PAGE 1

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TITLE ¢14¢ MINERLOGRAPHY OF THE BETHLEHEM COPPER CORPORATION (N.P.L.) PROPERTY IN HIGHLAND VALLEY, BC _card 1 _card 2

ABSTRACT ¢15¢ _card 1 _card 2 _card 3 _card 4 _card 5 _card 6

Geological field(s) ¢16¢ 1 2 3 4 5

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03 Engineering Geol.
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02 Atomic abs.
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NTS Ø26Ø	Year /	Author /	

THE FOLLOWING INFORMATION RELATES TO MINERAL DEPOSITS

Deposit name Ø27Ø BETHLEHEM

Host rock age

- 1 PHANEROZOIC →
  - 1 CENOZOIC → 1 QUATERNARY, 2 TERTIARY
  - 2 MESOZOIC → 1 CRETACEOUS, 2 JURASSIC, 3 TRIASSIC
  - 3 PALEOZOIC → 1 PERMIAN, 2 PENNSYLVANIAN, 3 MISSISSIPPIAN, 4 DEVONIAN, 5 SILURIAN, 6 ORDOVICIAN, 7 CAMBRIAN
  - → 1 UPPER, 2 MIDDLE, 3 LOWER
- 2 PROTEROZOIC → 1 HADRYNIAN, 2 HELIKIAN, 3 APHEBIAN
- 3 ARCHAEAN

Ø28Ø INSERT ZERO FOR UNCERTAIN OR UNKNOWN DIGITS

Deposit type(s) 1 2 3 4

Ø31Ø 15

01 Carbonatite
02 Coal
03 Contact metamorphic (skarn)
04 Diatreme (diamond pipe, breccia pipe)
05 Evaporite
06 Geothermal (hot spring)
07 Industrial mineral
08 Lateritic
09 Magmatic
10 Massive sulphide
11 Oceanic (Mn nodules, etc.)
12 Pegmatite
13 Petroleum/gas/tar sands
14 Placer
15 Porphyry
16 Replacement
17 Residual
18 Stratiform sedimentary
19 Stratiform volcanic
20 Supergene
21 Vein

Other : enter below

Deposit Ø29Ø **age**

Other → Ø32Ø

Major metal(s)
- in decreasing order of importance
- use chemical symbols: AG, PB, etc. (left justify)

1 2 3 4 5 6 7

Ø30Ø

Major minerals (in decreasing order of importance)
- use 4-letter acronyms (see list or use coding algorithm)

Ø33Ø

Enter most important citations of your bibliography as: year/author's surname/publication/"short" title
- separate these items by a slash; abbreviate freely but logically; use only 2 digits for year of publication

Example: 71/SUTHERLAND-BROWN /CIM TRANS, 74, P121/METALLOGENY OF THE CAN. CORDILLERA

1 Ø34Ø

2 Ø35Ø

3 Ø36Ø

4 Ø37Ø

5 Ø38Ø

4276 West 14th Avenue
Vancouver 8,
British Columbia,
March 29, 1956.

Dr. R.M.Thompson,
Department of Geology,
University of British Columbia,
Vancouver, British Columbia.

Dear Sir:

In accordance with the requirements of the University of British Columbia for partial fulfilment of the course, Geology 409, I submit my report entitled "Mineralography of the Bethlehem Copper Corporation (N.P.L.) property in Highland Valley, British Columbia".

Yours truly,

Harold Jones

Harold Jones

MINERALOGRAPHY OF THE BETHLEHEM COPPER CORPORATION (N.P.L.) PROPERTY IN HIGHLAND VALLEY, BRITISH COLUMBIA

A report submitted in
partial fulfilment of the requirements
for the course in Geology 409

HAROLD JONES

March 29, 1956

Summary

The Bethlehem Copper Corporation (N.P.L.) property is situated in Highland Valley, thirty miles southeast of Ashcroft, British Columbia. The property is readily accessible by road from Ashcroft or Merritt.

The quartz diorite of the Guichon Creek Batholith underlies the Highland Valley district. On the Bethlehem Copper property it is intruded by a series of granitic rocks and an igneous breccia. The mineralization appears to be related to the breccia and the intrusives.

Three types of mineralized zones are present; breccia zones, joint controlled zones and fissure vein zones. These zones are highly jointed and in most places, deeply weathered. The mineralization is widespread and of low grade, the main minerals being chalcopyrite, bornite and malachite. Minor amounts of covellite, chalcocite, molybdenite, tetrahedrite, pyrite, chrysocola, azurite and galena are also present.

