A MINERALOGRAPHIC REPORT
ON THE HARRISON GOLD GROUP
B.C.

600265

MEGASCOPIC

Hand Specimens -

Several dozen hand specimens of ore ranging in size from approximately 2 cm. - 8 cm. were examined. The gangue mineral of the ore is milky quartz, predominantly massive but with some vuggy cavities containing poorly developed quartz crystals. Fracturing of the ore is not extensive. Two specimens contained weathered surfaces of the ore which are a heavily oxidized reddish-brown gossan with a delicate boxwork structure. Heavy limonite staining is present on some fracture surfaces and in vuggy cavities. Only two other gangue minerals were observed in the ore : sericite which occurs smeared on some fracture surfaces, and white, chalky argillic material in some of the areas of vuggy quartz along with limonite staining. Sericite and argillic material also occur intermixed with the ore minerals. These two minerals appear to be from late hydrothermal activity, being derived from late fluids filling fractures in the quartz.

Mineralization -

The ore contains two groups of minerals that were recognized in hand specimen:

1. base metal sulphides - pyrite, sphalerite, chalcopyrite, galena
2. Tellurides

There appears to be no extensive association of the two groups in the ore. Massive pyrite and chalcopyrite occur in some of the vuggy quartz. Much of the pyrite and chalcopyrite has a dark blue-sooty tarnish. Massive sphalerite and chalcopyrite along with pyrite and minor amounts of galena occur as clots scattered throughout the gangue.

The tellurides occur as minute blebs with a brilliant metallic luster scattered throughout the gangue and as dark gray irregular masses composed of microscopic grains giving the appearance of a gray stain to the quartz. The latter occurrence is the most predominant.

MICROSCOPIC

Minerals -

1. Pyrite FeS_2
   - colour pale yellowish white
   - H - E
   - polish moderate
   - stands up in relief

2. Arsenopyrite FeAsS
   - colour pale creamy pink
   - H - D (brittle)
   - anistropism distinct with colours reddish-brown and blue
   - stands up in relief

   - etch tests -
   HNO_3 - faint iridescent-brown tarnish
   all other reagents (-)

3. Sphalerite (ZnFe)S
   - colour gray
   - H - C
   - polish good with some scratches
   - some reddish-brown internal reflection

- etch tests -

HNO_3 - tarnishes patchy black
HCl - tarnishes patchy brown and iridescent
KCN - stains pale brown
$FeCl_3$ - (-)
KOH - (-)
$HgCl_2$ - stains patchy brown

- Microchem. tests -

Zn (+)
Fe (+)

4. Chalcopyrite $CuFeS_2$
- colour yellow
- H - C
- isotropic

- etch tests -

$AgNO_3$ - orange purple iridescence
Aqua Reg. - (-)
KCN - (-)

5. Galena PbS
- colour white
- H - B
- isotropic

- etch tests -

HNO_3 - rapidly tarnishes black
HCl - rapidly tarnishes iridescent
$FeCl_3$ - slowly tarnishes iridescent
KCN - (-)

6. Hessite Ag_2Te
- colour grayish white
- H - A, sectile - deforms in front of needle and gives powder
- polish poor in some sections showing many scratches
- anisotropism weak to strong showing patchy interference colours dirty-orange and blue gray.

- etch tests -

HNO_3 - tarnishes rapidly brown to black
HCl - tarnishes brown to iridescent
Aqua Reg. - effervesces and tarnishes brown to black

KOH - tarnishes pale brown with some iridescence
KCN - tarnishes pale patchy brown
$HgCl_2$- tarnishes dark brown
$FeCl_3$- tarnishes dark brown with some iridescence

- Microchem. tests -
Te (+)
Ag (+)

7. Tellurbismuth Bi_2Te_3
- creamy gray white
- H - B
- anisotropism distinct from violet to brown gray to dark gray
bladed habit in some sections revealed under xed nicols.

