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# "MINERALOGRAPHY OF THE ISLAND MOUNTAIN ORE"

by

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BIBLIOGRAPHY.

The general information contained in this report was obtained from the

GEOLOGY 9

# MINERALOGRAPHY OF THE ISLAND MOUNTAIN ORE

## INTRODUCTION

This report is the result of a microscopic examination of polished sections prepared from samples of high-grade ore from the Island Mountain Mine. The examination of the sections was conducted in the laboratory of the Geology Department of the University of British Columbia during the spring term of the 1939 - 1940 session.

## LOCATION.

The Island Mountain Mine is in the Barkerville gold belt on the north-west shore of Jack-of-Clubs Lake at the town of Wells, B. C. The mine is some 55 miles by the Quesnel-Barkerville Highway from Quesnel, the northern terminus of the Pacific Great Eastern Railway, and about 550 miles by the Cariboo Highway from Vancouver. The mine workings extend westwardly into Island Mountain, and the mill and campsite are directly above the lake shore.

## HISTORY.

The group of claims which now comprise the Island Mountain holdings were originally staked in 1896, but it was not until interest in lode mining in the Cariboo

was initiated in about 1930 that any active development took place. Soon after, the above holdings were acquired by the Newmont Mining Corporation and in 1933, the Island Mountain Mines Company was formed. Production started in 1934 at a rate of 50 tons per day, and since that time has increased to the present daily total of 150 tons.

GENERAL GEOLOGY.

The workings of the Island Mountain Mine lie mainly in the Rainbow member of the Richfield formation of the Cariboo series ("Summary of the Bed-rock Geology of the Cariboo District" -A. H. Lang, B. C. Miner, August - 1938)

The Rainbow member consists primarily of impure quartzites, argillites, and limestones, which reacted more favorably to fracturing than did the other rocks of the formation, thus providing the best host rock for veins.

The ore deposits are of two fundamentally different types - veins and replacements. The main veins, or "diagonals", strike N. E. 65 to 75 degrees and dip S. 80 to 90 degrees. These diagonals, though few in number, are generally persistent and of average grade. A less persistent but more numerous type is the branch vein which strikes roughly N. E. 45 degrees and dips S. E. 40 to 70 degrees. These veins, commonly known as "horse-tails", vary considerably in width after branching from

the parent fissure, but seldom extend any great distance laterally. Occasionally, in the quartz veins, there have been found small pockets of extremely high-grade, "steely" pyrite. The specimens examined for this report were samples of this high-grade material.

The second type of deposit is the pyrite replacement in limestone. The beds of white, crystalline limestone, which have been found to be the only type favorable to the replacement, vary in width from 1 to 30 feet and plunge westwardly at an angle of about 30 degrees. The replacement ore lenses, containing up to 95 percent pyrite, usually carry high gold values. An essential condition for the formation of the ore lenses is the presence of numerous fractures in the adjoining rocks, which were probably the means of access of the mineralizing solutions to the limestone beds.

## MINERALOGY

### A. Introduction

Six sections of the Island Mountain high-grade ore, already mounted and polished, were repolished and examined. In addition to the above, four super-polished sections of the same ore, prepared by Mr. W. Irish, were examined. The minerals were determined by microscopic examination using etch tests, and also by micro-chemical methods. A possible paragenesis of the minerals in the sections examined was worked out and has been offered

in this report.

B. Megascopic Examination.

In the hand specimens, the ore appeared to be massive, "steely" pyrite, with occasional fine stringers of quartz. The specimens, assaying between 11.8 and 12.8 ounces of gold per ton, consisted of at least 95 percent pyrite. Larger grains of pyrite were observed disseminated throughout the fine-grained material, being particularly plentiful in the vicinity of the quartz veinlets. No other minerals were observed.

C. Microscopic Examination.

The following minerals were determined in the sections by microscopic methods: pyrite, chalcopyrite, galena, quartz and gold.

The pyrite is the only metallic mineral that could be seen under ordinary magnifications, and, in every case, occupied by far the greatest part of the field. Quartz, also, was readily discernible. Chalcopyrite, galena and gold are extremely rare in occurrence, and could be seen only under high magnification.

