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GOLD FLAKE PROPERTY

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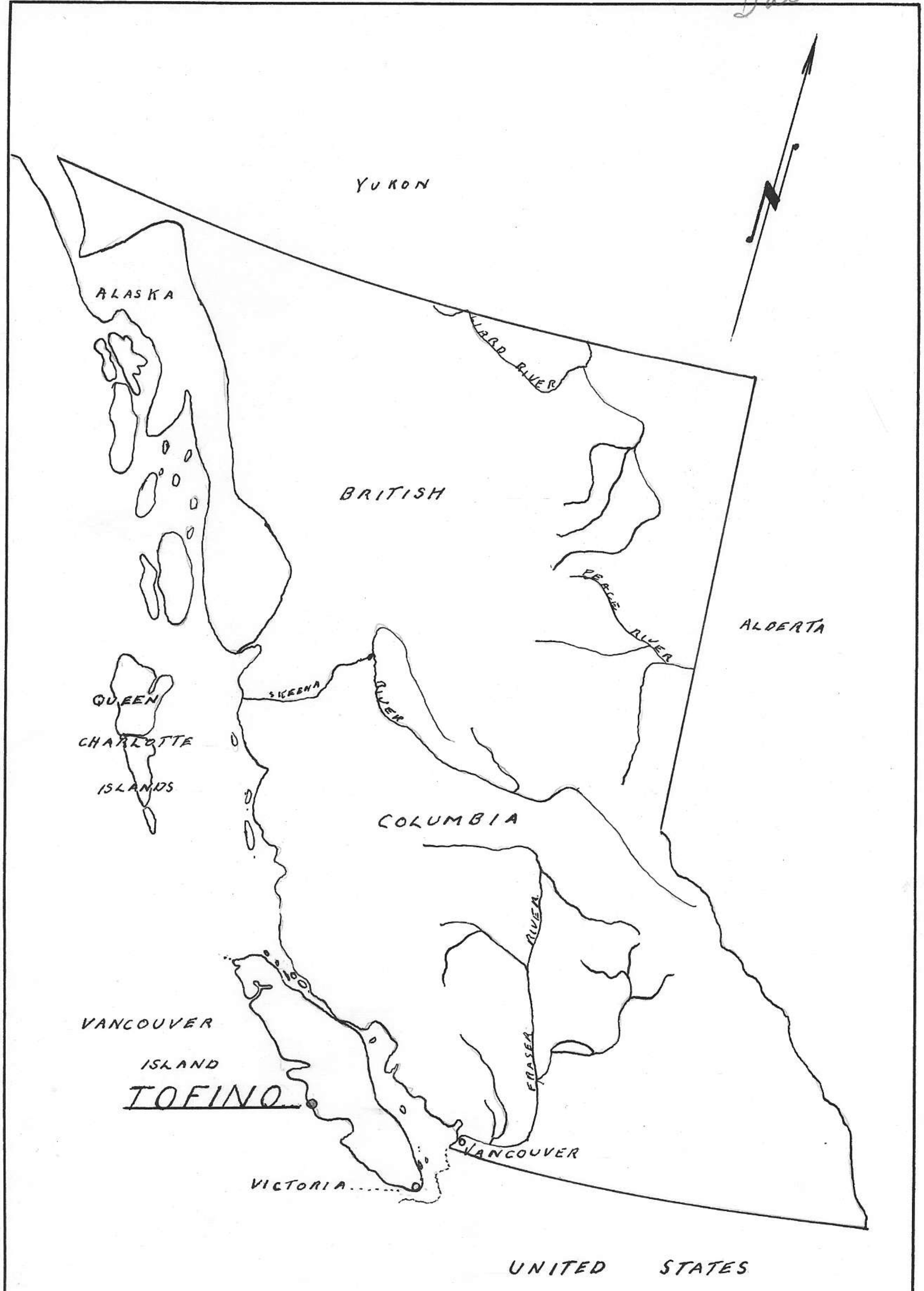
April 1959

Compare this with Davidsons



Frontispiece

CONTENTS

LIST OF ILLUSTRATIONS

GOLD FLAKE PROPERTY.

Introduction.

The purpose of the following paper is to descibe the mineralogy of the Gold Flake property in the Tranquil Creek, Warm Bay area of Vancouver Island, which is about fifteen miles northeasterly by water from Tofino.