- etch tests -
HNO_3 - rapidly tarnishes brown to black with some effervescence
HCl - (-)
KCN - (-)
$FeCl_3$ - (-)
$HgCl_2$ - slowly stains brown to iridescent
KOH - (-)

- Microchem. tests -
Te (+)
Bi (+)

8. Altaite PbTe
- colour bluish white against tellurbismuth (med. power) greenish gray (high power)

- etch tests -
same as for tellurbismuth except for:
KCN - tarnishes pale brown
$FeCl_3$- tarnishes rapidly iridescent

Altaite was observed only as fine graphic intergrowths with tellurbismuth making property determinations for this mineral difficult

9. Native Gold
- colour bright yellow
- H - A Sectile - needle sticks into mineral
- Characteristic strong greenish anomalous anisotropism

- etch tests -
$AgNO_3$ - (-)
KCN - tarnishes black

10. Tetradymite Bi_2Te_2S
- colour creamy white
- H - B
- anisotropism distinct - dark blue-gray to light gray

- etch tests -
HNO_3 - rapidly tarnishes dark brown to black with strong effervescence
HCl - (-)
KCN - (-)
$FeCl_3$ - tarnishes rapidly iridescent
KOH - tarnishes rapidly brown to iridescent (this test is anomalous but is not reliable)
$HgCl_2$ - (-)

11. Digenite Cu_7S_4
- colour pale blue
- isotropic
- occurs as minute replacement veins in chalcopyrite

- etch tests -
HNO_3 - some effervescence - tarnishes black

Textures

as previously observed in hand specimen the tellurides and gold are not tied up to any extent in the sulphides. The sulphides occur as irregular complex masses throughout the gangue. Pyrite occurs as anhedral grains and irregular masses associated with the other sulphides, fractured and replaced in places. Arsenopyrite was observed in only one section and occured as irregular corroded grains in hessite, 240 microns in size. Sphalerite, galena, and chalcopyrite are commonly associated in complex masses, with chalcopyrite interstitial to the sphalerite and galena and replacement veins of chalcopyrite extending into

the sphalerite in places. Galena commonly occurs as grains approximately 800 microns in size with some sphalerite masses somewhat larger. An oriented emulsion texture of chalcopyrite was observed in much of the sphalerite. The excess of chalcopyrite over that included in the sphalerite suggests that deposition of the two began simultaneously but the bulk of the chalcopyrite was deposited after the sphalerite.

The only tellurides observed tied up in the sulphides were tetradymite and hessite. Tetradymite occurs as minute oriented blades in galena and was also observed as an exsolution rim around galena. Hessite was observed interstitially occuring in sphalerite.

The tellurides occur predominantly as discreet grains throughout the gangue ranging in size from several microns to ½ cm. Hessite occurs as irregular grains commonly showing the characteristic patchy anisotropism and as some corroded grains in tellurbismuth. Tellurbismuth occurs also as irregular grains and is associated with altaite in a fine graphic intergrowth. Tetradymite occurs as fine veins and oriented blades cutting the tellurbismuth - altaite intergrowths in places.

Gold occurs as irregular replacement veins and filliform bodies cutting hessite and argillic gangue.

The argillic gangue shows irregular rim replacement of hessite, the two in turn being cut by the gold. This indicates that the gangue is later than most of the ore minerals but earlier than gold.

The only occurrence of supergene replacement observed in the ore was as fine veins of digenite cutting chalcopyrite.

Mineral Percentages

Primary	-	Pyrite	- 25%
		Tellurbismuth	- 20%
		Hessite	- 15%
		Sphalerite	- 10%
		Chalcopyrite	- 10%
		Galena	- 6%
		Altaite	- 5%
		Tetradymite	- 5%
		Native gold	- 3%
		Arsenopyrite	- 1%
Secondary	-	Digenite	- <<1%

TEMPERATURE TYPE OF DEPOSIT

The presence of exsolution emulsion texture of chalcopyrite in sphalerite sets a lower limit for the beginning of deposition of ore minerals in the range of 350-400°C. The bulk of the sulphides probably were deposited above this range. The patchy anistropism shown by much of the hessite suggests the inversion of this mineral at 155°C indicating that the bulk of the tellurides was probably deposited between the temperature range 155-350°C. The deposit could be classified as mesothermal-epithermal.

