Porter Dump
Carbon Hill
Yukon

Yukon

GEOLOGY 409

K.U. CAMPBELL

Porter Dump.

CARBON HILL SUITE

A. EMPIRE CLAIM 4 POLISHED SECTIONS

MICROSCOPIC DESCRIPTION

The minerals in the polished sections were identified by means of optical data, microchemical and etch tests. They are listed below.

MINERAL NO. 1.

- Good polish, color-white, pleochroic in white brownish grey, H:B, twinned, strong anisotropism-grey, blue, brown, dk. grey. HNO_3 eff. slowly and stains iridescent, HCl stains differentially light brown, KOH instantly stains brown with a yellow coating. $HgCl_2$ negative, occurs as irregular grains. Identified as STIBNITE.

MINERAL NO. 2.

- Poor polish, brass yellow, H> needle, isotropic, occurs as corroded cubes. Identified as PYRITE.

MINERAL NO. 3.

- Grey color, H:C, isotropic, red internal reflection. Identified as SPHALERITE.

MINERAL NO. 4.

- Grey white color, H:C, strongly anisotropic - green, blueish purple, brown. Lead and antimony microchem. tests positive. $HgCl_2$, KCN, $FeCl_3$ negative, KOH stains iridescent, HCl fumes tarnish brown, HNO_3 tarnishes brown with slight eff., Aqua regia eff., tarnishes dark brown to black, fumes stain iridescent. Occurs as irregular grains. Identified as ZINKENITE

MINERAL No. 5.

- Good polish, white, soft, anisotropic - blue, brown, grey. Occurs as irregular grains and blebs (average size ≈ 41 μ) in Stibnite. No microchemical or etch tests (other than negative to KOH) were done due to size. Believed to be BERTHIERITE.

ABUNDANCE OF THE PRIMARY MINERALS

- as estimated from the 4 polished sections.

STIBNITE 49%
ZINKENITE 46%
SPHALERITE 5%

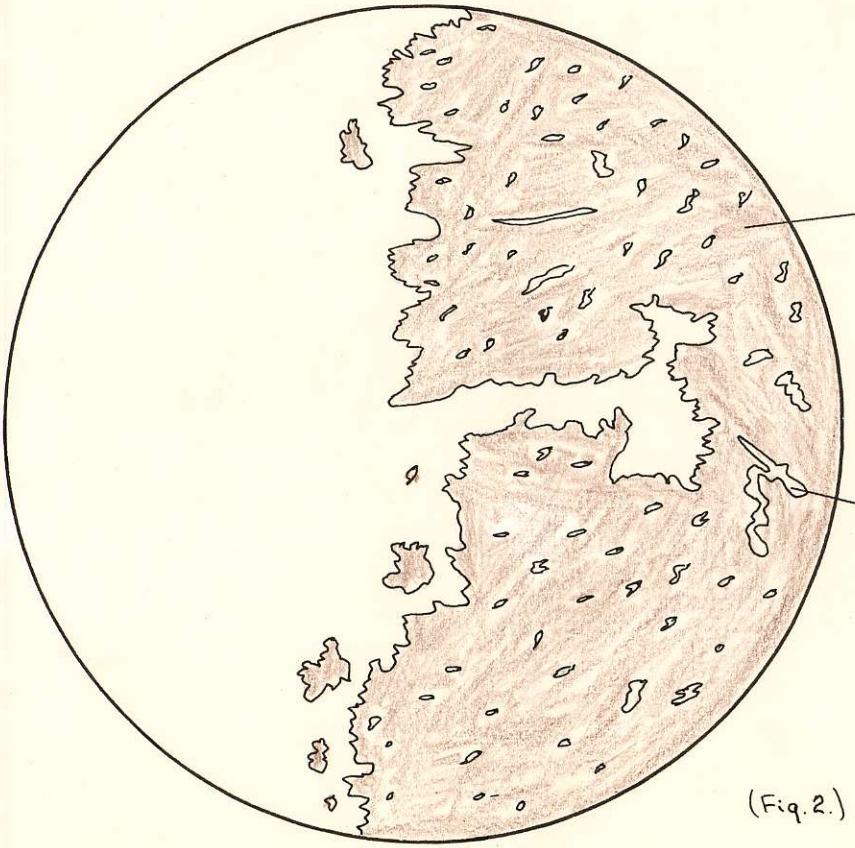
- plus minor amounts of PYRITE, BERTHIERITE.

PARAGENETIC SEQUENCE & TEXTURES.

