A MINERALOGRAPHIC STUDY OF ORE

from the

MOTHERLODE GROUP

HARRISON LAKE, B.C.

E.B.Vick

April, 1940.

ACKNOWLEDGEMENTS

The writer gratefully acknowledges the helpful advice and cooperation of Dr. H.V.Warren in the examination of the Motherlode ores.

The writer wishes also to thank Mr. A.Allen for his generous aid in assaying ore-samples from the property.

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INDEX.

LOCATION

The Motherlode Group of eight mineral claims is situated on the eastern slope of the Chehalis River, B.C. The principle workings are approximatelysix miles N. 30° E. from Harrison Mills at an elevation of six hundred feet above sea level.

ACCESSIBILITY

From Vancouver the property may most conveniently be reached by motor-car. A first class highway, the " Dewdney Trunk Road," goes within six road miles of the property. Branching north from it at the north end of the Harrison R. bridge, a second class highway passes within six hundred feet of the ore exposures. At present it is neccessary to travel the last two miles afoot due to the condition of the bridges.

The Can. Pac. Rly. has a siding at Deroche, fifteen miles away, Large barges may be operated in the Harrison River only five miles distant.

PHYSIOGRAPHY

The claims are situated in the Coast Range Mts. The typical combination of abundant rainfall, dense vegetation, and rough topography render travelling difficult and have discouraged prospecting and developement. The property was staked early in the century, but has apparently never interested mining capital.

GENERAL GEOLOGY

Glacial and post glacial deposits generally mantle the area.

Cairnes (I) pp.1-3 describes the rocks present as volcanics of Jurassic age, consisting of grey and green porphyritic and vesicular lavas and fine to coarse-textured tuffs and agglomerates. With these he groups a few intercalated cherty and tuffaceous sediments; and dykes and small intrusives of unknown age.

One half mile to the west a rather gneissic quartz-diorite of presumably middle Jurassic age is observed in contact with the above rocks.

PARTICULAR GEOLOGY

The writer found that the rocks varied from limestone and vesicular andesites to porphyritic cherty flow rocks and fine grained siliceous rocks in a heterogeneous manner. Regional metamorphism had altered their constituent minerals so thoroughly that only the vesicular andesites could be considered diagnostic. These had lost their bedding planes and were most severely fractured along joints striking N.E. and dipping at 70° to the N.W.

The surface slope is approximately 30°.

Uphill towards the north.

DEVELOPEMENT

Approximately two hundred and fifty feet of surface stripping, fifteen feet of drifting, and twenty feet of shaft work. See Map No. 1.

SAMPLING

Considerable sampling by previous examiners have shown values in lead, zinc, copper, silver and gold. Samples taken by the writer are shown on Map. No. 1.