CONCLUSIONS

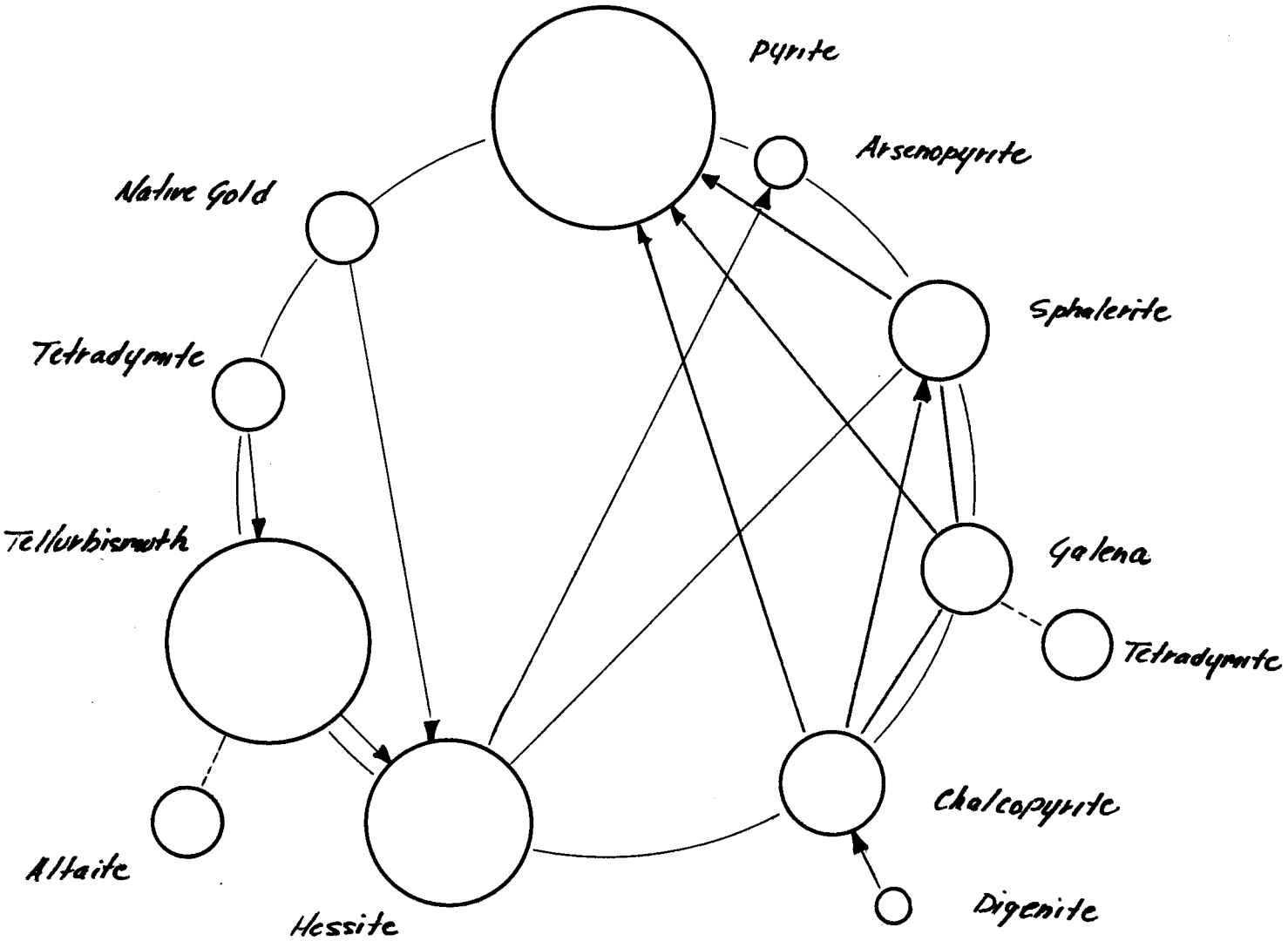
The bulk of the sulphides would be freed by grinding to +40 mesh, while grinding to -200 mesh would probably be required for complete liberation of the tellurides and separation of native gold.