The ocurrence of gold quartz veins was discovered in the late 1930's and subsequent work was done in this area. Which amounted to

There had been no significant amounts of ore shipped form this area up to 1946. In that year 35oz. of gold and some silver was shipped from for claims in the general area including the Gold Flake group.

GEOLOGY.

The following discription is taken directly from the B. C. Minister of Mines Report, 1946.

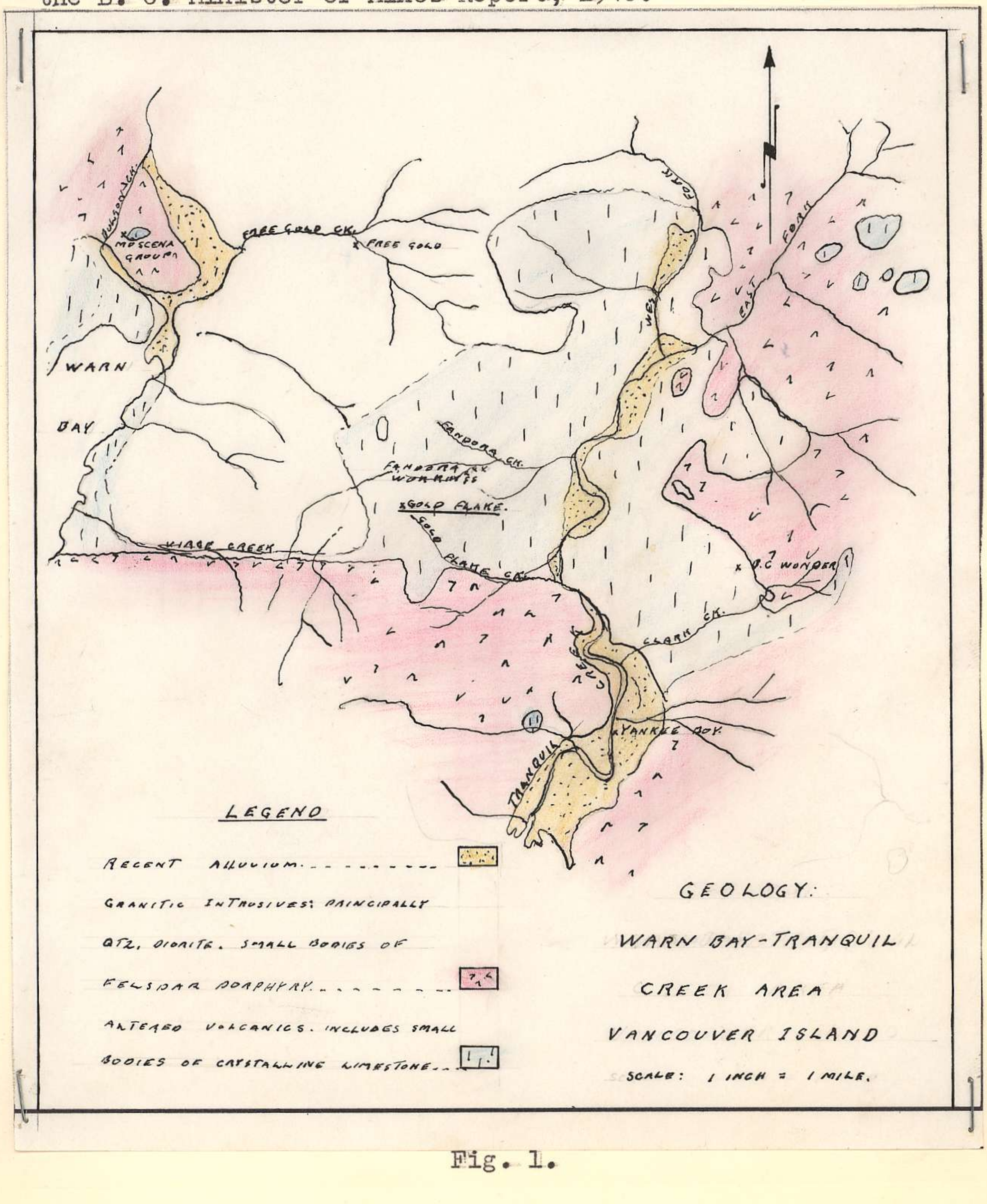


Fig. 1.

