METALLOGRAPHY OF HAZELTON SUB-DIVISION

BY

K.A.CRUISE.

FACULTY OF APPLIED SCIENCE

THE UNIVERSITY OF BRITISH COLUMBIA

APRIL, 1931.

TABLE OF CONTENTS

HAZELTON SUB-DIVISION

1. INTRODUCTION.

The Hazelton sub-district of the Omineca mining division has an area of approximately 225 square miles, and is situated 130 miles northeast of Prince Rupert. It is in the northwest quadrant of the area.

The C.N.R. railway gives good shipping facilities from the various properties as it practically bisects the district in making a right angle bend around the Rocher Deboule Mountains. The Skeena and Bulkley valleys' main trunk wagon roads connect the different mining groups with the railway.

11. GENERAL GEOLOGY

The Hazelton sub-district lies to the East of the Coast Range and is a continuation of the Interior Plateau of Southern British Columbia. There are isolated groups of hills and mountains of various altitudes, some of which are subdued in type, others are extremely rugged. These groups are separated by broad valleys in which erosion is rapidly carried on by swift streams.

The main valleys have all been eroded in rocks much softer than those which form the hills. The cores of the hills are igneous rocks in small stocks and these have metamorphosed and hardened the surrounding rocks forming resistant areas in a generally soft country. There is a striking contrast between the broad valleys of the Skeena and Bulkley Rivers and the rugged nature of the Rocher Deboule Mountains. This contrast is accentuated by glaciation, minor irregularities being filled with debris from tuncated spurs and ridges. The glaciers attained an elevation of over 5500 ft. and created, or accentuated, a subdued topography up to that altitude. More recent glaciation has produced a serrated topography above the main glaciation and many small glaciers are still in existance. The granodiorite of the Rocher Deboule group well illustrates this type of topography.

Finely stratified muds and sands have been redeposited as a result of the reworking of boulder clays by the rivers.

Glacial striae have been found on the west side of Glen Mt. in three sets - one N13°E, one N21°E and an older set N 6°E overridden by the other two. On Ninemile Mt., towards the west side, the striae are N 31°E, and the movement north to south. In most places the hills are covered with vegetation, or are weathered to such an extent that no striae are to be seen.

The Bulkley and Skeena Rivers and their numerous tributaries drain the entire district. The Bulkley flows through several miles of canyon above Hazelton and is capable of furnishing power for the whole district. Many other streams are also potential power sources.

The bedded rocks of the Hazelton district are of the

Hazelton series, described by Leach[1] from the Telkwa district and extending north into the Groundhog[2] area.

Flows of course tuffs or tuff-agglomerates extend across the southern part of the Rocher Deboule mountains. The series is rather evenly bedded north of the central part of the group. Very distinct banding of tuffaceous material occurs.

Fossils found in exposed beds of the Bulkley River canyon seem to indicate that these rocks are of Jurassic or lower Cretaceous times. A horizon on Ninemile Mt., near the northern edge of the sheet contains an abundance of marine fauna, mostly pelecypods. Dr. T. W. Stanton (U. S. Geol. Surv.) says that the age of this series is "most probably upper Jurassic."

Folding in these rocks, as indicated in the Bulkley River canyon, took place with axes approximately north-east--south-west. Small stocks forming the cores of Ninemile, Fourmile and Rocher Deboule mountains came in after the folding. Dykes which followed, cutting both the mountains and the valleys, made little deflection in the bedded deposits.

1. Can. Geol. Survey, Sum. Rept., 1919, page 91.
2. " " " " " 1912, page 76.

111. ECONOMIC GEOLOGY:

The Bulkley River divides the district into two parts. The Southern, or Rocher Deboule division is characterized by deposits of chalcopyrite carrying some gold and silver. The Northern area which includes Ninemile, Fourmile and Glen Mountains, is characterized by silver-lead deposits.

The Rocher Deboule mine is the only large producer in the southern area, but development is being carried on at Delta, Hazelton View, and Golden Wonder properties. Milling facilities are needed for economical mining of the low grade ore.

Chalcopyrite carrying small values in silver and gold is the principal mineral in all these properties except Hazelton View. This prospect contains practically no chalcopyrite and gold. The Black Prince property in the southern area shows considerable amounts of wolframite.

The Silver Standard (Glen Mt.) and the American Boy (Ninemile Mt.) have been large producers in the silver-lead group of the Northern district. In both these properties the ore is in fissure veins in tuffaceous sediments, and neither property is close to the contact of a igneous intrusion. The veins contain sphalerite, galena and tetrahedrite in siliceous gangue. The silver value in the ore is high, the tetrahedrite carrying at some places as much as 2000 oz. to the ton.

In 1929 the Mohawk was producing a silver-lead-zinc ore, and the Silver Cup, silver-lead-gold values.

The ore in all of these properties occurs in distinct shoots because the high grade material is associated with so much low grade milling is usually required. The Silver Standard ran a custom mill to treat ore from the American Boy in 1919, and The Silver Cup started milling operations in 1929.