Pyrite was the first metallic mineral to be formed. It occurs in subhedral cubes to rounded grains and can be seen replaced by all other ore minerals. Sphalerite was deposited next, occurring as irregular shaped grains. It replaces pyrite as indicated by the corrosion of pyrite grains. Stibnite, with the inclusions of berthierite, and zinkenite appear to have been deposited at the same time. In one instance only, were these two minerals observed in close association with one another. They then had a mutual boundary relationship. The stibnite occurs in lath-like and irregular grains, replacing sphalerite (Fig. 1) extending along fractures with internal corrosion of the latter's grains. Zinkenite occurs in the same manner and replaces Sphalerite by many fine tongues (Fig. 2). Stibnite & zinkenite also replace pyrite by corrosion of its grains.

1.8 mm

(Fig. 1.)



(Fig. 2.)

490 μ

B. PORTER CLAIM.

MEGASCOPIC DESCRIPTION:

The hand specimens examined consisted of several pieces ranging in size to 1/8" x 1" x 2". They represent sections of a vein deposit some 1" wide. The wall rock is quartz-diorite, the feldspars of which show some alteration to Kaolin. The vein is bounded by 1/8" of white quartz showing a poor development of a palisade texture. There are several euhedral crystals of quartz, up to 1/16" long present in the vein.

The ore mineralization occupies the central 3/4" of the vein. It is of soft, grey Antimony Sulphides occuring massively and in very small acicular crystals.

The ore minerals are weathered a dark grey. The hand specimens all have a rusty weathered appearance.

MICROSCOPIC DESCRIPTION:

MINERAL NO. 1

- Good polish, white color, H: B, pleochroic white to grey, strongly anisotropic - blue white, grey, purplish brown. KOH instantly stains brown with a yellow coating.
Identified as STIBNITE.

MINERAL NO. 2.

- Good polish, white, H: > STIBNITE, strongly anisotropic - grey and dark blue. Copper and antimony micro chemical tests were positive. $HgCl_2$, KOH, $FeCl_3$, KCN, HCl all negative, HNO_3 fumes tarnish brown, with slight effervescence stains brownish yellow.
Identified as CHALCOSTIBITE.

ABUNDANCE OF THE PRIMARY MINERALS

:- estimated from 2 polished sections

STIBNITE - 85%

CHALCOSTIBITE - 15%

PARAGENETIC SEQUENCE & TEXTURES.

The Stibnite and Chalcostibite occur intergrown with one another. They have lath-shaped to irregular outlines. After staining with KOH the Chalcostibite could be seen surrounding and cutting through Stibnite laths indicating replacement of the latter.

Porter Dump

C. FOUR LARGE HAND SPEC. & 2 POLISHED SECTIONS.

MEGASCOPIC DESCRIPTION.

The hand specimens studied ranged in size from 3"x3"x4" to 2"+3"x2½". The specimens consist predominantly of radiating bursts of a grey Antimony Sulphide ore mineral coarsely disseminated in a white quartz gangue. A slight degree of banding is exhibited by the quartz. The quartz is generally drusy with cavities up to 3/4" diameter. In many cases the druses are lined with well formed quartz crystals, sphalerite or alteration products.

The Sphalerite is the brown, iron rich variety showing well formed cleavage faces. It is compact, occuring both massively in the grey Antimony Sulphide and in the druses.

The sphalerite is coated with an alteration product of reddish brown powder having a coarsely cellular honeycomb structure. Many of the quartz crystal lined druses have fine acicular yellow crystals of an Antimony Oxide. X-ray taken of this mineral closely match STIBICONITE in pattern.

All the hand specimens have yellowish to white antimony oxide alteration products on their surfaces. The grey ore mineral has a darker grey tarnish.

MICROSCOPIC DESCRIPTION.

MINERAL No. 1

- Good polish, color greyish white, H>C, non-pleochroic, anisotropic brownish green, bluish purple; KOH stained iridescent, HNO_3 fumes tarnish brown with a slight effervescence. Identified as ZINKENITE.

MINERAL No. 2

- Poor polish, color brass-yellow, H> needle, isotropic. Identified as PYRITE.

MINERAL No. 3

- Grey color, H>C, isotropic, red internal reflection. Occurs as irregular grains. Identified as SPHALERITE.

ABUNDANCE OF THE PRIMARY MINERALS

:- estimated from 2 polished sections

ZINKENITE - 65%

SPHALERITE - 35%

: minor amounts of PYRITE.

:- estimated from 4 hand specimens.

