



Lode Gold Types at the Cariboo Gold Mining District, British Columbia, Canada, in the Eastern Circum-Pacific Volcanic-Metallogenic Belt

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Abstracts: The Cariboo gold mining district is situated within the Quesnel Highlands on the eastern edge of the Interior Plateau in central British Columbia, Canada of the Eastern Circum-Pacific Volcanic-Metallogenic Belt. Recorded gold production from the area totals more than 4.0 million ounces, including an estimated 2.7 million ounces from placer mining from 101 creeks and 1.3 million ounces from lode mining.

The Quesnel Highlands are the remnants of rolling plateau formed initially from bedrocks lain down as the ancient North American Plate moved westwards colliding with offshore seabed and island groups. The bedrocks were then overlain by lava flows emanating from Chilcotin volcanoes that filled the lowlands between the Coast and northern Rocky Mountains (Cariboo Mountains).

The Cariboo mining district within the Southern Cordillera region is situated within the Cariboo Gold Belt, a world-class producer of gold that has had a history of mining dating from the Cariboo Gold Rush in the 1860's. The district encompasses (from northwest to southeast) the former producing Hardscrabble W-Au Mine, Mosquito Creek, Aurum, Island Mountain, Cariboo Gold Quartz, Bonanza Ledge, QR, Cariboo Thompson, and Cariboo Hudson Gold Mines.

The district lies within several Terranes of the Omineca Belt of the Canadian Cordillera. The Terranes consists of lower grade metamorphic green schist facies of the late Proterozoic and/or Paleozoic sequence of continental shelf and slope deposits developed adjacent to the craton of Ancestral North America, and includes clastic sedimentary rocks along with lesser amounts of volcanic rocks and carbonates.

Stratigraphic position, host rock lithologies and proximity to north-striking fault zones are important guides to different styles of gold mineralization recognized in the district. The mineralization is probably stratabound, in that each style is confined for the most part to a particular section of the local stratigraphy. Historical production has been from mesothermal pyrite-bearing quartz vein systems that cut turbiditic rocks, and from semi-massive to massive pyrite replacement type bodies that occur in carbonate-rich rocks structurally higher but stratigraphically lower in the sequence.

The area is underlain by a northwest striking, moderately northeast dipping sequence of rocks on the steep, overturned limb of a southwest-verging antiform, which, in turn, is on the northeast flank of the Island Mountain anticlinorium. The area is

underlain by the Baker, Rainbow, BC, Lowhee and Basal Units. The Baker and upper Rainbow Units are part of the Downey Succession and the lower Rainbow, BC, Lowhee and Basal Units, comprise part of the Hardscrabble Mountain Succession.

Structures developed in the district include at least three phases of deformation and folding. Faults and shear zones developed in the area are of several generations and orientations including north trending faults and strike faults.

There are five principal types of lode gold deposits in the district; namely, auriferous pyrite replacement, pyrite-quartz vein/veinlet lode gold, basalt-hosted auriferous pyrrhotite-pyrite lode gold, and associated gold in porphyry copper styles (Table 1).

Based on orientation, four types of quartz veins were recognized in the district; namely, transverse (orthogonal) veins, describing the orientation of vein set with respect to compositional layering of strata, typically striking NE at 30°–40° with sub-vertical to steep southeast dips; diagonal (oblique) veins, typically striking north 70°–90° east, vertical or north/south dipping; strike veins, the earliest of the veins, striking parallel to northwest trending bedding and parallel/subparallel to S2 foliation, and dipping 45°–70° to the northeast, generally more steeply than bedding; northerly veins, striking NNE and occurring within faults. Transverse and diagonal veins together were called “B veins”, while strike veins called “A veins”.

Table 1 Lode gold types in the Cariboo gold mining district

Lode Gold Types	Subtypes	Example Gold Deposits
auriferous pyrite replacement	Limestone hosted	Mosquito Creek, Aurum, Island and Cow Mountains
	Clastic rock hosted	Bonanza Ledge on Barkerville Mountain
basalt-hosted gold-bearing pyrrhotite-pyrite lode gold	N/A	QR gold deposit
auriferous pyrite-quartz vein/veinlet lode gold	Strike quartz vein	BC Vein on Barkerville & Cow Mountains
	Diagonal quartz vein	Hardscrabble W-Au Mine, Island, Cow and Barkerville Mountains
	Orthogonal quartz vein	Island, Cow and Barkerville Mountains;
	quartz veinlet	Cariboo Thompson & Cariboo Hudson Gold Mines
associated gold in porphyry copper	N/A	Island, Cow and Barkerville Mountains
		Mount Polly porphyry copper

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In Island Mountain, the diagonal veins are regularly spaced at intervals of approximately 30 m. The diagonal and orthogonal veins are the most important types for vein-hosted gold mineralization. Both orthogonal and diagonal veins were mined in Cow Mountain, but diagonal veins only were mined at Island Mountain.

Individual veins are arranged en echelon due to minor displacements across cleavages and flat faults in less competent beds and showed better continuity down dip than along strike. Stopes developed on the quartz veins averaged 0.9 - 1.8 m in width, 30-38 m in length and about 30 m on the dip of the veins (Hall).

The gold-bearing pyrite-quartz veins typically occur in siliceous turbiditic rocks of the Rainbow Unit generally within 100 m of its contact with the structurally overlying but stratigraphically lower Baker Unit. Many transverse veins and some stringers off the ends of diagonal veins extend short distances into Baker Unit. The more common type of transverse veins either cut straight through the diagonal veins or extends

straight out from either wall. All the transverse veins are essentially straight and either branch off diagonal veins or go straight through them.

The Rainbow and Sanders Zones provided the bulk of pre-war gold production; largely from complex and relatively wide quartz structures in the Rainbow Unit, tending to occur within and adjacent to the fault zones on Cow Mountain.

Key words: pyrite replacement, quartz vein, associated gold, basalt-hosted gold, Cariboo gold mining district, Omineca Belt, Canadian Cordillera, the Eastern Circum-Pacific Volcanic-Metallogenic Belt

Brief introduction to the Author

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