

# THE STORY OF ONE HARPOON. REUTILIZATION OF AN OSSEOUS PROJECTILE FROM SUBNEOLITHIC AT ŠVENTOJI (LITHUANIA)

La historia de un arpón. Reutilización de un proyectil óseo subneolítico  
procedente de Šventoji (Lituania)

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**ABSTRACT** Among the rich collection of osseous artefacts found in the Subneolithic and Neolithic levels from archaeological sites in Šventoji (Lithuania), a small fragment of a bone harpoon head is particularly interesting. The characteristics of the use-wear traces that were identified on the artefact suggest that the piece was reused as a kind of grinding tool. This observation became a starting point for a discussion concerning the presence of such practices in prehistoric hunter-gatherer societies of Europe and the significance of these kind of objects.

**Keywords:** Šventoji, Subneolithic, Harpoon Head, Bone, Reutilization, Traceological Analysis.

**RESUMEN** Entre la rica colección de artefactos encontrados en los niveles Subneolíticos y neolíticos de varios yacimientos arqueológicos de Šventoji (Lituania), resalta un pequeño fragmento de la cabeza de un arpón, constituyendo un elemento realmente interesante. Las características de las trazas de uso que fueron identificadas en la pieza sugieren que ésta fue reutilizada como una herramienta empleada en actividades de abrasión. Esta observación supuso un punto de partida para una discusión relativa a la presencia de tales prácticas en las sociedades prehistóricas de cazadores-recolectores de Europa y el significado de este tipo de objetos.

**Palabras clave:** Šventoji, Subneolítico, Cabeza de arpón, Reutilización, Análisis tra-ceológico.

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## INTRODUCTION

Projectiles, in the form of various types of points and bone harpoon heads, comprised some of the most important equipment of hunter-gatherers worldwide. These tools, especially harpoons, are found even at very early periods throughout Africa (see Bradfield and Choyke, 2016:956-957) as well as Asia and Europe (see Langley, 2016:3-7). It is generally distinguished between spears and javelins equipped with fixed points (e.g. David, 2005:62), and harpoon heads, which detached from the shaft after the target had been hit (Weniger, 1987:80). Studies on these two types of prehistoric projectiles have a long-standing tradition and present an important source of information about past societies, especially due to the characteristic elements of their construction, which often enable the classification of finds into archaeological cultures. Therefore, they have been the subject of various typological (Clark, 1936; Kozłowski, 1977; Weniger, 1987; Ramseyer, 1988; Galiński, 2013), technological (Knecht, 1991; Zhilin, 1998; David, 2005; Cristiani and Borić, 2016; Skakun *et al.*, 2014; Orłowska and Osipowicz, 2018; Zhilin, 2017), and functional analyses (Arndt and Newcomer, 1986; Pokines, 1998; Pétilion, 2005; Skakun *et al.*, 2014; Pétilion *et al.*, 2016; Zhilin, 2017).

An abundant collection of such finds comes from the Subneolithic and Neolithic levels of archaeological sites in Šventoji, located on the north-western coast of Lithuania. This archaeological complex was discovered by Mikelis Balčius and Rimutė Rimantienė during land-development efforts in 1966. Several dozen archaeological sites were identified, dated to the time period between 6000 and 500 cal. BC. Excavations conducted at a later date provided a wide array of unique organic and stone artefacts (Rimantienė, 2005; Piličiauskas, 2016; Luik and Piličiauskienė, 2017).

During the first stage of the recently-initiated traceological analyses of the osseous artefacts from the prehistoric sites at Šventoji, a small fragment from a harpoon head attracted particular attention. It has marks suggesting that the broken artefact was re-worked<sup>1</sup> and reused<sup>2</sup>, although not as a projectile. The implications of this observation are discussed in detail in the rest of the article along with the general importance of the existence of such practices in other prehistoric hunter-gatherer societies and their significance in early cultural contexts.

## MATERIAL AND METHODS

The harpoon head (EM 2132:30) was found in 1972 during excavations at the Šventoji 3 site (fig. 1; Rimantienė, 2005). The site is located in the middle of

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1. What means, that its primary form was changed to adapt it to a new function.  
2. What means, that after reworking it was used to brand new function, different than the primary one.