1. Pyrite.

Pyrite is by far the most abundant metallic constituent of the ore, occurring in a massive and, less commonly, in a crystalline form. The massive pyrite appears well fractured, the fractures being healed and

cemented by quartz and occasionally by minute veinlets of galena and chalcopyrite. The crystalline pyrite occurs in and around the quartz. This last fact indicates that there was probably considerable over-lapping in the deposition of pyrite and quartz. It is possible that the massive pyrite, deposited first, was subjected to strain, causing fractures which were subsequently healed by an incoming solution depositing quartz and pyrite.

2. Quartz

Milky white quartz forms the only important gangue mineral in the sections studied. As described above, it occurs veining or cementing the fractured massive pyrite. The boundaries between the two are extremely irregular in outline.

3. Galena

Galena is a very minor constituent in the ore, occurring as minute particles filling small fractures in the pyrite. The presence of galena could not be determined in any of the hand-polished sections; it was necessary to revert to the super-polished sections and high magnification to make the determination. The mineral was characterized by its color and triangular cleavage pits(Plate VI.)

4. Chalcopyrite.

Chalcopyrite was observed in only one super-polished section, and then only under high magnification.

It occurred in contact with the galena, healing a fracture in pyrite, and the smooth boundary between the chalcopyrite and the galena suggested contemporaneous deposition.

5. Gold.

Particles of gold, finely divided and bright yellow in color, were observed in the sections. The distribution of the gold is erratic, although its mode of occurrence is characteristic, being typically associated with the massive pyrite as tiny veinlets and fracture-filling particles. The gold occurred only in the pyrite; none was observed occurring with the other metallic minerals or the quartz. It is interesting to note, however, that wherever galena occurred, a higher concentration of the fine gold particles was observed, indicating the possibility that the occurrence of galena favors the presence of gold.

D. Paragenesis.

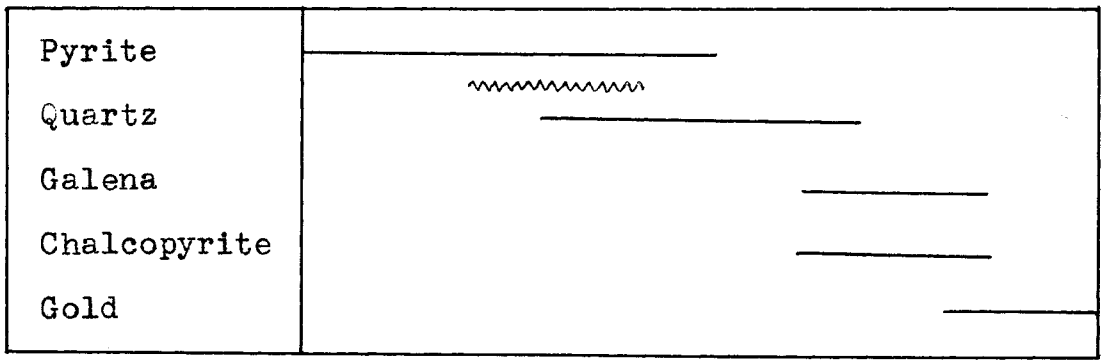
From the observations as recorded in the foregoing description of the minerals, the following paragenesis is suggested:

1. Pyrite

Period of fracturing.

2. Pyrite and quartz
3. Galena and chalcopyrite
4. Gold

Diagram of Paragenesis.




## SUMMARY AND CONCLUSIONS

1. The ore consists chiefly of massive, well-fractured pyrite, the fractures of which have been filled with quartz and very small amounts of galena, chalcopyrite and gold
2. The gold, which is in the native state, is extremely finely divided and lies in fractures in the massive pyrite.
3. Some of the gold may be associated with the galena, since the concentration of gold particles in the vicinity of galena appears higher.

