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GEOLOGY 409

MINERALOGRAPHY REPORT

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THE GREY ROCK DEPOSIT

The Grey Rock property is located in the Lillooet District at the head of Truax Creek, a tributary of the Bridge River. The property consists of 20 claims lying between elevations 6000 and 8000 feet.

The main rock types outcropping in the area are the Fergusson series and the Bendor batholith. The Fergusson series is a complex assemblage of folded and metamorphosed sediments and volcanic flows. The chief sedimentary member is a much contorted bluish-grey chert which grades into a cherty quartzite. Interbedded with the chert is argillite which is thin-bedded, highly siliceous and commonly schistose. Numerous lenses of siliceous limestone occur throughout the series. The volcanic rocks in the series are black, dense, altered basalt with pronounced pillow structure in places.

Intruding the Fergusson series is the Bendor quartz diorite which occurs as dikes in the series and as a batholith located about 1500 to 2000 feet south of the property.

The Grey Rock deposits occur in a system of roughly parallel fissure veins which cut both the Fergusson series and the dikes in them. The vein system strikes north 70° east and dips 50 to 65° southeast. The width varies from a fraction of an inch to 4 feet wide.

The main gangue mineral is quartz with some brecciated fragments of country rock. Stibnite occurs disseminated and massive throughout the veins and in some places comprises 20 to 30% of the vein material. Smaller amounts of pyrite, tetrahedrite, sphalerite, galena, and arsenopyrite are present. In places realgar is abundant. Samples from the deposit have assayed as much as 82.8 oz./ton Ag, 0.06 oz./ton Au, 14.1% Sb, 6% Pb, 8% Zn and 0.5% Cu.

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Megascope Examination

The minerals identified in the hand specimens are stibnite, realgar, galena, pyrite, tetrahedrite and sphalerite in a gangue of quartz and siliceous brecciated fragments.

Stibnite occurs as dark-grey crystalline masses of striated columnar blades up to about 1 inch wide and 3 inches long. It was found associated only with the quartz.

The realgar is bright reddish-orange and massive. It is found in fractures and around breccia fragments. Some orpiment occurs with the realgar but in an earthy form. It is probably an alteration product of the realgar.

Pyrite, galena, sphalerite, tetrahedrite and quartz are associated. The pyrite occurs as coarsely crystalline masses and where pyrite is exposed in cavities well-formed crystals are present. The crystal diameter goes up to 1 cm. Pyrite comprises about 25% of the samples.

The sphalerite is brownish-green in colour and occurs as cleavage masses. Sphalerite comprises about 15% of the samples.

The galena also occurs as coarse cleavage masses, the grain size averages about 0.5 cm. Galena comprises about 25% of the samples.

Tetrahedrite occurs massive and as well-formed crystals in cavities. It comprises about 15% of the samples.

Microscopic Examination

Examination of the polished sections reveals the following minerals in order of decreasing abundance.

Stibnite
 Realgar
 Pyrite
 Galena
 Quartz
 Sphalerite
 Tetrahedrite
 Arsenic
 Chalcopyrite
 Pyrrhotite
 Bournonite

Relative percentages are difficult to obtain because either the stibnite or the realgar do not occur with any other sulfides.

Pyrite (FeS_2): occurs as large partially corroded crystals (1 cm. in dia.). Associated mainly with the galena, sphalerite, tetrahedrite and quartz. Some pyrite occurs associated with the realgar.

Galena (PbS): occurs massive and coarsely crystalline.

Sphalerite (ZnS): occurs massive with exsolution blebs of chalcopyrite and pyrrhotite. Some sphalerite occurs in reaction rims with bournonite between galena and tetrahedrite.

Tetrahedrite ($\text{Cu}_{12}\text{Sb,As}_4\text{S}_{13}$): occurs massive

Chalcopyrite (CuFeS_2): occurs mainly as exsolution blebs in sphalerite (emulsion texture). This indicates a minimum temperature of deposition of 350 to 400° C. Some later chalcopyrite was observed cutting the tetrahedrite. This may be a result of migration of the exsolution chalcopyrite.

Pyrrhotite (Fe_{1-x}S): occurs as exsolution blebs in sphalerite (emulsion texture). This indicates a minimum temperature of formation of 138 to 894° C.

Bournonite (CuPbSbS_3): occurs as a reaction rim between galena and tetrahedrite. Not enough bournonite was found to run a complete series of microchemical tests but a sample was found to react positive with aqua regia. Other properties: Color - lighter than tetrahedrite and darker than galena. The boundaries are therefore quite difficult to see. Moderately anisotropic.

Stibnite (Sb_2S_3): occurs as highly anisotropic masses associated only with quartz.

Realgar (AsS): occurs as fracture fillings in siliceous material.

Arsenic (As): occurs as small blebs in the quartz and realgar.

