600073

MINERALOGRAPHIC REPORT

No. 4

"MORRIS PROPERTY"

TATLAYOKO LAKE, B.C.

April 1964.

Don Ward

Morris Property

Introduction

The purpose of this report is to identify and provide a description of ore minerals of the Morris Property, Tatlayoko Lake, B.C. Data for the report was obtained from a suite of specimens consisting of 23 polished sections and a large number of handspecimens.

The Morris Property is located south of the head of Matthew creek, 3 miles south-east of the south end of Tatlayoko lake, in the rugged mountainous area near the eastern boundary of the Nanaimo Mining Division. Access to the property is gained by a road which extends 145 miles west of Williams Lake and then 24 miles south to the wharf at the north end of Tatlayoko lake. From the landing at the south end of Tatlayoko lake a road extends south-east for 3½ miles to the Morris base camp. From the camp there is a 3 mile pack trail to the mine camp.

The country rock of the property consists of argillites, quartites and a thin bed of fine cherty conglomerate, all of which have been partly obliterated by granitoid dykes. These dykes are so numerous that local attitudes of the sediments are impossible to take. The dyke network is mostly basic and ranges in composition from diorite to basalt, the more recent acid dykes having cut the basic ones. These metamorphosed sediments and dykes are on the contact zone of the coast range batholith that lies a few miles to the south. A quart diorite rock lies to the north, trends north-east for 800 feet and is probably a large dyke or sill.

Quartz veins are mainly within the diorite rock or within 400 feet of it. They cut both the metamorphosed sediments and dykes. The number 1 Morris vein is best exposed and strikes S 20° E, dips 37° to the east and has an average width of 18 inches. Heavy sulphide mineralization such as stibnite, arsenopyrite, sphalerite and tetrahedrite occur in the quartz and in lenses along side the vein. Maximum assay values obtained are 3.50 oz. per ton of gold and $26 per ton of silver.

History of the Property

1907 - I.T. Morris and A.H. Sheppard discovered and staked 6 claims

1909 - title to claims assigned to Tatlayoko Gold Mines Ltd.,
- transportation improvements and underground work initiated.

1911 - claims crown granted.

1912 - company ceased activity.

1920 - Sheppards interest acquired by M. Sutton.

1921 - sawmill brought in and lumber sawn for camp buildings.
- road that extends from the south end of the lake to the power-plant site partially developed near base camp.

1934 - Bridge Island Golds Ltd. assumed control of operations.
- base camp built and 6 mile narrow guage road constructed.

No mining of consequence since 1912.

O'Grady (1935) concluded that due to the remote location and refractory character of mineralization, major tonnage would have to be developed before production could be considered. It would also be impracticable to ship concentrates, therefore a more concentrated shipping product would be required.

Megascopic Description

Handspecimens are heavily mineralized and difficult to classify. They consist of material from a quartz vein, rhyolitic or granitoid dyke, massive quartz, silicified argillite and possible basalt dyke.

The quartz vein has a tight comb texture consisting of parallel quartz crystals, averaging $\frac{1}{2}$ inch in length, and interstitual grey metallic mineralization. In addition there are euhedral crystals of arsenopyrite between and in the quartz crystals. The handspecimens indicate that the veins are more heavily mineralized to the center or perhaps even to one side. One specimen shows layers of mineralization parallel to the walls and perpendicular to the comb texture of the quartz. There appears to be an alternation of layers with arsenopyrite crystals at the wall followed by relatively unmineralized quartz, then interstitual and fibrous stibnite with sphalerite and back to arsenopyrite again. Sphalerite occurs in grains up to $\frac{1}{2}$ inch accross. A $\frac{1}{2}$ inch long inclusion of dioritic rock, partially lined by chalcopyrite and carbonate, was observed in the vein rock.

The remainder of the rock types are much less distinct. A dark grey porphyritic rock containing indistinct quartz phenocrysts resembles a granitoid dyke. Massive quartz which is highly fractured and sheared to give it a pseudocleavage, is dull milky-white in color and occurs within silicified argillite beds. The argillite beds are $\frac{1}{4}$ to $\frac{1}{2}$ inch thick and are also in contact with quartz sandstone or quartzite. Thin carbonate stringers less than 1 millimeter wide cut across the argillite beds.