This property has the same characteristics as some of the large porphyry copper deposits in the United States. If ore grades are sufficiently high, this property could be developed into a large tonnage porphyry copper mine.

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ILLUSTRATIONS

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CHAPTER I

Introduction

A. General Statement

The object of this paper is to give a mineralogical report on the Bethlehem Copper Corporation (N.P.L.) property in Highland Valley, British Columbia. This property is within the Kamloops mining division.

Exploration work by this company began in the summer of 1955. The purpose of the work was to map geologically the Snowstorm group of claims and to delimit and evaluate the mineralized areas. Planetable mapping on a scale of 100 feet to the inch was followed by bulldozer trenching, ~~by bulldozers~~, of the Iona and Jersey mineralized areas. The trenches were then bulk sampled, taking one ton of sample over each 20 feet of trench length.

Location and Accessibility

The Bethlehem Copper Corporation property is in the Highland Valley district, thirty miles southeast of Ashcroft, British Columbia. Ashcroft (Figure 1) is on the Thompson River, 220 miles by road northeast of Vancouver B.C. The Bethlehem Copper group of claims is situated on the southwest side of Forge Mountain, which forms the northeast side of Highland Valley.

Highland Valley is accessible by secondary roads from two directions, one from Ashcroft to the northwest and the other from the Savona-Merritt highway to the east. Both of these roads connect with main provincial highways.

B. Topography

Highland Valley is the name given to the valley occupied by the headwaters of Pukaist Creek draining westward, Witches Brook draining eastward, and the small lakes at the divide.

The topography of the Highland Valley district is of the Interior Plateau type. The valley floor is at about 4100 feet elevation and is up to one mile wide. The relief is low, with the adjacent mountain summits only 1000 to 1200 feet above the valley floor.

The mountains are well rounded, heavily drift covered and with few rock outcrops. The slopes are covered with abundant, but not dense, vegetation, the growth being mainly hemlock, fir and pine of non-commercial grade. There is very little, if any, underbrush.

C. History of the Property

Parts of Highland Valley have been known to be mineralized since the turn of the century. Properties staked in the early 1900's include the O.K.Mine, the Kathleen Claim, the Glossy Group, the Transvaal Group, the Highland Group and the Snowstorm Group. Extensive exploration was carried out on some of these properties. The O.K. property developed into a small mine and had a mill which during 1916-17 produced 10,000 tons of copper concentrate.

On what is now the Bethlehem Copper property, there was staked, in 1905, the Snowstorm Group of claims which consisted of 23 claims and fractions. (The accompanying map covers part of this old group). On the Snowstorm claim a 50-foot shaft was sunk and a 75-foot adit driven and from these openings a small stope was opened. During 1915-16 a small ore shipment was made. Because of transportation difficulties, very little ore was shipped from this area.

In 1919 the British Columbia Department of Mines carried out some exploration on the Snowstorm Group. Their work consisted of driving a 280-foot adit on the Iona claim and diamond drilling a few holes on the Snowstorm claim, all work being done for sampling purposes.

Work ceased in 1921 and the claims lapsed. In 1937 the claims were re-staked and a little work was done in the Snowstorm shaft. In 1942 Ventures, Ltd. and Anyox Metals diamond drilled on the Iona claim and also drilled one hole on the Jersey claim. They also sank the Jersey and Guernsey shafts. (See map).

Many surface pits and small bulldozed trenches may be found on the property. These are the results of the earlier exploration programs.

In 1954 the claims lapsed and shortly later they were re-staked by Bethlehem Copper Corporation.

D. Acknowledgments

The writer wishes to express his appreciation to Dr. R.M.Thompson for his helpful suggestions and assistance on problems dealing with mineralography.

Acknowledgments are due Mr. John McGraw for the generous use of his camera for taking the photographs used in this report.

CHAPTER II

General Geology

A. Introduction

The rocks on this property consist of several varieties of granitic rocks, igneous breccias, and minor volcanics.

The oldest granitic rock unit is the "older" quartz diorite which underlies most of the area. It forms the Guichon Creek Batholith. It is intruded in several places by a pink aplitic granite. These two rock units are in turn intruded by a younger igneous complex of "coarse" porphyry, "fine" porphyry, quartz diorite and leuco quartz diorite. These younger intrusives occur as more or less parallel bands. (see map).

