Calling all Celts:

Exploring Pacific Northwest Exchange Relationships Through Stone Celts

Jesse Morin

Ground stone axe-like tools variously called celts, adzes, and chisels appear in the archaeological record of British Columbia around 4100-3500 BP. These tools are generally thought to have been used in woodworking activities such as dressing cedar planks, shaping poles for houses, or shaping and hollowing out canoes. And, in the absence of such preserved objects, stone celts offer some of the best evidence for the development of a wood-intensive material culture such as typified the Northwest Coast at contact.

In the past, peoples from different regions of British Columbia used a range of stones for making celts. Different suites of raw materials seem to have circulated within rather wide regions of B.C. Nephrite celts, for example, are most common along the Canadian Plateau and the Gulf of Georgia and occasionally occur in assemblages from the Northern Northwest Coast (Darwent 1998; Mackie 1995). Jade (nephrite) is B.C.'s official rock, and B.C. is the world's largest exporter (Leaming 1978). On the Central Northwest Coast and the Chilcotin drainage, a slate-textured pale grey-green chlorite rock—or range of such rocks—overwhelmingly dominates assemblages of celts. In the Northern Interior of B.C., a variety of basaltic rocks were flaked and ground into celts, and on the Northern Northwest Coast, a wide variety of rocks were used for making both splitting adzes and small celts.

My dissertation research attempts to map out prehistoric use of celts of different materials in British Columbia; and I am particularly interested in the production and exchange of nephrite/jade celts. One major endeavor of this research is accurately identifying the mineralogy of celts. The Laboratory of Archaeology at the University of British Columbia has recently acquired two portable, non-destructive/non-marking near-infrared spectrometers. These devices allow one to sample a stone artifact and identify its mineral content. Acquiring an infrared spectrum from a sample takes less than 5 seconds; interpreting and matching an infrared spectrum to a large library of spectra of known minerals (~1200) takes less than 5 minutes. The major strengths of this type of analysis is that one can identify the mineralogy of a very large number of artifacts very rapidly causing no damage whatsoever to the artifact. These spectrometers are entirely portable, so that they can be easily brought to museums for analyzing collections. Near infrared (NIR) spectroscopy is based on the interactions between matter and light energy (Bokobza 1998). Briefly, NIR <u>does not</u> determine trace elements or isotopic composition of samples the way that x-ray fluorescence (XRF) or instrumental neutron activation analysis (INAA) do. Instead, NIR spectroscopy works on the principle of matching unknown NIR spectra to known NIR spectra in a spectral library or database. All molecules absorb some infrared radiation at particular wavelengths of light or wavenumbers. Portions of molecules such as water, hydroxyl,