METHODS OF EXAMINATION OF THE MINERALS

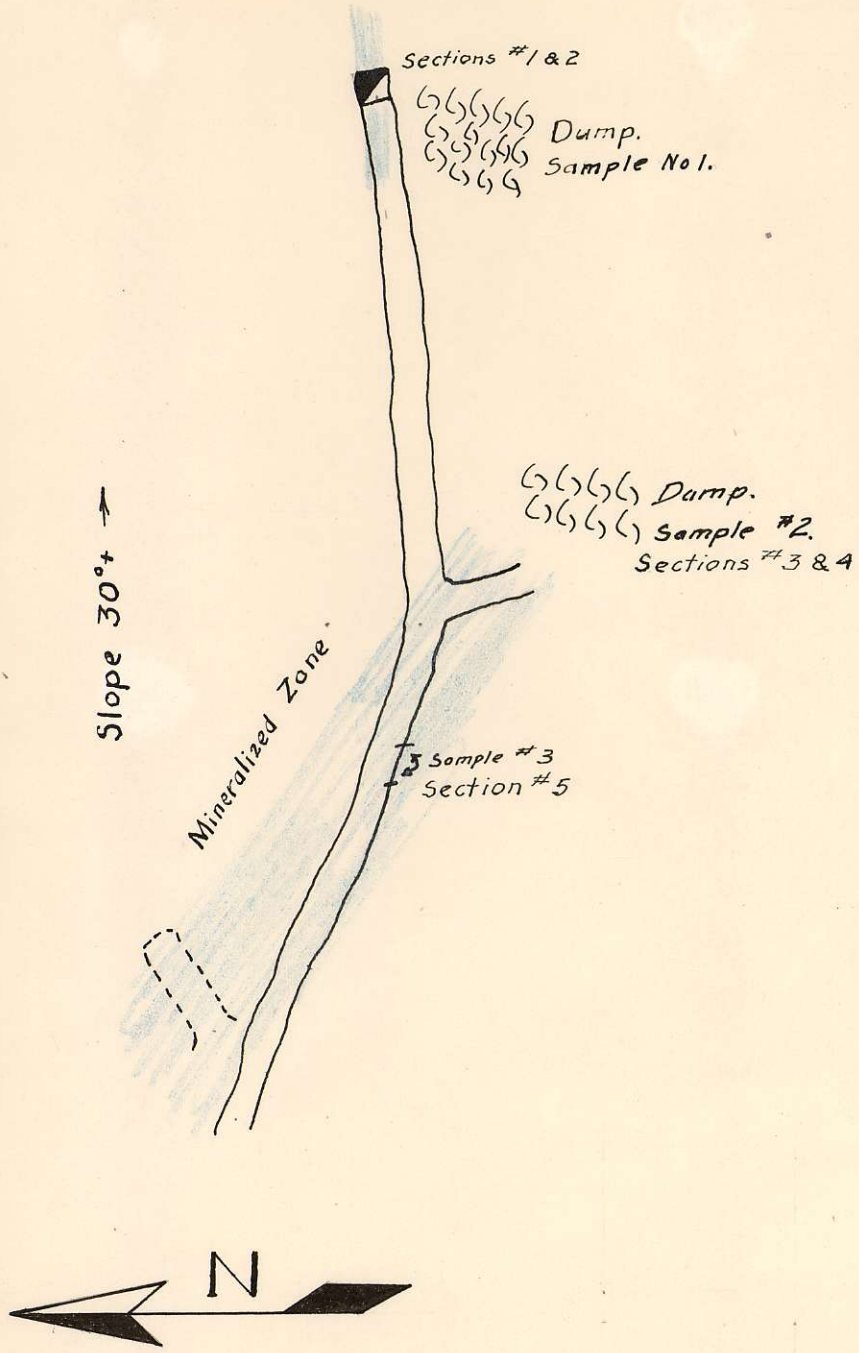
The methods used in examining the ore for this report were as follows.

(I) Examinations in the hand specimen with the aid of a hand lens.

(2) Examination of the flat polished specimen with the aid of a reflecting microscope and of etching chemical solutions.

(3) Examination of the chemical reactions of minute particles of the ore.

Sample	Values			
	Pb	Zn	Cu	Au
# 1	Tr.	7.8%	3.9%	.04 oz
# 2	Tr.	6.6	5.8	.14
# 3	Tr.	Tr.	0.8	.006



MOTHERLODE

PLAN OF WORKINGS

SCALE 1"/ 40'

MAP Nº1.

DESCRIPTION OF SAMPLES

No. 1. Picked sample from the shaft dump. 25% sulphides. The rock exposed in the shaft is irregularly mineralized with pyrite, sphalerite and chalcopyrite as concentrations 1"-4" wide in quartz seams at intervals across 8'. The seams appear to be converging at no great depth.(20' perhaps) Str. N. 85° E. Dip 70°N. Analysis Pb. Tr. Zn. 7.8% Cu. 3.9% Au. 0.04 oz.

No. 2. Picked sulphides from the crosscut dump. 30% sulphides. Pyrite chalcopyrite and galena fine-grained and vuggy in quartzites and andesites. Stike and dip not ascertained. Analysis. Pb. Tr. Zn. 6.6% Cu. 5.8% Au. 0.14 oz.

No. 3. Chip sample across 4' of ore and country rock in a zone 12' wide. Strike apparently N.70° W. Dip 70° S. Analysis. Pb. Tr. Zn. Tr. Cu. 0.8%. Au. 0.006 Oz.