ZINKENITE - 85%

SPHALERITE - 15%

: minor amounts of Antimony Oxide alteration products.

STIBICONITE
± other Antimony Oxides.

PARAGENETIC SEQUENCE & TEXTURES.

Pyrite was the first formed, present in irregular grains in contact with Sphalerite which replaces it by corrosion. Zinkenite occurs in irregular grains to lathes and replaces Sphalerite by many fine tongues and fracture fillings. (similar to Fig 2).

D. THREE HAND SPECIMENS.

Porter Dump

MEGASCOPIC DESCRIPTION

The hand specimens range in size from 2" x 2" x 3" to 1" x 1" x 2". They represent a vein deposit some 2 1/2" wide in contact

with a quartz diorite wall rock. The central part of the vein (1"-1½") is of crystalline, drusy quartz. There is an apparent banding of the ore minerals, galena and tetrahedrite, in the width ¼" to ½", some ½" from the wall rock contact. The tetrahedrite is mostly concentrated on the outside of the galena. The vein is bounded by ⅛" of goethite.

The galena is fresh appearing and displays cubic cleavage. The tetrahedrite occurs massively and in a few places has altered to Malachite. X-rays taken of the tetrahedrite exactly matched the pattern of Argentiferous Tetrahedrite.

The specimens are weathered a great deal to rusty browns & dark greys.

MICROSCOPIC DESCRIPTION:

MINERAL NO. 1

- Brownish grey color, H: D, isotropic, brownish-red internal reflection when scratched, copper test positive. Occurring as irregular grains. Identified as TETRAHEDRITE

MINERAL NO. 2

- Good polish, white, H: B, isotropic, triangular cleavage pits common, occurring as highly irregular grains. Identified as Galena.

MINERAL NO. 3

- Very poor polish, dark grey color, H: D, red-brown internal reflection, occurs massively in a band with a skelatal cellular structure. Iron test positive, All etch test negative. Identified as GOETHITE.

ABUNDANCE OF THE PRIMARY MINERALS

GALENA :- 80 %

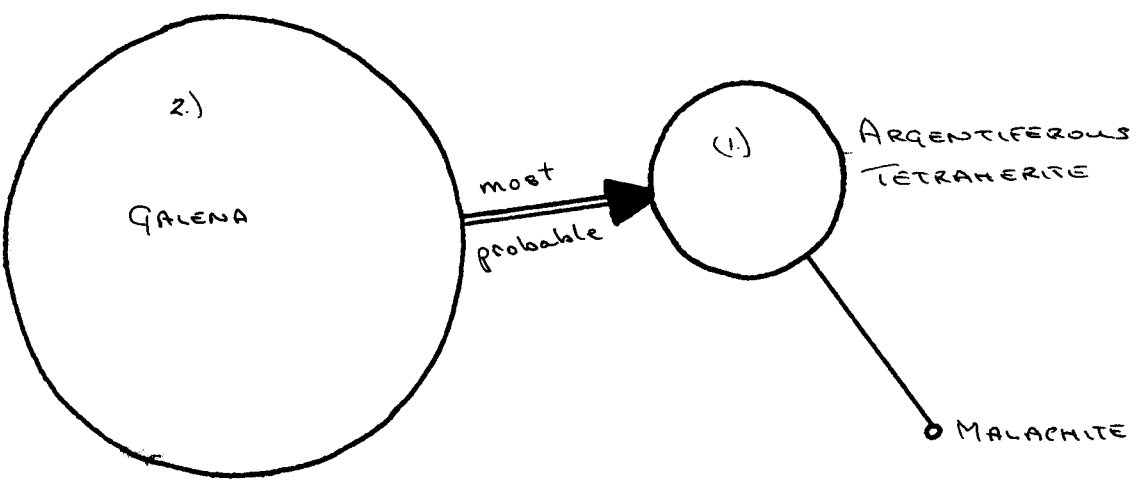
ARGENTIFEROUS TETRAHEDRITE :- 20%

PARAGENETIC SEQUENCE & TEXTURES.

Galena and Tetrahedrite were seldom in contact with one another, usually being separated by gangue. In the few instances they were observed in contact, they exhibited a mutual boundary textural relationship. The tetrahedrite was probably deposited first, as suggested by its dominance in the periphery of the vein. Goethite was the last mineral to form as understood by its low temperature of stability (150°C).

