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A Mineralogical Study
of Ores from
The Elsie, Black Fly and Gold Creek Extrusive Claims
of the MacGillvray Group
in the Kamloops Mining Division

A. Morris

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INTRODUCTION

This report has been prepared from a microscopic study of polished sections of ores from the MacGillivray group of claims in the Kamloops mining division. The work was conducted in the laboratories of the Geology Department of the University of British Columbia.

Since the claims have not yet been developed, no geological information was available. As a result this report is confined to the determination of the minerals in each claim, the paragenesis of these minerals and their grain size.

The writer wishes to express his appreciation for the valuable assistance given by J. DeLeen and J.A. Donnan in this problem.

ELSIE CLAIM.

The minerals identified in the polished sections of the samples from this claim were: pyrite, arsenopyrite, sphalerite, galena, chalcopyrite and pyrargyrite.

Megascopic Examination.

Hand specimens indicated massive sulphides with scattered inclusions of gangue which was later identified as quartz, calcite and feldspars.

Microscopic Examination.

The history of mineralization as deduced from the microscopic examination of the samples is as follows: Pyrite was deposited first closely followed by arsenopyrite which is occasionally found to replace the pyrite. Both minerals appear as massive aggregates which have been highly fractured, with replacement by sphalerite and galena occurring along these fractures (plate 2). They also appear as smaller ^{er} ~~in~~hedral crystals, some of these crystals are extremely small. This is particularly noticeable in the arsenopyrite which seems to have been less susceptible to replacement.

Next in this sequence was the deposition of gangue which is ^{er} ~~fo~~und cutting the pyrite and arsenopyrite and which in turn is replaced by sphalerite and galena.

Deposition of sphalerite followed the intrusion of the gangue. Inclusions of galena in some of the

3.

sphalerite suggests simultaneous deposition towards the end of the zinc mineralization. Most of the galena was post sphalerite since it replaces everything including sphalerite that has been deposited up to this point.

Chalcopyrite (section #1) was found in the galena and also scattered through the quartz. It is believed to be the same age as the galena. This mineral was found in minor quantities only and appears to have been more closely related to the galena than to the sphalerite. In this respect the ore somewhat resembles that of the "Sullivan".

Pyrargyrite was identified with difficulty by means of etch tests (plate 1). This mineral has been identified in only the #2 polished section of the Elsie claim.

Grain size.

Pyrite	10 - 16u
Arsenopyrite	6u
Sphalerite	7u
Galena	10u
Chalcopyrite	4u
Pyrargyrite	15u

BLACK FLY CLAIM.

In this group of specimens, the minerals identified were: pyrite, arsenopyrite, sphalerite and galena.

Megascope Examination.

Again the hand specimens were massive sulphides with inclusions of gangue.

Microscopic Examination.

The sulphide ore consists of a very intimate mixture of galena, sphalerite, pyrite and arsenopyrite. These sections show a strong resemblance to those of the "Elsie".

Pyrite was deposited first. The larger aggregates often show replacement by sphalerite and galena along the pyrite cleavage planes. This results in a rectangular pattern (see plate 3). Sections of the Elsie claim also show this unusual pattern.

Arsenopyrite closely followed and replaced the pyrite in the same manner as in the Elsie claim. (see plate 4). This was followed by intrusion of gangue. Sphalerite with an overlap of galena completed the sequence.

Although pyrargyrite was not found in these sections it is felt that a study of fresh sections, time permitting, would have brought this out definitely.

Grain size.

Pyrite	9u	Sphalerite	8u
Arsenopyrite	6u	Galena	10u

GOLD CREEK EXTRUSIVE CLAIM.

In the polished sections from this claim the sulphide minerals identified were: pyrite, sphalerite, pyrrhotite, galena, and chalcopyrite.

Megascopic Examination:

This ore proved to be different from that of the "Elsie" or "Black Fly". These samples were gneissic, mineralized, chloritic rock whose origin, as the title implies, appears to have been volcanic. The ore has been oxidized and leached as indicated by the alteration of pyrite to limonite.

Microscopic Examination:

Because of the leached condition of the ore, difficulty was found in getting suitable sections for polishing. Plucking of the softened minerals was extensive during the polishing process and as a result the writer can not be certain that all the minerals present in the ore have been identified. However, micro chemical tests of the powdered sample gave no test for elements not shown in the composition of those minerals identified.