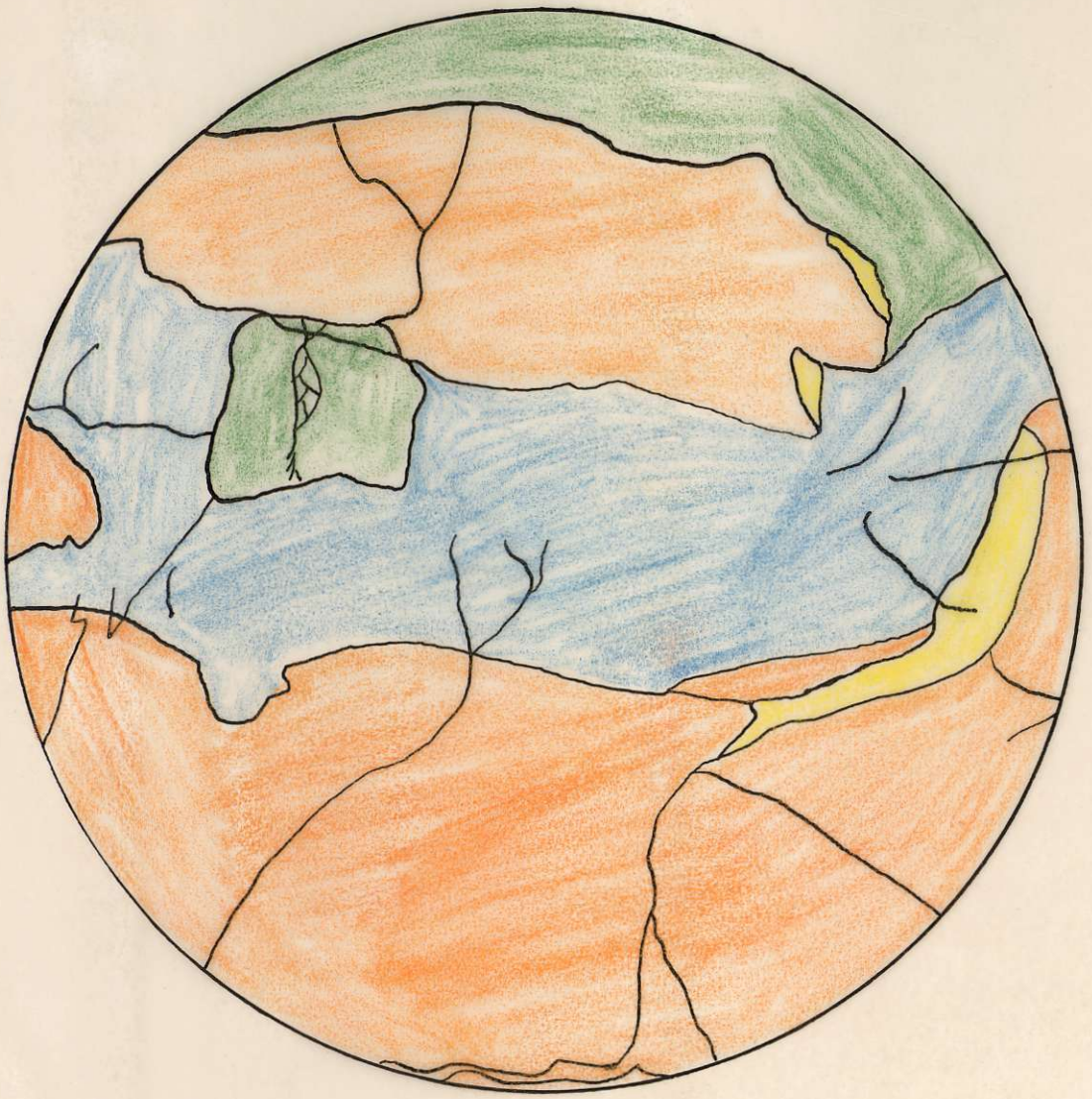
COMMENT Excessive rain and surface drainage had partially filled the workings with creek debris and prevented a satisfactory examination.

MEGASCOPIC EXAMINATION

The ore occurs as replacements in flow rocks.

The ore occurs as fissure veins in joint planes in the above rocks. Euhedral crystals of pyrite chalcopyrite bornite sphalerite and galena occur in open comb structure with a gangue of quartz. Some cavity filling has occurred with the deposition of anhydrite and calcite.