Ref: A.C.Taplin - A Report on the Mineralogy of the Harrison Group, Lindquist Lake, B.C. 1950

RMT April 21/65

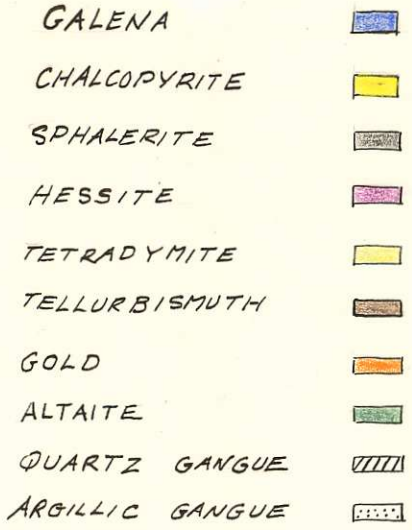
PARAGENESIS

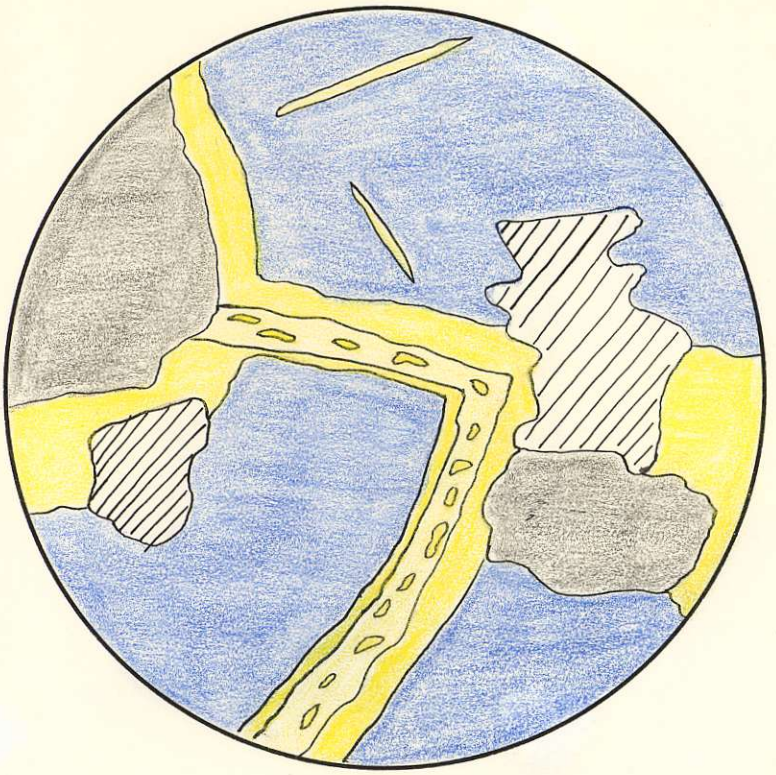
VAN der VEER DIAGRAM



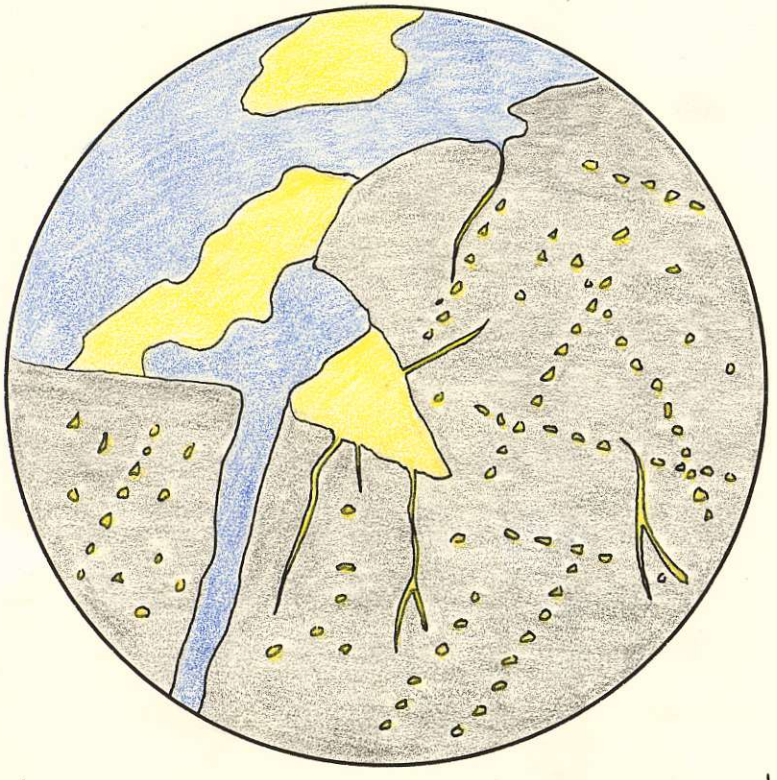
DIAGRAMS

LEGEND :

