

Introduction

Jadeite is a mineral synonymous with high pressure formation, in as much as it is a relatively high-density mineral composed of low atomic-number elements: $\text{NaAlSi}_2\text{O}_6$. But the earliest context for this mineral is the archaeological material for which it is named: Jade and particularly that material used by the indigenous people of Central America as both a tool (Nature's lithic version of steel) and prestige ornament. The problem of jadeite formation and its presumed association with high pressure was discussed long ago by Hatten Yoder (1950), Vladimir Sobolev (1949, 1953), and Akiho Miyashiro & Shohei Banno (1958), because experimental synthesis had not been successful. Moreover, in this pre-plate-tectonics era, interpretation of high-pressure origins in coherent lithological settings was not yet understood. Add to this that the problem was greater, in that jade is a rock constituted predominantly of jadeite, the rock called jadeitite, such that both the mineral and a monomineralic rock needed an explanation. Early descriptions (e.g., Bleek, 1908) of jadeitite dykes in serpentinite from Burma implied an igneous origin. However, no simple silicate melt approaches jadeite in composition, so some process such as metasomatism was needed, as pointed out by Bob Coleman (1961, 1980) with respect to the jadeitite occurrence in California. The relationship of ophiolites and plate tectonics were then folded into these discussions, such as in Nikolai Dobretsov's "Problem of the jadeite rocks . . ." in 1984. One of us (GEH) became intimately involved with these enigmatic rocks around this time with studies of the world's second most important commercial deposit (after Burma) in Guatemala, and he hasn't given up since – see Harlow et al. (2007, 2011). Progress on interpretation of jadeitite has evolved with the understanding of high-pressure/low-temperature processes in subduction channels, trace element and isotopic studies, experimental petrology, and geodynamic modeling.

From a different perspective, the importance of jade to our forebears turns out to bear significant scientific fruit. Neolithic peoples were not blasé about rocks because they needed tough ones for tools: axes, clubs, hammers, gouges, etc. Recognizing a useful toolstone was of far greater importance in pre-metal cultures than for our electronic one. Consequently, jade turns up in archaeological finds all over the world, and, in some cases, the objects represent unrecognized sources, as a paper in this issue describes. Thus, archaeology can inform geology and vice versa, additionally providing edifying stories for educating students and the general public. Whereas this theme is only touched on here, it is well understood by most of the authors of the articles that follow.

This issue of the European Journal of Mineralogy results from a session on jadeitite that we sponsored at the International Mineralogical Association meeting 2010 in Budapest. Upon a flurry of new discoveries of jadeitite occurrences, advances in interpretations, and opportunities for extension to studies of jade artifacts, we thought that enough new research was underway to merit the first-ever session on jadeitite at a major scientific meeting. The successful session led to putting the results and ideas into print. The papers in this issue demonstrate the range of activity and discoveries, as well as ongoing debates about the origin of jadeitites – whether metasomatic or vein crystallizations, the similarities and dissimilarities among the occurrences, the mineral diversity recorded in them, and the importance of geochronology to interpreting subduction processes. We hope that readers will find the papers here edifying about the "jadeitite problems" and see that jadeitites, in addition to potentially being tough and beautiful, have considerable relevance to the Earth system.

The articles in this issue have been organized according to the following themes, in the order listed:

*New descriptions (four articles)
New geochemical data (three articles)
Updates and reviews (four articles)
Geoarchaeology (one article).*

Whereas there is considerable cross-over among the articles within the different sections, we believe knowing this ordering will assist the readers of this issue.

The guest editors of this issue want to express their thankfulness to Christian Chopin and Bertrand Fritz, the editors at the European Journal of Mineralogy who have handled the manuscripts and this special issue. We owe a particular debt of gratitude to Walter Maresch, the coordinator for special issues and a jadeitite enthusiast, whose considerable assistance and involvement with the manuscripts in this issue have contributed substantially to making it a success.

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