Quartz (SiO_2): is the main gangue mineral. It occurs massive and as partially corroded crystals.

From the exsolution textures and the minerals present, the deposit was probably formed in stages from about 500 to 200° C. Therefore the Grey Rock deposit may be classified a mesothermal.

PARAGENESIS

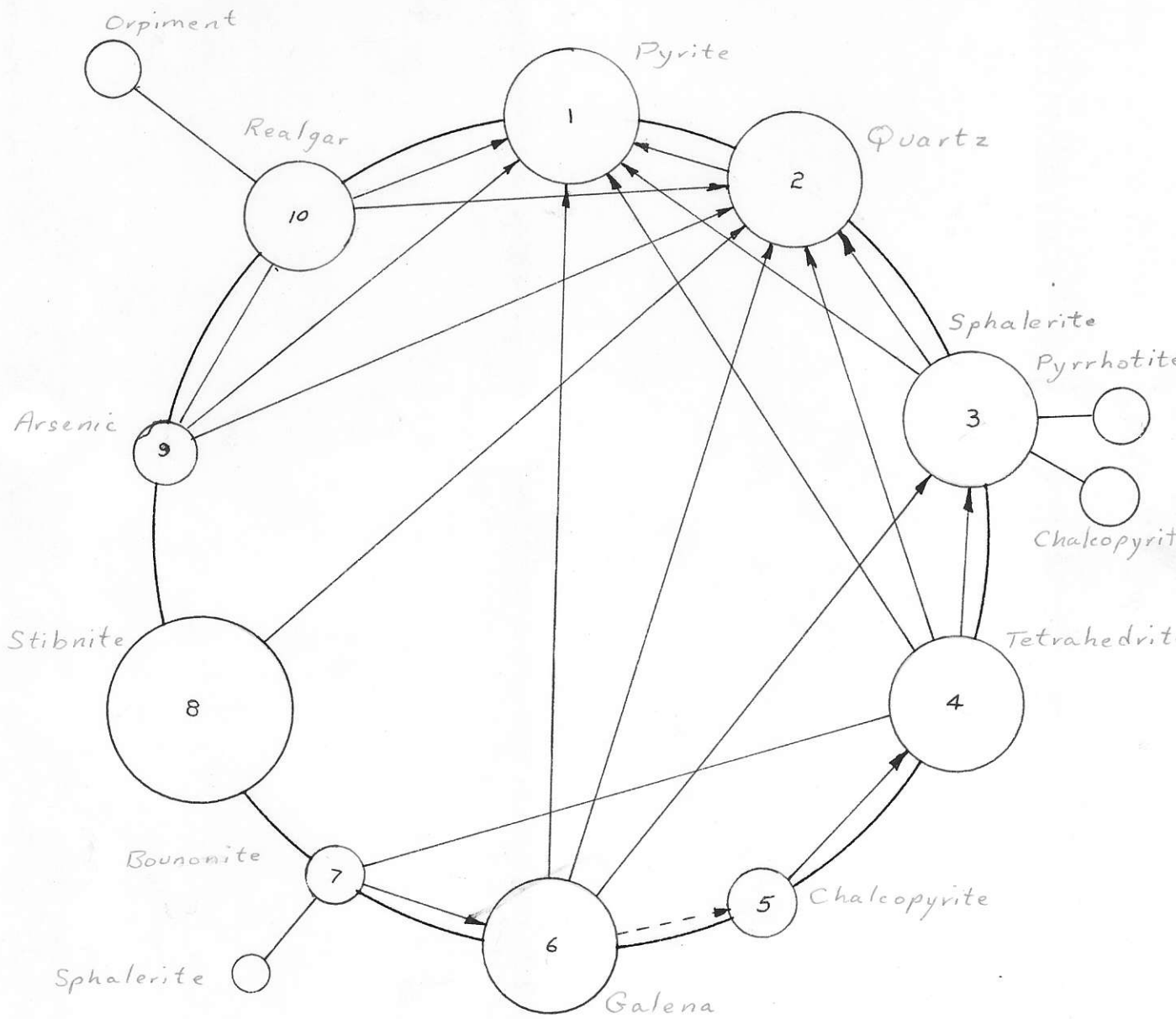
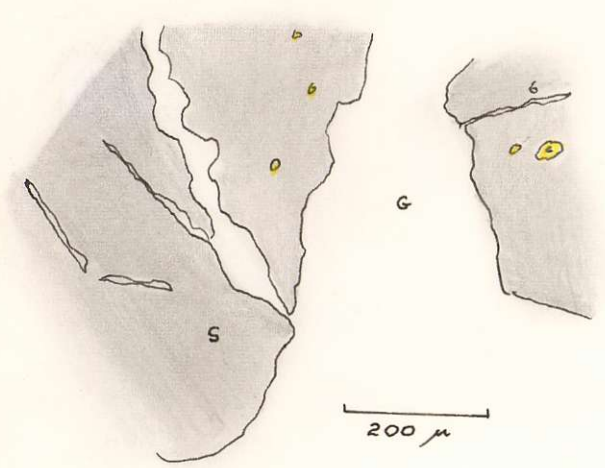