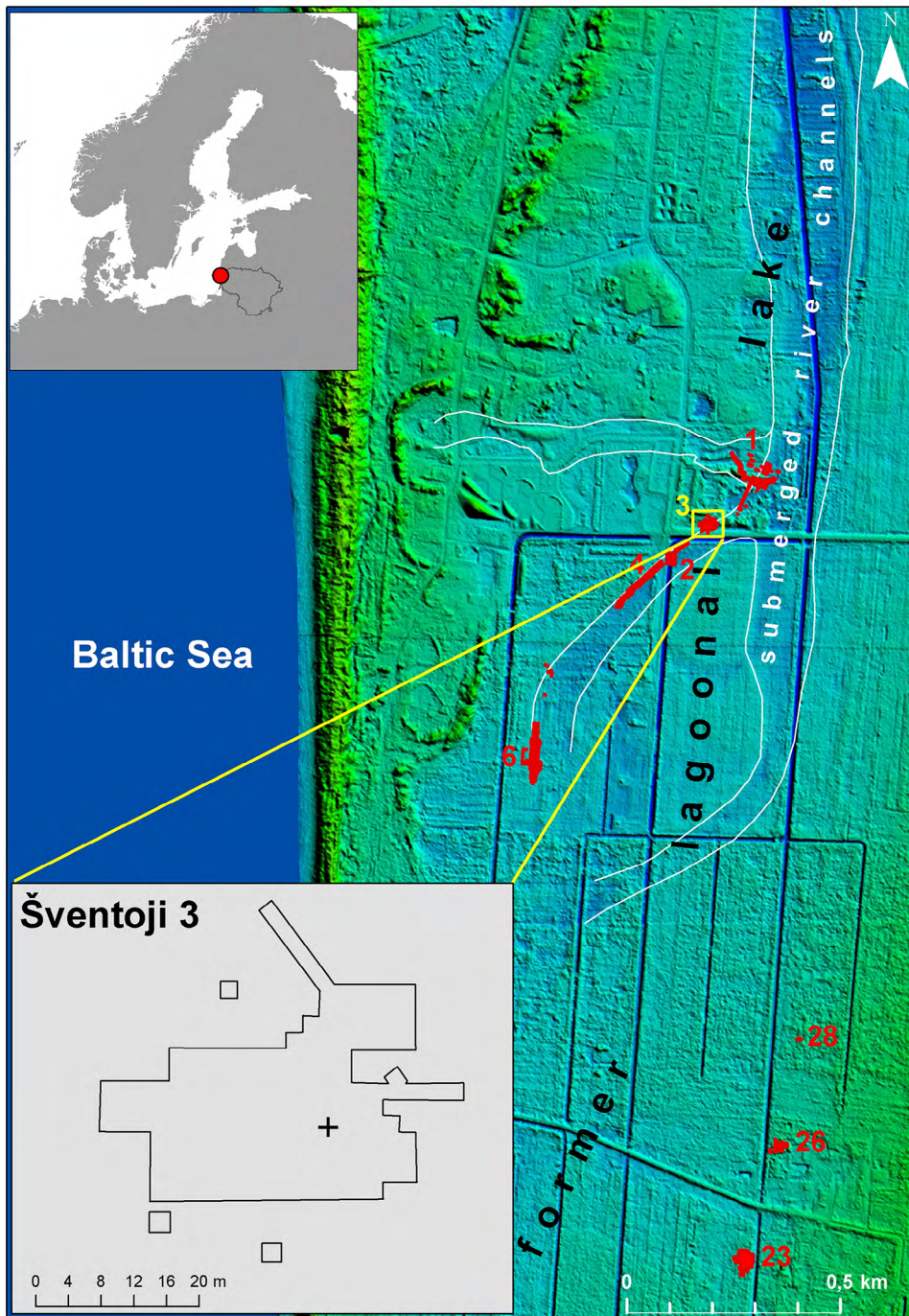


Fig. 1.—Situation of the site Šventoji 3. The place where the analyzed harpoon head was found on the excavation plan was marked with a cross.

former lagoon. A cultural layer was sealed within waterlogged gyttja (sediment rich in organic matter deposited at the bottom of a eutrophic lake). Organic artefacts, including bones, are therefore very well preserved. The site dates to 3200/2700 cal BC, i.e. to the Subneolithic-Neolithic transition. It was interpreted as a fishing station where human generated debris accumulated during many episodes of fishing activities (Rimantienė, 2005; Piličiauskas, 2016). The harpoon head (EM 2132:30) was recovered at the lower layer B which dates to very end of Subneolithic, ca. 3000 cal. BC.