Breccia zones, occurring in several areas on the property, consist largely of coarse fragments of igneous rock.

B. Rock Units

The following is a brief description of the various rocks encountered in the mineralized zones.

(1) "Older" quartz diorite

The "older" quartz diorite underlies most of the Highland Valley area. It is referred to as "older" to avoid confusion with a young quartz diorite intrusive.

The "older" quartz diorite is a medium to coarse grained rock, ranging from light grey to dark grey in colour, the colour being controlled by the size and amount of mafics. Its composition is, quartz (15%), plagioclase (65%), hornblende (10%) and biotite (10%). Sphene, sericite, apatite, epidote and magnetite occur in accessory amounts.

Pinkish ?

2. Younger igneous complex.

(a) Leuco quartz diorite

The leuco quartz diorite is characterized by its generally light color, which is a result of a low proportion of mafics. It is a medium grained rock and consists primarily of quartz (12%), plagioclase (75%), actinotite (5%) and epidote (6%). Sphene, apatite and chlorite occur in accessory amounts.

(b) Porphyritic rocks

(i) "Fine" porphyry

This is a fine grained porphyry, the phenocrysts of which are 2 to 3 mm across. Its colour ranges from light grey to nearly white, to light grey-green. The phenocrysts make up about 60% of the rock and consist of quartz (3%), plagioclase (95%), and hornblende (2%). The matrix is mainly quartz and feldspar but may have about 5% of hornblende, chlorite and magnetite.

(ii) "Coarse" porphyry

The "coarse" porphyry is coarser grained than the first mentioned, its phenocrysts being about twice the size of those found in the first variety. Its colours are much the same as the first variety. The size of the phenocrysts is the most diagnostic property of the rock.

Its composition is quartz (5%), plagioclase (90%), hornblende (5%). Chlorite, sericite, calcite, apatite, feldspars, and quartz form the matrix.

(c) Hornblende biotite quartz diorite

The hornblende biotite quartz diorite closely resembles some phases of the "older" quartz diorite but is medium grained rather than coarse grained. Its colour may be light grey, light green or light pink, depending on the amounts of dark mafics and pink quartz and feldspars.

Its composition is quartz (20%), plagioclase (60%) orthoclase (10%), and biotite (5%). Chlorite and magnetite occur in accessory amounts.

3. Breccia

The breccia consists of coarse, angular fragments of the "older" quartz diorite and of the younger complex rocks. Its matrix is dark grey and contains numerous vugs.

CHAPTER III

Mineralogy

A. Introduction

Several types of mineralized zones are found on the property. They are: mineralized breccia zones, joint controlled zones and fissure vein zones. All the rocks on the property are highly jointed. It is probable that most of the mineralization is related in some way to the jointing. In the case of the breccia zones, although they are highly jointed and fractured, they are composed of such a distinctly different rock that it is best to consider them as separate zones. It must be pointed out that although all the rocks are jointed, not all are mineralized.

B. Mineralized Zones - general descriptions and laboratory data

1. Iona Zone

The Iona zone is possibly the largest mineralized area on the property. It contains both a mineralized breccia zone and a joint controlled zone. Trenches #1, 2, and 3 have indicated the Iona zone to be about 1200 feet long in the north-south direction and 900 feet wide in the east-west direction.

About 70% of the rock in this zone is breccia, the remaining 30% being equally divided between "fine" porphyry, coarse porphyry, and hornblende biotite quartz diorite. The rocks are highly jointed and strongly weathered, the result of the latter being abundant iron staining of the rocks.

The minerals of economic interest in the Iona zone are bornite, chalcopyrite and malachite. Minor amounts of molybdenite, powellite, chrysocola and azurite are also present. Limonite is associated with all the copper minerals.

Four specimens were studied from the Iona Zone. Data on these are as follows:

Specimen #1

Specimen #1 is from the breccia zone in trench #2. It consists of several fragments, the largest being about 1 inch square, in a fine fragmental matrix. Vugs are present in the matrix.

Chalcopyrite appears to be the only primary mineral present. It occurs in fractures in the matrix and to a lesser extent, in fine cracks in the breccia fragments. Malachite is abundant and coats the joint surfaces and vugs.

In a polished section of specimen #1 magnetite was found as an accessory mineral.

