600428

Geology 409 Problem 4

No geology.
No references.
Untyped.

"Rossland New" — Silver, Zinc.

P.W. Basham. April, 1961.

Rossland New - Silver, Zinc

The Rossland New Mining Company holds a number of properties in the area about one mile south of Rossland B.C. Included in these are the Bluebird and Mayflower prospects. The specimens studied in this problem were taken from various locations at and near these two prospects.

The deposits are sulphide veins a few inches thick in augite porphyry. The principal metals are silver and zinc. The ore veins average about 200 ounces of silver per ton and about $20 in gold is recovered per ton.

SURFACE GEOLOGY NEAR
MAYFLOWER WORKINGS

Megascopic Examination:

In most specimens, brecciated pyrite and arsenopyrite were seen, sometimes angular and sometimes partially rounded. All other minerals appeared to be filling the fractures in this brecciated material. The non-metallic gangue was mainly quartz with a small amount of carbonate in a few specimens. None of the augite porphyry was seen in the hand specimens.

The sphalerite, of which a great deal was present, was a coarse massive black variety filling the fractures of the pyrite and arsenopyrite.

In some specimens pyrrhotite appeared to dominate the pyrite leaving small fragments of arsenopyrite and containing some sphalerite and galena.

A great deal of boulangerite (later confirmed in polished section) was present; sometimes comprising almost the entire specimen and in others occurred with fragments of pyrite, quartz, arsenopyrite, sphalerite and pyrrhotite. The boulangerite appeared as dark gray fibrous masses.

Chalcopyrite appeared in some pyrite fractures but was abundant in only one or two of the specimens.

Microscopic Examination:

The following minerals were seen and identified on sight: quartz, pyrite, arsenopyrite, pyrrhotite, chalcopyrite, tetrahedrite, sphalerite and galena. The boulangerite was confirmed by tests and a sheet of these tests appears at the end of this report. The owyheeite was known to appear in the boulangerite. It was very similar in appearance to the boulangerite but showed a very subtle color difference and relief in ordinary light and stronger anisotropism under crossed nicols.

Approximately 40 polished sections were examined, each showing different abundances of minerals; hence, it was difficult to estimate the overall average percentage of each. My rough estimate is as follows.

pyrite	FeS_2	25 %
pyrrhotite	$Fe_{1-x}S$	15 %
sphalerite	ZnS	15 %
boulangerite	$Pb_5Sb_4S_{11}$	15 %
galena	PbS	10 %
quartz	SiO_2	5 %
arsenopyrite	$FeAsS$	5 %
chalcopyrite	$CuFeS_2$	5 %
owyheeite	$8PbS \cdot 2Ag_2S \cdot 5Sb_2S_3$	3 %
tetrahedrite	$Cu_{12}Sb_4S_{13}$	2 %

Textures and Paragenesis:

The general sequence of events leading to the formation of these deposites was obvious in most cases. The paragenetic sequence is shown on the paragenetic diagram but the following information should be added.

The pyrite and arsenopyrite were the original simultaneous minerals and were fractured, then filled and partly replaced by quartz. Pyrrhotite entered as a separate stage of mineralization followed by chalcopyrite and tetrahedrite together and then by sphalerite. Figure. 1. gives evidence that pyrrhotite is later than pyrite which it partially replaces while filling fractures. Similar evidence was seen between pyrrhotite and the arsenopyrite and quartz. Figures. 2. and 3 show galena and boulangerite to be latest in the paragenetic sequence.

The relationship between galena and boulangerite was not determined. They were not seen together in any polished section. If there existance together was not overlooked there are two possibilities: (1) each resulted from the final mineralization but in different parts of the area, or (2) one has completely replaced the other in the specimens examined.

The origin of owyheeite was not definitely determined. Exsolution in boulangerite could be assumed from Figure 4 were it not for the fact that the general lineation of the owyheeite is not parallel to the fibrous texture of the boulangerite. Should it be? Figure 3 shows similar evidence but the material shown in red is puzzling. It may be later hematite or only a small crack in the section. The high power required made any positive identification impossible. My assumption is that the owyheeite is is simultaneous with the boulangerite.

All of the zinc occurs in the sphalerite and all of the silver in the miargyrite. The gold is probably in the pyrrhotite. Why.

Could be in pyrite, arsenopyrite
Ag in silver also?