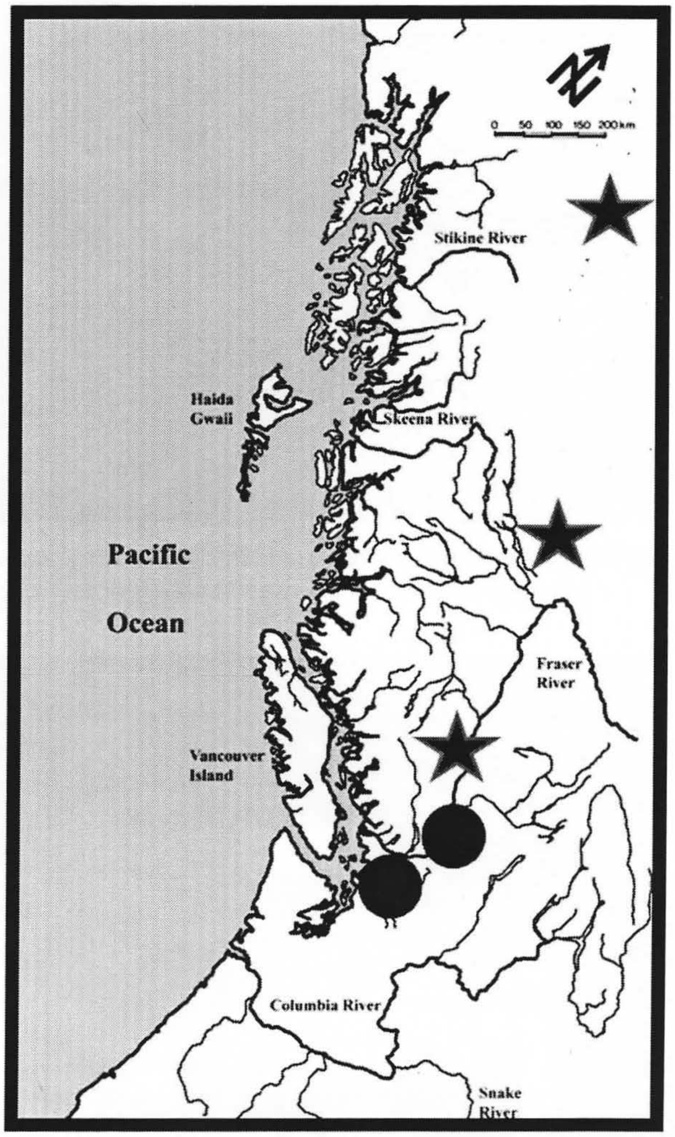

Figure 1. Nephrite source locations in the Pacific Northwest. Stars indicate major source locations and circles indicate minor source locations. Note that each star encompasses up to a dozen individual outcrops.

or metal ions known as "functional groups" absorb infrared radiation at particular wavenumbers (Kemper et al. 2003). As molecules or minerals are each unique based on their structure and content, it follows that all molecules will have unique infrared spectra based on the presence and location of a number of such functional groups. Spectra from unknown samples (artifacts) can then be compared to libraries of known spectra to search for matches. In this way, NIR spectroscopy is much more similar to true 'fingerprinting' than other methods of geochemical and statistical comparison.

Further, once the mineralogy of a given sample is confirmed, it can then be statistically compared to a spectral library of the same mineral from known locations. In this way, I can compare the spectra from nephrite artifacts to the spectra from 25 nephrite source locations across the Pacific Northwest to determine the artifacts provenance or source (see FIGURE 1). In NIR spectroscopy the approach usually employed involves chemometrics, a branch of multivariate statistics that converts thousands of variables into 3 or 4 using Principal Components Analysis (Kemper et al. 2003). These methods have great promise in archaeology, but have seen few applications (Parish 2009; Zhang et al. 2007). In food science, these methods have been successfully employed to discriminate between chicken genotypes in ground meat (McDevitt et al. 2005), to authenticate olive oils from discrete Italian regions (Bertran et al. 2000; Casale et al. 2008), to classify different oak species (Adepide et al. 2008), and to authenticate Basmati versus other varieties of rice (Osborne et al. 1993). While we are in the very preliminary stages of comparison of nephrite bedrock spectra, we are having some success statistically differentiating regional outcrops. This means that it may be possible to correlate a nephrite artifact to a known source location by means of comparison of NIR spectra.