This specimen is about 1% mineralized, the minerals being chalcopyrite (80%), malachite (20%) and magnetite (1%).

Specimen #2

Specimen #2 is from the breccia zone at the east end of trench #2 and consists of "fine" poprhyry fragments cemented together by a fine-grained matrix. This specimen is about 10% mineralized with chalcopyrite (90%) and molybdenite (10%) being the main minerals. Magnetite occurs as an accessory mineral. The mineralization appears to be concentrated in openings between the breccia fragments as well as in fine cracks throughout the fragments.

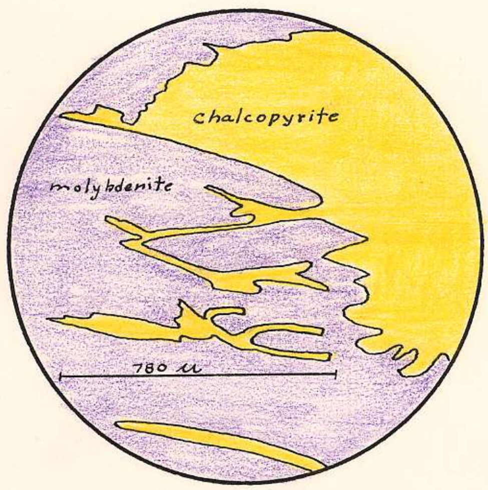


Figure 2. Molybdenite replaced by chalcopyrite

In a polished section of specimen #2 the molybdenite occurs as fine laths projecting into or surrounded by irregular shaped chalcopyrite grains (Figure 2). This texture indicates that the molybdenite crystallized first and was then replaced by chalcopyrite. The chalcopyrite appears to have entered the molybdenite along cleavage planes. The fact that molybdenite is a high temperature mineral and chalcopyrite a medium temperature mineral would also indicate that molybdenite crystallized first.

Specimen #3

Specimen #3 is from the same area as specimen #2. The rock appears to be leuco quartz diorite. It is a small specimen and may be a part of a breccia fragment. The mineralization has a disseminated appearance but, as in the other rocks, there are numerous fine cracks with which the mineralization is related. The minerals identified with the aid of the binocular microscope are chalcopyrite (70%) and pyrite (30%). The rock is about 3% mineralized.

In a polished section of specimen #3 many of the chalcopyrite grains are rimmed with a thin layer of covellite. Magnetite occurs as an accessory mineral.

Specimen #4

Specimen #4 is from trench #1. The rock is a light coloured (leuco ?) quartz diorite. The primary minerals are chalcopyrite (40%) and bornite (50%) and they occur in a network of interconnecting fine cracks (Figure 3). Malachite (8%) is abundant along joint surfaces and in some small cracks.

In a polished section of specimen #4 the chalcopyrite and bornite are both rimmed by covellite. Chalcopyrite and bornite are in about equal proportions and both show exsolution textures. Bornite contains exsolved lamellae and

Figure 3. Handspecimen showing interconnected cracks filled with chalcopyrite and bornite X.1/3

blebs of chalcopyrite while chalcopyrite has exsolved blebs of bornite on its margins. It appears that chalcopyrite and bornite must have been in about the same proportions in the original hydrothermal solutions and on deposition, some grains contained an excess of bornite and hence exsolved chalcopyrite while others had an excess of chalcopyrite and exsolved bornite.

A few bornite fissure veins cut through the breccia. These resemble the Snowstorm fissure veins in mineralogy so they will be neglected here.

Two zeolites, Heulandite and Laumontite, are found in this zone. The former is the most abundant and is found coating many of the joint surfaces in the Iona zone as well as in most of the other zones. Laumontite occurred as a small pocket, as an alteration product. The zeolites probably were deposited during the last stages of mineralization by low temperature hydrothermal solutions.

2. Jersey Zone

The Jersey Zone is that area which includes the Jersey shaft and several bulldozed trenches (see map). The rocks in this zone are "older" quartz diorite, leuco quartz diorite, "fine" and "coarse" porphyry and breccia. These rocks, as elsewhere on the property, are strongly jointed and, in many places, highly oxidized. Some exposures in the trenches show copper gossan and heavy iron staining.

Specimen #1

Specimen #1 is from the Jersey shaft. It is a highly oxidized "coarse" porphyry and has all its fracture surfaces heavily iron stained. Mineralization of chalcopyrite (60%) and molybdenite (40%) is disceminated throughout the rock.

