Geology 9

Mineralogy of the Buccaneer Gold Ore

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Introduction

This report is the result of a microscopic examination of polished sections prepared from samples of gold ore from the Buccaneer mine, Vancouver Island. The examination of the sections was conducted in the laboratory of the University of British Columbia during the spring term of the 1941-42 session.

Location

The Buccaneer property is in the Bedwell (Bear) River area, on the west coast of Vancouver island, 120 miles due west of Vancouver.

Access to the property is by boat, trail or airplane. Steamer may be taken from Alberni to Tofina, the latter at the foot of Bedwell Sound; then twenty miles by launch to the head of the sound; and finally six miles by car. The trail route, from Central lake, near Alberni, to the property, a distance of approximately forty miles, is not an advisable one to take.

History

The earliest mining activity in the Bedwell River area took place in 1860, in the form of a minor placer gold rush. From 1860 to 1933 mining was carried on intermittently, with only moderate success.

In 1938, the Buccaneer and adjoining Musketeer group of claims were independently located by two prospectors. As a result of these discoveries, hundreds of claims were staked, the two above named properties being the most important.

Development of these two properties was carried on with encouraging results, and in 1941 both properties went into production.

The ores examined in this report are from the Buccaneer group only.

General Geology

The area is situated close to the Bedwell River batholith which is the nearest igneous source. The intrusive rocks of the area are of granitic type and related to the Jurassic Coast Range granitic batholith. Volcanics and sedimentaries are also present but in the Musketeer-Buccaneer area the intrusive rocks predominate.

Economic Geology

The ore at Buccaneer occurs in quartz veins which are present in fractured andesitic dykes, the dykes cutting the quartz-diorite country rock. The ore also follows the contact between the dykes and the quartz-diorite. The dykes are usually from two to ten feet wide.

The main structural control has been a uniform pre-mineral fracture pattern. This pattern consists of three sets of fractures - two sets of shears and one set of tension fractures. Some of the vein matter (quartz) is ribboned by closely-spaced fractures parallel with the walls.

Pre-mineral block faulting has developed sections of the tension fractures to the point where they became reasonably wide, open, clean-cut fissures suitable for the later deposition of ore.

Five veins have been uncovered on the property, each parallel to the other, striking N 25° E and dipping almost vertical. The veins are quite lenticular, varying from 1" to 36", the average being about 12".

The ore shoots are small in size. Their vertical range is unknown, but at present, where operations have reached a depth of 300 feet, the ore is still of a fair grade, mill heads running a little over one ounce of gold per ton.

The importance of the ore shoots is due to the fact that they are reasonably close together in the same fissures, and also due to the closely spaced parallel system of veins.

Mineralogy

Introduction

Eight sections of Buccaneer ore were mounted and polished. The minerals were determined by microscopic examination using etch tests and also micro-chemical methods. A possible paragenesis of the minerals in the sections was worked out and has been offered in this report.

Megascopic Examination

The specimens used in this report were taken from one of the veins about 50 feet below the surface. In these specimens, the ore consists chiefly of milky quartz with scatterings of the primary sulphides, chalcopyrite, pyrite, galena, and sphalerite, and a small amount of visible gold. There is also some secondary alteration, malachite from chalcopyrite.

As ascertained from the hand specimens it would seem as if locally the sulphides constitute several per cent of parts of the vein, but the average sulphide content would probably be a fraction of one per cent.

The quartz is often well crystallized, showing individual rhombohedral crystals. Where the quartz is massive, the ribboned structure is seen. The ribbon fractures in the quartz and the individual crystal outlines are seen with the naked eye in the polished sections.

Microscopic Examination

The following minerals were determined in the sections: quartz, chalcopyrite, pyrite, sphalerite, galena, malachite, and free gold. All the minerals, including the gold, could be seen under low magnification.

Quartz

White quartz is the most important gangue mineral. The quartz is highly fractured and forms a ribboned structure, these "ribbons" often branching. These fractures are well mineralized, as are the spaces between the individual quartz crystals.