In these sections the mineralization, as seen with the lowest power objective, appears to be along fractures related to the gneissic structure of the country rock.

Pyrite is this time followed by the deposition of the gangue since there is no arsenopyrite present. In

these sections pyritization was local and of a minor nature.

Sphalerite which in this case forms the bulk of the sulphides was next to be deposited. It was accompanied by chalcopyrite. The chalcopyrite occurred as microscopic exsolution blebs in the sphalerite as well as a replacement mineral. These chalcopyrite blebs are so small that often they appear to be almost galena white and may be mistaken for an unidentified mineral in the sphalerite.

The pyrrhotite in places occurs in contact with the sphalerite and seems to be closely related to the zinc sulphide. It is also found replacing gangue, and surrounding galena in quartz. Therefore, it and the galena must be about the same age. The galena occurs in minor replacement patches in the sphalerite.

Grain size.

Pyrite	15u
Sphalerite	
Galena	12u
Pyrrhotite	60u
Chalcopyrite	4u

SUMMARY

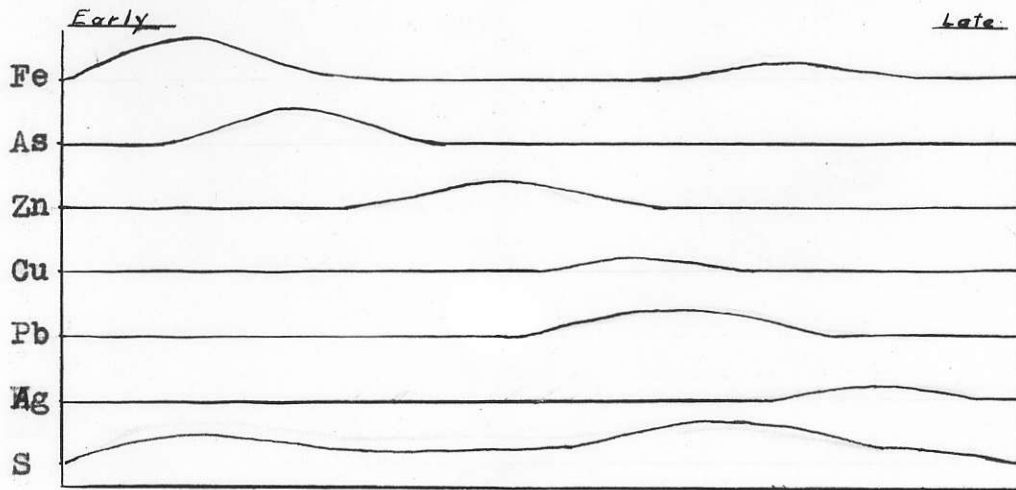
In a general way the paragenesis for all three claims is similar. The mineralizing solutions in each case were hypogene. Deposition probably took place over a fairly short range since arsenopyrite, and pyrite which are usually higher temperature minerals are telescoped in with sphalerite, galena, pyrrargyrite, (pyrrhotite) and chalcopyrite which are lower temperature minerals.

Concentration of these ores is going to be a difficult problem. The arsenopyrite crystals are so small that crushing will not entirely free them from the other sulphides, and of course the arsenic can not be roasted off, in B.C. None of the other sulphides can be entirely freed by crushing either, as will be seen from the grain size.

Pyrite	10u - 16u
Arsenopyrite	6u
Sphalerite	7u
Galena	10u
Chalcopyrite	4u
Pyrrhotite	60u
Pyrrargyrite	15u

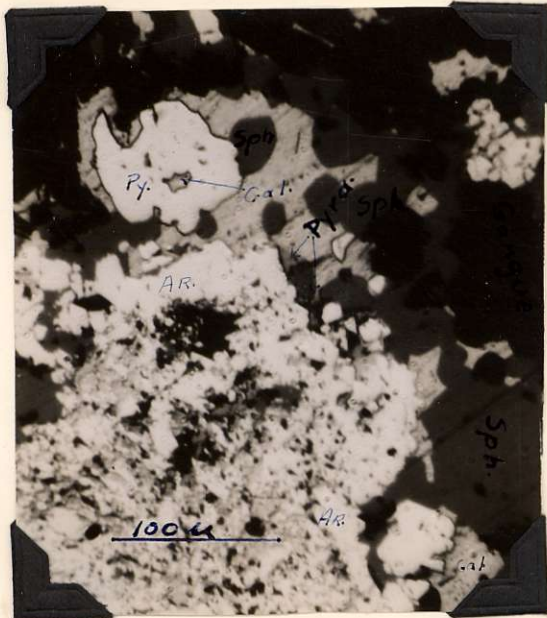
These would require something much finer than a 400 mesh screen.