Pyrite is scattered through the quartzite and in places is concentrated along fractures.

Many of the specimens are covered by cervantite, a yellow oxide of antimony, others have minor amounts of malachite or limonite stain. Some of the tetrahedrite has a surface alteration to covellite. Arsenopyrite also may show a irridescent tarnish. In one specimen what appears to be covellite flakes and needles fills an interstitual space between quartz grains. Both tetrahedrite and stibnite appear to have replaced quartz.

Microscopic Examination

1. Arsenopyrite FeAsS
   - hardness F+
   - very light yellow, almost white
   - strong anisotropism, colors = blue, green, brown, yellow
   - triangular and rhomb-shaped cross sections

2. Chalcopyrite $CuFeS_2$
   - hardness C
   - brassy yellow
   - fair polish
   - weakly anisotropic

3. Galena PbS
   - hardness B
   - galena white
   - isotropic
   - triamgular shaped pits on surface

4. Gold Au
   - hardness B, too fine grained to test
   - bright orange
   - weakly anisotropic

5. Jamesonite $4PbS.FeS.\ 3Sb_2S_3$
   - hardness B+
   - galena white
   - strong anisotropism, colors = light grey, dark brown, dark grey

6. Pyrite FeS_2
    - hardness F
    - pale brass yellow
    - pitted surface
    - isotropic

7. Sphalerite ZnS
    - hardness D-
    - brown
    - isotropic, with orange to yellow internal reflection under crossed nicols

8. Stibnite Sb_2S_3
    - hardness B
    - white with strong pleochroism, sometimes appearing as 2 minerals
    - extremely anisotropic, colors = blue, grey, white, brown and pinkish brown
    - mossaic extinction
    - etch tests
        - $HgCl_2$ - negative
        - KOH - instantly turns yellow and then to brown
        - KCN - stains differentially brown
        - HCl - negative to a light brown stain
        - HNO_3 - stains iridescent to black
        - Aqua regia - effervesces and stains black

9. Tetrahedrite $Cu_{12}Sb_4S_{13}$
    - hardness D+
    - light grey, distinctly grey against sphalerite and arsenopyrite
    - isotropic

Order of Abundance of Minerals

The order of abundance was calculated directly from the polished sections, giving equal weight to each section. Estimates from 5 fields of view on each of the 22 sections were made.

Stibnite	42.6 %
Arsenopyrite	41.9
Sphalerite	7.1
Tetrahedrite	3.7
Jamesonite	2.8
Pyrite	1.8
Galena	0.1
Chalcopyrite	trace
Gold	trace

Minerals formed by alteration in order of abundance are:

"Cervantite"
Limonite
Calcite
Covellite
Malachite

Significant Textures

1. Open space filling

Stibnite, jamesonite and tetrahedrite have filled space between quartz grains and to a lesser extent between arsenopyrite grains.

2. Caries texture

Stibnite, tetrahedrite and galena replace sphalerite by caries texture. There is a suggestion that stibnite has partially replaced tetrahedrite.

3. Fracture filling

Stibnite, tetrahedrite fill fractures in sphalerite. Tetrahedrite, jamesonite and gold fill fractures in arsenopyrite.

4. Exsolution

Chalcopyrite and tetrahedrite exsolve from sphalerite. One example of gold exsolved from arsenopyrite was observed.

5. Others

Arsenopyrite usually occurs as euhedral crystals in quartz, however at one point (see plate V) arsenopyrite was seen to surround a euhedral quartz crystal, suggesting simultaneous deposition. Arsenopyrite also occurs as a granular vein.

Jamesonite occurs as inclusions in arsenopyrite, and both jamesonite and sphalerite surround euhedral arsenopyrite crystals. Rounded pyrite grains are in the quartz gangue. Tetrahedrite may contain very small parallel rows of minute inclusions of a light cream colored mineral of which the grain size is too small to determine properties.

