

ANALYSIS OF THE TRACES OF USE ON POLISHED STONE TOOLS FOR WOODCUTTING AND WOODWORKING FROM THREE ENEOLITHIC NECROPOLISES IN BULGARIA

Radoslav RACHEV*

Cuvinte-cheie: *eneolitic, necropole, practici funerare, unelte din piatră șlefuită, tăierea și prelucrarea lemnului, topoare, tesle, dălți, urme de utilizare.*

Keywords: *Eneolithic Period, necropolises, funerary practices, polished stone tools, woodcutting and woodworking, axes, adzes, chisels, traces of use.*

Rezumat: *Obiceiul depunerii obiectelor în morminte a continuat pe teritoriul Bulgariei de-a lungul eneoliticului. Pe parcursul acestei perioade, unelte de piatră șlefuită asociate cu activități precum tăierea și prelucrarea lemnului au fost depuse ca parte a inventarului funerar, deși cu o frecvență mai redusă decât alte categorii de piese. Aceste unelte sunt reprezentate cu precădere de topoare, tesle și dălți de piatră. Structuri funerare conținând astfel de unelte au fost descoperite în 10 necropole din Bulgaria.*

Urmele de utilizare prezente pe uneltele de piatră ar putea oferi informații privind modul specific de folosire al unei piese, intensitatea manevrării, sau, în unele cazuri, reparații și reutilizare. Urmele de uzură pe uneltele descoperite în contexte funerare pot fi comparate cu cele de pe uneltele descoperite în așezări, oferind mai multe informații privind rolul jucat de această categorie de obiecte în context funerar. În articol au fost analizate urmele de uzură de pe piesele descoperite în trei necropole (Varna II, Varna I și Targovishte). Cele mai multe unelte care provin din mormintele acestor necropole nu au fost utilizate sau prezintă urme slabe de uzură. Unele piese prezintă semne de reascuțire înainte de depunerea în morminte. Cu foarte puține excepții, uneltele sunt într-o stare bună, potrivite pentru folosire. Se pare că o cerință în cadrul ritualurilor funerare era aceea de a depune în morminte unelte de piatră șlefuită, într-o stare cât mai bună și cu puține urme de uzură. Această situație poate fi comparată cu cea a altor categorii de obiecte nefolosite, depuse în morminte, precum vase ceramice sau piese de silex.

Abstract: *The tradition of placing objects in graves continued through the Eneolithic period in Bulgaria. During this period, polished stone tools associated with woodcutting and woodworking were part of grave goods, although with less frequency than other categories of objects. They are mainly stone axes, stone adzes and stone chisels. Grave complexes with these categories of tools were excavated from 10 necropolises in Bulgaria.*

* Radoslav RACHEV: Sofia University "St. Kliment Ohridski", Sofia; e-mail: radoraxhev@gmail.com

The use-wear traces on the stone tools could give information for the specific use of a tool, intensity of that use and in some cases indicate repairs and recycling. The traces of use of the tools from grave context could be compared with those on tools from settlement context, giving more information regarding the role that this category of objects played in the funerary rites. The use-wear traces on the tools from three necropolises (Varna II, Varna I and Targovishte) are examined in the article. Most of the tools placed in graves from these necropolises are unused, or slightly used. Some of the tools show signs of resharpening before being placed in a grave. All of them, with few exceptions, are in good, working condition. It seems that a requirement of funeral rites is for the polished stone tools placed in the grave to be as new and unused as possible. This situation could be compared with that of other types of objects, placed in graves, as new, such as pottery and flint tools.

Introduction

The earliest prehistoric graves excavated on the territory of Bulgaria are from the Early Neolithic Period. The tradition of burying the deceased comes with the Neolithic Period (New Stone Age) economy as a part of the so called “Neolithic Package”. It appears that the placement of objects in the grave, with the dead body, was a significant part of the funeral rituals even in this early period¹. This tradition was kept all through the Neolithic and the Eneolithic Period (or Copper Age) in Bulgaria, even when other characteristics of the funeral rites changed. From the Neolithic Period (New Stone Age) onward, polished stone tools, more specifically tools that could be associated with woodcutting and woodworking, were placed in graves². During the Eneolithic Period this tradition continued, and the larger number of graves could give more information about the role of those tools in the funeral rituals.

