

Combining the archaeological, ethnographic, and experimental evidence for nephrite use on the British Columbia Plateau indicates that there was considerable value invested in nephrite artifacts by pre-contact occupants of the Interior. This value primarily derived from the large amount of time needed to manufacture nephrite implements, the benefits of using nephrite to create durable celts, and the potential of nephrite celts to symbolize wealth.

Archaeological celts recovered in the Fraser River area generally reflect the ethnographic information provided by Emmons (1923) and Teit (1900, 1906, 1909) for the types of celts made in the region. Although three distinct celt sizes were not discerned from the archaeological data, (as found in the ethnographic record, Emmons 1923), different sizes of celts were manufactured. This is based on variation in the size and integrity of the celts found in burials compared to other site types. Nephrite celts over 200 millimeters in length are only reported from burial contexts. This roughly corresponds with the size differences observed between working axes and ceremonial axes in New Guinea (Sherratt 1976:576). Based on artifact analysis, however, there is some indication that most nephrite celts were utilized in some manner, regardless of size. The nature of this use was not investigated and it could be possible that the wear observed on large celts originated from some form of ceremonial use or a less percussive use such as hide working.

Analysis of the celts and related artifacts from the museum collections, clearly demonstrates that nephrite was the primary material chosen for celt production on the British Columbia Plateau. The stone types reported from the various excavations and surveys in the British Columbia Interior and the Columbia Plateau supports these findings. As determined by the experiments undertaken in this thesis, nephrite has one of the largest manufacturing costs in terms of time. This is in comparison to virtually any other material available in the Interior. Ironically, the same characteristics that make nephrite costly to manufacture are also beneficial for stone tool use. Nephrite may have been a vital for certain tasks, and it appears that prehistoric Plateau occupants

chose to use this high cost material instead of 'cheaper' stone alternatives for celt manufacture. Alternatively, it is possible that certain Interior groups had the *luxury* of using such a costly material. There are no utilitarian benefits to exaggerated celt size -- if anything, the advantages decrease. It is reasonable to assume this purely represents *surplus*, as defined by Olausson (1983).

It is highly probable that nephrite celt manufacturing was primarily carried out in times or conditions of abundant food supply. Torrence (1983, 1989) postulates that the time needed to manufacture stone tools has to be balanced with the time needed to perform subsistence tasks. To meet the demands of food gathering activities, tools with the greatest importance in these activities will be manufactured or curated before less vital implements. Nephrite celts are not tools directly needed for subsistence gathering and as such, they constitute a large drain on the total amount of time available for re-tooling. This is especially the case with manufacturing over-sized celts where all the activity is non-essential. Therefore, in times where virtually all subsistence needs are attended to, time could be allocated to manufacture of nephrite celts. In the Fraser region, this could occur in the winter season when people were living on stored salmon resources (Teit 1900, 1906, 1909). However, this would be dependent on whether sufficient salmon supplies were harvested and dried during the summer. During a year where shortages were encountered, attention would be focused more on hunting activities or possibly on raiding for salmon supplies (Cannon 1992) and not on activities such as nephrite manufacturing.

It also is possible that only certain individuals or groups had access to raw materials or the ability to manufacture nephrite implements. Although almost anyone can perform the task, it is possible that not everyone would have had the time to expend making such implements. It has been postulated that social inequities developed during or before the Plateau horizon on the British Columbia Plateau (Stryd 1973; Hayden et al. 1985; Hayden 1992; Hayden and Spafford 1993). At this time development of "corporate groups" (Hayden and Cannon 1982) could have occurred, as indicated by a bi-

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modal distribution of housepit sizes (Stryd 1973; Hayden et al. 1985). In this scenario, certain affluent family groups would have controlled access to resources and other poorer families would enter into service with these families to make a living. It is conceivable that members of the wealthy families would have had greater resources to manufacture nephrite celts, especially larger sized specimens. This is not to say that wealthy individuals would perform the actual grinding -- rather they would 'contract' the task out to families under their influence or possibly employed slaves that belong to their family. Once completed, the celt would subsequently be used to further the wealth of the family. Poorer families, locked in more of a struggle for existence may have been too busy with subsistence activities (Hayden and Spafford 1993) to afford the time to make nephrite implements for themselves. Again, this situation would not be unlike the ethnographic pattern of axe exchange in New Guinea (Phillips 1975; Dalton 1977; Sherratt 1976) or in Australian with the Yir Yoront (Sharp 1952) where clan heads or corporate leaders acquired axes to use for ceremonial exchanges.