Paragenetic Diagram

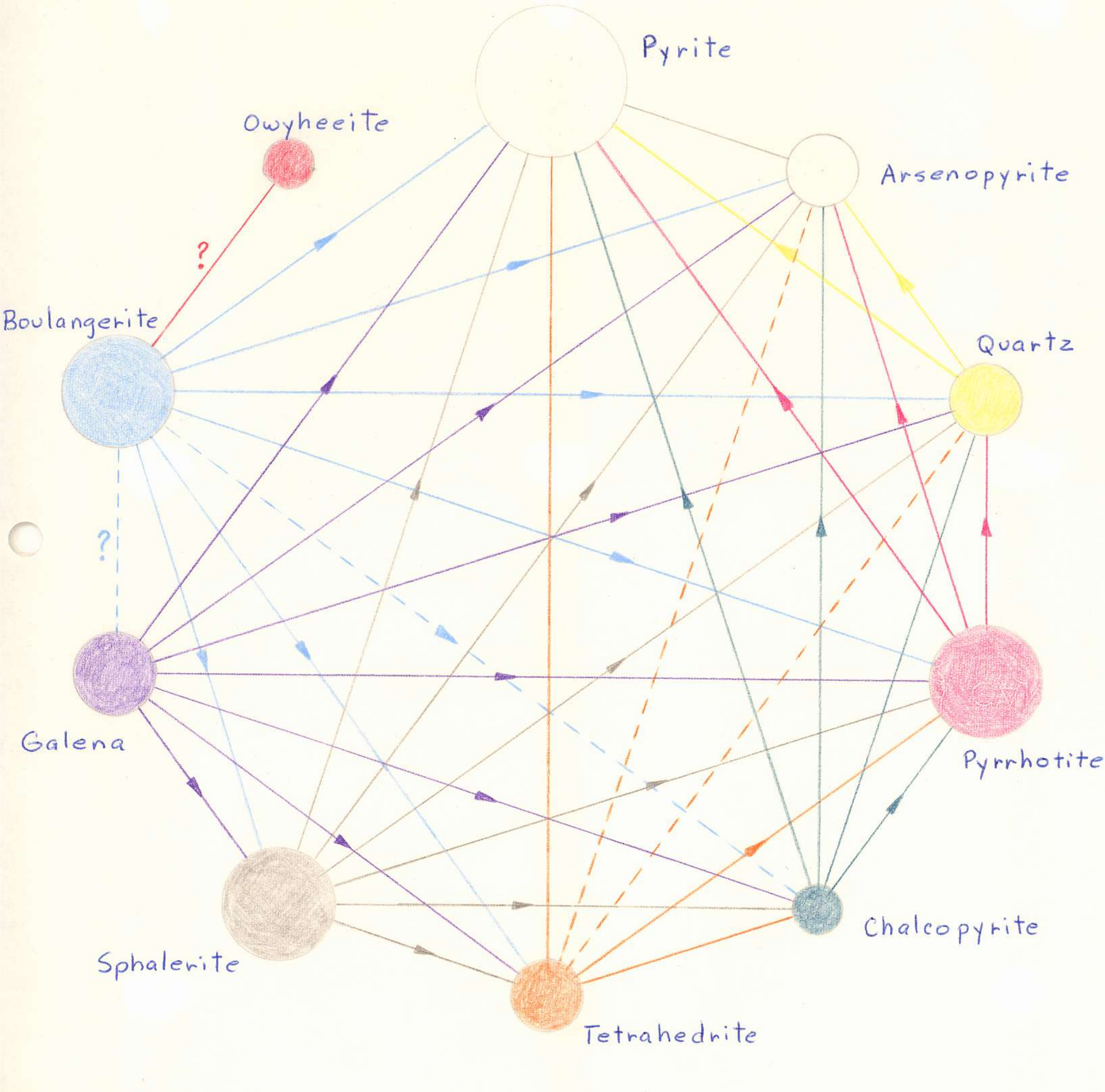


Figure. 1.