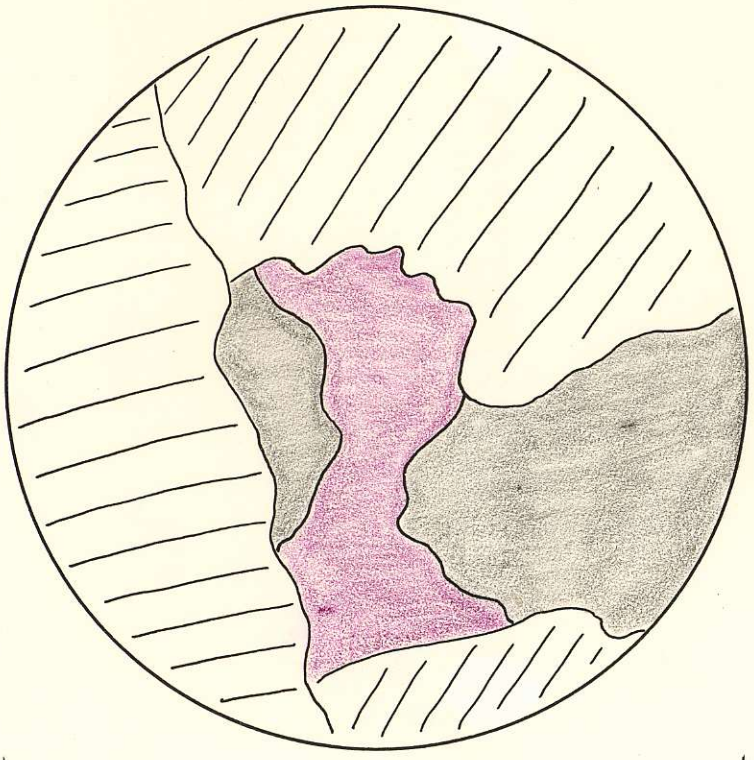




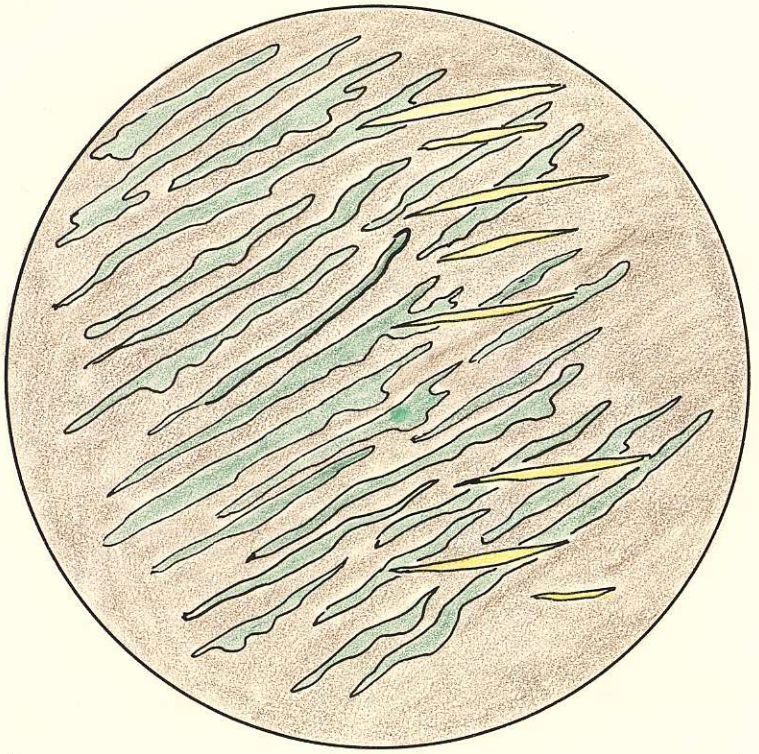
exsolution rim texture between galena and tetradymite