From the distribution of celt sizes outside the Fraser River area, it appears that many smaller, utilitarian celts were being retained by the producers. Trade in nephrite with the outlying areas was primarily in larger celts. In an exchange system that extended to the Shuswap Lakes, these celts were possibly traded as "primitive valuables" (Hayden et al. 1985) in the sense defined by Dalton (1975, 1977). Although not producers of the celts, the groups in the direct contact zone (Sherratt 1976) would have traded other, equally important goods into the Fraser River area. As symbols of wealth, the same, if not more, value would be attributed to nephrite celts in the Nicola Valley and Shuswap Lakes regions as in the Fraser Canyon.

It can be hypothesized that this exchange occurred between kin related groups or in ceremonial exchanges between elite family heads. There are some ethnographic accounts which indicate that valuables were symbolically exchanged in historic times. For instance, Teit (1900:322-5, 1906:590-1, 1909:269) recorded that the Thompson, Shuswap, and Lillooet all encouraged marriage of individuals with partners outside their villages and that often 'presents' were exchanged to secure betrothals. Teit (1900:325) reported the following for the

Thompson; "There seems, however, to have been an inclination, on the part of those who were wealthier, more successful, or more industrious, and so more distinguished, than others, to marry their children to other wealthy people." It seems likely that the 'presents' exchanged would reflect the economic station of the suitor. Teit (1900:322) does indicate that parents (and other kin) evaluated the presented gifts before deciding whether to allow the marriage. This was considered the most honorable form of betrothal in Thompson society (Teit 1900:322). Similar practices were noted for the Shuswap and Lillooet (Teit 1906:591, 1909:269).

Beyond marriage, there were other practices noted where exchange of primitive valuables may have occurred. For instance, the Thompson were said to have exchanged 'presents' with friendly bands (Teit 1900:271). In another example, the Canyon division of the Shuswap would charge 'certain fees' to those who wished to cross a bridge in their territory (Teit 1906:541). Additionally, the Canyon group often tried to maintain peace to ensure trade relations and this could entail offering "presents or blood-money for their slain relatives" (Teit 1906:541). This is also reported for the Lillooet, who often resolved feuds and murders through exchange of presents (Teit 1909:236). In the political sphere, power or influence in Interior society was recorded as being gained from ritualized gift-giving at potlaches or feasts (Teit 1900:289, 1906:569, 1909:255). Again, precious items may have been used during these festivities to cement political ties.

While all of these types of exchanges are from the ethnographic record, it is quite conceivable that similar occurrences happened between family groups in the past. Nephrite was not recorded as one of the ethnographic items traded, but Teit's descriptions of the 'presents' that were exchanged are exceptionally vague. Because the contexts of acquisition (Phillips 1975:109) are virtually invisible to archaeologists, only the final location of artifact deposition can give us clues as to the manner in which nephrite celts were exchanged. From the locations in which nephrite celts are found, it is evident that they are predominantly recovered in burial contexts. This is especially the case with longer specimens. Burial inclusions on the Plateau probably reflect the socioeconomic position of the individual with whom they are interred (Stryd 1973; Schulting

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1995). It is therefore likely that special value was attached to nephrite placed in burials. Further evidence of this is indicated by differences between the relationship of artifacts found in votive contexts compared to non-ritual contexts (Levy 1982). Nephrite celts in burial contexts are on average twice the size and have a greater complete-to-broken ratio than those found in other site types. This further supports the notion that special value was attached to them.