Altered volcanic rocks and granites rocks, principally quartz diorite are the chief rock types found in the area. (see above sketch)

The volcanics found in much of the northern two-thirds of the area extends north from a body of quartz diorite, of which the northern contact runs easterly from Warn Bay, just south of Virge Creek. Another incompletely mapped body of quartz diorite is found in the vicintiy of Bulson Creek and its principal tributary, Free Gold Creek, which empties into the head of Warn Bay. An unmapped area extends east from Bulson Creek to the divide between Free Gold Creek and the west fork of Tranquil Creek. At the divide a tonque of quantz and diorite about one-third of a mile wide has been mapped for a length of about half a mile. A third considerable body of quartz-diorite is found in the north-eastern part of the area.

The volcanic rock is now altered to greenstone and is composed largely of secondary minerals. Probably the rock was originally andesitic in compostion. Lenses of crystalline limestone with a maximum length of a few hundred feet, lenses of other sedimentary rocks and of garnet-diopside rock are found in the altered volcanics. Dykes and small masses of felspar porphyry and some small masses of quartz-diorite are found in the areas of greenstone, which are also cut by later andesitic and basaltic dykes.

Most of the quartz diorite is massive but it is gneissic along the quartz-diorite side of some contacts with older rocks. The most extensive area of gneissic quartz-diorite is along the border zones of the larger area lying south of Virge Creek and Gold Flake Creek. Along the contacts of other bodies of quartz-diorite, breccia zones of varying width are found in which the bordering volcanics have been brecciated and the fragments sealed by quarty-diorite.

The quarty-diorite bodies contain pendants and small masses of andesite and sediments. These included rocks are particularly abundant in an area about three-quarters of a mile in diameter in the east side of the east fork of Tranquil Creek. The abundance of included rock here and brecciation of much of it, suggest that this area is close to the original roof of the batholith.

The typical quartz-diorite of the area is greyish-white in color and medium grained in texture. The principal minerals are quartz, 10 to 35 percent; felspar, up to 70 percent, of which less than one-third is oathoclase and the remainder oligoclase plagioclase; hornblende and biotite. The minor accessory minerals include apatite, magnetite, sphene, pyrite and hematite and the secondary minerals include sericite, epidote, clinozoisite, and chlorite. The felspars are sericitized, the orthoclase usually more than the plagioclase, and the hornblende and biotite are partly altered to chlorite. The moderate amount of quartz and on orthoglase-felspar to plagioclase-felspar ratio of less than 1 to 3 serve to classify the rock mineralogically at a quarty-diorite.

Dykes of several types and ages are found in both the andesite and the quartz diorite. They include basalt, andesite and felspar porphyry, and quarty felspar porphyry. Most of the dykes cut both the quartz-dioite and the andesite but more were seen cutting the altered sediments and only one dyke, an altered fine grained andesite or basalt was seen cutting limestone.

Isolated outcrops of felspar porphyry were seen within areas mapped as underlain by quartz diorite, but nowhere was the rock seen in contact with the quartz-diorite. The felspar porphyry consists of plagioclase felspar (oligoglase andesine) and some quartz phenocrysts in a fine-grained groundmass. It also contains some patches of hornblende, magnetite, ilmenite, sphene, limonite, and pyrite. Secondary minerals include chlorite, epidote, clinozoisite and levcoxene. The rock has a fresh appearance and is thought to be a quickly cooled as a low pressure phase of the quartz-diorite. Similar rock intrudes the andesite.

Three different strike and slip groups of factures constitute the main structural features of the area. One group strikes north 65 to 80 degress and is approximately vertical in dip, a second group stricks northwest and is also approximately vertical in dip, and a third group is nearly flat lying. The north-easterly striking group of fractures is reflected in the topography by deep, narrow chimneys and gorges, approximately transverse to the northerly trending ridges and steepvalley sides. The flat lying structures are marked by benches and small caves or the preciptous bluffs of the hillsides.

Gold bearing quartz veins occupying well defined shear-zones and sheeted zones constitute the main type of ore deposit in the area. Such veins are found in the altered volcanics in the quartz diorite and in the later andesite dykes.

The claims are underlain by altered volcanics, tuffs and breccias. These rocks are out by dykes and small bodies of felspar porphyry and by dykes of andesite and basalt.

Steeply dipping fractures, north and south of east cut the volcanic rocks and are reflected in the topography as narrow canyons. In the area of the showings an andesite porphyry dyke 10 to 20 feet wide, strikes north 70 to 80 degrees east and dip 60 to 75 degrees northwestward, and follows such a fracture. A working on the Gold Flake property see fig.2) shows a 4-inch vein cutting altered volcanics near a contact with quartz-diorite and fresh andesitic rock.