The polished stone tools associated with woodcutting and woodworking are: stone axes, stone adzes and stone chisels³. In the Bulgarian archaeological literature on the subject this view is generally accepted⁴, with the addition of a few specific and rare types of tools such as “stone wedges” for example. Until present, only stone axes, stone adzes and stone chisels were found in funerary contexts. Polished stone tools from the mentioned categories were found in 10 necropolises from the Eneolithic Period: Varna II⁵, Durankulak⁶, Varna I⁷, Varna III⁸, Devnya⁹, Vinitsa¹⁰, Golyamo Delchevo¹¹, Kamenovo¹², Lilyak¹³ and Targovishte¹⁴. Some of the tools were

¹ BACHVAROV 2003, p. 40.

² PETKOV 1961, p. 66.

³ KARIMALI 2005, p. 198.

⁴ TODOROVA 1986, p. 154; KANCHEV, NIKOLOV 1983, p. 18.

⁵ IVANOV 1978, p. 83.

⁶ TODOROVA 2002.

⁷ SLAVCHEV 2010, p. 17.

⁸ SLAVCHEV, ATANASOVA, RUSEVA 2018.

⁹ TODOROVA-SIMEONOVA 1971.

¹⁰ RADUNCHEVA 1976.

¹¹ TODOROVA, IVANOV, VASILEV *et alii* 1975.

¹² BOYADZHIEV, CHERNAKOV, DILOV 2019.

¹³ OVCHAROV 1963.

¹⁴ ANGELOVA 1986.

placed in graves, others were placed in complexes without human remains. All and all, stone axes, adzes and chisels are present in 8.3% of the complexes from these necropolises, situation which makes them a rare category of grave goods. Still, there are some outliers like Varna I, with 19.8%, and Targovishte, with 36.4% of all graves.

Methodology

The use of the polished stone tools leaves traces on their surface. Publications on the topic of use – wear analysis¹⁵ and experimental studies¹⁶ are used as a guide for the interpretation of the observed traces. The approach used in this study is visual observation with a digital microscope, under magnification $\times 50$. The observed use-wear traces could be subdivided, according to their location on the body of the tool into:

1. Traces on the cutting edge of the tool – they give information about the material that the tool was used on, as well as the intensity of use, therefore the length of time it was used;
2. Traces on the body of the tool – they give information about the direct hafting of the tool in a handle or in a socket used to connect it with a handle;
3. Traces on the sides of the tool – they give information about the hafting of the tool;
4. Traces on the butt of the tool – they give information about the type of hafting and the type of pressure and force used on the tool (through a handle –working like a lever, or through direct strike on the butt of the tool) and about the length of the period of use.

These traces are degrading changes on the original surface of the tool. They could be easily visible (chipping or breaking of large parts of the surface) or microscopic (changes on the surface of the tools, result from chipping or eroding, that could be observed under different levels of magnification). Often, they are microscopic, macroscopic flaking or visible polishing.

When examining polished stone tools from Eneolithic settlements, it can be concluded that there are certain traces of use, which are most often found on one of the three groups of tools. All these traces are the result of the specific way of using the axe-successive blows with great force that fall directly on the cutting edge of the tool. For example, the cutting edges of polished stone axes show microscopic irregular flaking of particles that gradually dull the edge. In addition, there is macroscopic flaking of uneven fragments on both sides of the edge.

As for chisels, the way they are used is through long periods of constant pressure during which the edge of the tool slides at an angle over the surface of the wood being worked. This kind of activity results in a gradual smoothing and rounding of the cutting edge, with little or no flaking of fragments.

Sometimes there are signs that a particular polished stone tool has been reworked. Traces are found that a stone tool was made by recycling another old tool.

