

W A T E R L O O M I N E.

Report on Polished Sections and Suite  
of Ores.

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600450

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## INTRODUCTION

Location: The Lightning Peak area is situated at the headwaters of Granby River and Rendell Creek, Osooyos District, British Columbia. The property of the Waterloo Mine is situated in this area at the headwaters of Rendell Creek, at the western terminus of the tractor road leading into the Lightning Peak area.

Communication: The area is accessible from Edgewood on Upper Arrow Lake via the Edgewood-Vernon highway and a tractor road which branches to the west from the highway at a distance of 24 miles from Edgewood. The tractor road built by the Provincial Government, is about 17 miles long and is passable by automobile for 9 miles from the highway.

Maps:

- (1) Key Map of the Area
- (2) Map of Waterloo Mine

## GENERAL GEOLOGY

Tertiary Basalt: black or dark bluish grey, massive,  
fresh looking lava.

Minor Intrusives: quartz porphyrys, granite porphyrys,  
and pegmatites.

Batholithic Intrusives: porphyritic granite, granite-  
diorite complex, pink granite

Pre-Batholithic Rocks: variety of volcanic and  
sedimentary rocks.

Locally the structures are very  
complex, but the general structure appears to be  
that of a syncline plunging westerly or northwesterly.

## ECONOMIC GEOLOGY

Types of Deposits:

(1) Vein matter occurring within strongly developed shear zones striking about east and west and dipping in general steeply to the north. At Waterloo the rock involved is chiefly limestone and replacement by mineralizing solutions has been a significant factor.

(2) Veins are also represented by numerous quartz veins striking nearly north and south.

The relation between the north and south system of quartz veins and the east-west trending mineralized shear zones is uncertain. Gold values, probably allied to the pyrite, are a significant feature of the north and south system of quartz veins, and are negligible in the east-west veins. High grade silver minerals are present in both vein systems, but are more abundant in the east-west veins, which include conspicuous amounts of ruby and native silver, whereas the north-south veins are more apt to contain tetrahedrite. The inference is that either the two vein systems were formed at different times or under different conditions.

Mineralogy:

- (1) Native Silver: arborescent form as in small bodies closely associated with the ruby silver.
- (2) Ruby Silver: is of the antimonial type; Pyrargyrite and Miargyrite.
- (3) Argentiferous Galena: most very fine grained.
- (4) Sphalerite: rather pale resinous variety chiefly.
- (5) Freibergite: argentiferous tetrahedrite
- (6) Chalcopyrite: in rather small quantities, mostly along boundaries, fractures, and cleavage cracks.

## DESCRIPTION OF POLISHED SECTIONS

W #10            This section is composed chiefly of sphalerite and galena. Small stringers of chalcopyrite can be seen at the outer edges of the galena and sphalerite. The sphalerite is seen to be surrounding particles of galena, which indicates that the galena is older than the sphalerite. The chalcopyrite is considered to be younger than either the sphalerite or the galena.

Figure (1) is taken from section W #10

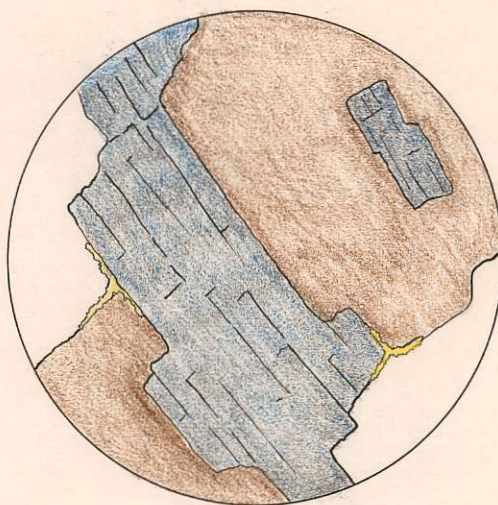


Figure (1)

W #11                    Sphalerite, Pyrargyrite, Galena, and Chalco-  
pyrite were definitely identified in this section.  
They appeared in very fine particles closely inter-  
grown. Etch tests revealed the probable presence  
of Miargyrite (?) and Freibergite (?). The ruby  
silver was seen veining the sphalerite, indicating  
that it is younger than the sphalerite.