In a polished section of specimen #1 chalcopyrite is rimmed by covellite. Specular hematite occurs as an accessory mineral. The mineralization is associated with numerous fine cracks and appears to have deposited simultaneously.

Specimen #2

Specimen #2 is coarse porphyry and came from cut #4. Abundant malachite covers the joint surfaces. Chalcopyrite and bornite also occur on joint surfaces and in small cracks.

This specimen is about 2% mineralized with chalcopyrite and bornite occurring in equal amounts.

Specimen #3

Specimen #3 also came from trench #4 and is from a one-half inch wide chalcopyrite stringer. The walls of this stringer are lined with a thin coating of specular hematite.

No other minerals were found in a polished section of this specimen.

3. Snowstorm Zone

At the Snowstorm, small fissure veins are found in the old workings. In the stope, a vein 3 feet wide shows bornite stringers in both the foot and hanging walls as well as copper mineralization in the shattered rock between the two walls.

In a specimen of wall rock from this zone the main gangue minerals are quartz, epidote and chlorite. In a thin section it was found that wall rock alteration is complex and includes epidotization, chloritization, carbonatization and sericitization.

Specimen #1

Specimen #1 is from a bornite rich quartz fissure vein. This specimen is about 40% massive bornite and 60% quartz. Several polished sections were made from this specimen which appears to contain only bornite. The following is a summary of the observations made in these polished sections.

Many grains show chalcopyrite as fine lamellae, of which some are straight and some are wavy. Many of these lamellae feather into fine cracks, coating the cracks with chalcopyrite. The chalcopyrite formed by ex-solution from the bornite and diffused into the cracks.

Covellite is present as partial veins around the bornite. It also lines small pits in the bornite.

Chalcocite occurs as thin rims around the bornite but is in lesser amounts than the covellite. Both the covellite and chalcocite are supergene.

A few irregular grains of galena were found associated with bornite and separated from it by mutual boundaries, (Figure 4). The galena has the appearance of simultaneous deposition with, or ex-solution from, bornite. Edwards (pp. 213 1954) states, "that on slow cooling of a lead-copper matte the galena crystallizes out in a eutectic relation with the bornite compound." This may explain the presence of galena.

The minerals present are bornite (98%), chalcopyrite (1%) and chalcocite, covellite, and galena, (1%).

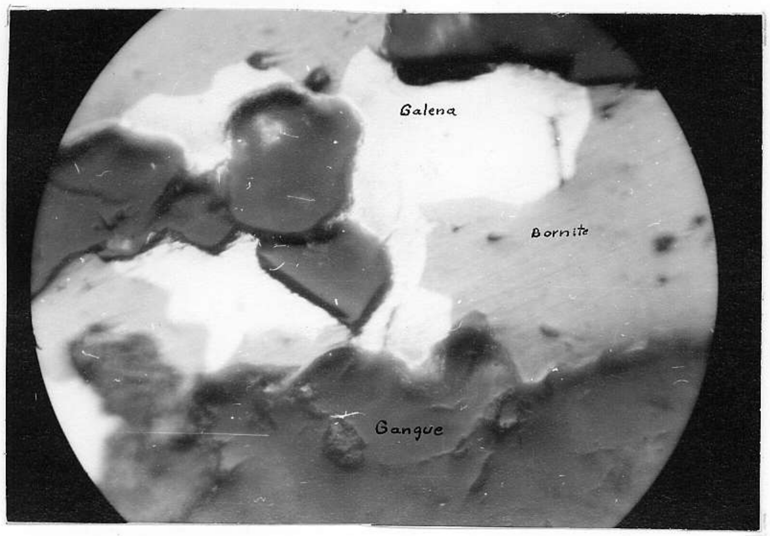


Figure 4. Galena ex-solved from bornite X 400

Specimen #2

Specimen #2 is from one of the Snowstorm fissures veins. This specimen shows two irregular mineralized veins; one three-quarters of an inch wide, the other one-half inch wide, cutting through altered quartz. (Similar to Figure 5). The main vein mineral is massive bornite (80%) but appreciable chalcopyrite (20%) is also present. Malachite lines all the planes of weakness in the gangue. The gangue minerals are quartz, calcite, chlorite, and epidote.