The artefact is very well preserved despite its fragmentary state (fig. 2). It has a brown color and a smooth, slightly shiny surface. The middle part of the harpoon is preserved, including one barb. The specimen is made from an elk (*Alcesalces* L. 1758) metacarpal diaphysis and is 117 mm long, 24 mm wide and 12 mm thick. In total, eight harpoon heads were found at Šventoji sites 1-4 and four at site 6 (calculated from percentage data presented in the article of Luik and Piličiauskiene (2017:194, fig. 9). All specimens have more or less a similar form.

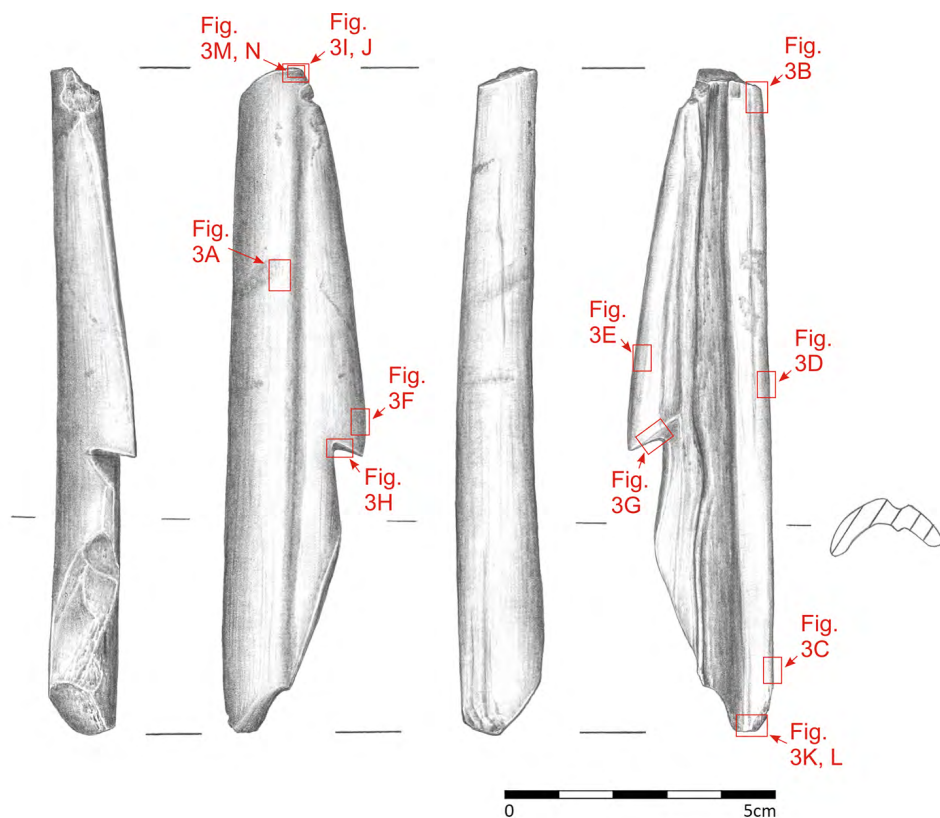


Fig. 2.—Analyzed reutilized harpoon head from site Šventoji 3 (EM 2132:30), with marked locations of the photomicrographs (draw by B. Kowalewska).

## Technical parameters of the analysis

The traceological analysis of the described artefact was conducted using a Nikon SMZ-2T microscopic-computer kit coupled with a Nikon D7100 camera. The said device enables the photo documentation at magnitude of up to 12.6x (with real magnitude of up to 120x), as well as computerised processing of the digital images. The said kit was used for making all of the attached microphotographs. For reasons of museum restrictions, it was not possible to analyze the observed polishes using a metallographic microscope, as well as to study them using SEM.