When moving beyond the Shuswap Lakes and the Nicola Valley areas, celt sizes decrease and fewer specimens are found in burial contexts. While this might be a factor of sample size, it could also reflect a natural size decay with increasing distance from the source. The transition in average size is quite abrupt between the Shuswap Lakes and Nicola Valley compared to the Okanagan and Arrow Lakes areas. This may represent a significant ethno-linguistic boundary. Unfortunately, data were not available for the areas interspersed between the two regions. It is possible that the Nicola Valley and the Shuswap Lakes regions were staging areas where larger celts were reduced into smaller celts to trade to southern groups or that these were enemy confederacies. In this situation, groups in these areas would have acted like 'middlemen' and maximized their gains by trading more celts rather than large implements. At least one celt (from the Chase burial site) appears to have been cut from a larger specimen suggesting an interest in "maximizing profits". Groups present in the Nicola Valley and the Shuswap Lakes areas also had a geographical advantage to act as 'middleman' because of natural travel corridors between mountain ranges. Although frequencies of nephrite artifacts decrease markedly overall in the Okanagan and Arrow Lakes regions, the rates of recovery in some locations would suggest quantities of nephrite comparable to the Fraser River area. Of interest, nephrite is the only substance that solidly links contact with the Fraser River region by groups living in the Similkameen Valley (Vivian 1992:123). No other materials (e.g., chert) attributable directly to the Fraser Canyon were recovered in this area.

The trade routes between the British Columbia and Columbia Plateaus are generally thought to have followed the Similkameen and Okanagan rivers and possibly the Upper Columbia River (Galm 1994). Vivian (1992:37-9) and Galm (1994:298) have commented on how poor the understanding of the

nature of the contact between the two areas is in current archaeological literature. In his study of the cultural interaction between the Similkameen Valley and areas adjacent to it, Vivian (1992:123) found that little in the way of common materials, such as cryptocrystalline stones, were transported through the valley from an external origin. He suggests that when prehistoric trading parties made their way through the valley, they "were likely restricted to small bands, which usually only transported small prestige items" (1992:129). It is likely that nephrite was one of those materials.

The numbers of nephrite artifacts found on the Columbia Plateau is not very large. There appears to have been no real alternate material to replace nephrite based on the limited number of celts made of different stone types. Average lengths of nephrite celts found on the Columbia Plateau are for the most part greater than those for the Okanagan and Arrow Lakes regions and two large celts (over 20 centimeters) were recovered along the Snake River in burial context (Spinden 1915). In addition, some of the celts recovered on the Columbia Plateau are deemed not practically functional because of their form (Galm et al. 1985). All of this evidence indicates that nephrite celts of any size were similarly valued on the Columbia Plateau as they were on the British Columbia Plateau.

The nature of nephrite exchange with the coast was not investigated in this thesis. At present, the relationship between producers of nephrite artifacts in the interior and consumers on the coast is not clear. Mackie (1992), in his analysis of coastal celts, determined that most celts followed a distinctive life-cycle because of their importance as woodworking tools, but he never fully addressed where the Coastal celts primarily originated. In fact, there is good evidence from sites in the Hope area that many Coastal nephrite celts were produced in that area (e.g., DjRi 5, DiRi 38 (von Krogh 1980), DiRi 14 (Roberts 1973; Eldridge 1979), DjRi 1 (Mitchell 1963), and DiRi 39). What remains undetermined is how many celts arrived on the southern coast by way of alternate routes such as the Lillooet River, rather than the Fraser Canyon. Until such issues are addressed, it will not be known what effect trade of nephrite outside of the Plateau had on the value of nephrite for Interior societies.

Data suggest that there was an intensification in the nephrite industry throughout the Plateau Pithouse traditions, that peaked in the Kamloops horizon. Although found over a

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broad area during the Shuswap period, it was not until the Plateau horizon that real growth in the nephrite industry occurred. During the Plateau horizon the center of the nephrite manufacture was probably the Lillooet region. By the start of the Kamloops period, it appears that the exchange of the material had expanded into the adjacent Shuswap Lakes and Nicola Valley regions.