W #12                    Sphalerite, Galena, Pyrargyrite and Chalco-  
pyrite were identified. Again the ruby silver was  
noticed veining the sphalerite. Etch tests again  
revealed the possible presence of Freibergite (?).  
In a portion of this section a piece of galena  
appeared to surround some sphalerite. This would  
indicate that the sphalerite was older than the  
galena. Since other sections seemed to definitely  
show galena older than sphalerite, this observation  
is merely mentioned and is not considered in the  
paragenesis.



W #13            This section shows a vein of ruby silver in a field of quartz and calcite. Although no boundary could be distinguished, parts of the pyrargyrite gave etch tests indicative of miargyrite (?)

Figure (2) is from section W #13

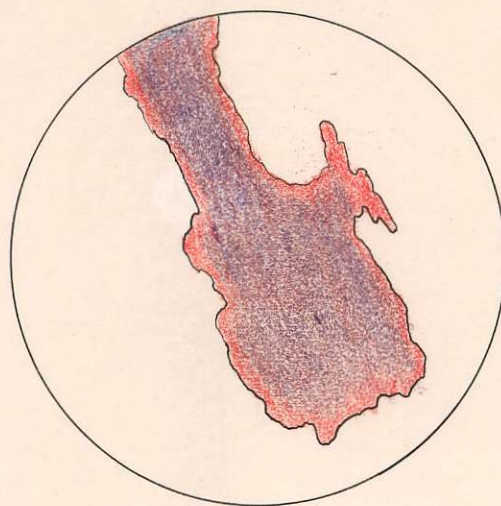


Figure (2)

W #14            Several rhombohedral hemimorphic crystals of  
pyrargyrite are illustrated in Figure (3) surrounded  
by a sheet of native silver. Most of the section was  
composed of fine grains of native silver closely  
associated with ruby silver. Native silver is judged  
to be younger than the ruby silver.

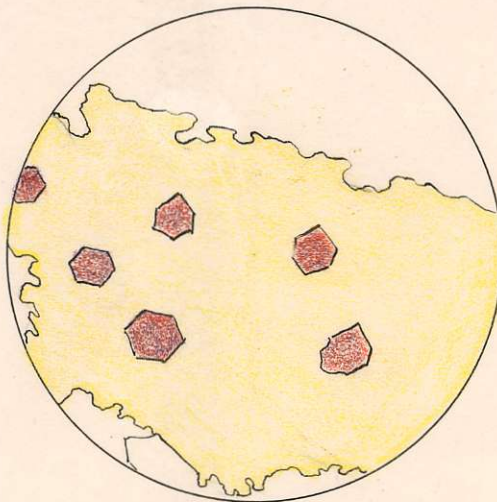


Figure (3).

W #15            Sphalerite, Galena with a small amount of  
Chalcopyrite. The sphalerite in this section  
appeared to be younger than the galena. The Chalco-  
pyrite again indicated that it is younger than the  
galena and the sphalerite.

W #16            This section shows sphalerite, galena, and  
chalcopyrite. As in W #15, the galena is mostly  
very fine grained. The same age relations are  
clearly seen in Figures (4) and (5), which are  
taken from section W #16.

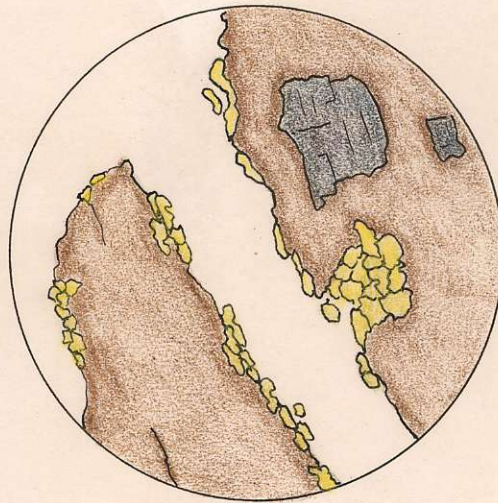


Figure (4)

