ARCHEOMATERIALS 4: 69–76 (1990)

Neolithic Manufacture of Antler Axes at Brześć Kujawski, Poland

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ABSTRACT Antler axes, sometimes referred to as "T-axes," appear on Neolithic sites across north-central Europe. They are normally found as finished products in burials or without provenience. Pits excavated in 1982 at Brześć Kujawski, Poland, yielded scrap and semi-finished antler axes that permitted the reconstruction of the manufacturing sequence of these artifacts. Their role in Neolithic economy and society is discussed.

INTRODUCTION

Between 5000 and 3000 b.c. (unrecalibrated radiocarbon dates), a characteristic artifact—the antler axe—appears on sites across north-central Europe from Holland to Poland. It is sometimes called a "T-axe" because of the presumed appearance of the artifact when hafted. Many of these artifacts either lack provenience or occur as isolated finds in settlements. Large assemblages of antler axes and associated manufacturing scrap are rare and often lack secure contexts. Until recently, the technique of their manufacture has been poorly understood, and the context of their manufacture within prehistoric settlements of this period has been unknown.

Since 1976, we have investigated a Neolithic settlement at Brześć Kujawski, Poland (Bogucki 1982; Bogucki and Grygiel 1983; Grygiel and Bogucki 1981, 1986; Grygiel 1986). Earlier excavations were carried out at Brześć Kujawski between 1933 and 1939 by Konrad Jażdżewski (Jażdżewski 1938; Gabałowna 1966). In the course of these excavations a number of antler axes and antler fragments have been found. A pit excavated at Brześć Kujawski in 1982 yielded a collection of worked antler that reflected the stages in the manufacture of these axes in a secure archaeological context (Grygiel 1986).

Brześć Kujawski is a large Neolithic settlement located about 150 kilometers northwest of Warsaw (Fig. 1). There are two major Neolithic components at Brześć Kujawski. The first is that of the Linear Pottery Culture, dating to between 4500 and 4000 b.c. (unrecalibrated). This occupation, or series of occupations, appears to have been short-lived (Bogucki 1982). The second Neolithic occupation at Brześć Kujawski is that of the Lengyel Culture, between 3500 and 3100 b.c. The Lengyel settlement at Brześć Kujawski is characterized by over fifty longhouses (Fig. 2), some over 30 meters in length, and over seventy burials, in addition to numerous pits filled with rubbish. It represents a long-term occupation of an agrarian community, with an economy based on cultivated grain, domestic livestock, and the hunting and collecting of wild animals and plants (Bogucki 1984).

The worked antler from Brześć Kujawski offers important comparative material for the study of T-shaped antler axes from other sites in north-central Europe. Perhaps the most important collection is that from Spoolde, near Zwolle in the Netherlands, in which a large number of antler axes and fragments were found in 1961 during the construction of a canal (Clason 1986). In her analysis of the Spoolde material, Clason sketched a manufacturing sequence of antler axes that parallels the more elaborate description below. Another large assemblage of antler axes comes from the settlement of Hüde I on the Dümmersee in Niedersachsen, Germany (Werning 1983). Numerous stray finds are documented by Waals (1972) from the western part of the