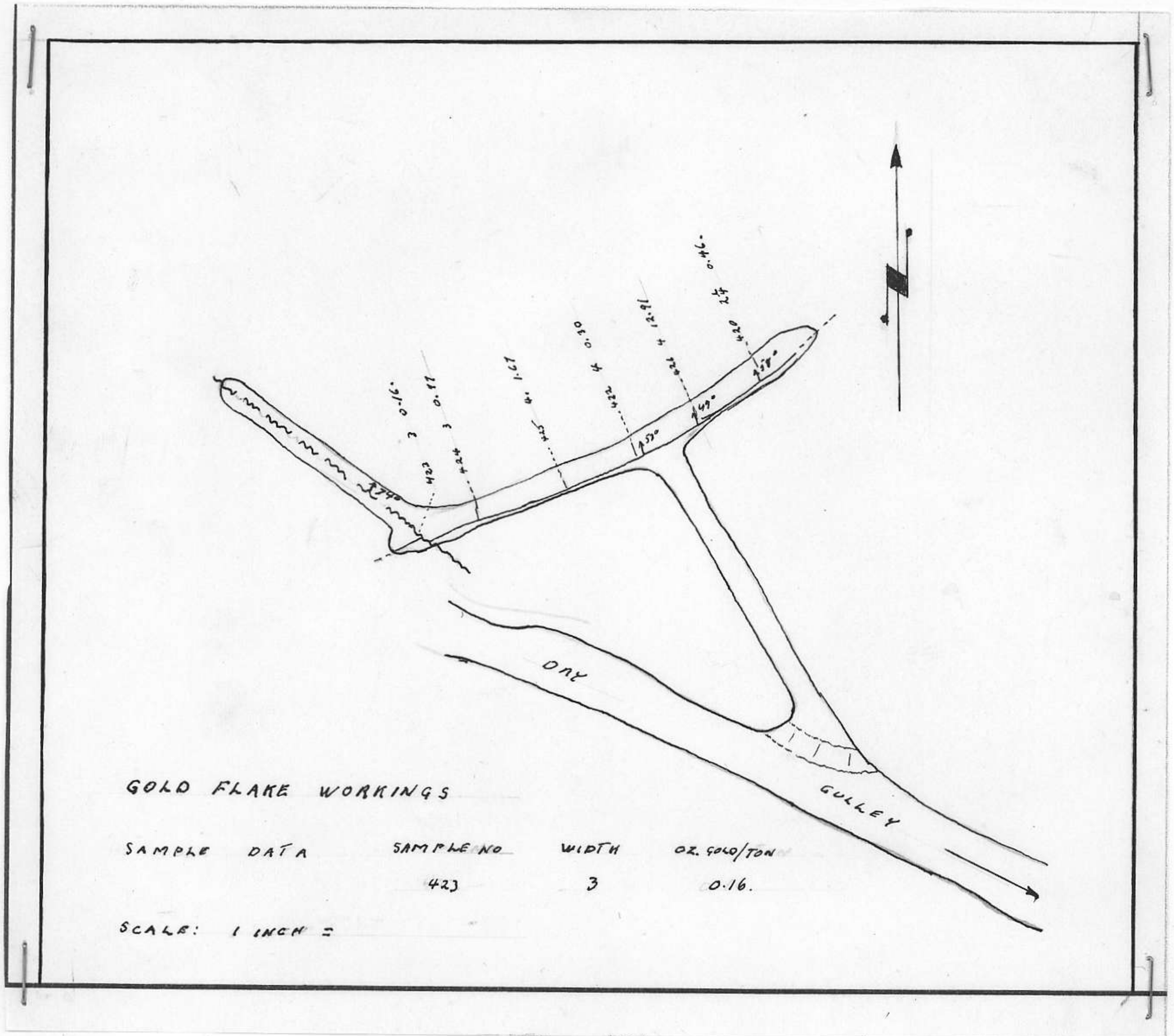


Fig. (2)

MINEARALOGY.

Hand Specimens.

The hand specimens fall into two groups.

I. Intensely sheared and fractured fragments which are quite friable.

II. Those much less fractered but sheared to some extent.

Characteristics:

I. (a) shape: Elongate, tabular or irregular, or irregular. Regularity of shape decreases with decreasing size approaching the irregular characteristics of finely crushed quartz.