Genesis:



KAMLOOPS M.D.
MacGillivray Group

<u>Claim</u>	<u>Section</u>	<u>Plate</u>
Elsie	2	1



Abbreviations

Py - Pyrite
 Ar - Arsenopyrite
 Pyra - Pyrargyrite
 Gal - Galena
 Sph - Sphalerite

Description: This picture shows the association of pyrargyrite with galena and sphalerite. It also serves to show the highly fractured nature of the arsenopyrite being replaced by galena and sphalerite.

<u>Mike No.</u>	<u>Obj.</u>	<u>Oc.</u>	<u>Mag.</u>	<u>Ill.</u>	<u>Exp.</u>	<u>H.</u>	<u>V.</u>
Leitz 52	3	5	230	Lamp	105 sec	12.5	54.5

KAMLOOPS M.D.
MacGillivray Group

<u>Claim</u>	<u>Section</u>	<u>Plate</u>
Elsie	2	2

Abbreviations

Py - Pyrite

Sph - Sphalerite

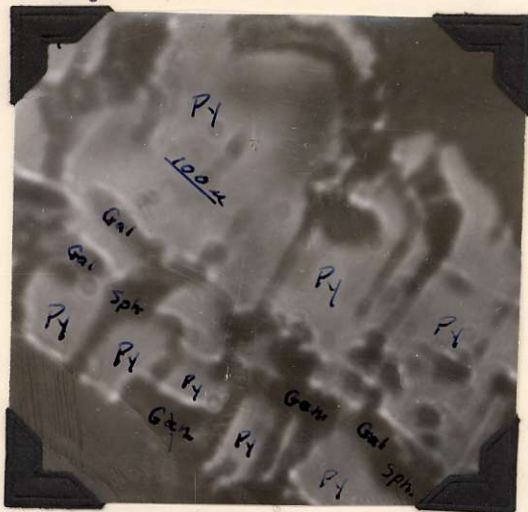
Gal - Galena

Description: Indication of age relations between pyrite, gangue, sphalerite and galena. This also shows to a minor extent the tendency for pyrite to be replaced along its cleavage planes - suggested by the rectangular pattern of the fractioning.

<u>Mike No.</u>	<u>Obj.</u>	<u>Oc.</u>	<u>Mag.</u>	<u>Ill.</u>	<u>Exp.</u>	<u>H.</u>	<u>V.</u>
Leitz 52	3	4	125	Lamp	2 min.	15.4	54.9

KAMLOOPS M.D.
MacGillivray Group

<u>Claim</u>	<u>Section</u>	<u>Plate</u>
Black Fly	2	3

Abbreviations

Py - pyrite
Gal - galena
Sph - sphalerite
Gan - gangue

Description: This photograph, although out of focus, is an excellent example of what the writer took to be replacement of pyrite along its cleavage planes by galena, sphalerite and gangue.

<u>Mike No.</u>	<u>Obj.</u>	<u>Oc.</u>	<u>Mag.</u>	<u>Ill.</u>	<u>Exp.</u>	<u>H.</u>	<u>V.</u>
Leitz 52	3	4	110	Lamp	15 sec.	19.3	55.8

KAMLOOPS M.D.
MacGillivray Group

<u>Claim</u>	<u>Section</u>	<u>Plate</u>
Black Fly	3	4



Abbreviations

Py - pyrite
A - arsenopyrite
S - sphalerite
G - galena

Description: Original shape of pyrite was triangular. It has been replaced by arsenopyrite and sphalerite chiefly and by galena in a minor extent.

<u>Mike No.</u>	<u>Obj.</u>	<u>Oc.</u>	<u>Mag.</u>	<u>Ill.</u>	<u>Exp.</u>	<u>H.</u>	<u>V.</u>
Leitz 52	3	4	135	Lamp	15 secs	21.0	59.4