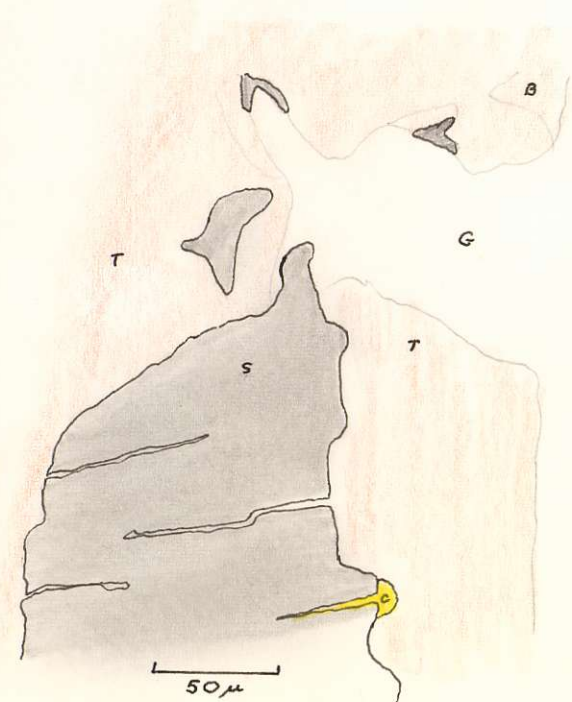
Diagram shows emulsion texture of chalcopyrite (C) and pyrrhotite (P) in sphalerite (S).

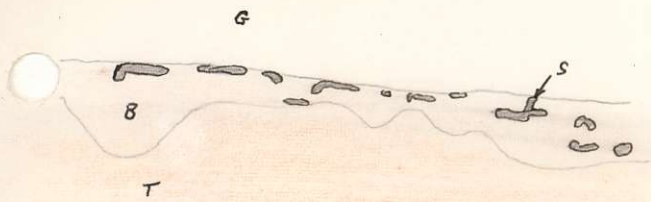


Shows galena (G) replacing sphalerite (S). Some exsolution blebs of chalcopyrite (C) are visible.



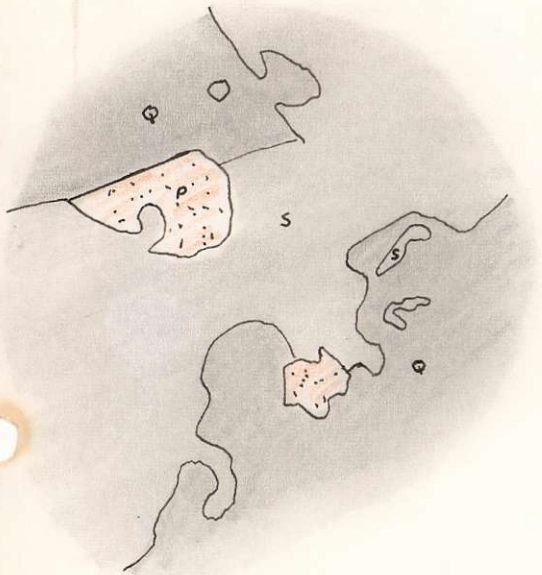
Shows tetrahedrite (T) replacing sphalerite (S) and galena (G) replacing tetrahedrite. Bournonite occurs at the galena-tetrahedrite contact.





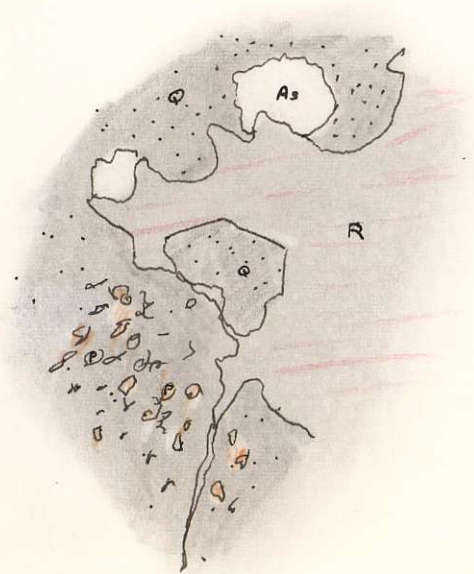
Shows a reaction rim of bournonite (B) and sphalerite (S) formed at the contact between tetrahedrite (T) and galena (G).

50 μ



Shows sphalerite (S) replacing quartz (Q) and pyrite (P).

200 μ



Shows realgar (R) replacing arsenic (As), quartz (Q) and pyrite (P).

200 μ