¹⁵ RAJKOVIĆ *et alii* 2014, p. 103; KANCHEV 1997, p. 138; KANCHEV, NIKOLOV, 1983, p. 16; KANCHEV, STANEV, 1981, p. 16–17.

¹⁶ MASCLANS LATORE *et alii* 2017, p. 164–165.

In another case, such an instrument was simply repaired. The most common repair attested among tools recovered from settlements is the resharpening of the blade.

Bearing in mind the observations made on large quantities of tools and types of traces on them, from an Eneolithic settlement context, it is possible to make a comparison with the tools found in graves from synchronous necropolises.

Analysis

This comparison is made for three of the necropolises for now: Varna II, Varna I and Targovishte¹⁷. The analysis is based on a limited number of sites, but they cover the last phase of Hamangia and Varna culture, as well as allow for a comparison with Kodzhadermen – Gumelnita-Karanovo VI culture. Hopefully, in the future, the rest of the tools from the Eneolithic necropolises in Bulgaria will be analyzed in order to create a more complete picture.



Fig. 1. Polished stone tools for woodcutting and woodworking from Eneolithic necropolises in Bulgaria: a) axe from Grave 1, Varna II necropolis; b) adze from Grave 43, Varna I necropolis; c) chisel from Grave 155, Varna I necropolis; d) adze from Grave 286, Varna I necropolis; e) adze from Grave 1 Targovishte necropolis.

For Varna II it would appear that the tools that were placed in the graves were unused, or minimally used. For one tool there is evidence for second sharpening of the cutting edge, but after this resharpening the tool appears to be unused.

¹⁷ I would like to express my gratitude to V. Slavchev and O. Pelevina from the Regional Historic Museum-Varna and M. Zhecheva and S. Ivanov from Regional Historic Museum-Targovishte for offering me the opportunity to examine the stone tools from the three sites.

Tab. 1. Varna II necropolis – the tools and the traces on them.

Complex:	Tool:	Traces:
Grave 1	axe	small macrotraces-few chips on the cutting edge
	adze	minimal traces of use on the edge
	chisel	no traces of use
Grave 3	axe	no traces of use
	axe/votive, axe	no traces of use
	adze	no traces of use; traces of resharpening of the edge

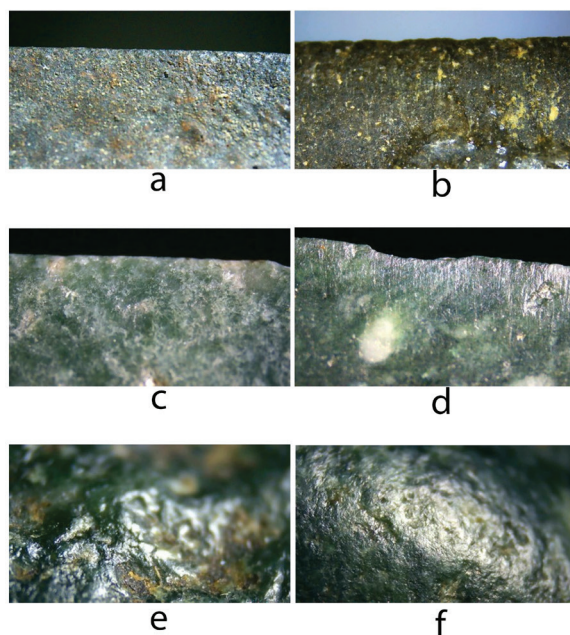


Fig. 2. Traces on polished stone tools (magnification $\times 50$): a) cutting edge of the adze from Grave 1, Targovishte necropolis-without traces of use; b) cutting edge with traces of use, of an adze from Targovishte tell settlement; c) cutting edge without traces of use of the adze from Grave 51, Varna I necropolis; d) cutting edge of the chisel from Grave 155, Varna I necropolis-with traces of use; e) a patch of shining polish from the hafting of the tool, on the butt of the adze from Grave 43, Varna I, necropolis; f) detail of the butt of an adze from Grave 172, Varna I necropolis, that has no traces of prolonged hafting.