The adopted terminology is based on a popular conceptual system (Newcomer, 1974; *Ho Ho Committee*, 1979:133-135; d'Errico *et al.*, 1984; Vaughan, 1985:10-13, Glossary, s. VII; van Gijn, 1989:16-20; LeMoine, 1991; Juel Jensen, 1994:20-27; Korobkova, 1999:17-21; Christidou, 2008; Osipowicz, 2010:24-35) that was adjusted to the needs and requirements of the conducted analysis. Terms referring to the method of using the tools are based on the classification proposed by L. H. Kealey (1980:18, fig. 3).

Micro-traces were recorded taking into account their kind, development, location, and distribution over the surface of the analyzed tool. Morphological definitions of the harpoon head are based on the terminology developed by the Committee of Nomenclature of Prehistoric Bone Industry (Averbouh, 1995).

## RESULTS

The technological traces that were observed on the artefact can be separated into two groups (fig. 3): (1) such developed during the manufacture of the harpoon head, and (2) others caused by its adaptation to a secondary function. The first group includes marks caused by the scraping of the entire, currently visible surface, including the medullary cavity using a stone tool (fig. 3A,B). This process was executed on the hard and dry surface of the bone, something indicated by the visible chatter marks (fig. 3C). The surface with the barb, as well as the opposite upper side, display concurrent, layered traces of the additional phases of production, including grinding (fig. 3D), smoothing of the surface, and a precise, glossy polish, most likely achieved with a scrap of leather (fig. 3E). The barb was shaped by means of sawing and scraping on both sides (fig. 3G,H).

Technological traces associated with the process of transforming the broken harpoon head into a different type of tool primarily derived from grinding (as well as occasional whittling), carried out to eliminate any unevenness of the surface, in the fractured area and around it, at the apical part of the specimen (fig. 3I,J). The process was likely meant to lightly round off that part of the tool (eliminating the rough edges). The remains of multidirectional grinding, meant to remove any unevenness caused by the fracture, are also visible on the base of the product (fig. 3K). However, that work had a different purpose; to create a flat, even, and obliquely oriented surface, or in the case of the apical part, a surface perpendicular to the long-axis of the tool (fig. 3L).