(b) size: The specimens range from minute to perhaps two pounds in weight.

(c) Fractures: (i) Main fractures: There are a fraction of an inch apart, sub-parallel and control the fracturing of the specimens in one plane.

(ii) Minor fractures: These run entirely at random thru the specimens.

The above fracturing is very dense. If one puts the point of one's pen on a specimen it will permeate the rock much as it does in a blotter instead of rumming along several main lines of fracture.

(d) Almost all of the fractures are filled with cryptocrystalline secondary calcite emplaced after the shearing. The entire surface of some specimens will rggrtbrdvr with dilute HCI due to the fracture density in several instances the calcite replaces the quartz. One grain of calcite found was 3/8 inches across and does not support the fracture systems present in the quartz.

(e) A number of the main fractures have chloritization along them. This is very fine grained and is smeared over the surfaces by shearins. Some of these faces show distinct slicken-siding.

(f) Mineralization:
(i)
very fine euhedral crystals of pyrite (FeS) and arsenopyrite (Fe As S) occur along these fractures. Most grains are microscopic in size. The largest found was approximately 1/15 of an inch in the largest dimension. Almost all of this is in the main fractures or adjacent to them.

(ii) Interspersed thruout the quartz are very minor concentrations of galena (PbS), sphalerite (ZnS) and native gold (Au). These are for the most part micro-granular. These do not show particular relationship to the fracturing.

II (a) Shape: tubular, quadrangular. They become increasingly less regular in shape with decrease in particle size.

(b) Size: The largest specimen is in excess of two pounds in weight .

(c) Fracturing. Main set: This is probably the same set as in I and controls one plane of fracturing. These give the specimens a distinct ribbon stauctures. These do not show movement along them.

(ii) Minor sets. Subordinate to (i). These occur at random and are less well developed than in I. These fractures contain little or no calcite. They do not, in most cases, cut across mineralization.

(d) The mineralization is controlled by a few of the main fractures. At least 90 percent of the mineralization is within one-half inch of these fractures which allowed the acess of the mineralizing solutions.

(e) Mineralization:

1. Galena (Pbs) in "massive" blebs replacing quartz in the vicinity of fractures and in fractures in the quartz none are over 1/2 inch across.

2. Sphalerite (Zns): Asso ciated with the galena: Emplaced in the quartz in the same manner.

3. Native Gold (Au) Mainly near the fractures but dispersed thruout the quartz, galena, and sphalerite. Minor amounts present . Mostly microscopic in size.

Polished Sections.

Sections:

1. Three sections mounted in plastic.

2. Two sections mounted in plastic ene.

3. One heavy mineral concentrate mounted in plastic.

Mineralization:

1. Pyrite (FeS) occurs along fractures in the quartz. Subhedral in form. Cut by arsenopyrite and native gold.

2. Arsenopyrite: (FeAsS) scattered thruout the secti ions usually in segregations in fractures. Usually in euhedral crystals . It is in all minerals except gold and pyrite in euhedral crystals. It cuts the pyrite as a fracture filling. It contains extremely finely divided gold.

3. Sphalerite (ZnS). Varnish brown in color. occurs along fractures and as a replacement in the quartz. Encloses euhedral grains of arsenopyrite.

4. Galena (PbS) occurs in fractures and as a replacement in the quartz. And the spharite.

5. Native Gold (Au) Occupies fractures in the quartz and all other minerals. Also in extremely fine intergrowths in arsenopyrite. Please refer to indes I for photographs of some of the above relationships. Etch tests are in appendix III.

Paragenesis: (See appendix II for diagram.)

1. Pyrite. (FeS)

2. Arsenopyrite- with Au. ($FeAsS$.)

3. Sphalerite (ZnS)

4. Galena (PbS)

5. Native Gold (Au)

These are arranged so that 5 replaces 4. 4 replaces 3 etc.

Gangue Minerals;

1. Quartz (SiO_2) 95 percent plus of the gangue minerals. The fracturing is easily seen under the binocular. microscope.

2. Calcite: ($CaCO_3$) 4 percent plus. present as a fracture filling in the quartz.

3. Unknown carbonate 1% plus or minus. Associated with the calcite around mineralization. In one instance there are groups of embryonic star-shaped microcrystals in the calcite. They seem to be hexagonal and stand up in relief

in the section.

Estimated Values.