Temperature type of Deposit

Pyrrhotite is typically a high temperature mineral deposited above 500° C. Galena, tetrahedrite and jamesonite are intermediate temperature minerals deposited below 500° C, and stibnite is a typical low temperature mineral. Exsolution of chalcopyrite from sphalerite sets a lower limit of deposition of those minerals at 350 to 400° C. It appears evident that this deposit has a wide range of temperature through which deposition occurred.

Deposition of quartz and arsenopyrite commenced above 500° C. Secondly, the quartz vein was slightly deformed causing granulation of some arsenopyrite. Deposition then ceased between 350 and 400° C. Finally a late surge of mineralization brought in stibnite below 250° C.

References

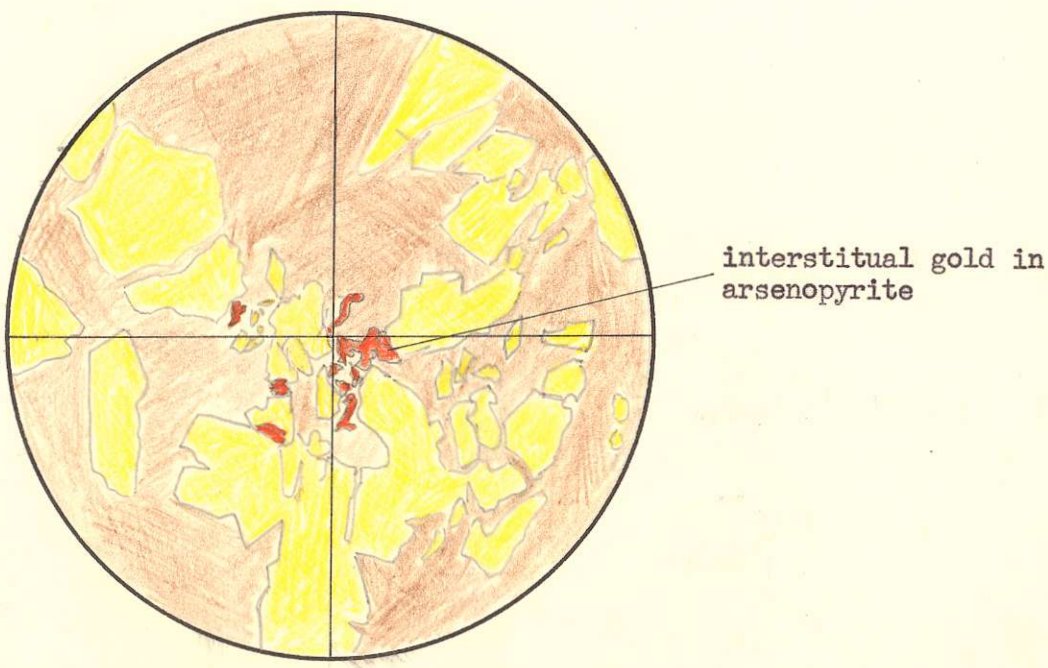
Morris, I. Thomas. Tatlayoko Lake. Victoria, Queen's Printer, 1910 and 1916. (B.C. Minister of Mines Report) pp. 156 and 166 respectively.

O'Grady, B.J. Tatlayoko Lake Area, Morris Property. Victoria, Queen's Printer, 1935. (B.C. Minister of Mines Report) F-29.