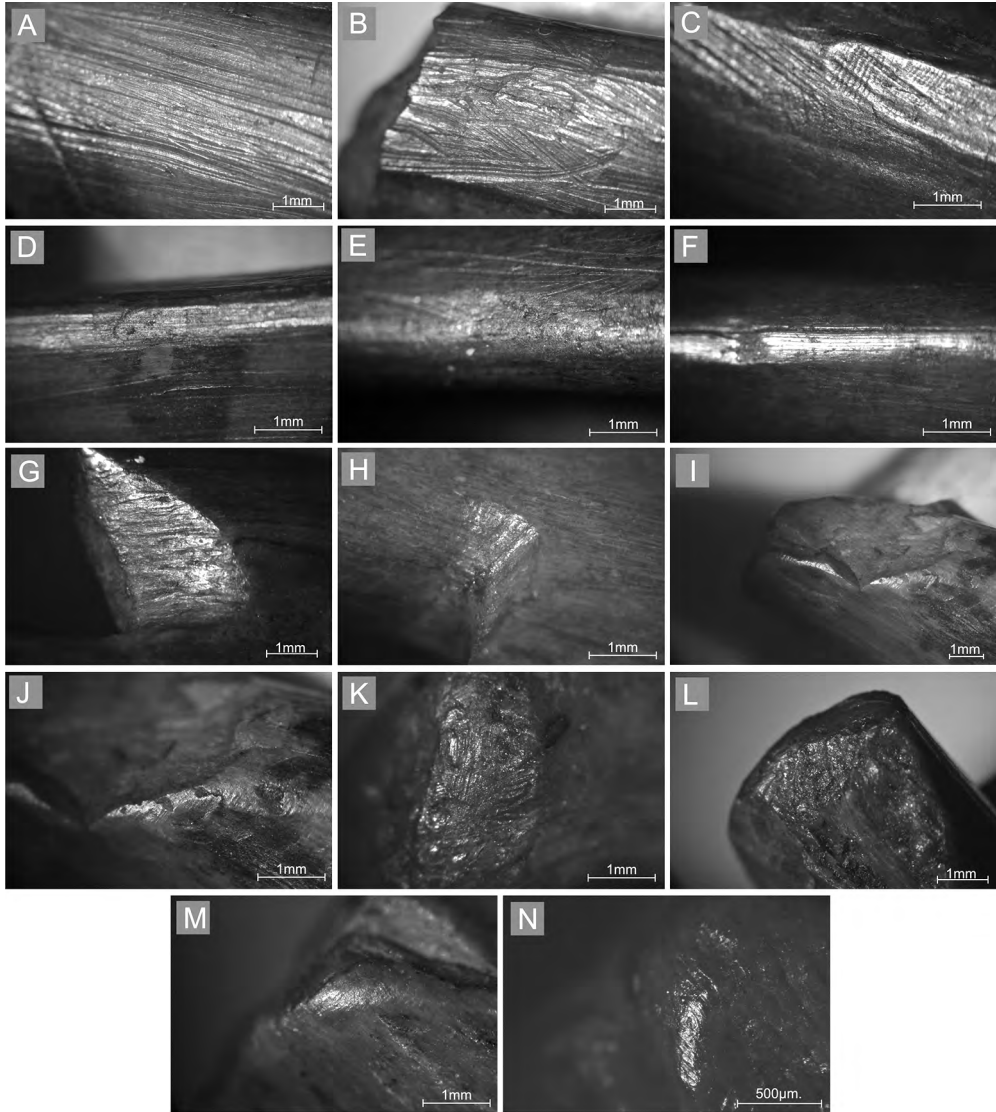


Fig. 3.—Use-wear and technological traces observed on the analyzed artefact (photo G. Osipowicz).

Traces of use related to the likely primary function of the harpoon, that of a hunting projectile, unfortunately are not visible. It is quite likely though that the visible fractures were caused by such use. The damage caused by the item's secondary function is very noticeable. Such evidence is visible on the abraded apical part in the form of a pronounced rounding (fig. 3M) and polish (fig. 3N), primarily covering and rounding the upper parts of the micro-relief, although it is also visible

on other parts of the artefact. The polish looks “greasy” and shiny, its topography is similar to a dome. It probably had a slightly rough texture. Unfortunately, as already stated in the introduction, analysis with a metallographic microscope was not possible so that more reliable attempts to interpret the exact function of the tool were excluded. We cannot know what kind of material was meant to be processed with this reworked tool. Nevertheless, the characteristics of the use-wear traces suggest that the contact materials were relatively soft and possibly of organic origin. The slight roughness of parts of the working edge, however, as well as observed linear traces (dark striations connected to the polished surface-fig. 3N), does not exclude the possibility that this object was used in an abrasive manner (burnishing work on the surface of a ceramic vessel?). The linearity of the polish, visible on fig. 3N, suggests that the item was more likely used for a specific purpose, probably for scraping. The general layout of the recorded traces indicates however that the tool was most likely used for an activity similar to grinding. The small surface and general characteristics of the tool’s working edge suggest that it was not used for typical, lengthy, domestic work, but instead for the precise grinding of small amounts of substances (as a pestle).

The rounding of the fractured edge and a polished surface are also evident on the base of the artefact. However, it lacks an obvious polish indicating that the grinding was probably not meant to create a working edge but rather to blunt the surface enabling the craftsperson to hold the tool firmly in his/her hand and work safely.

## DISCUSSION

The artefact analyzed in this paper is a fascinating example of the reutilization of a projectile: a highly specialized category of tools, to make something simple yet relatively unique in its function, as will be demonstrated below. In order to follow the nature of the changes that were taking place in this region both economically and culturally, it is necessary to consider the probable functional significance of both types of products for the prehistoric communities that utilized them and to look at the described artefact in the context of other, similar examples of hunters’ behavior during this time period.

The main features of each harpoon head are the barbs, which prevent the tool from being easily pulled out after the prey is hit, preventing the escape of an animal in an environment that is not necessarily easily accessible to the hunter. Ethnographic evidence on a global scale indicate that with some notable exceptions (Pétrequin and Pétrequin, 1990) this type of prehistoric tool was mostly used for hunting medium- and large-sized aquatic animals (Leroi-Gouran, 1945:55). The inventory of faunal remains discovered at the Šventoji 1-4 sites, which includes vast numbers of pike (*Esox Lucius*), zander (*Sander lucioperca*), perch (*Percafluviatilis*), and seal bones (comprising the highest percentage of mammalian remains), supports the validity of such an interpretation of the primary function of the artefact, despite the absence of use wear traces on its surface that would suggest such a function.