The Mohawk and the Silver Cup are close to the contacts of the ingenous stocks of Fourmile and Ninemile mountains. Here the deposits contain jamesonite in addition to silver, lead and zinc. Many strong veins, carrying high silver values are found on Ninemile mountain.

lV. MINERALOGY

Arsenopyrite:

This mineral occurs in the shattered zones of Hazelton formation shales as shown in Fig.l. Also Fig.lV shows arsenopyrite in an "island" surrounded by tetrahedrite. This shows that tetrahedrite came in later than arsenopyrite.

Pyrite:

Massive pyrite has been shattered and partly replaced by quartz as shown in Fig.11. Fig.111 shows pyrite replaced by galena.

Chalcopyrite:

Stringers of chalcopyrite are found in fissures in arsenopyrite. This is shown in Fig.1V which also shows the chalcopyrite cut off by tetrahedrite. The order of mineralization here is arsenopyrite followed by chalcopyrite and then by tetrahedrite.

Tetrahedrite:

The relations of this mineral have been discussed above. It occurs massive, surrounding "islands" of quartz and arsenopyrite as shown in Fig.1V.

Sphalerite:

Found in small quantities disseminated and evidently replaced by galena. This is shown in Fig.111 which illustrates the replacements of pyrite, sphalerite and hornblende by galena.

Galena:

Galena has been discussed above, under sphalerite. See Fig.111. It occurs, coarsely crystalline, in quartz gangue in one specimen. Fig.V shows galena filling fissures in quartz.

V. GENESIS.

The igneous intrusives of this district, granodiorite stocks, were responsible for the mineralization. Mineral-containing solutions from these, deposited ore in true-fissure-replacement or shear-zone-replacement types of veins.

J. J. O'Neill[1] reports two separate periods of mineralization in some of the ores of this district but no evidence of this was found in any specimens examined.

1. J.J. O'Neill Memoir 110. G.S.C.,1919, p.14.

Vl. SUMMARY AND CONCLUSIONS:

1. The ore is found close to the granodiorite-tuff contacts.
2. The ore is found in veins of the true-fissure-replacement and shear-zone-replacement types.
3. There were two periods of mineralization in some of the ore deposits.
4. The approximate order of deposition of the metallic minerals is as follows:

    a. Arsenopyrite
    b. Pyrite
    c. Chalcopyrite
    d. Sphalerite) may be reversed.
    e. Tetrahedrite)
    f. Galena

Most of the specimens from this district were highly weathered. Polished specimens were made of seven sections. These did not give really sufficient evidence to make a very complete report.

Fig 1

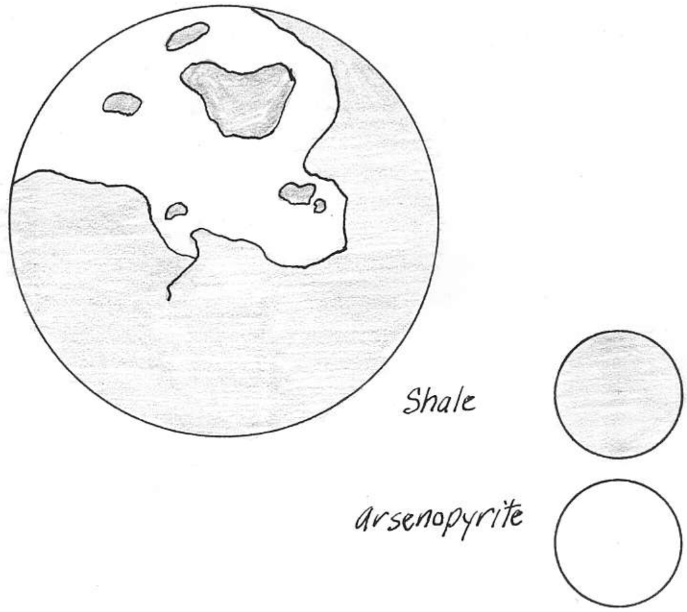

Fig. 2.

