the only intrusions known to cut Hazelton rocks are fresh Tertiary dykes that certainly postdate mineralizing events. (Scattered pyrite reported as occurring in the quartz porphyry phase of the Fenton Creek rhyolite is not considered part of or related to the main mineralization.)

SILT AND SOIL GEOCHEMISTRY: The results of a silt geochemical survey in the Code Creek drainage basin is shown on Figure 42. A total of 11 samples were collected by the writer and submitted for acid extraction treatment and atomic absorption analysis.

The determinations show a regular increase in silver passing upstream from a point near the mouth of Code Creek (station 11) to its east fork tributary approaching the Hazelton window (stations 3, 4, and 5). The behaviour of zinc is markedly similar to silver as is lead and manganese; copper is somewhat erratic. Average background readings established from stations on the upper reaches of Code Creek (Nos. 1, A, B, and C) are as follows: 0.6 ppm silver, 24 ppm copper, 14 ppm lead, 74 ppm zinc, and 608 ppm manganese. The highest values, all from stations 3, 4, and 5, are: 4.2 ppm silver, 80 ppm copper, 233 ppm lead, 670 ppm zinc, and 4,700 ppm manganese.

Detailed soil sampling in the area of the Hazelton window shows good geochemical coherence between lead and zinc and to a certain extent, silver. According to a company report the results of a total of 395 samples (normally taken from 'B' horizon) shows lead greater than 60 ppm and ranging to 1,000 ppm in 74 samples and zinc greater than 700 ppm and ranging to 2,000 ppm in 75 samples. Copper levels rarely exceed 75 ppm and are nowhere considered anomalous. The threshold level for silver has been set at 1.7 ppm in this area; in a few soil samples silver attains values in excess of 16 ppm.

WORK DONE: Surface workings mapped; induced polarization survey, 5 line-miles covering central area of the Code-Fen claims; Aftmag survey, 2.5 line-miles covering the same claims; geochemical soil survey, 270 samples covering the same claims; surface diamond drilling, 25 holes totalling 11,000 feet on Code 6-9, 12, 13, 15, 21 Fraction and Fen 1.

REFERENCES: *Minister of Mines, B.C. Ann. Rept.*, 1965, p. 81; 1967, p. 109; 1968, p. 139; *B.C. Dept. of Mines & Pet. Res.*, G.E.M., 1970, pp. 149, 150; 1971, p. 173; Assessment Reports 799, 1229, 2734, 3257, 3646; Tuttle, O. F. and Bowen, N. L., 1958, *Geol. Soc. Amer.*, Mem. 74, p. 153.

HAGAS (No. 104, Fig. D)

LOCATION: Lat. 54° 09' - 10.8' Long. 126° 59' - 127° 02' (93L/2W, 3E)
OMINECA M.D. At approximately 3,000 feet elevation 2 miles southeast of the junction of Morice River and Lamprey Creek, 25 miles southwest of Houston.

CLAIMS: HAGAS 1 to 37, HR 1 to 10.

ACCESS: By the Morice River road from Houston, 25 miles.