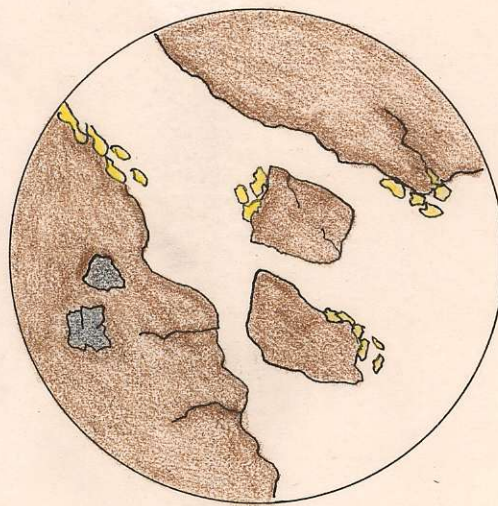


Figure (5)

W #17            This section shows a vein of pyrargyrite in  
which there can be seen minute grains of native  
silver. Figure (6) is taken from section W #17

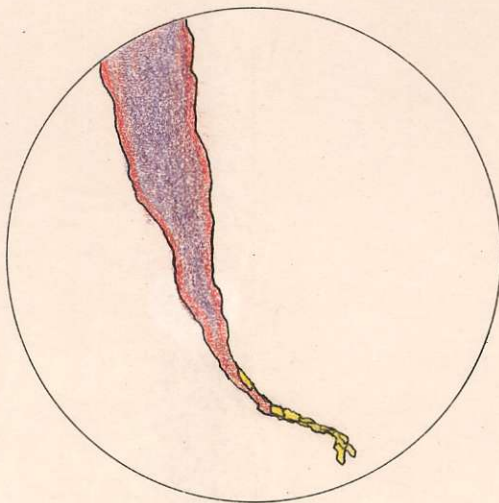


Figure (6)

W #18            Sphalerite, Galena and Chalcopyrite are seen in this section. The same age sequence of galena, sphalerite and chalcopyrite is again indicated rather definitely.

W #19            Sphalerite, pyrargyrite and native silver were identified in this section. The sphalerite was observed to be veined by the ruby silver, which indicates that it is younger than the sphalerite. The native silver seemed to be still younger, indicating that it is also younger than the pyrargyrite.

W #20      In this section pyrargyrite and native silver were identified. The native silver indicated that it is younger than the pyrargyrite. Several portions of the ruby silver again gave etch reactions indicative of miargyrite(?). Figures (7) and (8) are from W.#20.

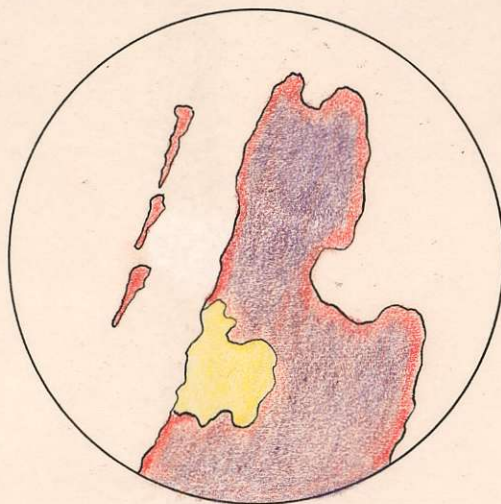


Figure.(7).

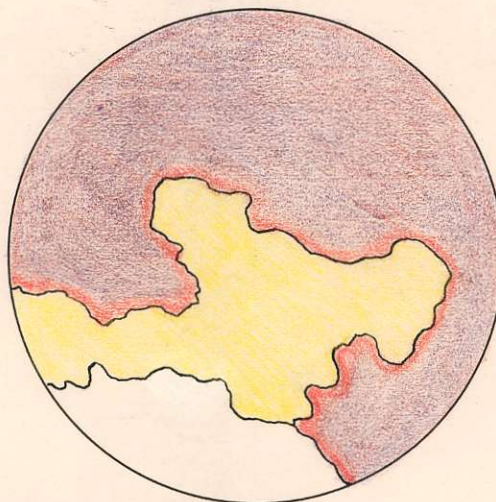


Figure.(8).

W #21

This section shows finely divided native silver closely associated with ruby silver.

Figure (9) taken from this section shows a sheet of native silver and several fairly well developed quartz crystals.

