

USE WEAR ANALYSIS ON BONE AND ANTLER TOOLS OF THE MACKENZIE INUIT. By GENEVIEVE M. LeMOINE. Oxford, England: John and Erica Hedges, 1997. BAR International Series 679. ix + 146 p., map, b&w illus., bib., appendices. Softbound. £40.00.

Functional studies of stone tools are now fairly common. They employ a variety of competing techniques: some are mainstream; others, such as residue analysis, rather controversial. Applications of these techniques to bone and antler are rare, however: hence the importance of this monograph to technological studies in archaeology. As stated in chapter 1, the major objectives of the study are (1) to develop criteria for identifying the traces of manufacture and use of bone tools, (2) to apply experimental results to the analysis of archaeological specimens from several prehistoric Inuit sites in the Mackenzie Delta, and (3) to reconstruct the design system for the manufacture and use of bone and antler implements. The latter is considered to be culture-specific and thought to represent the choices made by artisans making implements, as well as aspects of tool morphology and symbolic representation. Also introduced in this chapter is the concept of tribology, a branch of engineering that deals with the study of friction, lubrication and wear. Although tribology is usually applied to metals, the author believes that the theory can be used effectively to “enhance understanding of the development of wear on all materials” (p. 1).

Chapter 2 begins with a brief summary of methods for the study of use wear as applied by other investigators working in the Mackenzie Delta, northern Yukon, and Banks Island, and outlines study techniques. The author claims that, unlike her analysis, which deals only with tools, previous studies of bone/antler technology focused on debitage. I find this statement curious, since my own study of Late Prehistoric Athapaskan bone/antler technology (Le Blanc, 1984) covered the entire reduction sequence from raw material acquisition, through blank production, to finished tools. Background material is followed by a more detailed discussion of tribology, which the author believes allows researchers to determine “how and why wear occurs [thus providing] a sound theoretical basis for the identification of use wear patterns on prehistoric tools” (p. 5). Aspects of friction, wear, and polishing are described, and applications to archaeology are mentioned. I’m sure there are some truly frightening mathematics underlying the theoretical basis of tribology, but thankfully this has been hidden from the reader. The chapter ends with a consideration of the theoretical model, which discusses its design, style, and cognitive aspects.

Methods and results of the experimental programme are treated in the next two chapters. For the latter, several tools were replicated (crooked knives, chisels/gravers, adzes, drills) and used in a variety of cutting, scraping, chopping, and drilling experiments to work various materials. The working part of the tool was also duplicated in different materials (chert, copper, iron, and slate). In

addition, the actions of grinding and polishing, sawing, and filing were performed. The experiments generated use wear patterns on the functional elements of the tools. These patterns are illustrated by 16 excellent quality glossy photomicrographs in the appendix. On the basis of an impressive number of experiments, the author concludes that “the material being worked on is a far more significant factor in the production of microscopic wear patterns than the type of tool or the manner of its use” (p. 30). She also comments that “wear patterns follow tribological principles and so are to some extent predictable” (p. 40). A useful table is provided, which summarizes wear patterns by material being worked.

This section on replication relies on previously made typological definitions and assumed functions for the suite of tools that were selected. By and large, this may be an acceptable procedure for prehistoric Mackenzie Inuit artifacts, since there is considerable ethnographic information on tool function for historic Inuit tool categories, some of which may be applicable to the prehistoric period. Indeed, such reliance follows a long-held tradition in late prehistoric Inuit studies. Some discrepancies should be anticipated, but do not seem to have been considered. For example, the crooked knives (p. 23–25) that are illustrated look much like simple cutting knives, and their presumed manner of use deviates from that which many Subarctic specialists would identify. The schematic (Fig. 4.2) shows a knife being used in a downward motion, held much as one would hold a modern kitchen or pocket knife. Crooked knives typically have L-shaped handles designed so that the thumb can be used to exert force on the horizontal extension of the L, with the blade extending out the bottom of the hand adjacent to the smallest finger. The knife is used in a drawing motion toward the user. One wonders if the difference in motor patterns could in fact result in a different type of wear.