SECTION NO. I. X120



Pyrite

Chalcopyrite

Sphalerite

Quartz

MICROSCOPIC EXAMINATION

Note. Drawings tracings with Camera Leucida.

SECTION NO. I. FROM SHAFT

Approximately 30% Pyrite, 40% sphalerite, 10% chalcopyrite, balance gangue.

Pyrite is well crystallized, badly fractured and present both in the solid quartz walls and as inclusions in the other sulphides. Calcite is found as a film over pyrite crystals in vugular cavities.

Sphalerite is massively crystalline with inclusions of chalcopyrite.

Chalcopyrite is massive. Some reaction rims with fractured pyrite noted. Other pyrite crystals show clean boundaries.

Quartz crystals are visible and intergrown.

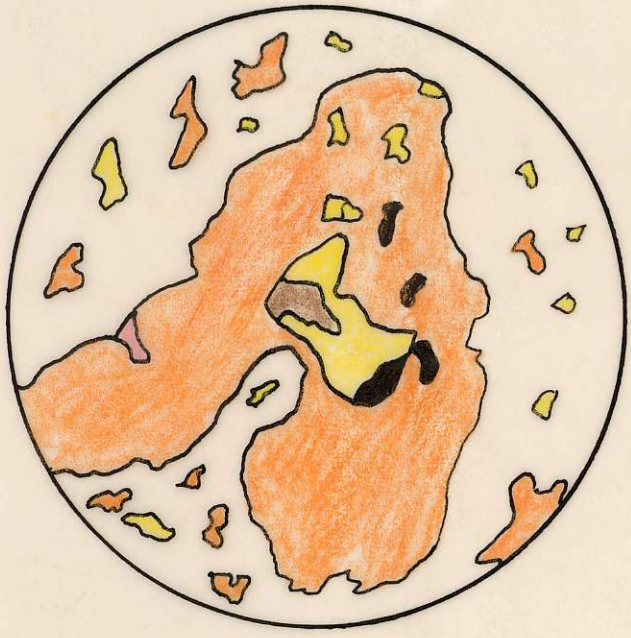
Fracturing in the chalcopyrite, sphalerite and quartz is slight and continuous.

SECTION NO. 2. FROM SHAFT.

Pyrite 2%, chalcopyrite 20%, balance gangue.

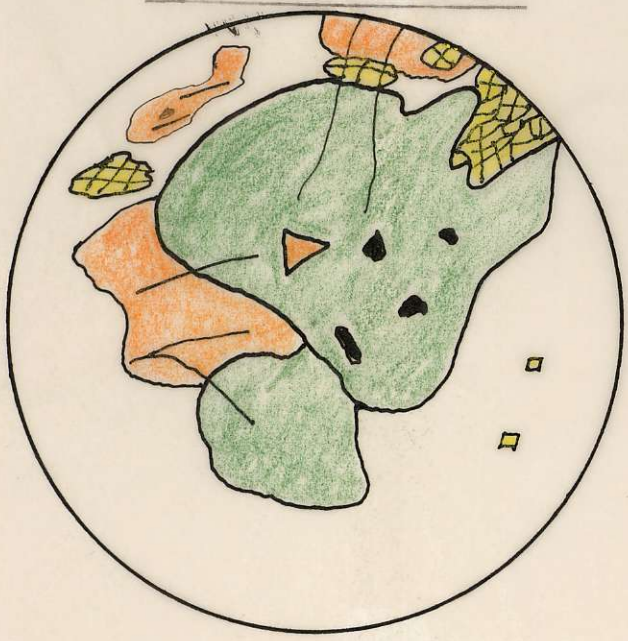
Chalcopyrite contains inclusions of pyrite and sphalerite with rough and smooth boundaries respectively. Pyrite in chalcopyrite is badly shattered, that in quartz is small and euhedrally crystallized. Country rock intruded and in reaction with silica. Faint cracks in chalcopyrite and in quartz are respectively continuous. Illustrates genesis.

SECTION NO. 3. X 120



Pyrite
Chalcopyrite
Bornite
Gold
Polishing Rouge
Pore Spaces

SECTION NO. 4 X 120



Pyrite
Chalcopyrite
Sphalerite
Anhydrite

SECTION NO. 3. FROM CROSSCUT.

Quartz, calcite and anhydrite gangue 15%. Balance sulphides.