The same observations apply to the Varna I necropolis. Form 68 examined cutting and woodworking tools over 45 show no signs of use on their cutting edges and no signs of a prolonged period of being hafted into the handle.

When tools have edge wear, the use traces are minimal and often accompanied by a light burnish on the butt from hafting. Since the polishing of these tools is not intensive, it can be concluded that the tool was placed in a socket for a short period of time, that is, it was used either for a short time or sporadically.

One tool shows signs of resharpening the cutting edge. For several tools, it is difficult to conclude whether they were used because the material they are made of is a sedimentary rock that has a surface that crumbles easily. This means that micro traces of work can erode and therefore microscope observations are uncertain. However, there are no macro traces of work on these tools, such as chipping off edge fragments.

For three other instruments it is uncertain whether they were used due to their surface finish. As they are extremely polished, it is difficult to distinguish whether they were used or not. In case they were used, the traces indicate work as chisels, although their shapes are not like that of other chisels. It should be noted that these three tools are the largest tools identified at Varna I necropolis as being made of jadeite¹⁸. Since the raw material in their case was imported from great distances, it can be assumed that the effort to polish them so perfectly was justified. At the same time the butts of these tools show that they were hafted in handles for a long time. Polishing of the surface of a tool is a result of movement between polished stone tool and handle. Therefore, it could be proposed that those tools were in use, although exactly what their use was is uncertain.

Tab. 2. Varna I necropolis – the tools and the traces on them.

Complex:	Tool:	Traces:
Grave 255	chisel	few traces of use on the edge
Grave 244	adze	little traces of use on the edge
Grave 240	adze	little traces of use on the edge, traces of hafting on the butt
Grave 97	adze	little traces of use on the cutting edge
Grave 14	chisel	little traces of use on the cutting edge
Grave 166	adze	little traces of use on the cutting edge, a bit of polishing on the butt from hafting
Grave 135	adze	little traces of use on the cutting edge, polishing on the butt from hafting
Grave 78	adze	little traces on the cutting edge, traces of resharpening
Grave 206	adze	no traces of use
Grave 209	adze	no traces of use
Grave 217	adze	no traces of use
Grave 229	adze	no traces of use
Grave 247	adze	no traces of use
Grave 252	adze	no traces of use
Grave 253	adze	no traces of use
Grave 259	adze	no traces of use
Grava 262	adze	no traces of use
Grave 21	adze	no traces of use
Grave 51	adze	no traces of use
Grave 111	adze	no traces of use
Grave 116	adze	no traces of use
Grave 127	adze	no traces of use

¹⁸ PÉTREQUIN *et alii* 2012, p. 1245.

Grave 133	adze	no traces of use
Grave 145	adze	no traces of use
Grave 150	adze	no traces of use
Grave 152	adze	no traces of use
Grave 153	adze	no traces of use
Grave 159	adze	no traces of use
Grave 172	adze	no traces of use
Grave 180	adze	no traces of use
Grave 181	adze	no traces of use
Grave 182	adze	no traces of use
Grave 187	adze	no traces of use
Grave 192	adze	no traces of use
Grave 195	adze	no traces of use
Grave 201	adze	no traces of use
stray find	adze	no traces of use
Grave 249	adze	no traces of use
Grave 284	adze	no traces of use
Grave 282	adze	no traces of use
Grave 286	adze	no traces of use
Grave 290	adze	no traces of use
Grave 293	adze	no traces of use
Grave 256	chisel	no traces of use
Grave 265	chisel	no traces of use
Grave 14	chisel	no traces of use
Grave 23	chisel	no traces of use
Grave 143	chisel	no traces of use
Grave 151	chisel	no traces of use
Grave 166	chisel	no traces of use
Grave 170	chisel	no traces of use
Grave 200	chisel	no traces of use
Grave 204	chisel	no traces of use
Grave 4	adze	on the cutting-edge traces of use similar to chisels, on the butt polishing from hafting
Grave 43	adze	on the cutting edge uncertain because of the overly polished surface, on the butt and the side ridges polishing from hafting
Grave 43	adze	on the cutting edge uncertain because of the overly polished surface, on the butt polishing from hafting
Grave 243	adze	severely damaged cutting edge
Grave 155	chisel	severely damaged cutting edge
Grave 194	adze	severely damaged cutting edge, flaking from the both sides of the edge – rare for adzes
Grave 261	fragmented tool	the cutting edge is severely damaged
Grave 13	adze	traces from resharpening of the cutting edge, on the butt polishing from hafting