Legend

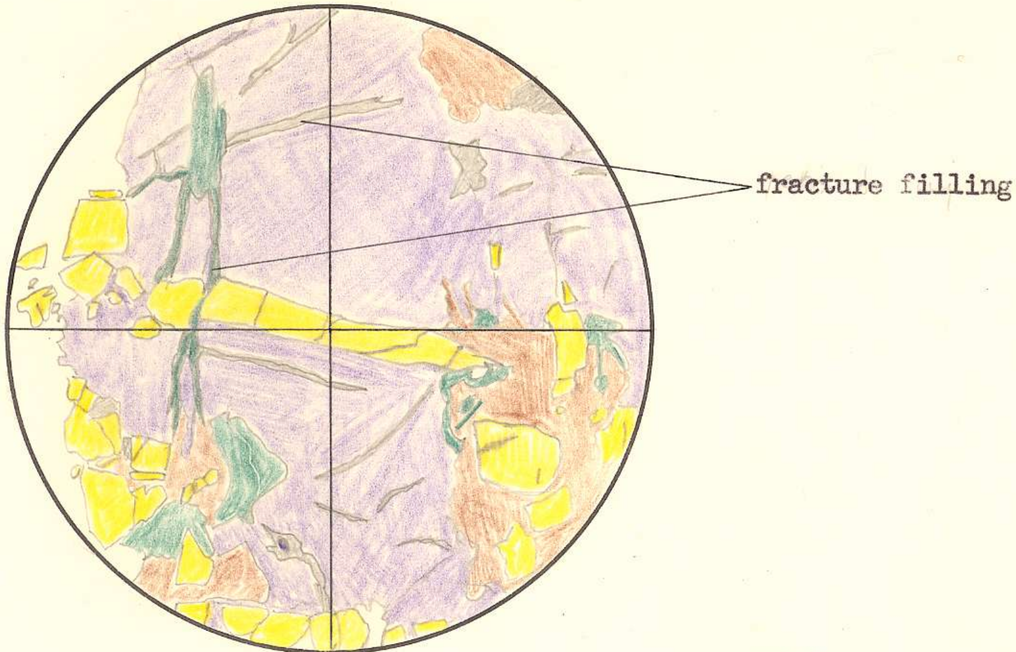
- gangue
- stibnite
- arsenopyrite
- sphalerite
- tetrahedrite
- jamesonite
- pyrite
- galena
- chalcopyrite
- gold
- polishing powder or hole