Figure 5. Fissure vein showing bornite and chalcopyrite X⅓

Fine chalcopyrite stringers are present in the bornite and tend to parallel the vein, causing a flow banded

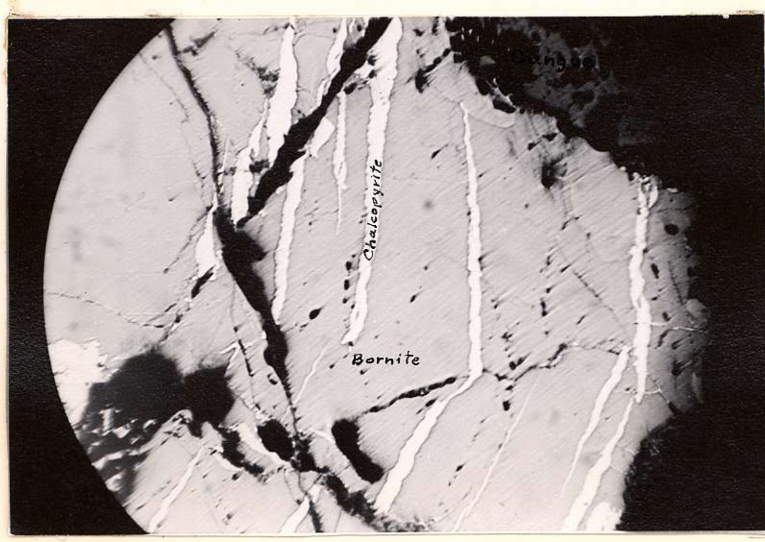


Figure 6. Ex-solution lamellae of chalcopyrite in bornite X200

appearance (Figure 5). These chalcopyrite stringers are most likely the result of chalcopyrite ex-solving from bornite into pre-existing cracks. Another section from this specimen shows excellent Widmanstatten texture.

Minor amounts of tetrahedrite are present on the outer margins of some bornite grains (Figure 6). Bornite-tetrahedrite solid solutions can exist above 275°C, thus the tetrahedrite probably formed by ex-solutions from bornite (Edwards, pp 104, 1954).

This may account in part for the low Ag content.

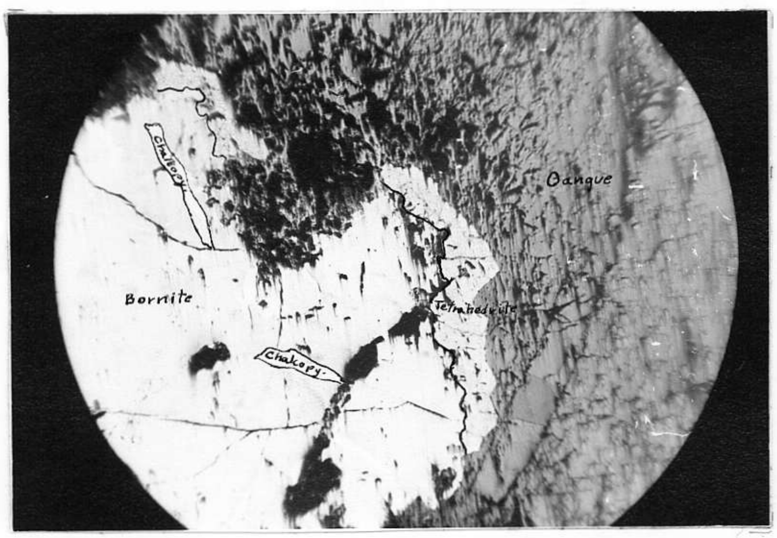


Figure 7. Tetrahedrite and chalcopyrite exsolved from bornite X 200

Covellite is abundant, forming many fine, intergrown flakes along cracks in the bornite.

Fine laths of speculer hematite are abundant in the gangue.

The minerals present in specimen #2 are bornite (80%), chalcopyrite (16%), tetrahedrite and covellite (2%), and specular hematite (2%).

4. White Zone

The rock in the White Zone is hornblende biotite quartz diorite. This rock is closely jointed with many of the joints filled with bornite and malachite. These joints are between one-sixteenth to one-eighth inches wide.

The feldspars in contact with the bornite-filled joints are a lighter colour than the rest of the gangue. In places the feldspars have a tendency to line up parallel with the joints. The only metallic mineral appears to be bornite.

In a thin section of this rock a great amount of sericite was found along the boundaries of the joints. The sericite, together with bleaching of the feldspars by the hydrothermal solutions, would account for the light banding along the joints.

