

JADE (NEPHRITE) IN BRITISH COLUMBIA, CANADA

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DEFINITION:

Jade is a commercial term encompassing green, white, black or yellow-brown material that consists either of Na-rich pyroxene (jadeite) or prismatic to acicular amphiboles of the tremolite-actinolite series that form bundles that are randomly oriented and interlocked (nephrite).

Nephrite is tougher (harder to break) than jadeite material. Its fracture strength is about 200 MN/m² whereas that of jadeite is about 100 MN/m². On the other hand, jadeite material is harder (7 compared to 6.5 on the Mohs scale).

JADE IN BRITISH COLUMBIA

There are over fifty known nephrite occurrences in British Columbia. These are located in the Cassiar, Cry and Dease Lake, and Mount Ogden areas, as well as in Southern British Columbia (Simandl, *et al.* 2001). These occurrences consist of individual blocks, boulder fields, talus blocks, and in situ occurrences. Most of the in situ occurrences are lens or cigar shaped. They occur at or near the contacts of ultramafic/mafic rocks (mainly serpentinites) with cherts, and other metasedimentary or igneous felsic rocks of oceanic terranes such as the Cache Creek (Mississippian to Jurassic) and Slide Mountain (Devonian to Permian) terranes. These contacts are commonly interpreted as shear/fault related. In general, it is believed that the British Columbia nephrite formed by metasomatic exchange between ultramafic and silica-bearing rocks. Impurities in the nephrite are spinel group minerals (chromite, magnetite, picolite), diopside, uvarovite, titanite, chlorite and talc (Leaming, 1978; Simandl *et al.*, 2000).

MINING THE NEPHRITE DEPOSITS

Mining a gemstone that is accurately described as the “toughest natural stone on earth” presents a challenge to any miner. As with any gemstone, explosive devices must be avoided to prevent unnecessary damage to the jade. However, traditional, non-explosive rock splitting methods are virtually useless on jade because its tightly locking fibres make reducing the jade into manageable pieces difficult. As some glacial boulders weigh in excess

of 100 tonnes and all in situ deposits have complex shapes and the need to reduce the jade into manageable sized pieces is the main task of a mining operation.



Figure 1. Nephrite in British Columbia

Two metre diameter circular diamond saws and diamond wire saws are used to reduce the size of the jade blocks and provide a visible cut surface for quality evaluation purposes (Figure 1). Modern extreme high pressure hydraulic splitters are helpful when existing fractures can be found.

The mining, or perhaps more accurately, quarrying, method used for the nephrite jade is determined by the type of deposit.

Jade boulders, formed by glacial erosion, represent the simplest occurrences to mine. These boulders are tested by diamond drilling or sawing, and only the commercial grade material is removed from the mine site for sale.

Today, in situ jade deposits have overtaken alluvial mining as the main source of jade production in Canada. The Northern British Columbia nephrite deposits are large but due to the difficulty in extracting the material and the current world demand favouring high and gem grade jade, only a small percentage of deposits are in production.

The northern jade deposits are remote and winter conditions are harsh, so mining typically occurs during

the very short summer season, which lasts from mid June to late September.

MARKETING JADE

For the past 100 years, British Columbia nephrite has been used in local jewelry and ornamental applications. It is the best quality nephrite jade that is available in the world today. Exports of approximately 200 tonnes per year over the past 25 years represent more jade produced than at any other time in the history of man. This has resulted in new uses for a stone once reserved for the Emperors of China.

The bulk of Canada's jade production is used for traditional jade carvings and jewelry. Products are exported to the historical jade nations of China, Taiwan and New Zealand. Canada's relatively small domestic consumption of at 4 to 5 tonnes per year supplies a few successful jade artists of world renown.

The famous gem-grade discovery at the Polar Mine secured Canadian Jade's fame as a world class gemstone producer. Polar Jade™ is now exclusively used for jewelry and museum quality carvings, but there are other very well-known high-quality nephrite deposits in British Columbia.

As the availability of Canadian jade has become better known, non-traditional uses of the stone have also increased. From massive Buddha statues, to fireplaces in the Getty Mansion, to translucent window panels in the Smithsonian Museum, Canadian nephrite is becoming world famous as a stone of wide versatility.

Its aesthetic appeal, strength, and toughness, coupled with the massive deposits of relatively low cost raw material, could lead to the use of jade as a dimension stone for interior and exterior tiles. This will probably be the next step in the evolution of the Canadian jade industry.

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