I



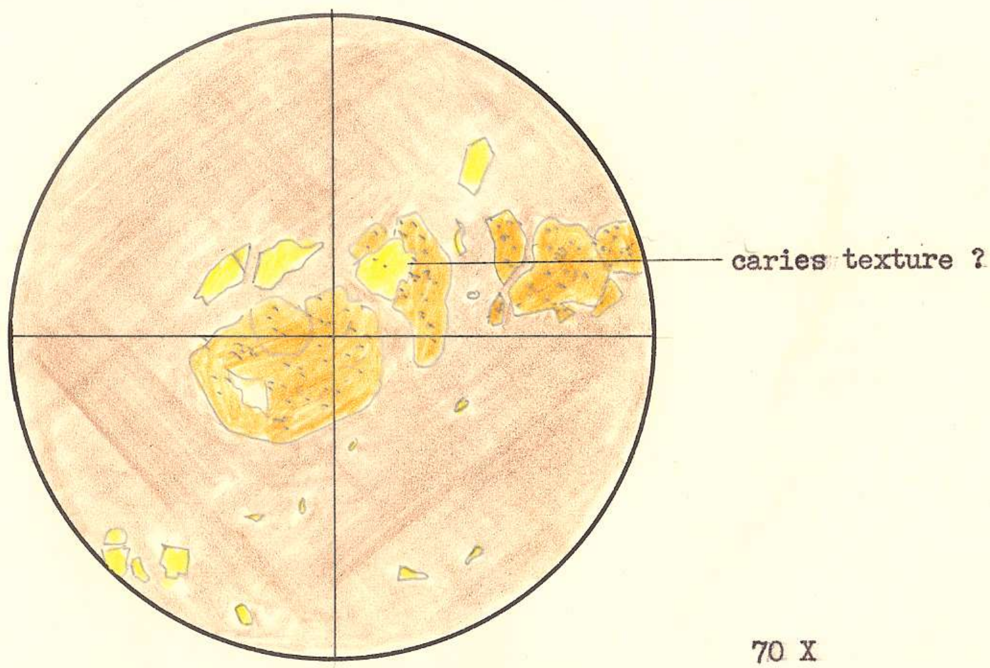
280 X

II



70 X

III



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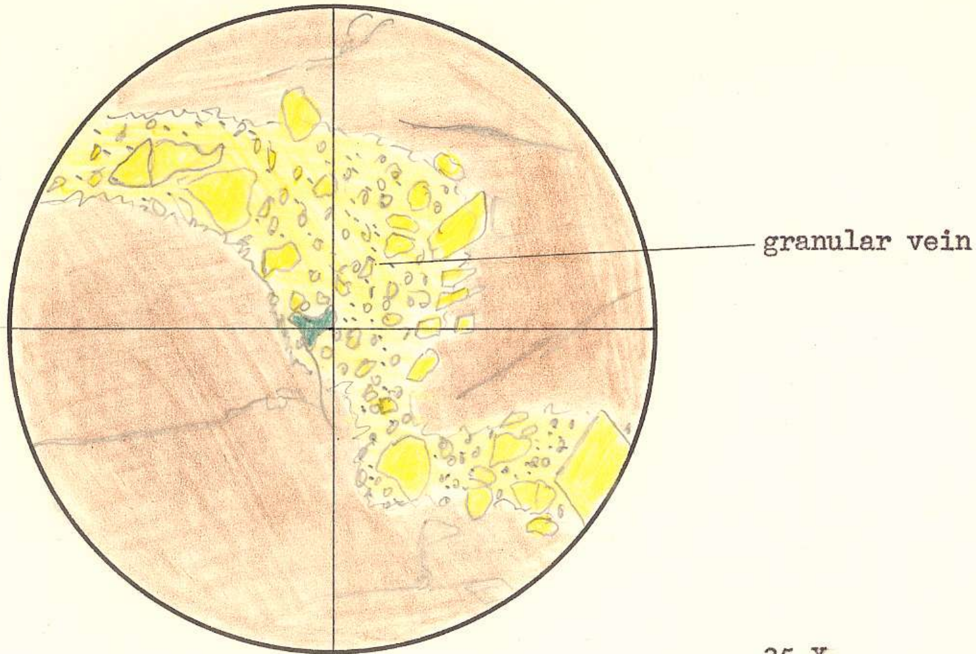
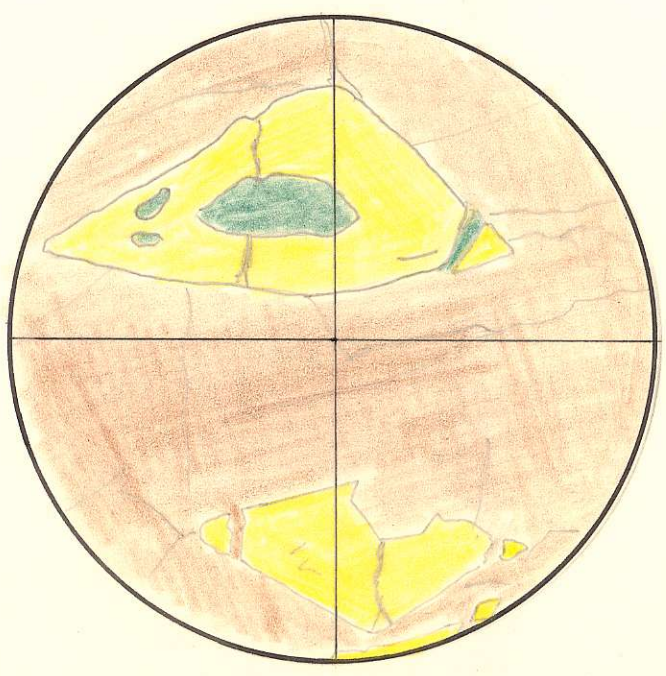
IV