A polished section showed chalcopyrite in the form of Widmanstatten texture.

5. Simons Zone

The Simons zone is 2,500 feet to the west of the Jerzey zone and is off the accompanying map. The rock in the Simons zone is "older" quartz diorite. This zone occurs on a ridge, the upper part of which has disseminated mineralization whereas the lower part has fissure veins.

Specimen #1

Specimen #1, which is from the upper part of the Simons Zone, contains disseminated bornite. The bornite appears to be related to the many zones of weakness in the rock.

A polished section of specimen #1 shows the bornite has entered the rock through small fractures and has replaced the gangue minerals.

Minor amounts of chalcocite are present as thin rims around the bornite and as blebs in the bornite. The blebs have sharp, smooth borders. Edwards (pp. 97, 1954) states that chalcocite and bornite form a solid solution at temperatures between 175°C to 225°C. It is thus probable that the chalcocite found inside the bornite formed by exsolution. The chalcocite rims are most likely supergene.

Specimen #1 is less than 1% mineralized, the minerals being bornite ($<$1%), malachite ($<$1%) and chalcocite (trace).

Specimen #2

Specimen #2 is from the lower part of the Simons Zone and contains a quarter-inch wide bornite fissure vein which cuts through the quartz diorite. Heavy iron stain is present on the borders of the vein.

A polished section of specimen #2 shows minor amounts of chalcopyrite as ex-solved lamellae in the bornite and as irregular grains in contact with the bornite (Figure 7).

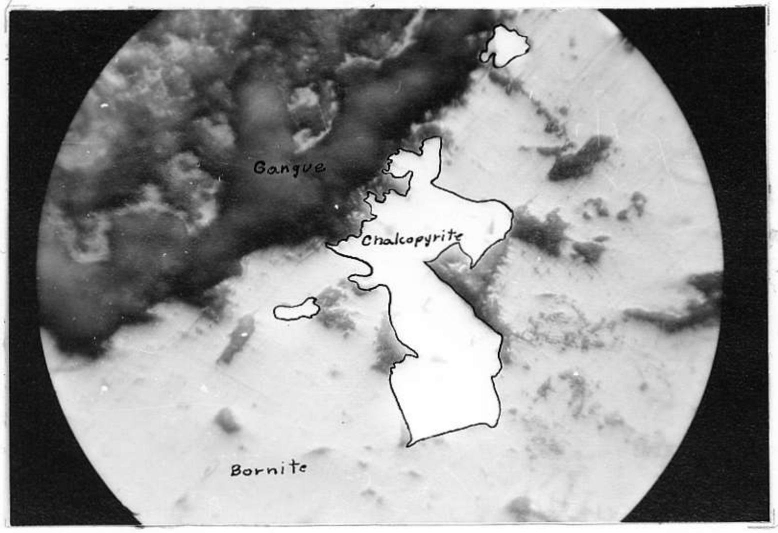


Figure 8. Chalcopyrite ex-solved from bornite X 400

6. Creek Zone

The Creek Zone is about 1500 feet southeast of the east end of #1 Iona trench and is not included on the accompanying map. Due to heavy drift, few outcrops are showing. From the limited information available, it appears that the mineralization is mainly in fissure veins in quartz diorite.

A specimen from this zone contains a three-eights inch wide bornite vein. Bornite and malachite appear to be the only minerals present.

A polished section of this vein shows chalcopyrite in the form of Widmanstatten texture, (Figure 8). Specular hematite and magnetite occur in the gangue as accessory minerals.

The minerals present are bornite (98%), chalcopyrite (1%), specular hematite and magnetite (1%).