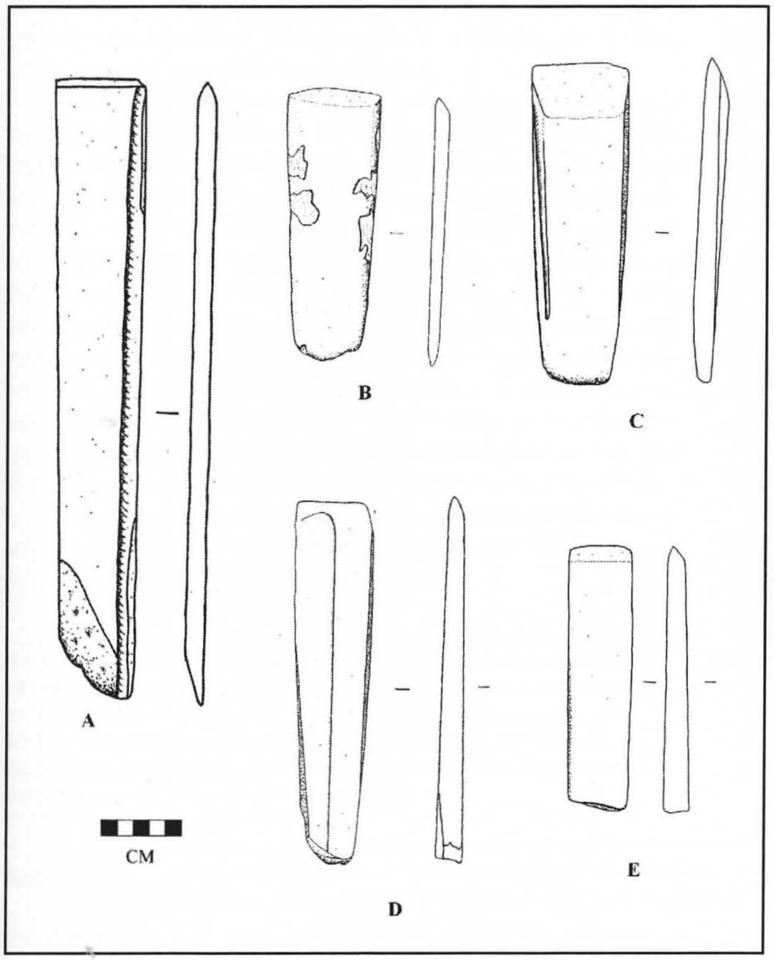

Figure 2. Examples of large nephrite celts from the southern Okanagan held at the Penticton Museum. A, Oliver, nephrite; B, Oliver, nephrite; C, Summerland, nephrite; D, Summerland, nephrite; E, Osoyoos, nephrite.

I am trying to sample celts from a very broad region of British Columbia using the methods described above. My sample consists of collections held at UBC, SFU, the Royal British Columbia Museum, the Vancouver City Museum, the Canadian Museum of Civilization, the Maple Ridge Museum, the Stó:lō Cultural Heritage Centre, the Penticton Museum, and will hopefully soon include artifacts held at the Burke Museum, Western Washington University, and a number of small municipal museums in B.C.. The archaeological record of much of this province is spotty, and the geographical coverage of each institution varies dramatically. I am trying to avoid bias in particular regions by analyzing collections held in a diversity of institutions. For this reason, I am asking the reader to consider if they perhaps have excavated celts—especially from Cultural Resource Management projects, know of collections of celts in small regional museums, private collections, or anywhere that they are interested in knowing what they are made of, and perhaps where they were from. If any reader is interested in having 'their' celts or other nephrite objects analyzed and identified with this method they can contact me (my email address is below).

I have sampled over 1600 celts, fragments of celts and worked nephrite objects over the last year. Most of my sample comes from the Lower Fraser and Gulf of Georgia regions and therefore I am particularly interested in future sampling any celts or nephrite artifacts from anywhere else in B.C.—especially Vancouver Island, the Central Coast, and the Plateau. Archaeological sites or regional collections not well represented by academic or professional archaeology, such as the 38-cm long nephrite celt from Oliver (see FIGURE 2a), continue to surprise me. Particular nephrite artifacts such as large celts (>15 cm long) (see FIGURE 2) or sawn cobble or boulder cores (see FIGURE 4) are so rare as to be nearly non-existent from modern or controlled excavations. Consequently I am very interested in analyzing any of these types of artifacts.

Almost all nephrite celts appear to have been laboriously sawn from boulders along the Mid-Fraser and Fraser Canyon, especially around Lytton. In fact, based on the distribution of the large nephrite sawn cores, almost all of the large celts were manufactured around Lytton and Lillooet. From here, small celts were primarily traded downstream towards the Gulf of Georgia (see FIGURE 3), and large celts traded eastwards into the Canadian Plateau. The Katz or *Sxwoxwiymelh* site on the Lower Fraser contains many small nephrite sawn cores, of which two date to around 2300-2200 BP and a large amount of nephrite debitage (Lenert 2007). People living at Katz undoubtedly produced some small nephrite celts for export, but the evidence for production here is greatly overshadowed by the volume of production evident around Lytton-Lillooet. By far, the largest number of nephrite celts are recovered from Marpole Culture (2500-1500/1000 BP) sites around the Fraser Delta, such as Marpole itself, Port Hammond, and Beach Grove. However, almost of these celts are small (<15-cm long), and not