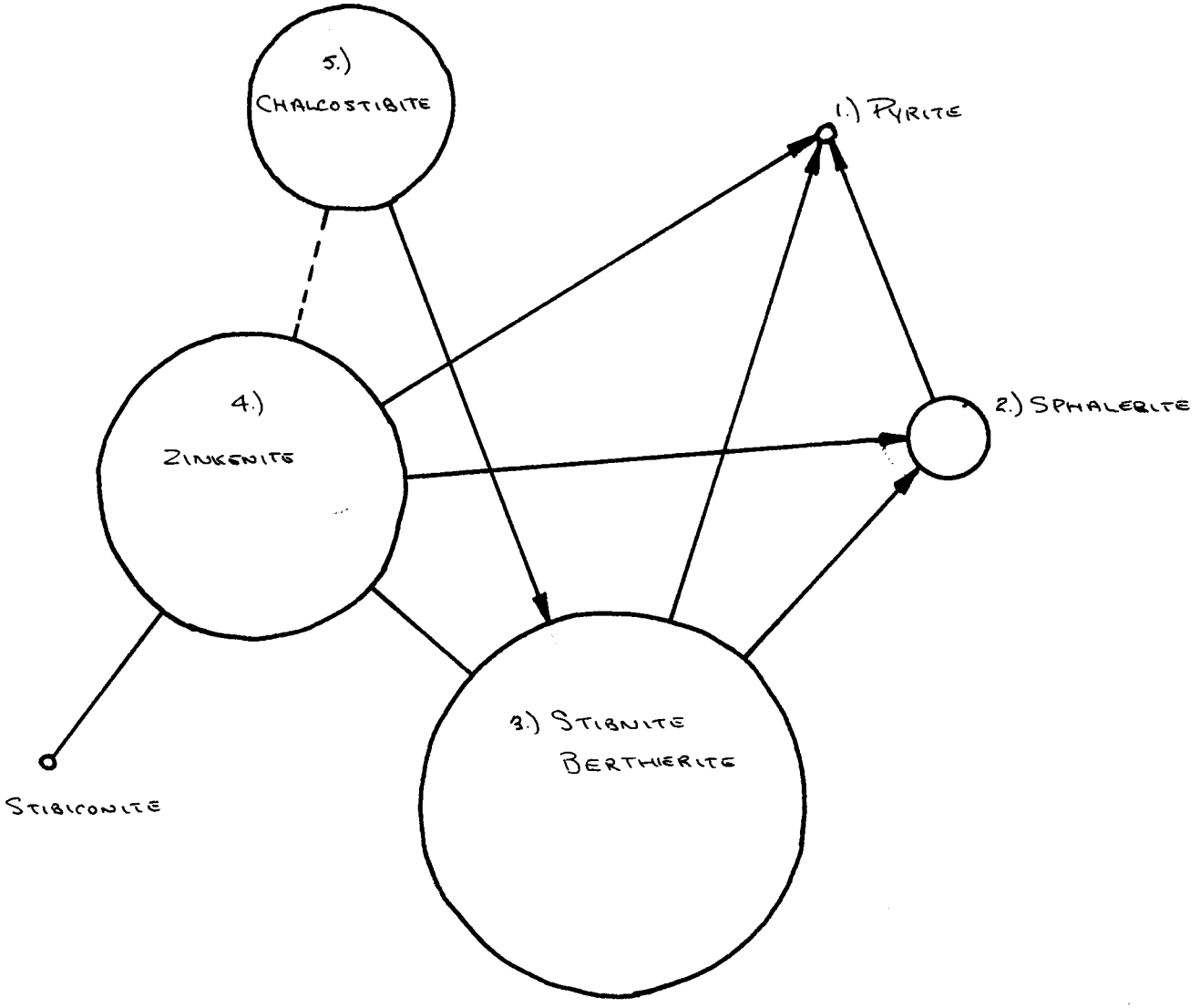
PARAGENETIC SEQUENCE DIAGRAMS.

A.) FOR ASSEMBLAGE D.



The specimens examined in assemblage D. could not be compared paragenetically to the other assemblages studied, as no common ore minerals were observed.

B.) Other 3 Assemblages.



CLASSIFICATION AS TO TEMPERATURE TYPE.

The minerals in assemblage D; galena, quartz and tetrahedrite, are typical of mesothermal deposits with a temperature of formation between 175°C and 300°C.

Assemblages A, B, and C are distinctive from D in that their ore minerals, stibnite, zinkenite, bertherite, and chalcostibite, are common of epithermal deposits formed in the temperature range 50°C to 200°C.

A

C.M.T.

Mar. 30/65