Grave 144	chisel	traces of use on the cutting edge characteristic for chisel, few chips on from the edge, polishing from hafting on the butt
Grave 52	adze	uncertain because of the characteristics of the material, but no macro traces
Grave 112	adze	uncertain because of the characteristics of the material, but no macro traces
Grave 115	adze	uncertain because of the characteristics of the material, but no macro traces
Grave 288	adze	uncertain because of the characteristics of the material, but no macro traces
stray find	chisel	uncertain because of the characteristics of the material, but no macro traces

The limited number of tools from the necropolis Targovishte show the same characteristics. With the exception of one stone adze, all other polished stone tools do not show any signs of use.

Tab. 3. Targovishte necropolis-the tools and the traces on them.

Complex:	Tool:	Traces:
Grave 1	adze	little traces on the cutting edge
Grave 2	adze	no traces of use
Grave 10	chisel	no traces of use
Grave 11	adze	no traces of use

Conclusions

It appears that the tradition for depositing polished stone tools for woodcutting and woodworking as grave goods, at least during the Eneolithic Period (or Copper Age) in Bulgaria, demands them to be new. This corresponds well with the observations for other categories of grave goods, such as pottery¹⁹ and some types of flint tools (super blades²⁰). At the same time this differentiates the polished stone tools from other utilitarian objects in grave complexes like the small flint tools²¹.

It is possible that the polished stone tools were not made especially for the burial, like the ceramic vessels. The fact that tools, that bear the marks of limited use, are placed in graves, may indicate that the ritual required a functional instrument to accompany the deceased. The indications for resharpening of some tools may indicate repairs made especially for the objects to be up to par for the burial. It should be noted that recycling and repair is easier than creating a completely new tool, for it to be buried. It should be emphasised that if the recycling or the repair of the tool was thoroughly done, there would have been no trace left on them. At the same time, with some exceptions, most of the polished stone tools placed in graves are made from softer rock materials²². In other words, materials that are easier and

¹⁹ GEORGIEVA, DANOV 2021, p. 50.

²⁰ MANOLAKAKIS 2006, p. 13.

²¹ GUROVA 2002, p. 252.

²² TODOROVA *et alii* 1975, p. 84.

faster to shape, grind and polish – fine volcanic tuffs in Varna²³ and fine sandstone for Targovishte. The latter is a good example because a direct comparison can be made with the settlement to which the necropolis belongs²⁴, where sandstone is rarely used and most of the polished stone tools for carving and woodworking are made of andesite²⁵.

Ever since the first Eneolithic necropolises were excavated in Bulgaria, the objects placed in the graves were interpreted based on their symbolic meaning²⁶. Scholars working in this field in the past have considered that the objects that were placed in grave were necessary to the deceased in the underworld²⁷. At the same time, they played a key role in representing the deceased in a very important moment for the prehistoric communities – funeral rites. The analysis of the grave goods from the Eneolithic does not allow for the interpretation of the polished stone tools used for woodcutting and woodworking as representing a special or very high status of the buried person, unlike the weapons for instance²⁸. The polished stone tools, probably with the exception of those made from exotic rocks, were part of the mundane life of the Eneolithic communities. But even as such, the traces of use, or more accurately their absence on the stone axes, adzes and chisels placed in graves, allow us another glimpse in the requirements of the funeral rites.

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²³ KOSTOV, PELEVINA 2006, p. 25.

²⁴ ANGELOVA 1986b.

²⁵ Personal observation.

²⁶ TODOROVA-SIMEONOVA 1971.

²⁷ TODOROVA 1986, p. 195.

²⁸ BOYADZHIEV 2016, p. 193.

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