The results of archaeological analysis of collections from several sites in the Mackenzie Delta are considered in chapters 5 and 6, the former dealing with use-wear, the latter with the analysis of manufacturing technique, as exhibited by traces on bone and antler tools; several tables and charts are used to present the results. Not too unexpectedly, the analysis was frustrated by the surviving condition of the tools. Bone-surface erosion was the critical factor here, since this obliterates evidence that can be used to identify wear patterns. My only problem here regards the use, once again, of typological identifications. The most specific deals with so-called daggers (p. 50). In commenting on wear traces on these objects, LeMoine states categorically that they “show so little sign of use [that this] is perhaps the strongest evidence that they are indeed daggers, intended as weapons for use against other people, rather than any other sort of tool” (p. 51). Some of those illustrated (e.g., Fig. 5.6, two on the left) are fragmentary distal sections that likely represent the functional ends of what other investigators working in the wider Mackenzie Delta region have identified as barbed

arrowheads (McGhee, 1974: Plate 18d; Morrison, 1990: Plate 10) or harpoons (McGhee, 1974: Plate 21c, d). Similar objects have been found in other prehistoric Eskimo contexts (Giddings, 1952: Plate 27) along the Kobuk River in western Alaska, and in interior Late Prehistoric Athapaskan contexts (Morlan, 1973: Plate 12b). These are considered weapons for hunting rather than for interpersonal warfare. Since no hunting weapons were considered in this study, there are no comparative data; had there been such data, a different interpretation might have been made.

In closing chapter 6, the author highlights a problem in working with tools for assessing manufacturing traces rather than debitage or a combination of the two: different stages of tool manufacture and use obscure evidence of the production traces. She comments further that investigators working at some of the sites whose collections she uses tended to neglect the collection of debitage in favour of finished tools (p. 78). This has been my experience as well, with one senior Arctic specialist answering my query about slate debitage by stating that “we just throw that junk away.” There may have been good reasons at the time for this kind of selective collection, but unfortunately, it can and does limit future research questions and results.

The design system model is evaluated in chapter 7 and again in the concluding chapter. Four patterns are identified: the manufacture of (1) drills; (2) “highly finished tools [such as] knives and daggers, needles and snow knives”; (3) picks and miscellaneous items; and (4) awls and spatulas (p. 93). The overall design system involves generalized blank extraction by grooving, followed by grinding into shape. An important objective of the study, namely, determining if the Mackenzie Inuit used one or more design systems, is satisfied in noting that all groups manufactured and used tools in the same way. I feel this is not too surprising, given the circumscribed area inhabited by the Mackenzie Inuit, the fairly narrow time span (500 years), and the vagaries of sampling and preservation problems. It might have been very instructive to compare the results obtained on the prehistoric Inuit assemblages with at least one of the available collections from the interior Athapaskan region, such as the Late Prehistoric components of the Klo-kut or Rat Indian Creek sites along the Porcupine River. Differences here might have helped to identify manufacturing traditions (design systems), or standard production procedures that are inherent in the material being worked and stand apart from morphological or symbolic aspects. This seems to be a logical step in the continuation of this valuable area of research.

Like the former Jenness volumes in the Canadian Museum of Civilization Diamond Jenness Memorial Mercury Series volumes, this monograph is, in the author's words, a “minimally revised version” of her Ph.D. dissertation. Thus there are some typos here and there, including the figure references. There are also some organizational difficulties that, on more than one occasion, made the study difficult to follow: for example, it would seem more logical to have chapter 6 on manufacturing traces precede

chapter 5, which deals with use wear evidence. On the plus side, BAR is to be commended for publishing the plates of use wear (SEM and Light microscope); they provide a useful complement to the experimental part of the study and provide a valuable record for other researchers. Setting aside my minor criticisms, this is an innovative study that makes a significant contribution to a long-standing gap in technological and functional analysis of archaeological materials. The author should be highly commended for carrying out such an ambitious research programme. The resulting monograph should be on the bookshelf of any specialist who deals regularly with bone and antler artifacts, and certainly all northernists would do well to add this study to their collection.

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NORTHERN PASSAGE: ETHNOGRAPHY AND APPRENTICESHIP AMONG THE SUBARCTIC DENE.
By ROBERT JARVENPA. Prospect Heights, Illinois: Waveland Press, 1998. 210 p., maps, b&w illus., bib., study guide. Softbound. US\$11.50.

In the acknowledgements to his book, Jarvenpa credits Cornelius Osgood's 1953 “retrospective account” of his 1928–29 field season at Great Bear Lake as stimulus for his own foray into retrospection. Like Osgood, Jarvenpa describes his earliest field excursions in northern Canada