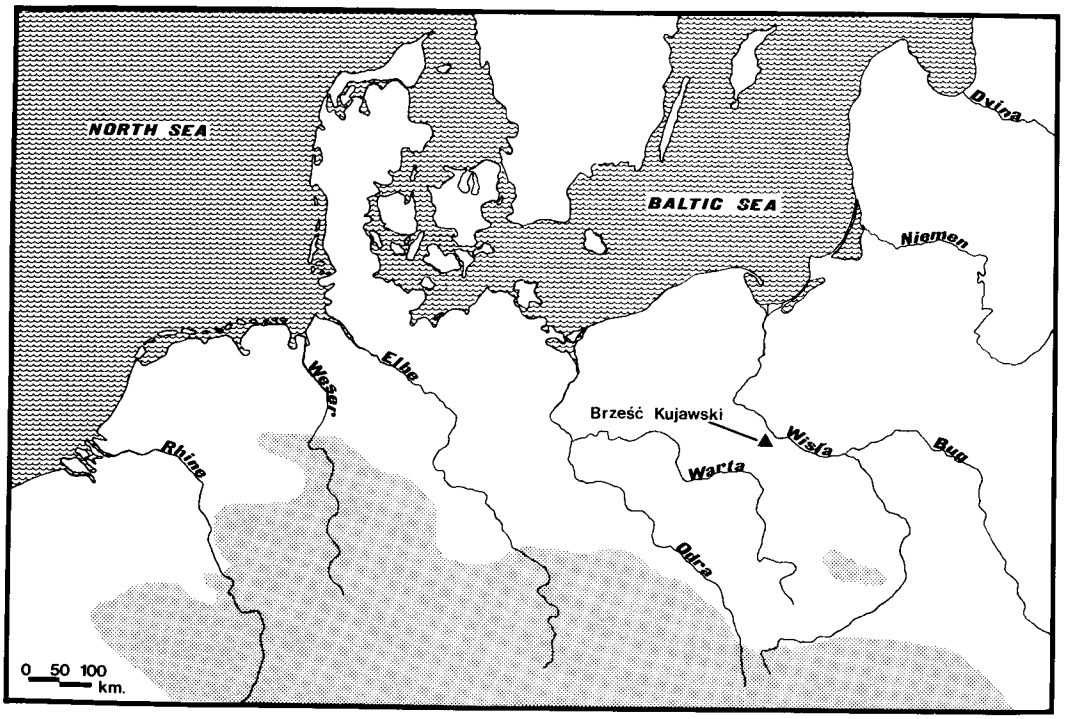

Fig. 1. Location of Brześć Kujawski in north-central Europe. Shaded zone represents elevations over 300 m. above sea level.

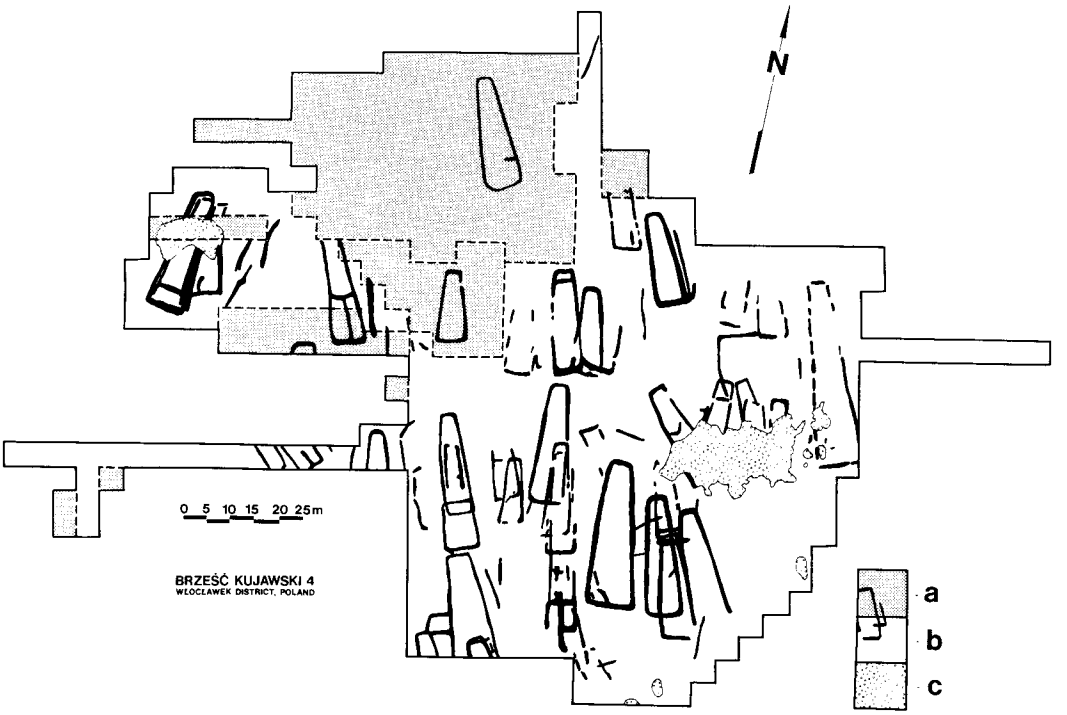

Fig. 2. Plan of the Lengyel settlement at Brześć Kujawski, Site 4 (3500–3100 b.c.), showing outlines of trapezoidal longhouses. Key: a—area excavated in 1976–1984; b—area excavated in 1933–1939; c—recent disturbance.