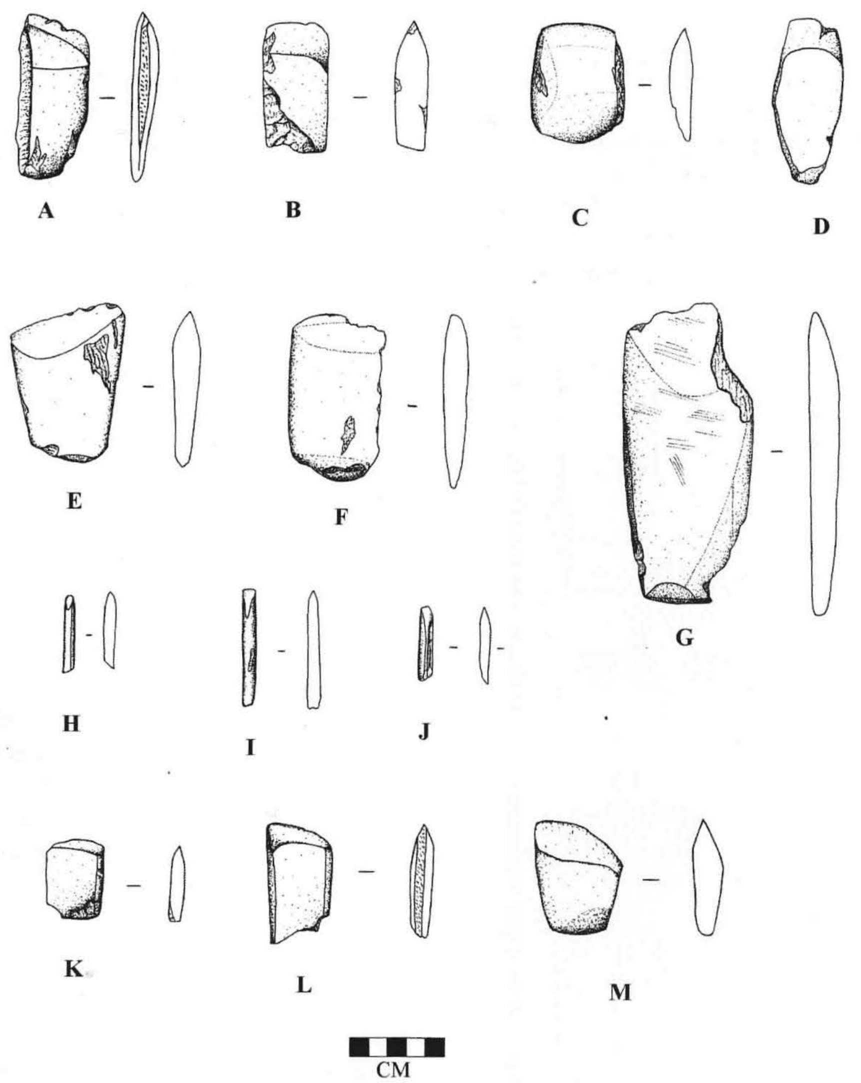

Figure 3. Examples of celts from the Marpole site. A, unknown material; B, nephrite; C, actinolite/tremolite, D, nephrite; E, nephrite; F, nephrite; G, unknown material; H, nephrite; I, nephrite; J, nephrite; K, nephrite; L, nephrite; M, actinolite/tremolite.

all Marpole communities had equal access to nephrite celts. In the subsequent Gulf of Georgia Phase, there is a marked drop off in the number of nephrite celts from dated contexts.