1:	Gold (Au)---------------------------	o-12oz/Ton
2:	Galena (PbS)------------------------	1% ± -
3:	Sphalerite (ZnS)--------------------	1% ± -
4:	Arsenopyrite (FeAsS)----------------	1 traces
5:	Pyrite (FeS)------------------------	1 traces

Temperature:

There is not sufficient evidence to determine the temperature of formation of the deposit.

Arsen@pyrite is thought of as a high temperature mineral. Galena, sphalerite pyrite and gold have f fairly wide ranges.

There are no exsolution textures that can be used as temperature indicators.

There has been absolutely no alteration of the quartz or the calcite. This may indicate a fairly low temperature of emplacement.

Conclusion.

The deposits consist of open space fracture filling in narrow highly sheared quartz veins. Mineralization probably took place at medium to low temperatures.

APPENDIX I

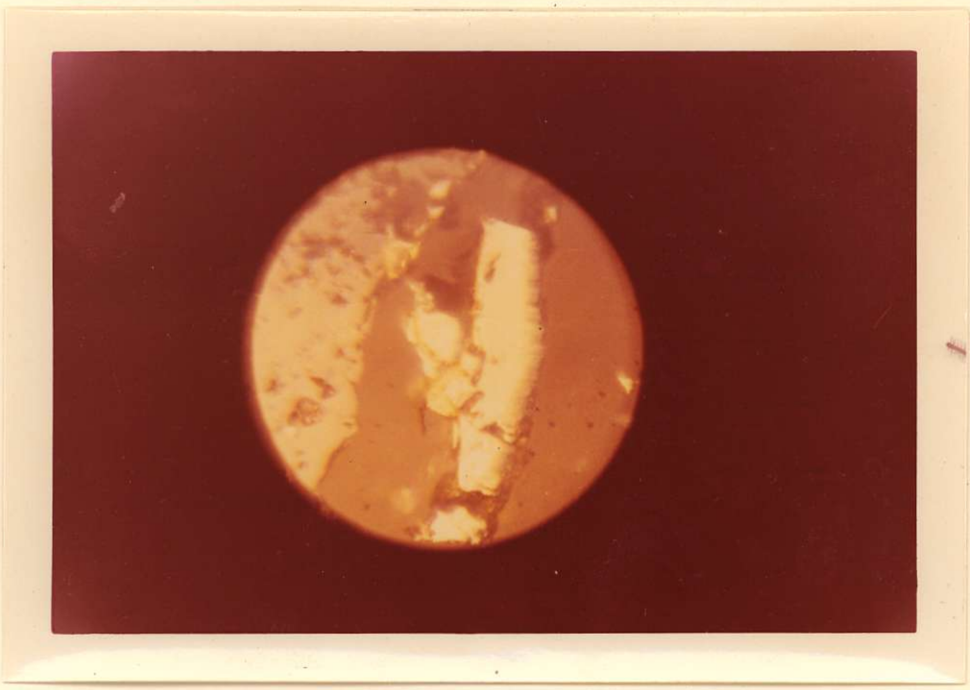


Fig. 1 X 450

Native gold in arsenopyrite, sphalerite and quartz

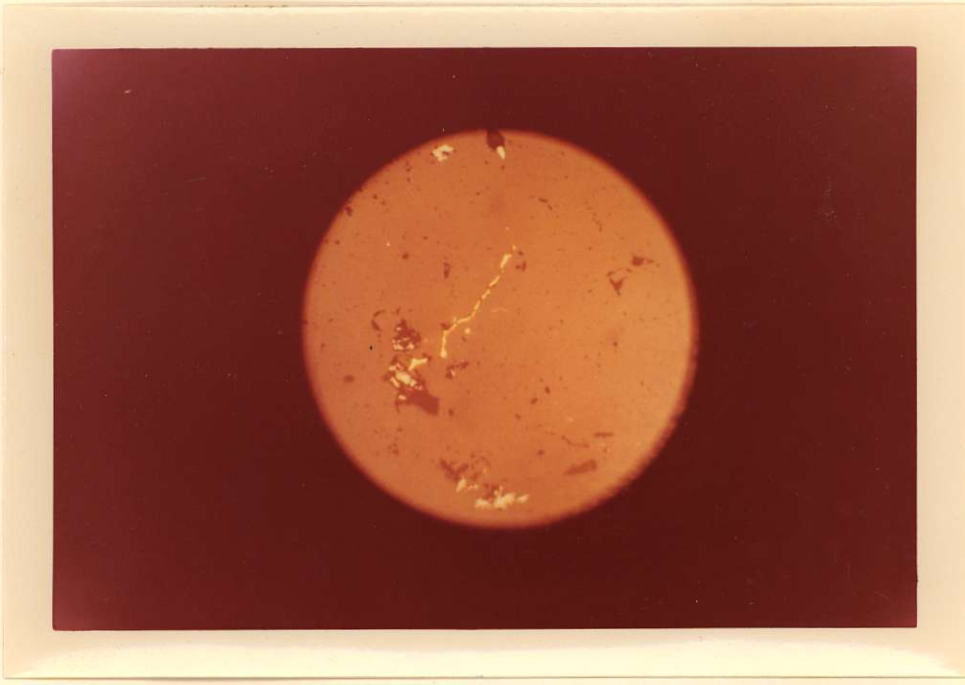


Fig. 2 X 130

Native gold in a fracture in quartz

APPENDIX I

Fig 3 X 450

Native gold in sphalerite

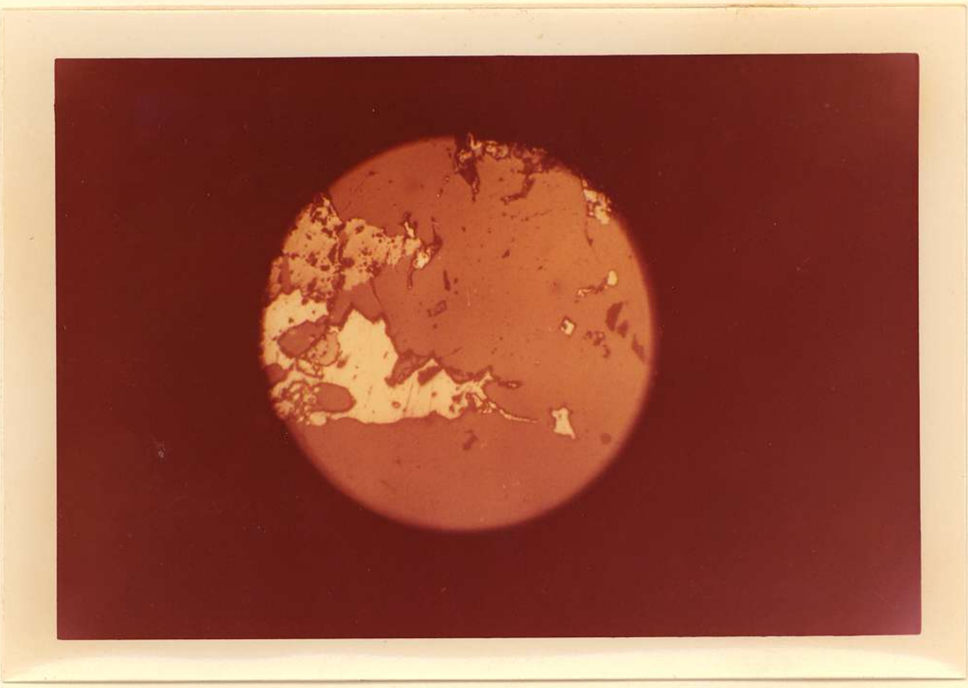


Fig. 4 X 130

Galena and sphalerite in quartz

APPENDIX I

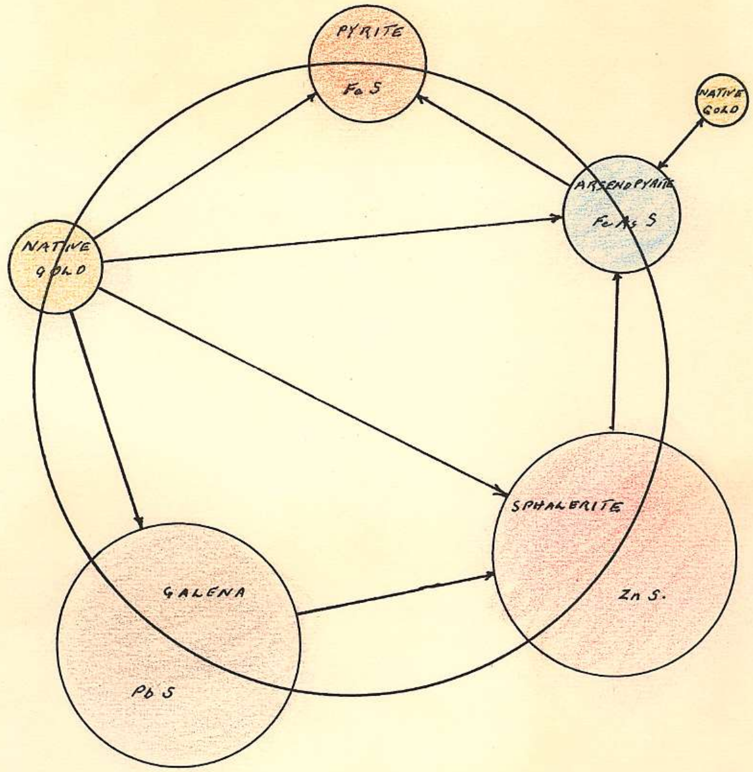
Fig. 5 X130

Galena and sphalerite in quartz

Fig. 6 X 130

Galena cutting sphalerite

APPENDIX II



Paragenesis

APPENDIX III

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . .