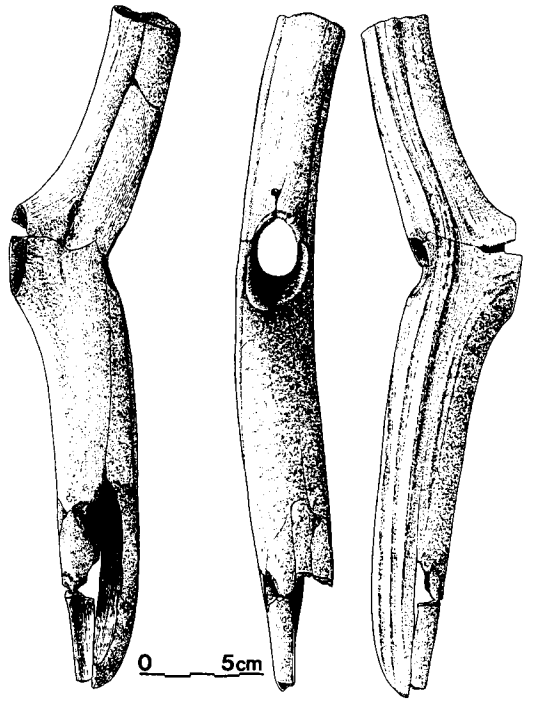

Fig. 3. Views of antler "T-axe" from Grave 78 at Brześć Kujawski, excavated in 1981.

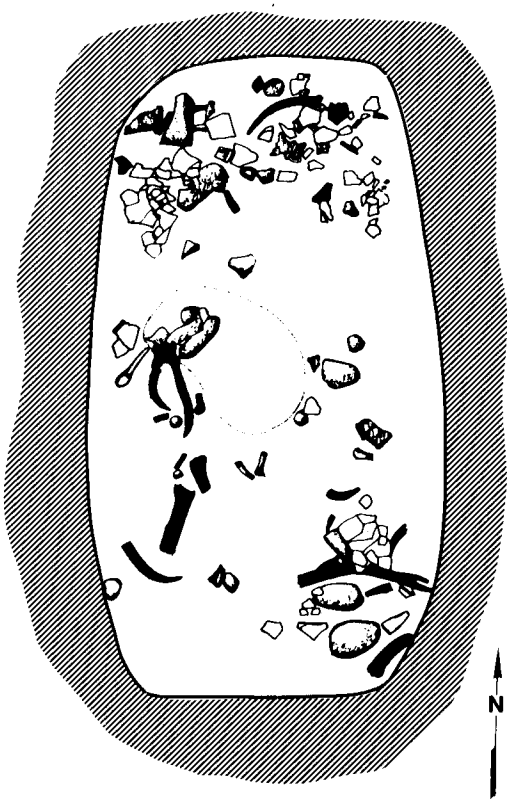

Fig. 4. Floor of Pit 892 at Brześć Kujawski. Key: a—sterile clay subsoil surrounding pit; b—stones; c—antler; d—animal bone fragments; e—potsherds.

North European Plain. In Denmark, a number of T-shaped antler axes have been found in Ertebolle contexts (e.g., Andersen 1975). Although they appear to be particularly common in the lowlands of north-central Europe, T-axes are also known from other parts of Europe, such as south-central Germany (Behrens 1973: fig. 21f) and the Iron Gates region in Yugoslavia (Bačkalov 1979).