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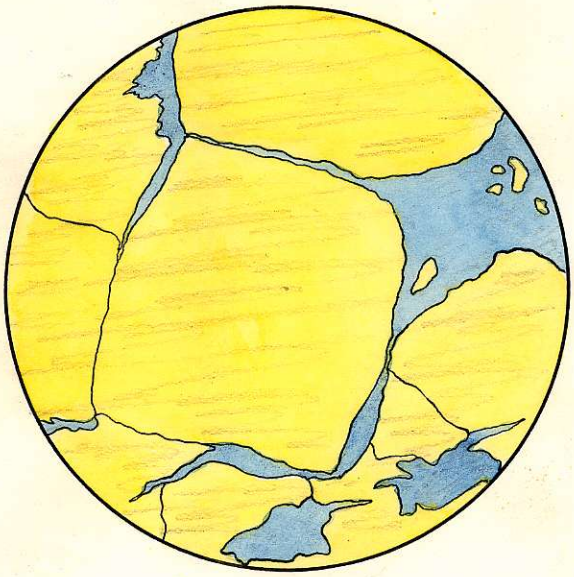
PLATE I



Pyrite

Quartz

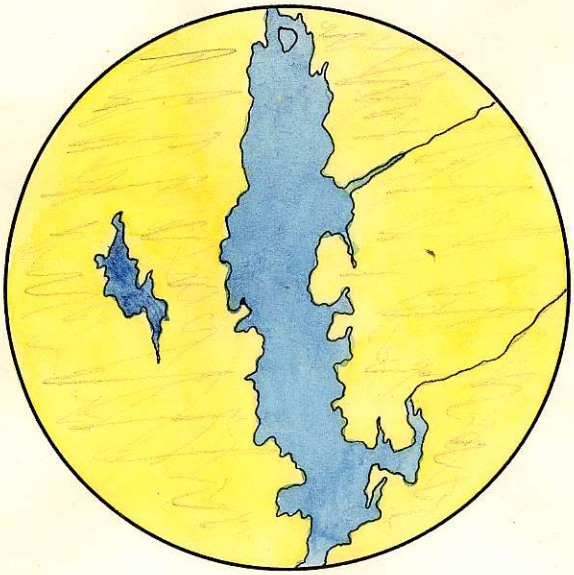
Magnification

x 33

Quartz veining and healing fractures in pyrite.

(Section No. 2)

PLATE II.



Pyrite

Quartz

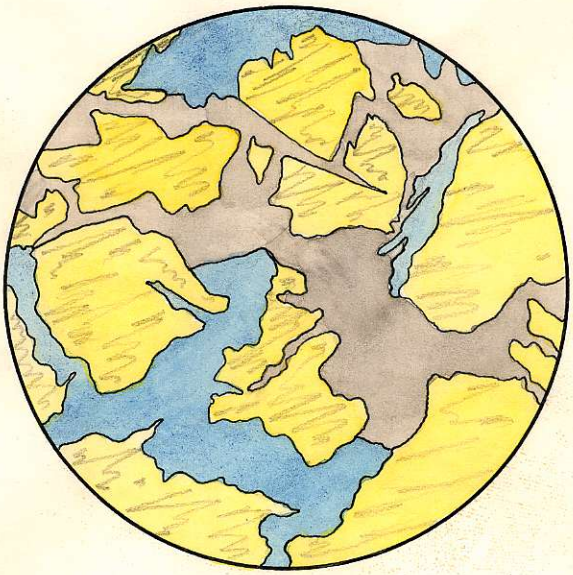
Magnification

x 33

Quartz veining the pyrite.

(Section No. 4)

PLATE III.



Pyrite

Quartz

Galena

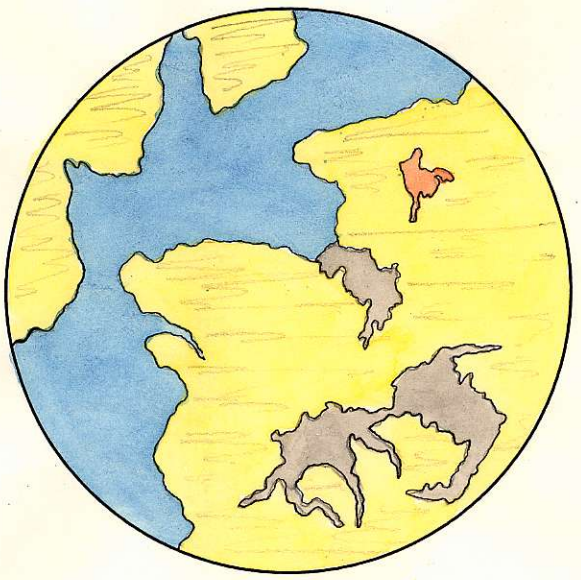
Magnification

x 450

Galena and quartz filling minute fractures in the massive pyrite.