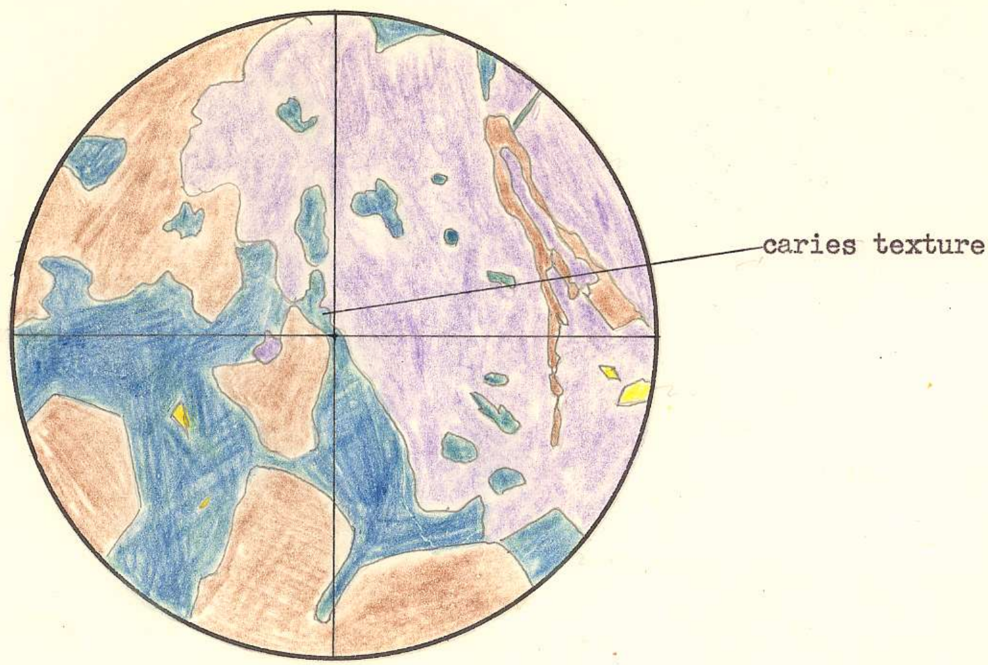
35 X

V



35 X

VI



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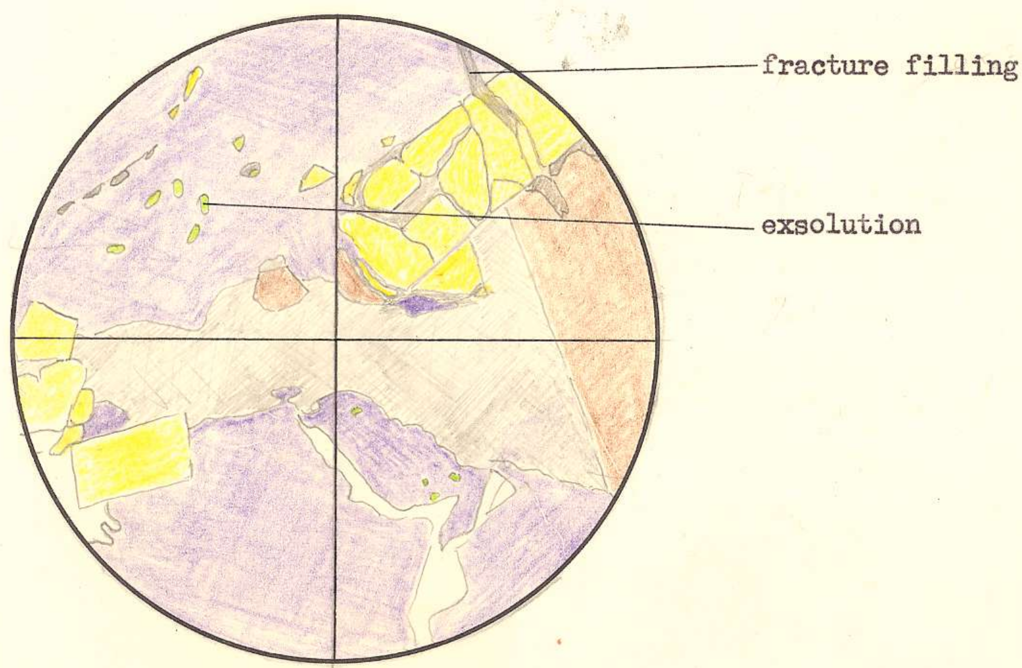
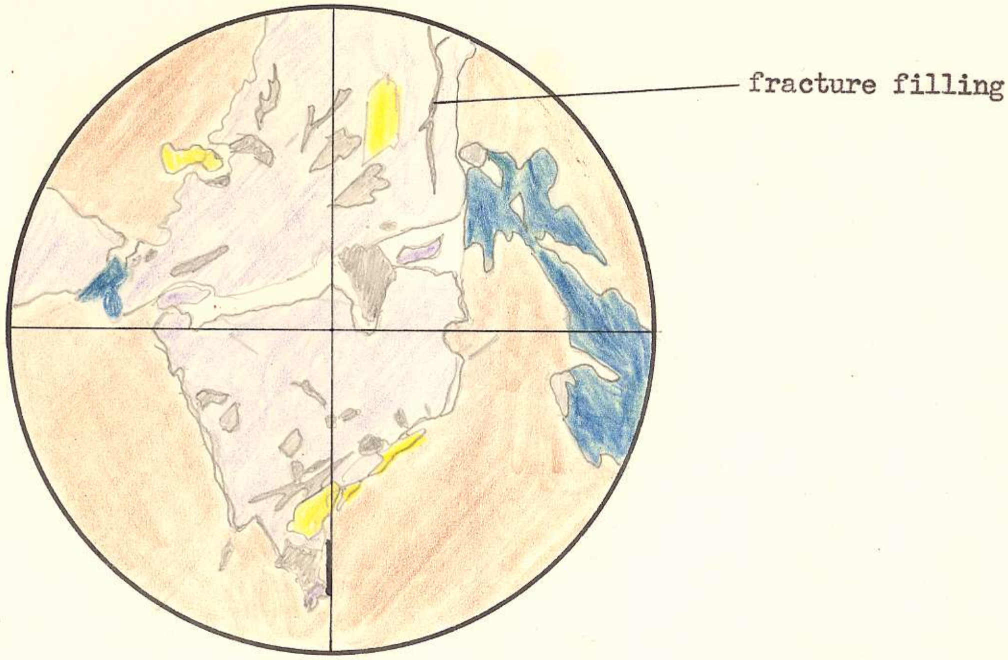
VII