The vast majority of large nephrite celts—from 15-50 cm long—are from burial contexts on the Canadian Plateau probably dating to the Kamloops Horizon (1200 BP- contact). Mackie (1995) suggests that these larger celts were simply worn down over time into smaller ones through use and resharpening. While this may be the case for the Gulf of Georgia region, on the Plateau these large celts clear appear to have been used as prestige objects (Hayden 1998), demonstrating the wealth and success of their owner. Ethnographic evidence from the Plateau is unequivocal in stating that these large celts were "property" rather than tools and were highly valued (James Teit referenced in Emmons 1923:26):

According to the old Indians these long celts were "property", and good ones were exchanged for considerable value. Some of them were occasionally used as chisels or wedges, in such cases being held, it seems, in the hand, and struck with hardwood mallets. The Indians aver, however, that generally speaking they were not made for any special use as tools. Occasionally they were also used in the hand, for rubbing skins, but it seems their use for this was also rare. More often they were used as weapons, being hafted as tomahawks across the end of a wooden handle, in which they were inserted or set. It is said, however, that they were not made especially for this purpose, but were "property", or works of art, as it were, exchanging for high values.

Large stone axes were used similarly in New Guinea for arranging marriages and sealing alliances (Chappell 1966; Seligmann 1910). I suspect that large nephrite celts were 'used' in a similar manner, forging alliances between wealthy chiefs from across the Canadian Plateau with those from Lytton (see Hayden and Schulting 1997).

The pattern that is beginning to emerge then is one in which relatively few communities, from Lillooet to Hope, specialized in nephrite celt production for export. The communities around Lytton appear to have acted as a major centre of production, supplying both Coastal and Plateau communities with the bulk of their nephrite tools. There appear to be particularly strong links between the Marpole Culture and the Classic Lillooet Culture or its regional equivalent around Lytton.

Statistical analysis of these observed trends are currently being undertaken to attempt to match the observed patterns of trade and exchange in nephrite celts to various anthropological models of exchange. For example, it would be particularly interesting to know whether Marpole-folks visited the Lytton-Lillooet localities directly to barter for nephrite celts, or whether such items were traded towards the Coast in a series of "down the line" exchanges (Renfrew 1977). Further, were there any communities that acted as centers of distribution (markets or trade-centers), or redistribution so often described for chiefdom-type economies (Service 1962, 1975)? I believe that answering these questions will greatly contribute to our understanding of the Late Prehistoric Period (3500 BP-contact) in the Pacific Northwest.

So, if you know of materials that you think should be including in my analyses please feel free to contact me at **jdmorin@interchange.ubc.ca**. Thank you.

Jesse Morin is a PhD Candidate in the Anthropology Department of the University of British Columbia, and a Research Associate at the Royal B.C. Museum. Jesse's primary study area is the Mid-Fraser region on the Canadian Plateau, and secondarily the Northwest Coast. When not researching celts, Jesse is currently analyzing lithics from Cedar Mesa, Utah.

