
New implements and specialization of traditional industries in the Eneolithic of Bulgaria

Part 2 : Woodworking tools

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RÉSUMÉ

A l'Énéolithique (Chalcolithique) bulgare, la fabrication de grandes lames standardisées fournit de nouveaux supports à différents types d'outils, dont les racloirs, les rabots et les forets à travailler le bois. Nous décrivons ici les microtraces d'usure que portent les parties actives de ces instruments dont nous reconstituons le fonctionnement en prenant pour références des exemples ethnographiques. Nous pensons que les forets ont été utilisés avec un mécanisme animé au moyen de disques en argile que l'on trouve également sur le site. Il y a probablement une spécialisation plus grande des outils à travailler le bois à l'Énéolithique qu'au Néolithique, et le travail du bois s'est sans doute effectué plus systématiquement et à plus grande échelle dans le cadre des transformations économiques qui ont caractérisé l'Énéolithique bulgare.

ABSTRACT

In the Eneolithic (Chalcolithic) of Bulgaria, a new blade blank provides inserts for various tools, including woodworking scrapers, planes and drills. Microwear traces on inserts for these kinds of tools are described, and their use is reconstructed, citing ethnographic parallels. The wood drills are thought to have been used in a device driven by clay disks, also found in the site. The author feels there is greater specialization of woodworking tools in the Eneolithic than in the Neolithic, and that woodworking was carried out more systematically and on a larger scale as part of the economic transformations characterising the Bulgarian Eneolithic.

(Note : see general introduction in Skakun's article in the chapter on use of animal materials, which refers also to woodworking tools).

Special large blades provided blanks for inserts of woodworking tools as well as skin-working tools, discussed previously. The woodworking

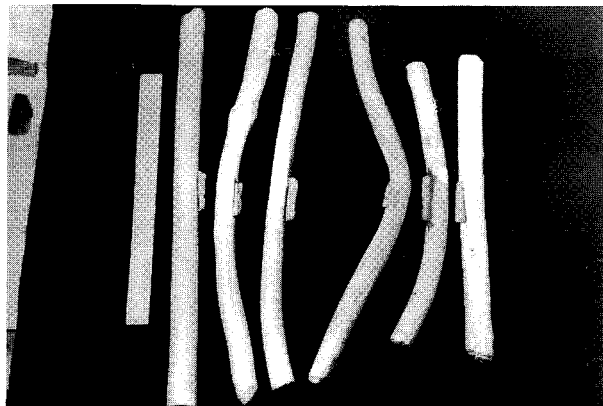


Fig. 1. Reconstruction of scraper-adze and plane knife-adze from wood.

tools include shaving-knives, planing knives-adzes and rod-shaped drills. These new implements for the wood-working industry were identified using use-wear analysis. Adzes were used in this industry along with longstanding tool types such as planing knives. These tool inserts were made from the middle parts of blades (3-4 x 2-3 cm), and show irregular utilization retouch along their lateral edges. Macro- and micro-use-wear is visible all along the working edge, whose extremities are rounded from use. These traces are typical of inserts of tools with handles used with both hands. The implements for wood-planing are called planes, and those for wood-scraping, scrapers (fig. 1).

Wood-planing implements have characteristic macro-use-wear in the form of one or two rows of large and small contiguous damage scars along the edge. Lustre also forms on these tools as a result of use. It is distributed along the edge in a broken line and as small spots on those parts of the ventral surface which were in close contact with the wood surface being worked. The striations, showing long strokes oriented perpendicularly to the working edge or somewhat at an angle, are found in the same area (fig. 2).

The macro-use-wear of inserts for wood-scraping is entirely different from the above type (fig. 3) and consists of vertical, multi-stage spalling whose facets often overlap in two and sometimes three rows, with the smaller damage located along the very edge. The cutting edge is somewhat concave in shape, and uneven in profile. Striations in the form of short lines across the edge are preserved only in isolated areas where edge damage has not occurred. Rare tiny facets are visible on the other edge face, which slides along the worked surface.