X 132

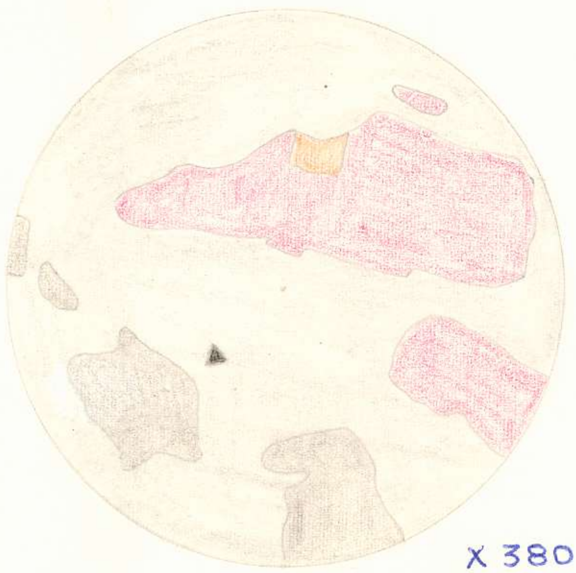
Pyrrhotite

Pyrite

Sphalerite

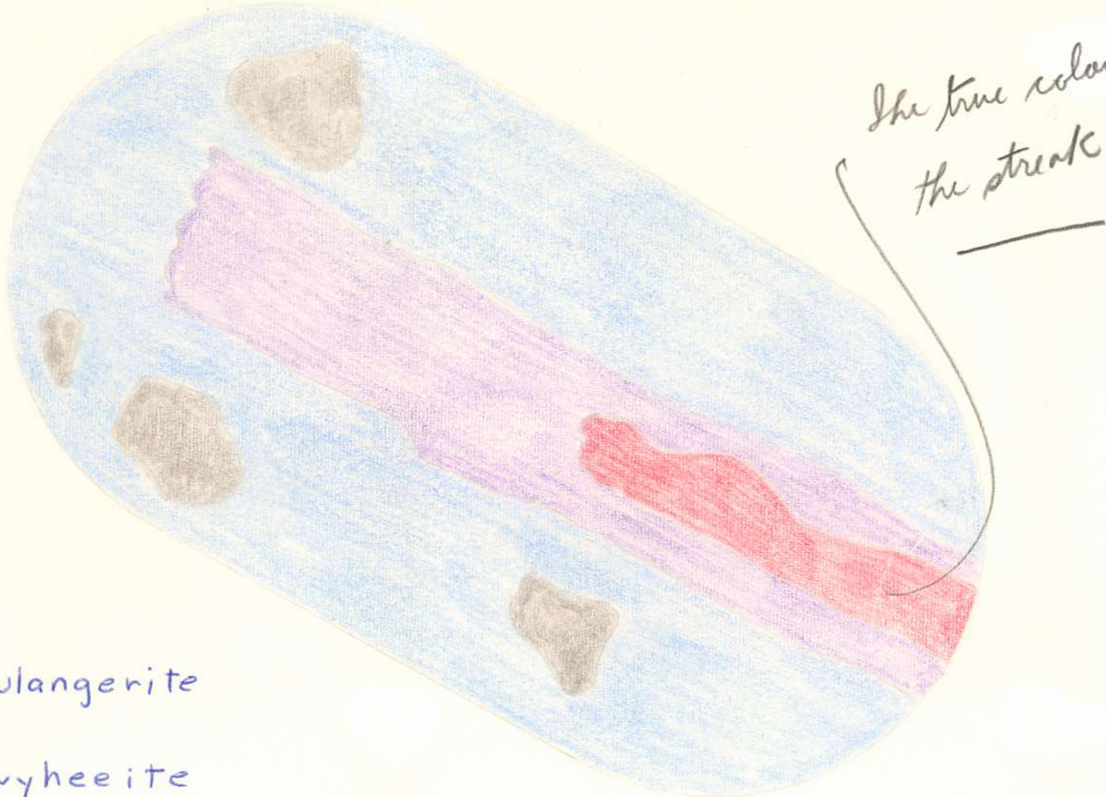
Galena

Figure. 2.



X 380

Figure. 3.



Boulangerite

Owyheeite

Sphalerite

Unknown

X 380

Figure. 4.

X 380

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . Verification of what appears to be Boulangerite . . .

Polish good

Colour gal white

Hardness A – B

Streak black

Texture filling spaces, sometimes fibrous

Pleochroism –

Anisotropism bluish white to dark brown

Texture under xd. nicols – same

Twinning –

Internal reflection –

Cleavage none

Association multi

Etch tests

$HgCl_2$ —— negative

KOH —— slight tarnish

KCN —— negative

HCL —— fumes tarnish brown, but negative etch

$FeCl_3$ —— negative

HNO_3 —— slight effervescence, fumes tarnish brown, dark black stain.

Aqua regia

Microchemical tests

Grain size

Boulangerite

Confirmatory features such as magnetism, sectility, fluorescence, blowpiping, radioactivity, etc. . . . .

Minerall or Group

Interpretation of textures.