Pyrite

Pyrite is seen in only one of the sections. The grains vary in size from 2 mm. to 0.2 mm. They are highly shattered, the fractures being filled with sphalerite. The pyrite is also replaced by sphalerite.

Apparently the pyrite was introduced slightly later than the quartz, or possibly contemporaneous deposition of the two minerals. Later, movements fractured both the minerals.

Sphalerite

Massive sphalerite is the most numerous of the sulphides. It occurs alone in the quartz fractures and in the openings between the quartz crystals. It also fills the pyrite fractures and replaces the pyrite. Where sphalerite and chalcopyrite occur together, the sphalerite surrounds the chalcopyrite.

Apparently the sphalerite was injected slightly earlier than the chalcopyrite.

The sphalerite rims most of the minerals. The contact between the sphalerite and the other minerals is sharp and well-defined.

<u>Chalcopyrite</u>

Chalcopyrite occurs as irregularly shaped grains, averaging approximately 1 mm. in size. Originally there was a fair amount of chalcopyrite but most of it has been altered to malachite.

<u>Galena</u>

Galena is rare in the sections. It occurs as small blobs in the quartz fissures. The galena and gold, unlike the rest of the minerals in the sections, are not rimmed by sphalerite. This could suggest that the galena and gold are later than the sphalerite but their exact position in the paragenesis is not known.

<u>Gold</u>

Free gold occurs in between the small quartz crystals. The grains vary in size from 30 microns to 300 microns, the average being about 60 microns.

No gold was found in or around the sulphides, although in one section a small blob of galena was found close to the gold particles. The larger gold particles are close together, the small particles seen under medium magnification (x 60) are scattered irregularly throughout the quartz.

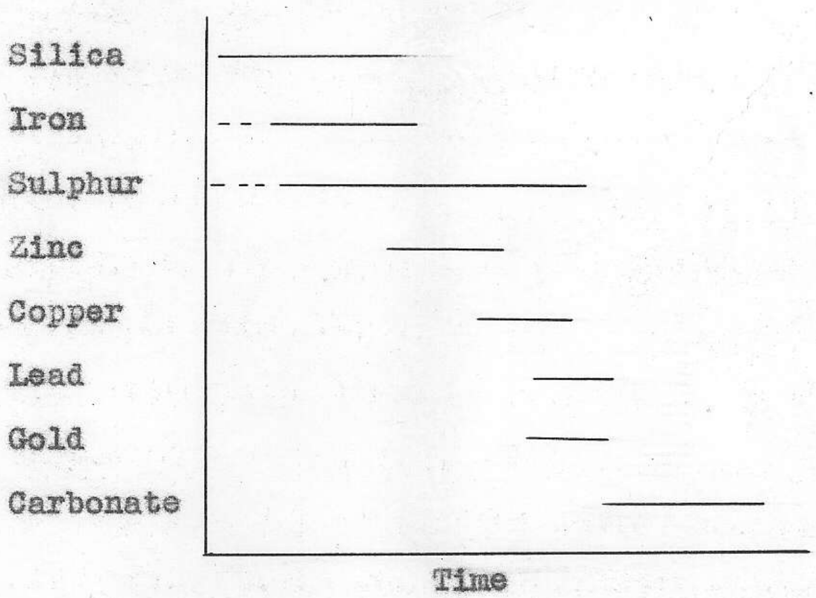
Malachite

Malachite is secondary from chalcopyrite, in most places it entirely replaces the copper. It is usually massive but it also occurs as groups of short, thin, radiating crystals.

Paragenesis

From observations as recorded on the foregoing description of the minerals, the following paragenesis is suggested.

Diagram of Paragenesis



Conclusions

As determined from the sections it would seem as if the quantity and type of sulphides present are not indicative of the gold content.

Since the gold in the quartz is free, it can be easily recovered. As determined in the sections the average size of the gold particles is about 60 - 70 microns (200 mesh). For recovering gold of this size, amalgamation could be used. Since chalcopyrite is fairly abundant, it may cause an increase in cyanide consumption if cyanidation were used.

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