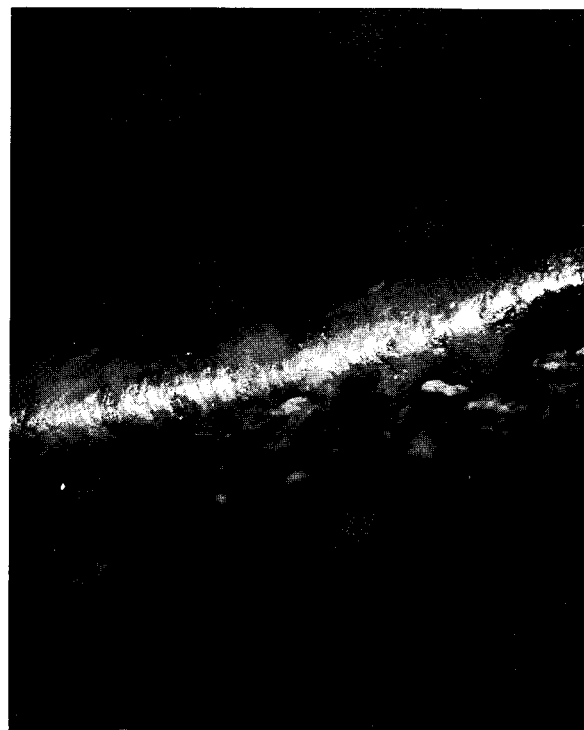


Fig. 2. Microphoto of plane knife-adze (x100).

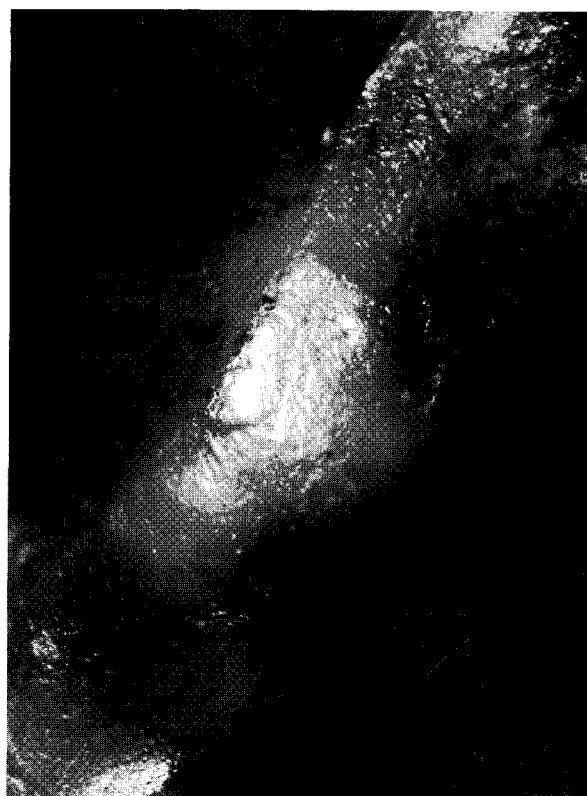


Fig. 3. Microphoto of scraper-adze (x100).

During use, wood-working tools for planing and scraping were held with two hands : while planing, the cutting edge was inclined towards the wood surface, and the tool was moved away from the worker ; while scraping, the working part was held vertically, and the tool was moved in the same direction. The objects worked with adzes were either fixed against the ground or fastened to a trestle for stability. Tools with the insert in the central part of a straight or curved handle were tried experimentally. As expected, straight-handled tools were more convenient for working flat surfaces, and the curved-handled ones more practical for working convex surfaces (fig. 4 : A-C).

The experiments showed the high efficiency of these wood-working tools. They can be used to work much larger surfaces in shorter periods of time and with a higher quality of work than ordinary scrapers and planes. These tools were used in our experiments for removing the bark of large logs, for planing planks, for making articles of complex form, etc. The ethnographic record shows a type of wood-working implement analagous to those found in archeological excavations. This is a two-handed metal tool-« rukan »-, which is still in use in Bulgarian villages.

Rare specimens of inserts for wood-working tools whose working parts show a combination of striations from two uses, planing and scraping, are also found. The small number of these dual-function tools can be explained by the fact that the rapid, very typical and different macrodeformation resulting from planing and scraping excludes the possibility of working with the same insert alternately for these two operations : flat edge damage produced by planing makes the working edge not thicker but rather sharper, and planing requires a thin working-edge with a low edge-angle. On the contrary, scraping produces intensive vertical spalling, increasing the angle of the working edge. Thus, planing with a tool already used for scraping is difficult, and quite often absolutely impossible.

