The Two Faces of Jade

Jade, the most famous gem of the Orient, has always had an aura of mystery around it. It has been highly prized as a gem by the Chinese, Maori, Eskimo, and Middle American cultures. Geologists have unlocked the mysteries of its formation, and its particular association with Pacific Rim cultures.

Jade is actually two different minerals. One is nephrite jade, a member of the amphibole family. The other is jadeite, a member of the pyroxene group. The jade of Chinese antiquity is nephrite jade. After about 1780, however, jadeite from Burma was imported in abundance into China and became the most widely used jade there. The jade of the New Zealand Maori is nephrite while that of the Aztec is jadeite. The fact that there were two jade minerals was not known to science until 1860, when a French mineralogist named Damour examined some deeply colored jade brought to him from China and found that it did not match the physical and chemical properties of the well-studied nephrite. He called the new mineral "jadeite", thus introducing an unfortunate confusion whenever the topic of jade is discussed.

How does one tell nephrite from jadeite? Both types of jade are harder than a knife blade, fine-grained, translucent and colored in many shades of green, tan and brown. In a few cases, color can be a help. Very pale to nearly white jade is almost always nephrite. More boldly colored jade such as vivid malachite green, purple, blue or bright red is almost always jadeite. The colors are due to trace element impurities, such as iron, vanadium or manganese.

Some useful tests help distinguish jadeite from nephrite. A streak plate has a hardness of 6.5. Jadeite is harder than a streak plate, while nephrite is softer. Nephrite is less dense (3.0 grams/cc) compared to jadeite (3.3 grams/cc). Thus jadeite will sink in liquid methyl iodide, while nephrite will float. Jadeite will fuse relatively easily when hit with a blow torch flame, while nephrite will fuse only with great difficulty. This is obviously not a test to do on an antique! There are also subtle differences in appearance. Jadeite is glassier compared to a more waxy luster for nephrite. Nephrite is also tougher to break, even though it is softer on the Mohs' scale. This toughness is due to nephrite's internal structure which is made of many microscopic interlocking fibers put together like felt.

Jadeite and nephrite are both metamorphic minerals. Nephrite often forms in metamorphosed fragments of the crust and upper mantle faulted up when ocean crust and continental crust collide during mountain building. Jadeite forms when these rocks are pushed deep down subduction zones and

experience low temperature but very high pressure. Only large scale faulting will bring jadeite-bearing rocks back to the surface. The best place to find such large vertical movements is in young mountain belts, like those forming in the Circum-Pacific and Himalayan zones. Thus, cultures of the Pacific Rim were those blessed with these remarkable gemstones.

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