THE CONTEXTS OF ANTLER ARTIFACTS AT BRZEŚĆ KUJAWSKI

Finished, complete antler T-axes at Brześć Kujawski occur exclusively in graves, including several male burials excavated by Jażdżewski in the 1930s and one excavated in 1981 (Fig. 3). Jażdżewski's excavations produced isolated fragments of antler with traces of working, but these did not indicate the technique of axe manufacture or even provide conclusive evidence of local production of antler axes. In 1976 through 1979, bases of shed antler with attached brow tines were recovered from rubbish pits (Grygiel and Bogucki 1981). These appeared to be related to the manufacture of the T-axes, although they were not directly associated with finished artifacts. Two features excavated in 1982, however, yielded a range of materials which not only indicated the local manufacture of antler axes but also illustrated the process of antler working in general. Pit 892, located about 18 meters west of House 56 (the northernmost house in Fig. 2), contained a large amount of antler scrap (Fig. 4). This feature had an oblong outline (2.6 × 1.4 m.) and was dug into packed glacial boulder clay. The long axis of this pit was oriented, like the house, along a north-south line. All the artifactual material in the pit was in several concentrations along the base. Included were stones (some were polished in various

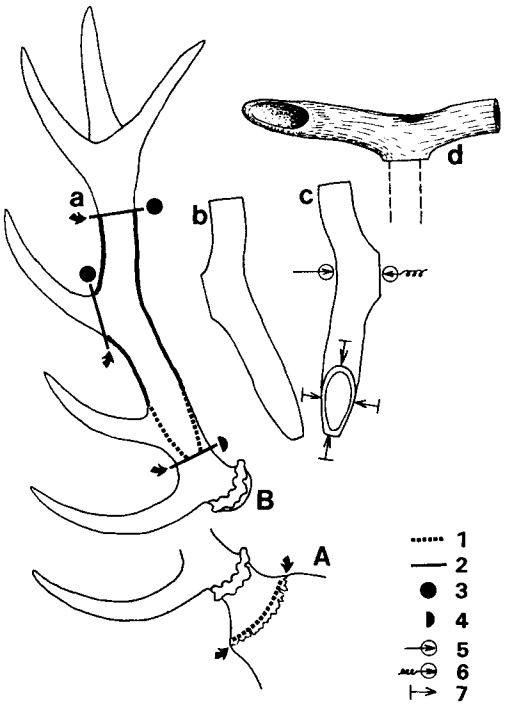

Fig. 5. Schematic summary of the steps in the manufacture of antler "T-axes" on the basis of manufacturing debris at Brześć Kujawski. Raw material: A—antler from hunted animals; B—shed antler. Steps in the process: a—removal of scrap antler elements; b—roughed-out antler blank; c—finish work; d—hafting. Technical processes: 1—chopping, breaking; 2—cutting locations; 3—scoring around the circumference of the beam; 4—partial cutting; 5—scoring a hole; 6—drilling a hole; 7—grinding.

degrees and others were raw pieces of granite), pottery, flint tools and debitage, animal bones, and above all, many pieces of red deer antler. The entire assemblage appears to be the byproducts of an antler workshop. Pit 898, five meters east of the same house, also contained a significant amount of antler scrap and unfinished axes.

THE TECHNIQUE OF ANTLER AXE MANUFACTURE

The material from Pit 892 permitted the reconstruction of the steps in the manufacture of antler axes, based on the finds of incomplete specimens in various stages of production (Fig. 5). The raw material was obtained both in the form of collected shed antlers and antlers from hunted red deer. This second method of obtaining antler is indicated by the presence of fragments which are still attached to pieces of cranium. One bore traces of chopping, probably with a stone axe. The chop marks run along the sutures of the skull, indicating that the inhabitants of the settlement had a knowledge of the osteological structure of the animal skull, for it is easiest to detach the antler base at this place (Fig. 5). The antler beams were cut at their bases to about one-half their diameter, then struck against a stone anvil. This operation had two effects: it separated the unusable bases from the antler beams, and it created roughly shaped working edges on the ends of the beams. In the features discussed here as well as in other features on Sites 3 and 4 at Brześć Kujawski, we have found pieces of antler scrap which indicate this characteristic and basic step in the manufacturing process (Fig. 6).