Polish fine.

Colour CREAM.

Hardness HARD

Streak –

Texture irreg. grain to [illegible]

Anisotropism IN REDS

Pleochroism –

Twinning –

Internal reflection –

Texture under xd. nicols -

Cleavage -

Association

Etch tests

$HgCl_2$ (–)

KOH (–)

KCN (–)

$FeCl_3$ (–)

HCl (–)

HNO_3 (+)

Aqua regia ±

Microchemical tests

Grain size

Mineral or Group ARSENOPYRITE

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

Interpretation of textures.

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . .

Polish FAIR.

Colour GREY.

Hardness C

Streak DARK.

Texture –

Anisotropism ISOTROPIC

Pleochroism –

Twinning –

Internal reflection –

Texture under xd. nicols –

Cleavage –

Association AU. ZNS.

Etch tests

$HgCl_2$?(–)

KOH (–)

KCN (–)

$FeCl_3$ (+) GOOD BLUE STAIN

HCl (+) DARK STAIN

HNO_3 (+) BLACK STAIN.

Aqua regia

Microchemical tests —

Grain size

Mineral or Group GALENA

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

Interpretation of textures.

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . .

Polish GOOD.

Colour BRIGHT YELLOW.

Hardness B.

Streak —

Texture MASSIVE BLEBS & SMALL STRINGER.

Anisotropism.

Pleochroism -

Twinning ?

Internal reflection -

Texture under xd. nicols -

Cleavage —

Association ZnS., PbS. QUTZ.

Etch tests.

$HgCl_2$? ⊝

KOH ⊝

KCN BROWN - ROUGH SURFACE

$FeCl_3$ ⊝

HCl ⊝

HNO_3 ⊝

Aqua regia ? very very slight.