280 X

VIII



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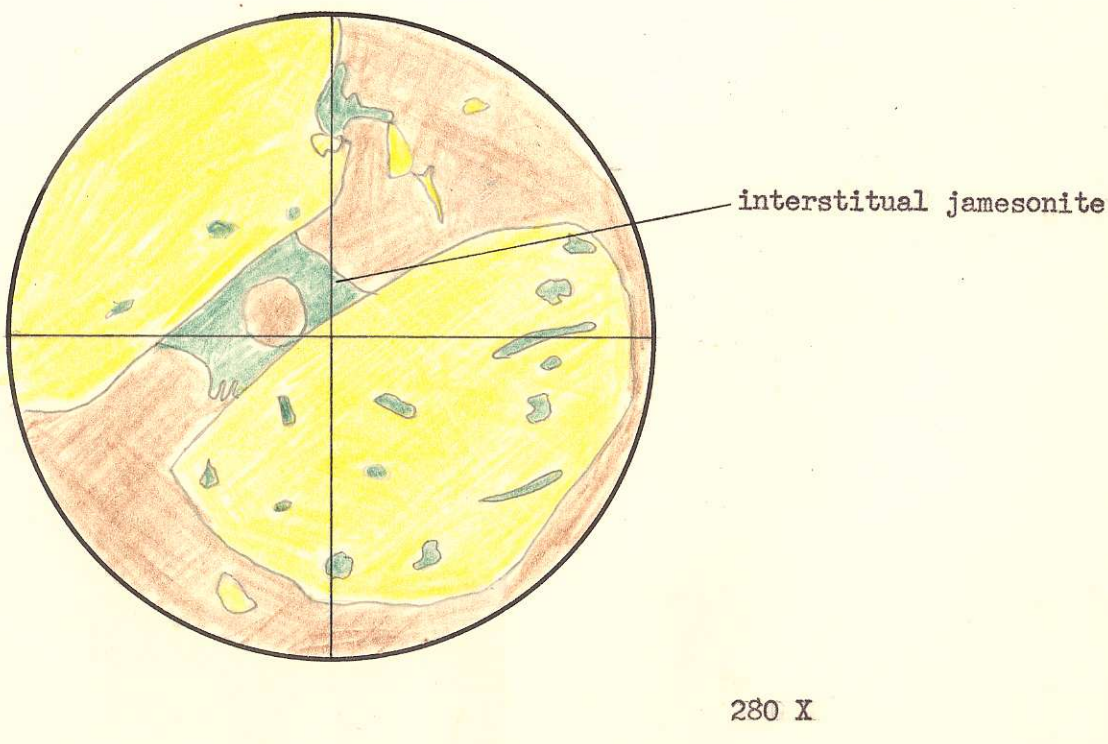
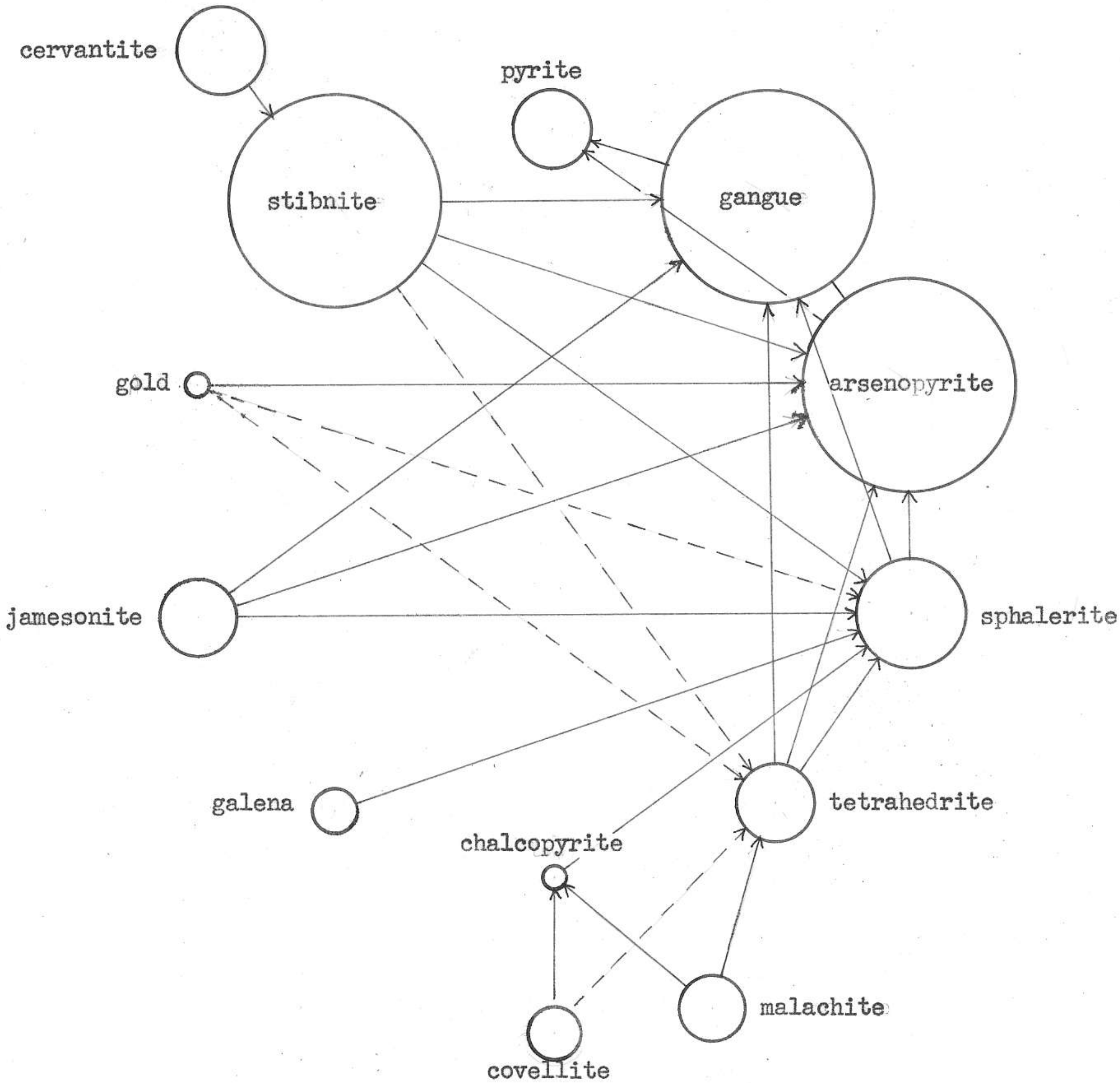


280 X

Paragensis


cervantite
pyrite
stibnite
gangue
gold
arsenopyrite
jamesonite
sphalerite
galena
tetrahedrite
chalcopyrite
malachite
covellite