It also demonstrates that the campsites at Šventoji were highly specialized, with a focus on fishing and hunting of aquatic mammals (Piličiauskas, 2016; Luik and Piličiauskienė, 2017:190). The harpoon heads, comprise 15.5% of all bone tool fragments discovered at the four sites (Luik and Piličiauskienė, 2017:194, fig. 9) and reveal their success rate since the broken ones would be normally retrieved back to the campsite sticking inside the prey.

It is hard to specify the reasoning behind the transformation of one of the harpoons into a different type of tool. Did it get damaged or was it purposefully fractured? Why was it not simply discarded? Was reworking the harpoon simply practical or was it connected to traditional cultural or ritual factors? The answers to these questions probably have multiple explanations. However, such behavior was by no means rare in prehistoric times.

Magdalenian sites offer many examples of bone tool reutilization (fig 4). Most such curation is connected to products that were originally meant for hunting. Magdalenian points and harpoons were often reused as wedges. This tradition was observed in assemblages from sites such as La Vache, Isturitz, La Madeleine, Laugerie-Basse, Grotte du Bois-Ragot, and Courbet (Pétillon, 2006; Cholet-Kritter, 2009; Treuillot, 2011; Langley, 2013). This was the case with points whose base had already been formed in the proper fashion (beveled?), as well as those that did not have this feature and had to be adapted to perform a new function. Harpoons were treated in a similar fashion. Their original form was modified, for instance into spatulate forms as documented by finds from La Vache, Laugerie-Basse, and Courbet (Langley *et al.*, 2017:151). In addition, some blades and harpoons were reused as needles (e.g. La Madeleine) or foreshafts onto which new heads were fastened (Isturitz, Laugerie-Basse). In some cases, a hole was drilled through the fractured fragment of the blade, perhaps in an attempt to create a decoration (Saint-Périer, 1936; Langley, 2013).

The behaviors in the subsistence situations of hunter-gatherers who lived during the Mesolithic period was similar, as demonstrated by two barbed points made from antler found at MacArthur's Cave (Great Britain). Their tips bear traces typical for use as projectiles, as that was their primary function. At some point, they were reutilized as bevel-ended tools (Elliott, 2012:103).

It is not possible to unequivocally state why the fisher folk at Šventoji decided to rework and reuse the harpoon head discussed here although it is quite likely that the people involved were motivated by the desire to save high quality raw materials. The various bone products at Šventoji were mostly made of elk long bones (Luik and Piličiauskienė, 2017:191) but, of course, completely different factors may have influenced the decision to reshape this item.

Perhaps the reason really lies in the tool's particular function during its "second life". In prehistoric times, objects used as pestles were mostly made of stone. However, a few examples demonstrate that bone tools were occasionally used for this purpose as well. They are not uniform in shape. In the light of current knowledge, it seems that bone tools were used for grinding in connection with other activities for which the tools were intended. Tools which bear marks caused by their use as