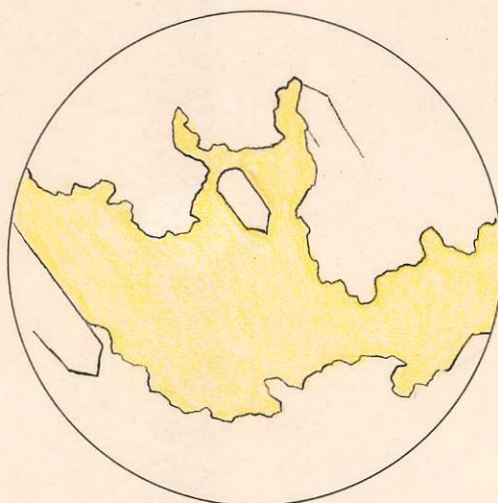


Figure (9).





	Galena.	Freibergite.	Tetrahedrite.	Chalcopyrite.	Sphalerite.	Native Silver.	Argentite.	Pyrargyrite.	Stephanite.	Miargyrite.	Polybasite.	Polyargyrite.
HNO <sub>3</sub>	Black. (+).	Brown to Iridescent. (+)	Slight Tarnish. (+)	Fumes may Tarnish. (+) (-)	May Tarnish. (+)(-)	Effervesces. Grey. (+)	Fumes Tarnish. (+)	Fumes Tarnish. (+)	(+)(-)	(-)	Fumes Tarnish. (+)	
HCL.	Brown to Iridescent. (+)	(-)	(-)	(-)	(-)(+)	Fumes may Tarnish. (+)(-)	Fumes Tarnish. (+)	(-)	Fumes Tarnish. (+)	Fumes may Tarnish-weak. (+)(-)	(-)	
KCN.	(-)	(-)	(-)	(-)	(-)	Gray to brown. (+)	Black. (+)	Instantly black. (+)	Dark grey. (+)	Black. (+)	Black. (+)	
Fe Cl <sub>3</sub> .	Iridescent. (+)	(-)	(-)	(-)	(-)	Instantly Iridescent. (+)	Quickly black. (+)	(-)	(+)	Slow Tarnish brown. (+)	Iridescent (+)	
KOH.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	Black. (+)	Black. (+)	Stains Iridescent. (+)	Slowly Iridescent. (+)	
W. #10.	✓			✓	✓							
W. #11.	✓	?		✓	✓			✓		?		
W. #12.	✓	?		✓	✓			✓				
W. #13.								✓		?		
W. #14.						✓		✓				
W. #15.	✓			✓	✓							
W. #20.						✓		✓	✗	✓		

Table of Etch Tests.

## PARAGENESIS

From the study of the polished sections prepared for this report, the minerals identified were probably formed in the following order: Galena, Sphalerite, Pyrargyrite, Chalcopyrite and Native Silver.

The minerals which have doubtfully been identified as Freibergite and Miargyrite occurred in such minor amounts and in such small particles that age relations could not be determined. It seems reasonable to conclude that the Miargyrite likely accompanied the Pyrargyrite.

Particles of galena can be seen surrounded by sphalerite in several sections. (Fig. (1)(4)(5)). Also in these same sections chalcopyrite appears to the edges of the sphalerite and along boundaries between sphalerite and galena. From these observations it is concluded that the galena is older than the sphalerite and the chalcopyrite is younger than either.

In sections W #11 and #12 the ruby silver is seen veining the sphalerite, and the conclusion is

that it is younger than the sphalerite. In regard to the ruby silver, from samples and polished sections, it seems reasonable to conclude that it is of primary origin. Its occurrence with fresh and unaltered galena and sphalerite points towards this conclusion.

The arborescent form of the native silver together with its occurrence in rock of a shattered and rather open nature, lead to the conclusion that it has probably been deposited as a secondary mineral.

## LIST OF SAMPLES

W #1 Ruby Silver

W #2 Galena: sphalerite

W #3 Native Silver: Ruby Silver  
Galena: Sphalerite

W #4 Native Silver: Ruby Silver: Galena  
Sphalerite: Chalcopryrite

W #5 Native Silver: Ruby Silver: Galena:  
Sphalerite: Chalcopryrite

W #6 Galena: Sphalerite: Chalcopryrite

W #7 Ruby Silver: Galena: Sphalerite

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