Microchemical tests Au

Grain size

Mineral or Group NATIVE Au.

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

Interpretation of textures.

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . .

Polish poor - pitted

Colour lt brass yellow. > chalcopyrite

Hardness HARD

Streak —

Texture Crystalline subhedral.

Anisotropism ISOTROPIC

Pleochroism —

Twinning —

Internal reflection —

Texture under xd. nicols —

Cleavage —

Association [illegible], Pb.S, Au. cobalt

Etch tests -

$HgCl_2$ ⊖

KOH ⊖

KCN ⊖

$FeCl_3$ ⊖

HCl ⊖

HNO_3 ? perhaps slight.

Aqua regia ⊖

Microchemical tests

Grain size

Mineral or Group PYRITE

Confirmatory features such as magnetism, sectility, fluorescence,

blowpiping, radioactivity, etc. . . . .

Interpretation of textures. Cut by Au. & arsenopyrite

Au into [illegible].

MINERALOGRAPHIC LABORATORY

Date

Name or number of section . . . .

Polish FAIR.

Colour DARK GREY

Hardness B.

Streak DARK

Texture MASSIVE

Anisotropism ISOTROPIC.

Pleochroism —

Twinning —

Internal reflection —

Texture under xd. nicols —

Cleavage —

Association GALENA, SPHALERITE.

Etch tests.

$HgCl_2$ ⊖

KOH ⊖

KCN ⊖

$FeCl_3$ ⊖

HCl ⊖? reacted but very little if any.

HNO_3 ⊖

Aqua regia ⊖

Microchemical tests

Grain size

Mineral or Group GANGUE

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

Interpretation of textures.

APPENDIX IV

Bibliography

1: B. C. Minister of Mines Report (1946).