Next the tines along the beam were cut off (Fig. 5), so entrance was gained to the spongy tissue in the interior of the antler. Then the end of the beam leading to the crown was cut off, leaving the straight part of the beam free of tines. This process resulted in the rough shape of the head of the axe. The remainder of the manufacturing process consisted of more detailed work, namely the drilling of the shafthole and the sharpening of the working edge. The shafthole was made by a combination of cutting and drilling. On the side of the beam opposite one of the spots where a tine was removed, a flint tool was used to cut a hole through the hard outer tissue down to the spongy interior (indicated by the unevenness of the hole and the traces of scraping). Then, starting from the spot where the tine was removed, a hole was made with a bone drill through the spongy tissue. This process was observed in an almost-finished axe from Pit 898 (Fig. 7). In the course of the investigation of the interior of the shafthole, a fragment of a broken bone drill was found which had become stuck in the spongy tissue and blocked the hole, preventing further work on the axe. Observations under the microscope (approximately 190×) indicated that the working edge of the drill bore traces of working both vertically and horizontally.

The entire manufacturing process of ant-

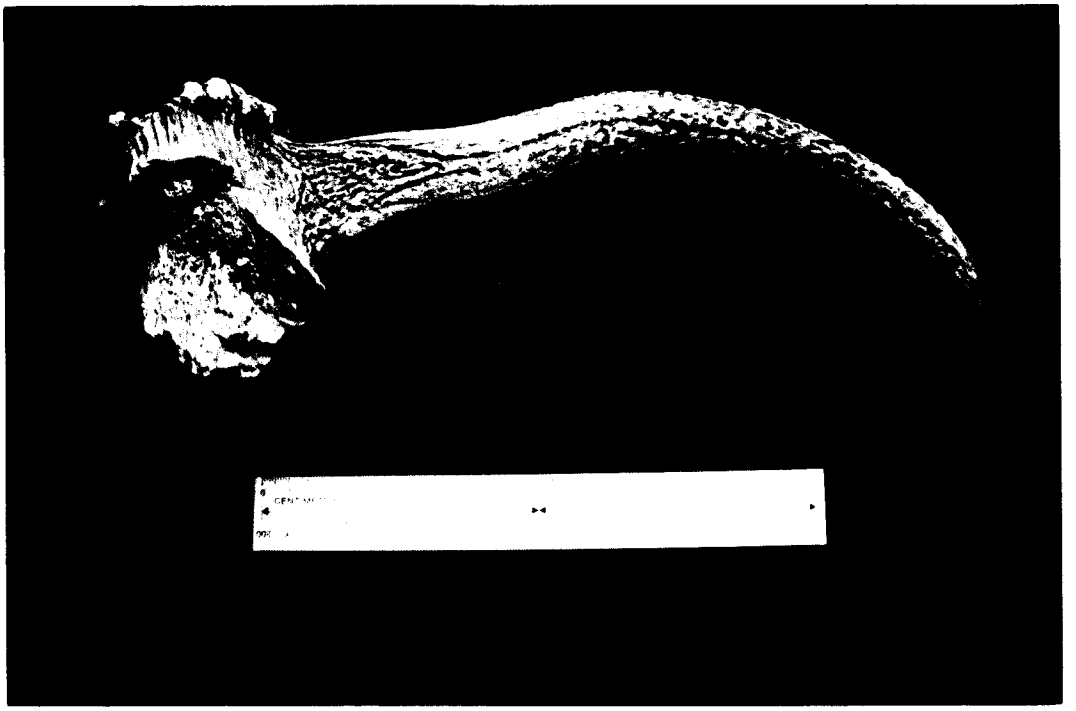

Fig. 6. Antler base and brow tine from Pit 782 at Brześć Kujawski, Site 3. Note traces of cut-and-snap technique.

ler axes represents an economical investment of labor. For instance, the hard surface of the antler was cut only as far as the spongy interior and then broken at the cut and ground to an edge, rather than being laboriously carved into a cutting edge. Also among the materials recovered from Pits 892 and 898 were broken axes in the process of being repaired. The beams had cracked along the shafthole but the working edges were still intact. The repair consisted of drilling a new hole halfway between the old one and the edge. Even if an axe repaired in this manner broke again, the edge could have been removed and hafted, probably like a flat stone axe. The continued repair of such axes probably represents the same parsimony demonstrated in the investment of labor in the original tool.