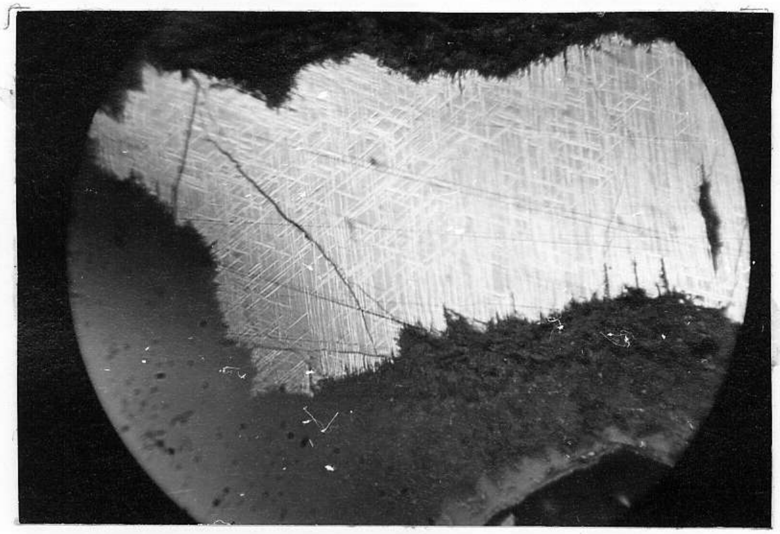


Figure 9. Chalcopyrite exhibiting Widmanstatten texture in bornite X 800

C. Discussion

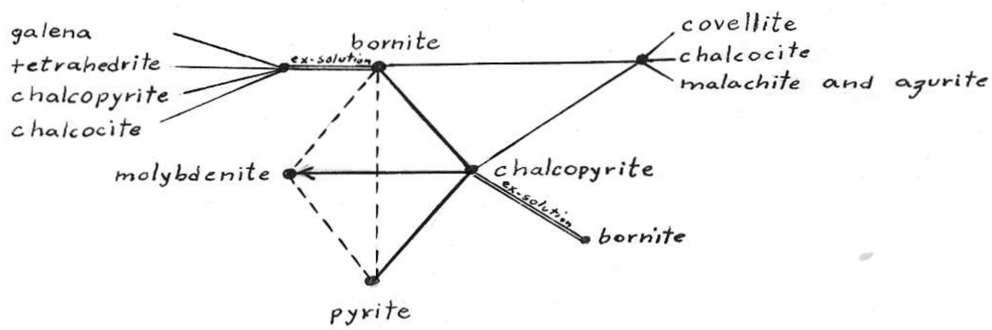
Laboratory data indicates that the mineralization is later than the igneous intrusives, brecciation and jointing. The mineral deposit must then be of the hydrothermal replacement porphyry type. The hydrothermal fluids probably entered the zones along the igneous intrusive contacts and then circulated through the rock via the joints. The minerals deposited along the joints or in small cracks feathering off the joints. Where the mineralization has entered the rock, some replacement of gangue had to occur.

Following mineralization there was a long period of weathering, the result of which has been the alteration of bornite and chalcopyrite to covellite, chalcocite, malachite, azurite and limonite. The limonite must have been derived from the chalcopyrite since very little pyrite is present.

In most of the mineralized zones, bornite and chalcopyrite show mutual boundaries and exsolution textures, Widmanstatten texture being the most common. The unmixing of bornite and chalcopyrite occurs at temperatures of 475°C or greater and thus indicates the deposit to be in the high temperature range. The presence of molybdenite would also indicate high temperature conditions. This property would be classified as a high temperature hydrothermal deposit or more correctly, a telethermal deposit. Wow! Impressive!

The paragenetic sequence would be as follows:

1. Molybdenite deposited above 500° C.
2. Bornite and chalcopyrite exsolved above 475° upon rapid cooling.
3. Pyrite crystallized
4. Alteration of copper sulfides to covellite and chalcocite.
5. Alteration and replacement of copper minerals to limonite, malachite and azurite.



The disseminated mineralization is quite fine grained, the average grain size being 607 x 360 microns. In the milling of this rock, fine crushing and grinding would be required to free the minerals.

Conclusions

The Bethlehem Copper property in Highland Valley, British Columbia is a large, low grade mineralized area. The most abundant minerals are bornite, chalcopyrite and malachite and occur most abundantly in highly jointed rock. Covellite, chalcocite, tetrahedrite, molybdenite, chrysocola, azurite, pyrite and galena occur in minor amounts. These minerals occur in breccia zones, joint controlled zones and fissure vein zones, where the main control appears to be jointing.

The mineralization appears to be related to the younger complex of igneous rocks although fissure veins do occur in the "older" quartz diorite.

The mineralization is the result of hot fluids or emanations so would be classified as a high temperature hydrothermal deposit.

The mineralized zones are near surface features, the only overburden being glacial drift which may be up to 40 feet deep. It may be concluded that if ore grades are sufficiently high, this property could be developed into a large tonnage, low grade, open pit mining operation.

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MAP OF A PORTION OF SOUTHEASTERN BRITISH COLUMBIA