Fine grained euhedral crystals of pyrite and quartz and subhedral chalcopyrite, sphalerite, anhydrite and calcite. Considerable open pore space.

Bornite is noted in chalcopyrite with smooth boundaries.

Gold is observed as small inclusions in both pyrite and chalcopyrite.

Pyrite is both fresh and badly fractured. Chalcopyrite and quartz cracked. Anhydrite not fractured. Calcite merely a film in open pore space.

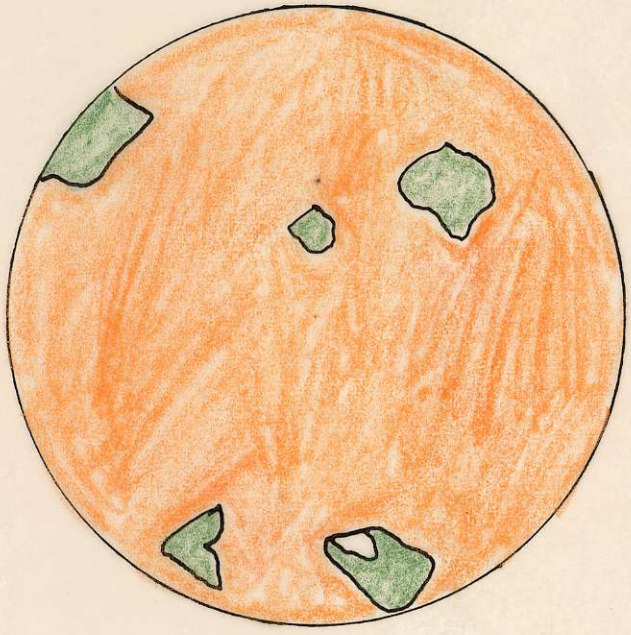
SECTION NO. 4. FROM CROSSCUT.

Very similar to No. 3. Sphalerite is seen cleanly crystallized on the boundaries of the anhydrite.

Gold is in small subhedral crystals in the chalcopyrite.

The ore from which these two sections were cut is apparently of the replacement type.

SECTION NO. 5. X 120.



Chalcopyrite

Sphalerite

Galena

Pits

SECTION NO. 5. FROM OPENCUT.

Pyrite 15%, chalcopyrite 10%, sphalerite 60%, balance anhydrite.

Pyrite very badly fractured in a zone next to the quartz gangue.

A zone of chalcopyrite next to the pyrite containing inclusions of both pyrite and sphalerite.

Azone of sphalerite containing inclusions of pyrite and chalcopyrite. The sphalerite has crystal faces projecting into a mass of anhydrite.

Some galena is present as inclusions in the sphaleri sphalerite.

Reaction has taken place between some of the pyrite and the chalcopyrite.

Boundaries between the sphalerite and the galena and between the sphalerite and chalcopyrite are smooth.

COMMENT.

Analysis showed a trace of silver in the sample. It is possible that specks of a light grey mineral too small to be identified were tetrahedrite.

PARAGENESIS.

The order of deposition of the minerals appears to have been.

Pyrite, Quartz, Pyrite, Sphalerite, Galena, Chalcopyrite, Bornite, Quartz.

THE PROBABLE MINERALOGICAL SEQUENCE.

(I) Primary extrusion of flow rock and deposition of sediments.

(2) Metamorphism of the above rocks with possible developement of pyrite and possible intrusion of small igneous bodies.

(3) Fracturing of rocks and intrusion of hydrothermal solutions carrying sulphides of lead, zinc, copper, and iron and some free gold.

(4) Hydrothermal stoping of pyrite and deposition of the sulphide load.

(5) Slight fracturing of the minerals.

(6) Deposition of anhydrite and calcite in pore space.

CONCLUSION.

The deposit is apparently of the mesothermal type and the result of hydrothermal solutions.

COMMENT.

It is exceedingly likely that a deposit of this nature would have considerable vertical depth.

Assuming the lead content to continue slight an easy separation of the gold copper and zinc could be made.

The width of the mineralized zone and the aggregate value of metals present seem to warrant:-

(I) The cleaning out of the present workings at a probable cost not exceeding five hundred dollars.

(2) A thorough examination of the prospect by a competent mining engineer.