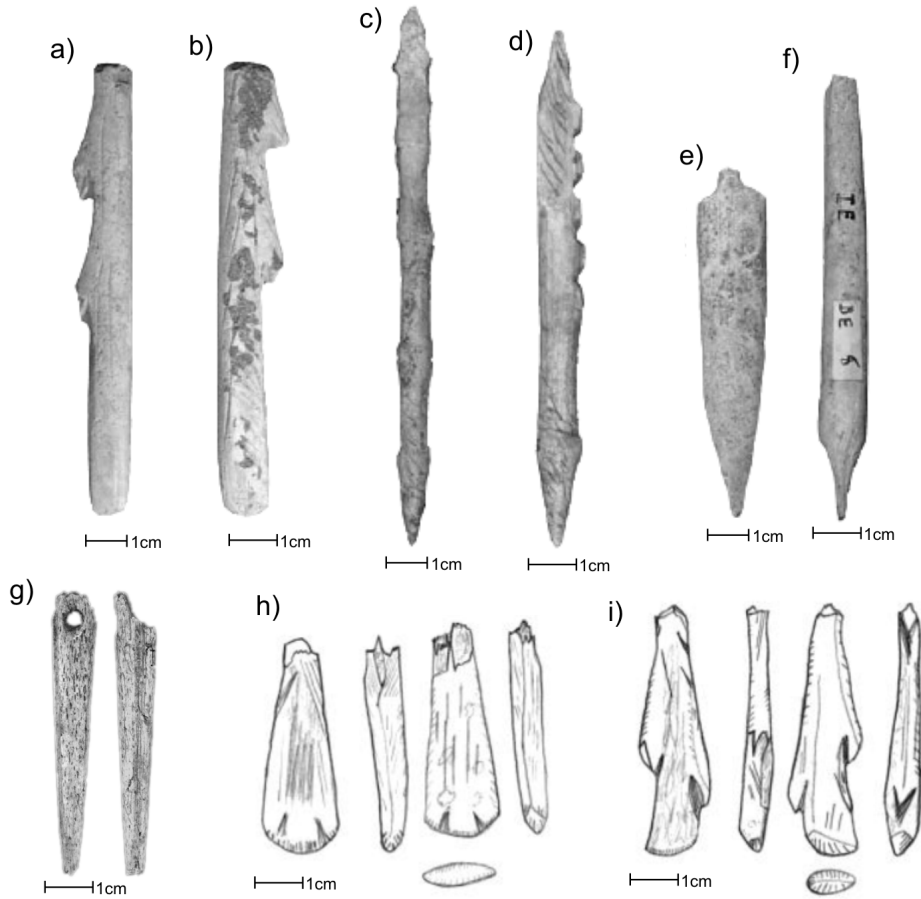


Fig. 4.—Examples of Palaeolithic and Mesolithic recycled bone and antler tools: a,b, barbed points recycled as wedges from La Vache (after Langley et al. 2016:152, fig. 10.5); c,d, barbed points recycled as spatulas from Courbet (after Langley et al. 2016:152, fig. 10.5); e, unbarbed point recycled as awl from La Madeleine (after Langley et al. 2016:153, fig. 10.6); f, unbarbed point recycled as awl from Isturitz (after Langley et al. 2016:153, fig. 10.6); g, fragment of projectile point recycled as pendant from Isturitz (after Pétillon J.-M., 2008:725, fig. 4); h,i, biserial points from MacArthur's Cave reused as bevel-ended tools (after Elliott 2012:102, fig. 86).

pestles were discovered e.g. at the Pavlov I site, dated to the Upper Paleolithic Period. Two antler products from that area have traces of use, classified as grinding-crushing, connected most probably with the transformation of vegetal or mineral materials (charcoal or ochre; Goutas, 2015:19). Similar products were discovered at the Mesolithic sites of Polderweg and De Bruin in the Netherlands, where one of the pestles made from antler was used for light pounding, but also used in a rotating fashion. This tool was interpreted as a pestle (van Gijn, 2005:86). Similar

tools made from bone have also been discovered. One such product, identified as a bone flaker or pestle, originated in the Neolithic levels of Tell Abu Hureyra in Syria (Olsen, 1984:359, fig. 106e). A similar function was suggested for antler products found at the Neolithic Syrian sites of Tell Aswad and Ramad (Stordeur, 1982:15-18). In Lithuania, bone tools intended for the same function and used as a kind of grinder/pounder for processing relatively hard and abrasive substances were identified among the inventory of a Corded Ware culture burial in Biržai (Piličiauskas *et al.*, 2018).

This survey indicates that bone tools used as pestles are rarely found or recognized at prehistoric sites. In addition, their cultural and functional significance could have varied since such tools have been discovered in burials besides both typical household utensils. When analyzing the example of the reutilized harpoon head from Šventoji, it is worth considering whether its transformation into a grinder was simply a pragmatic way of reusing a damaged piece of valuable osseous raw material for a tool with a new occasional function, or whether the new, subsumed function had a special social meaning of its own.