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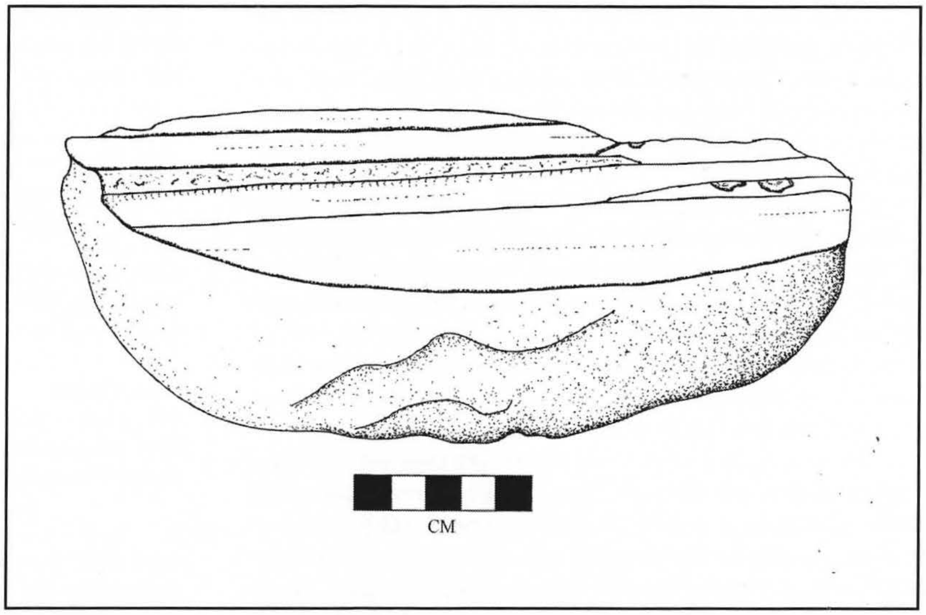
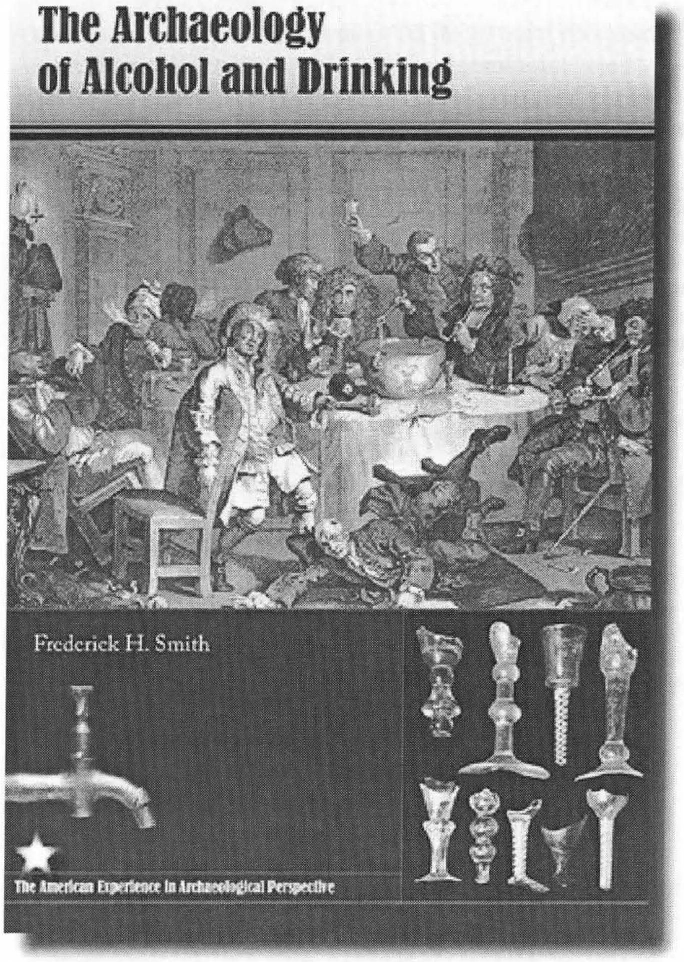


Figure 4. Example of a sawn cobble core from which celts were produced from Lytton held at SFU.

Book Review:

The Archaeology of Alcohol and Drinking

Frederick H. Smith. University Press of Florida, Gainesville. xvii+195 pp., 30 illus., ISBN: 978-0-8130-3290-0 (paper). $24.95. 2008.



With the publication of Frederick Smith's *The Archaeology of Alcohol and Drinking*, archaeologists finally have the opportunity (and pretext) for uniting their two great passions: digging and drinking. For those who lack the patience to read book reviews through to the end, I offer my verdict up front. A few quibbles aside, this book is a thoroughly researched, well-written and wide-ranging primer on its titular subject, and I urge anyone pursuing alcohol studies in archaeology (or faced with an assemblage of broken bottles to interpret) to save themselves considerable time by placing it at the top of their reading list.

Fred Smith is Assistant Professor of Anthropology at the College of William and Mary in Virginia, specializing in historical archaeology, ethnohistory, and the role of alcohol in Caribbean societies. His previous work includes the book *Caribbean Rum: A Social and Economic History*, and *TAAD* is an extension of that earlier research. It is part of a recent series published by UPF entitled "The American Experience in Archaeological Perspective," edited by Michael Nassaney, including volumes on topics such as institutional confinement, race and racialization, and North American farmsteads. The objective of this series is to provide comprehensive overviews of the archaeological literature on subjects and themes relevant to the origins and development of contemporary America. In this sense, the book should be more accurately called *The "Historical" Archaeology of Alcohol and Drinking* because, aside from a few minor references to the ancient past, the subject matter is limited to the last five hundred years.