ARTIFACTS ASSOCIATED WITH ANTLER AXE PRODUCTION

The antler scrap in Pits 892 and 898 was accompanied by an assemblage of stone and flint artifacts which were probably associated with the manufacturing process. These include pieces of local rock which do not occur naturally in the subsoil around the pits, and knives made from blades of "chocolate" flint which was imported from the northeastern scarp of the Holy Cross Mountains in south-central Poland. It is worth noting that the features elsewhere in the Brześć Kujawski settlement which are coeval with Pits 892 and 898 contain either very little chocolate flint or none at all. In this case, the high-quality flint was an indispensable material for the manufacture of tools for working antler. The knives prepared for this purpose were blades retouched on both ends and along the edge which was set into the haft. The retouched ends of the blade also had a characteristic protrusion which reflected the depth to which they were set in the haft. This detail of the knives associated with antler working enabled the entire sharp edge to be drawn freely through the initial cut in the antler. The cutting edge of the blade was basically unretouched. The presence of "retouch" in

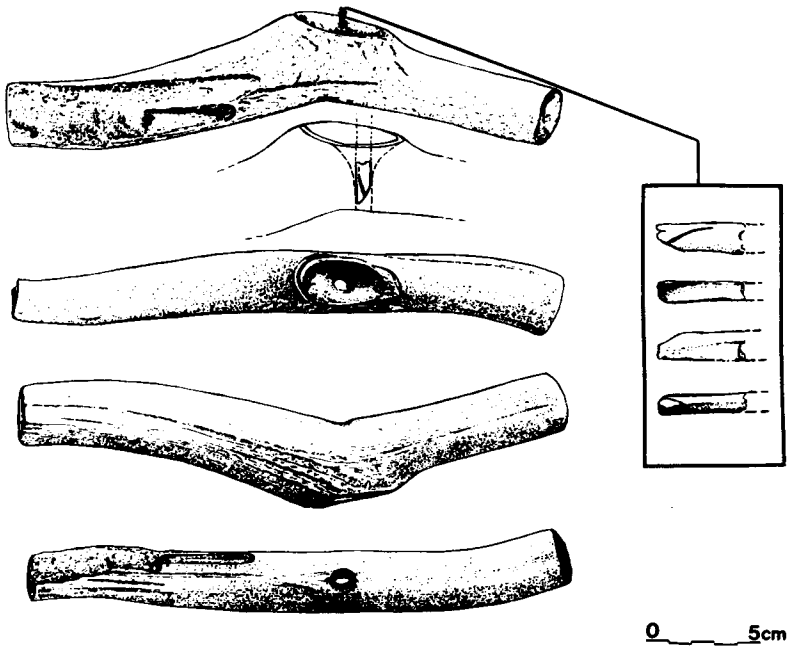

Fig. 7. Views of a nearly finished axe from Pit 898 at Brześć Kujawski, showing bone drill found embedded in the shafthole.

the form of deep chips from the cutting edge can be explained as an effect of the working of the tool against the uneven exterior surface of the antler. Two of these tools were in Pits 892 and 898, and a third was found loose near the western bedding trench of the house associated with these features.

The microscopic study of the working edges of these tools showed well-preserved microwear in the form of short, intersecting scratches and, above all, heavy polish. The width of the cut marks on antler objects is closely linked to the thickness of these tools. Among the tools recovered from the presumed antler workshop were also massive scrapers and trapezoidal knives. The latter were probably used to finish the working edges of the antler tools. In addition, unaltered flint blades were also used for the cutting of antler.

Within the concentration of material at the base of Pit 892, particularly in the areas with the greatest amounts of antler, there were many pieces of rock showing various degrees of wear. These were probably used for smoothing the cut antler beams and as anvils for snapping cut antlers. Some of these stones are so heavily polished that they resemble broken grindstones. Also present were "handstones," used possibly for grinding grain; their extensive wear also suggests secondary use as hammers.[1]

ANTLER AXES AND NEOLITHIC SOCIETY

The broad distribution of T-axes across the North European Plain, in both Mesolithic and Neolithic contexts, and the investment of labor in their manufacture indicate the role that these artifacts played in prehistoric communities between 4000 and 3000 b.c. Following Binford (1962) and Gibbon (1984: 139), it is possible to view artifacts as the objective reflections of the three major cultural subsystems: techno-economic, social (or sociotechnic in Binford's terms), and ideological (or ideotechnic in Binford's terms). The context of antler axe production and the finds of finished axes in graves raise questions that relate to each of these cultural subsystems.