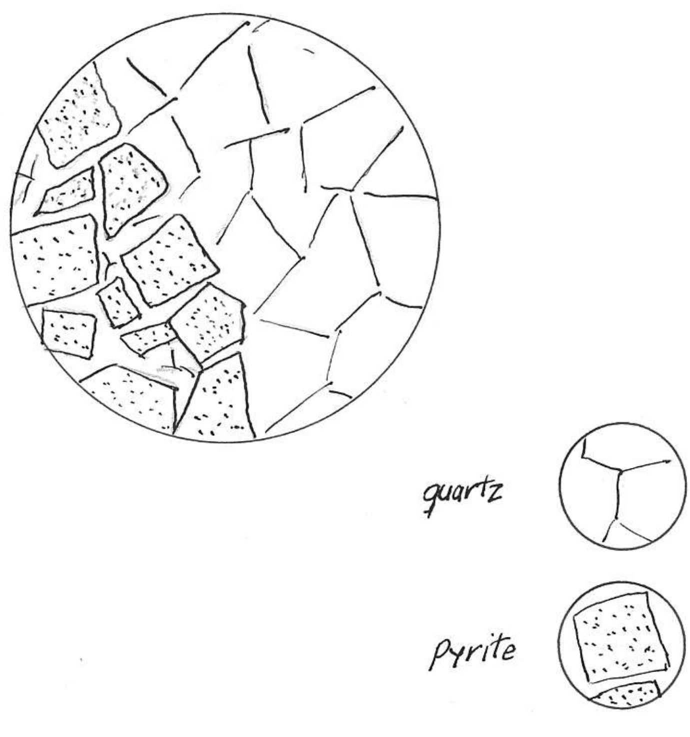

Fig. 3.

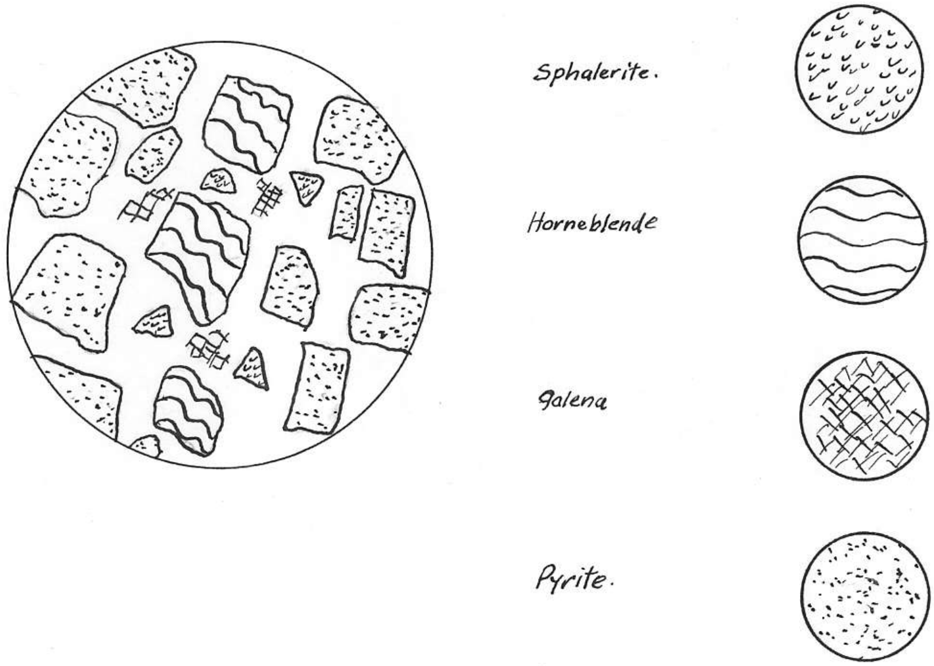
Sphalerite.
Horneblende
Galena
Pyrite.

Fig 4.

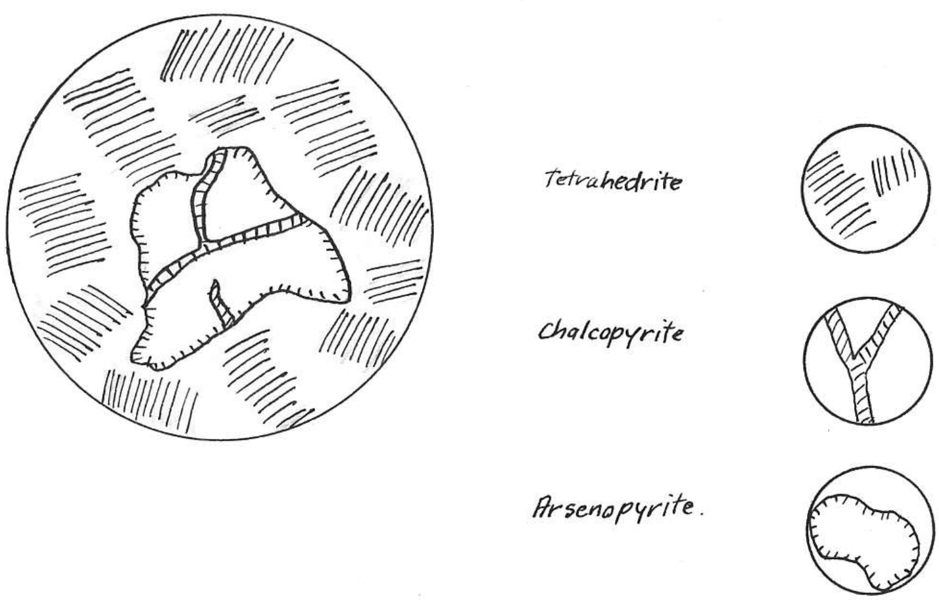
Tetrahedrite
Chalcopyrite
Arsenopyrite.

FIG 5.