(Section No. 2 - W. Irish)

PLATE IV.



Pyrite

Quartz

Galena

Gold

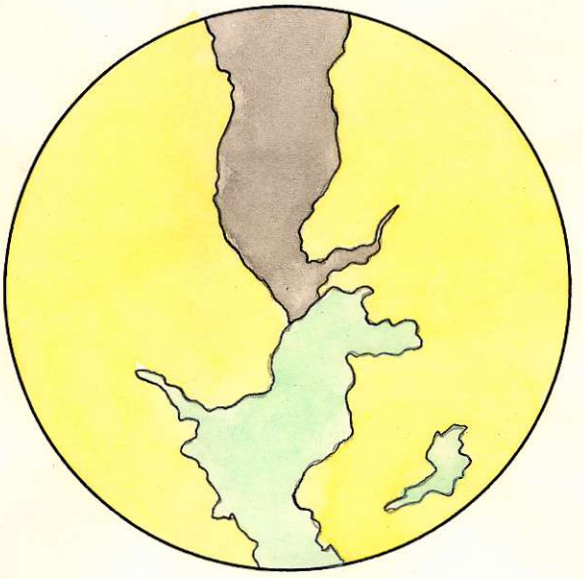
Magnification

x 360

Gold occurring in the massive pyrite in the vicinity of galena.

(Section No 4 - W. Irish)

PLATE V.



Pyrite

Galena

Chalcopyrite

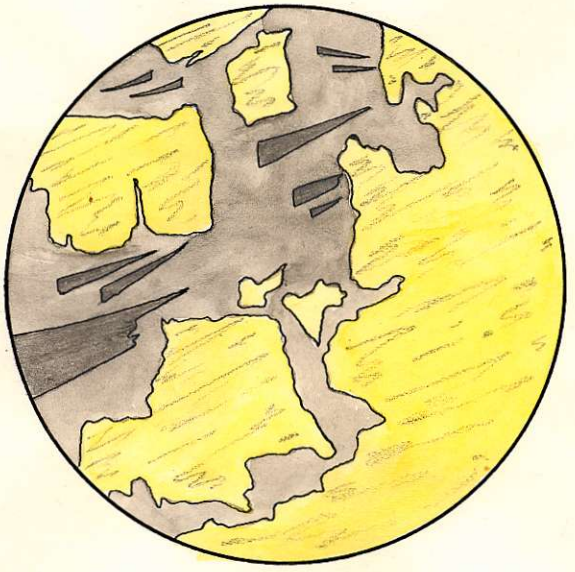
Magnification

x 360

Chalcopyrite occurring in contact with galena, healing a fracture in pyrite.

(Section No. 4 - W. Irish)

PLATE VI.



Pyrite

Galena

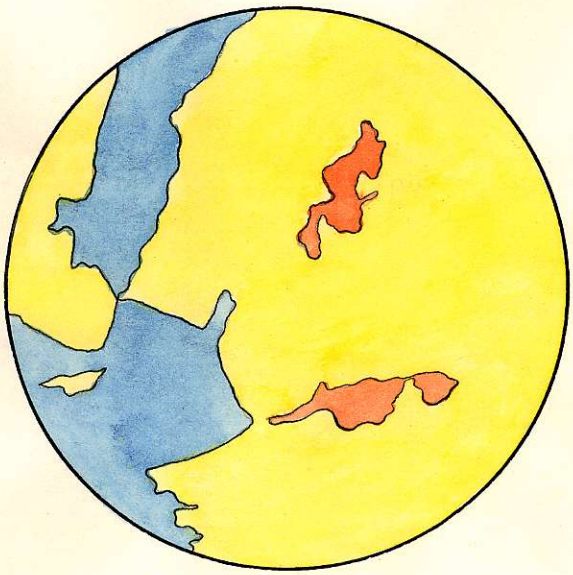
Magnification

x 360

Fractured pyrite which has been healed and cemented by galena. The cleavage pits in the latter are readily discernible.

(Section No. 2- W. Irish)

PLATE VII.



Pyrite

Quartz

Gold

Magnification

x 450

Small gold particles lying in fractures in the massive pyrite.

(Section No. 2)