The first issue is the role of T-axes in the technoeconomic subsystem, that is, in cop-

[1] Further study of the wear on the grinding stones may yield some information on the types of grinding motion used in shaping the cutting edges of the axes.

ing directly with the physical environment. The effectiveness of the antler edge for cutting wood, although inferred, has never been firmly established, yet the existence of broken and repaired T-axes indicates that they did have a function that could result in breakage. Whether this was hoeing or cutting brush, animal viscera and bone, or wood (possibly, as Clason [1986: 86] has suggested, for making dugout canoes) is not known. The hypothesis about dugout canoes should be considered, first because the antler edge seems more suited for cutting with the grain rather than across it. Second, lacustrine resources such as fish and turtles played a significant role in the economy at Brześć Kujawski (Bogucki 1984) and many of the other sites where T-axes have been found. Finally, there is the actual find of a dugout canoe at Hüde I on the Dümmersee in Niedersachsen, a site that has also yielded T-axes (Kampffmeyer 1983). Although the evidence is circumstantial, the possibility that T-axes were used to make canoes seems reasonable. Therefore, as Clason (1986: 86) advocated, experimental work should be undertaken to determine the function of antler axes and related implements.

More important, perhaps, are the implications of the antler T-axes for social and ideological subsystems of prehistoric culture. Finished antler axes appear in graves throughout the entire settlement at Brześć Kujawski, while antler scrap occurs in rubbish deposits. Fragments of antler with traces of working have been found, including antler bases from which the beams had been severed using the cut-and-snap technique described above. These are generally isolated finds, and the features containing them lack the concentrations of other antler fragments which would indicate that antler was worked at that location. In contrast, the markedly larger amount of worked antler in Pits 892 and 898 must have been discarded during the working of antler nearby. The spatial focus of the antler debris from all stages of the manufacturing in Pits 892 and 898 may indicate a certain degree of specialization in antler working by the inhabitants of the house associated with these pits. At the very least, these individuals were certainly proficient in T-axe manufacture and produced them in a quantity that must have been beyond that required for the use of that particular household.

The antler T-axes found at Brześć Kujawski and other Neolithic settlements in north-central Poland occur only in male burials, so it can be minimally inferred that they are markers of gender. Moreover, they do not occur in all male burials and thus may have some correlation with status and authority among males.[2]

The broad distribution of antler T-axes on the North European Plain in both hunter-gatherer and agricultural settlements could reflect either similar technological needs in the lowland environment or some interaction between the two types of communities. Although other forms of antler axes and mattocks are known, the T-axe appears to be the only common form over a broad expanse of north-central Europe between 4000 and 3000 b.c. T-axes are not commonly found at sites of the Lengyel and related cultures in the loess zone of central Europe, south of the North European Plain. In the loess belt, similar (although possibly slightly less dense) forested conditions existed, but the Mesolithic population seems to have been significantly lower.

Arguments have been advanced for interaction between the earliest Neolithic communities of north-central Europe and the indigenous hunter-gatherer populations (e.g., Cyrek, Grygiel, and Nowak 1986; Bogucki 1987), but they cannot be documented. Some sites with T-axes, such as Hüde I on the Dümmersee, have stratified Mesolithic and Neolithic components that indicate some measure of continuity. At Brześć Kujawski, however, such evidence is lacking, although there are some stylistic similarities between certain ceramics at Brześć Kujawski and those found at sites of the local incipient agricultural communities of the Funnel Beaker culture, which date slightly later (Grygiel 1986). The idea that the distribution of the antler T-axe may be the physical evidence of this hypothesized interaction should be investigated.

[2] Detailed study of the burials from Brześć Kujawski has yet to be carried out, but the antler axes would constitute an important variable in such an analysis.

Acknowledgments

Pamela Crabtree and Douglas Campana made helpful comments on a draft of this paper, although responsibility for its shortcomings rests solely with the authors.

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