Rod-shaped drills serving as the working part of a mechanical drilling device were discovered in the Eneolithic materials of Bulgaria (fig. 5). These drills were made out of the very dense, unbreakable parts of blades that were adjacent to their central dorsal ridge. Their dimensions are standard : 2-2.5 cm in length. The lateral sides of their points are abraded symmetrically, and so intensively that



A



B



C

Fig. 4. A. Work in wood by adzes. B. Work in wood by scraper-adze. C. Work in wood by knife-adze.

the retouch facet scars along the working edge are smoothed. And the very tip of the tool is so extremely worn that it has lost its sharp point and

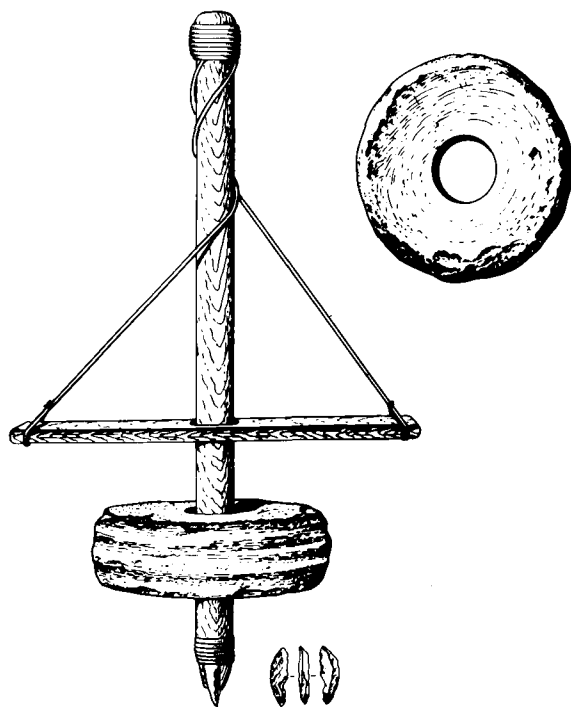


Fig. 5. The drill-device.



Fig. 6. Experiment with the drill-device.

become convex in outline and rounded in section. Luster and striations, oriented in a circular pattern, are visible on the lateral sides and on the tips of the implements. Besides drills, clay disks were found in the Eneolithic settlements. These disks are 15-18 cm in diameter, about 3,5 cm in thickness, and the central hole measures about 2.5 cm (Todorova, 1975). Traces of hand-moulding are visible on the lateral sides of these disks. No traces of friction induced by tying or other means of suspension are present on the parts located around the holes. The presence of such traces would be evidence of use of these disks as weights for looms or for fishing nets. On the contrary, traces of friction and real circular striations are visible in these holes. These facts lead us to suppose that these disks were the flywheels of a mechanical drilling device, and their suitability for such an operation was tested experimentally (fig. 6). The tests showed that such disks were suitable in size and weight for drilling devices with the Eneolithic-type drill as a working tip, and a board 2 cm thick was drilled in less than 1 min.

Eneolithic adzes and mechanical drills considerably enlarged the set of wood-working implements and increased the gamut of possible ways wood could be worked.

Conclusion of Parts 1 and 2

Thus these new, previously unknown implements were made from typologically uniform objects, unretouched fragments of middle parts of blades, and through use-wear analysis were shown to be inserts of scrapers (for skin, see Skakun's article in chapter on working of animal materials) ; inserts for planes and scrapers (for wood), inserts for a kind of leather-working frame, or for drills used in a mechanical device. All these tools arose from a new type of blank, large blades, which allowed the creation of new implements. It is interesting to note that tools used for the same purpose show clearly-marked morphological standardization, within a certain range of variation. That is to say, the blanks' size and shape were determined for implements of one or another function in particular. For example, the majority of inserts are made from the perfectly regular middle parts of blades, but other parts of the blades seldom were used for this. Furthermore, very

heterogeneous inserts can be divided into groups on the basis of similar morphological attributes which use-wear analysis showed correspond to the same use. The inserts for adzes and wood-shavers were fragments of 3-4.5 cm in length and 2.5-3 cm in width, and those for sickles, fragments of 3.5-3 cm in length and 2.5-3 cm in width. As stated above, particular forms and clearly defined morphological groups are present for endscrapers, rod-shaped drills and other types of implements such as borers and burins. Such a high level of standardization allowed for greater functional specialization of tools, and this is visually apparent for implements used for skin-working, leather-working and wood-working. Endscrapers were used for the initial stages of working and dressing of the areas of skins which were difficult to reach, and scraper-shavers for working of large areas and shammy-dressing, but the last working stages were carried out using the leather-working frame (see

description in article, in chapter on working of animal materials).

As concerns wood-working, scrapers and planing-knives were still used for some operations, whereas adzes were more efficient for others.

All the preceding observations give reason to believe that in the Eneolithic the complexity and demands of the technology of leather- and wood-working served to bring about specialization in these industries. This process reflects important changes in the Eneolithic economy, in particular the fact that many traditional activities grew from being domestic crafts to major components of large-scale, specialized craft operations. It is probable that these qualitative changes in the economy served as the basis for the prosperity of Eneolithic civilizations.

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