Beyond the socioeconomic aspects of nephrite, it is possible that nephrite celts were primarily used at housepit sites and possibly campsites. This is based on the large number of miscellaneous worked fragments recovered at this type of site, many of which could have been the result of celt breakage during house construction or accidental breakage during manufacturing. Other kinds of sites have lesser numbers of celts and fragments, that suggest a lower use of the material in these locales (although few such sites have been excavated). The specific location where celts were manufactured could not be discerned. Sawn boulders, the primary debitage from the early manufacturing process, were found more often in burials than in other site types. This context might actually reflect the value attached to sawn boulders. Because the removal of secondary celt blanks from boulders probably required considerably less time compared to primary blanks, a previously worked boulder may have had considerable value. The association of these artifacts with burials, however, does not provide information on where the manufacturing occurred. One fragmentary sawn boulder was also found in a housepit (EeR1 19-Stryd and Hills 1972) which suggests it was the primary location for such activities. Emmons (1923:plt.3) reports the recovery of a sawn boulder with multiple cutting grooves from a placer deposit in the Fraser River. This may indicate that celt manufacturing occurred near the river because the boulder was probably washed downstream by flood activity. Neither of these cases provide conclusive evidence for tool manufacture and it is possible that production was not limited to a specific location.

To conclude whether nephrite artifacts were used by Plateau societies to fulfill utilitarian woodworking requirements or as items of status, property or wealth, it is likely that both functions were of importance, especially in the production zone along the Fraser River. In regions beyond this area on the British Columbia Plateau, however, it appears that the pres-

tige roles of nephrite implements were more salient. Considering the time involved in manufacturing, the distribution and size of nephrite artifacts, the ethnographic information, and the contexts of nephrite object deposition, it seems probable that more emphasis overall was placed on the symbolic or wealth-bearing functions of the material rather than on its utilitarian uses. This is especially the case given the other 'lower-cost' alternatives for woodworking available on the British Columbia Plateau.

Recommendations for Future Research

The experimental procedures undertaken in this thesis represent an initial step in understanding prehistoric methods of nephrite manufacture. More work in the future will expand our understanding of how nephrite, abrasives, saws and lubricants interacted. There are many questions about nephrite manufacturing that remain unresolved. First, it would be worthwhile to determine whether it was advantageous to expend extra effort to collect hard abrasives, or saws with superior hardness, to increase sawing rates. The rates achieved during my experiments only represent preliminary data and no attempts were made to maximize cutting rates. What needs to be determined is whether appreciable gains can be made over the presently derived rates that would justify the additional energy expenditure. One alternative to experimentation would be to measure the hardness of sandstone saws recovered in archaeological sites. Second, it should be determined whether cutting speed could be increased by using grease instead of water for the lubricant. Johnson S. (1975) indicates that this may be the case. Third, there should be some assessment of whether the use of a thong or piece of wood instead of a sandstone saw would have been a practical alternative.

Another aspect that should be addressed is the endurance of celts made of nephrite in comparison to other materials. This should involve experimental use of celts of different materials for extended periods of time in similar types of woodworking tasks. In undertaking this sort of approach, it should be possible to compare the effectiveness and use-life of nephrite celts to other materials to determine whether the costs involved in making nephrite implements are warranted. Along with this, experimentation should be directed at deter-

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mining the point at which the size of a celt starts to hinder its performance. This research should be aimed at defining ergonomic constraints and the failure/breakage rates for certain sizes of celts. The results of such a study may allow for more conclusive statements on the non-utilitarian functionality of exaggerated celt sizes.

In addition to the experimentation on the cost-benefit and manufacturing aspects of nephrite celt technology, some attention should be given to analyzing use wear patterns found on nephrite implements. This type of study could indicate the activities in which nephrite implements were utilized. It may also be able to decipher what sorts of patterns are attributable to manufacturing, resharpening, or use. These studies could be carried on in conjunction with the cost-benefit experimentation.

Moving beyond experimentation, more investigation is needed on other artifact types that have been labeled 'primitive valuables' (Dalton 1975, 1977) on the Plateau. Even though many of these items probably had special value attached to them, there has been only a limited amount of evidence offered to back up these assumptions. More study of the contexts in which these seemingly special objects occur needs to be undertaken. The study of the distribution of primitive valuables may also give some insight into the nature of the entire exchange system. Perhaps the distribution of other artifacts indicates the same trading relationship between the mid-Fraser region and the Shuswap Lakes - Nicola Valley as found in this study of objects made of nephrite.