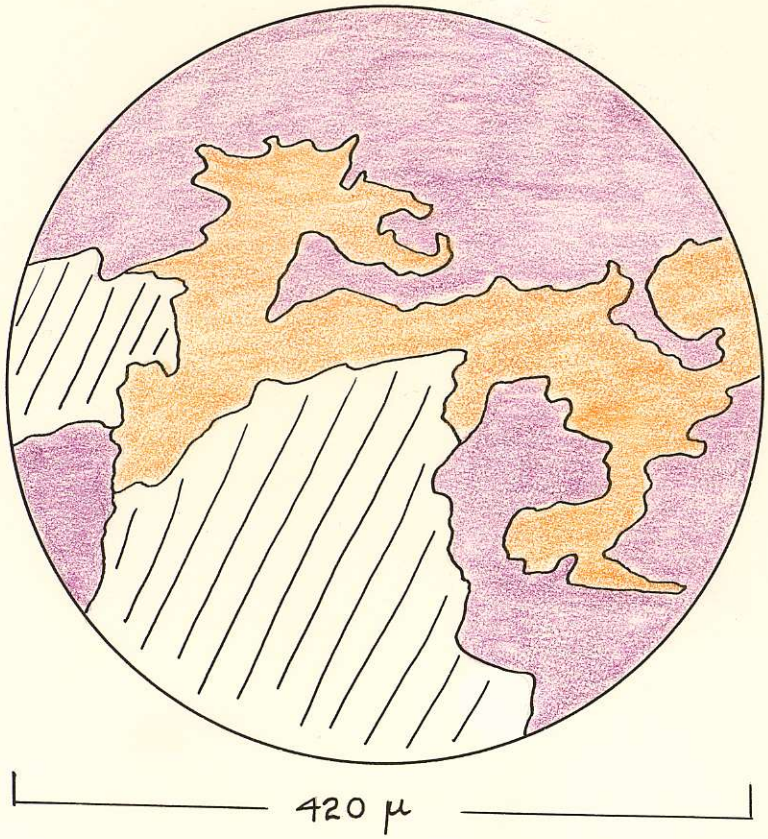
oriented exsolution emulsion texture of chalcopyrite in sphalerite sphalerite also replaced by chalcopyrite



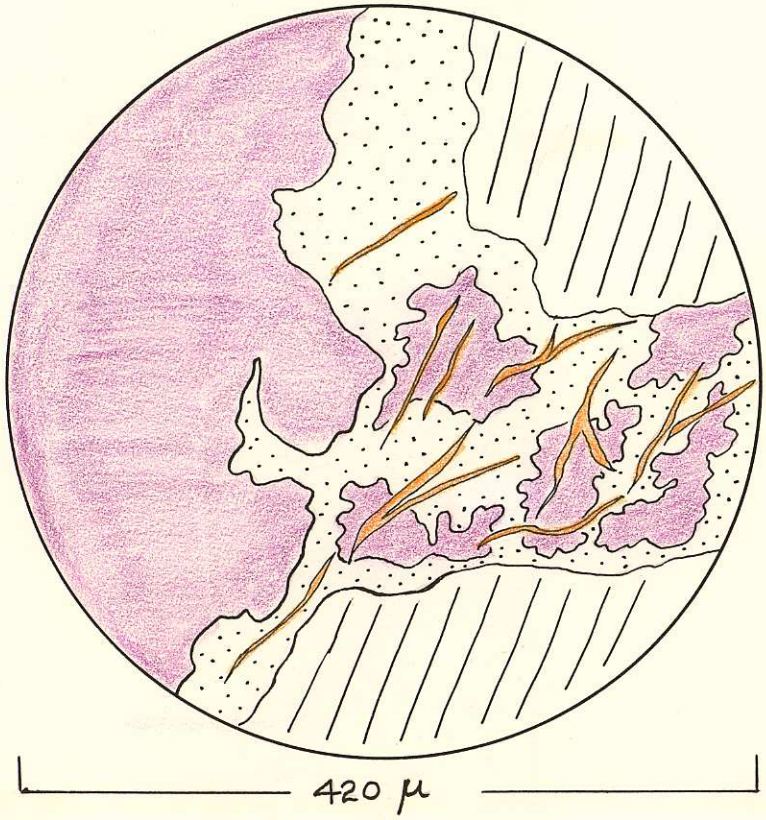
Hessite interstitial to sphalerite



Graphic intergrowth of tellurbismuth and altaite cut by oriented blades of tetradymite



Hessite replaced by native gold



Filliform texture in native gold cutting hessite and gangue