A projectile could have had different functions and be the carrier of a lot of cultural content. On the one hand, it could have been purely utilitarian, on the other hand, it could have been closely tied to the ritual/symbolic aspect of the lives of men in prehistoric hunter-gatherer society. This is evidenced by the unique find of the bilateral barbed harpoon at Kniegrotte (Magdalenian culture), the form of which prevented its practical use as a hunting weapon (Feustel 1974:111). It probably fulfilled a symbolic role (Płonka, 2012:107). Interesting observations were also made during the traceological analysis of two harpoons from the Wiele 33 site in Central Poland. Both projectile points were crafted in the same fashion and their surfaces lack any signs of damage caused by their use. Taking into account the characteristics of the observed technological traces and where they were found, they might represent intentionally deposited (ritual gift?) placed next to the campsite, in a deep part of the lake (Osipowicz, 2016). Two blades from the Polish lowlands constitute another example of items that were not purely utilitarian, namely the Late Glacial artefact from Witowo (Koszańska, 1947; Orłowska, 2018a) and the early Holocene point from Kosierzewo (Galiński, 1982). In both cases, traceological analysis enabled the identification of a series of small incisions, transversely arranged with respect to the axis of the products while parallel to each other, mostly visible on the tools' midsection (Orłowska, 2018b). They were definitely intentional and possibly ornamental. Short, horizontal incisions are a common decorative motif on artefacts from that time period (Płonka, 2003:44-45; Płonka, 2012:106). Taking into account their exceptional delicateness making them invisible to the naked eye, it is possible they were not purely practical but rather served a symbolic purpose. The fact that the role of decorations on the tools of prehistoric hunters is not purely ornamental, as well as the fact that the marks could have been created over a long period of time (for instance illustrating a specific event in the life of a person or a community) can be backed up by (besides the many already existing examples presented in archaeological literature) the uniquely fascinating

and recently discovered bâton percé from Gołębiewo (Osipowicz et al., 2017). The item's surface is covered in complex ornamentation in the shape of 10 asymmetric triangles, with oblique striations similar in shape and size, arranged in a horizontal line and filled with oblique shading. At some point, for an undetermined reason, one of the triangles had been precisely removed, which clearly indicates that the ornament did not serve a purely decorative purpose, but also contained important social content, perhaps associated with events that forced such a radical (and unaesthetic) change to its appearance.

Taking into account the available data, it is difficult not to muse on the cultural significance of bone products used as grinders/pestles in prehistoric times transformed by highly emotive objects such as harpoons. The exceptional rarity of this form and the characteristics of the working edges indicate that such products were not simply domestic tools, used on an everyday basis. They could have been used only occasionally (like the already mentioned examples from the Pavlov I site in the Czech Republic) or could have been highly specialized tools (such as the tool from the CWC grave in Biržai and the object described throughout this paper). They may have been used to grind rarely used substances, possibly connected to rituals. Proving their unique character would enable us to look at the reutilization of the product in a completely different way, as it changed from the head of a projectile into a precise tool for grinding.

As already mentioned, performing a traceological analysis of the described subject using a metallographic microscope or a SEM was not possible. It was also not possible to carry out physico-chemical tests that would allow for the precise determination of its actual function. For the time being, we can only suggest that the re-utilization described in the article might not have been purely practical but have been driven by complex cultural traditions.

## CONCLUSIONS

The transformed object described in this paper is, without a doubt, a fascinating example of the secondary use of a highly specialized bone tool. Setting aside the question of causal factors, it is important that such behavior should not be perceived from a single point of view, identifying it with purely utilitarian motives. Products that are considered by us to be solely a sign of economic activity may have had a great deal of cultural significance in the world of prehistoric hunters (and not only hunters —material culture always carries multiple layers of significance in the society where they are used— even today) (see Płonka 2012: chapter IV and VI), as demonstrated by the example of the Mesolithic bâton percé from Gołębiewo. In that case, it is especially difficult to find any economic reasoning behind the transportation of a fragment of reindeer antler over a few thousand kilometers, taking it through geographically and culturally varied regions, only for it to arrive in an area full of deer, just to produce an item that was ultimately intentionally (most likely) deposited in a lake (Osipowicz *et al.*, 2017).

This example re-working and re-utilization also indicates the importance of traceological analyses, especially in the case of artefacts made from hard osseous materials. Without such tests, this article could not have been written and the artefact analyzed herein would still be classified as a damaged tool, i.e. waste material. Hopefully, such analyses will become yet more common and will enable us to expand our, not only on the ways bone tools were manufactured and functioned in prehistoric times, but also on their social and symbolic meanings for the people and societies that used them.

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