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FIELD SURVEY AND MATERIALS

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A NEW FIND OF A MESOLITHIC ANTLER AXE FROM WESTERN POLAND

ABSTRACT

Płonka T., Diakowski M., Kufel-Diakowska B., Bronowicki W., Miazga B. and Stefaniak K. 2022. A new find of a Mesolithic antler axe from western Poland. *Sprawozdania Archeologiczne* 74/2, 93-109.

In 2017, a man fishing in the Oder River accidentally discovered an antler-base axe in the village of Domaszków, Lower Silesian Voievodship. In-depth study of the axe included analysis of the traces on its surface, radiocarbon dating and paleogenetic analysis, and concluded with the tool's conservation. Most of the traces casting light on the techniques used in its crafting had been eroded by intensive water action. The axe was made from the unshed red deer antler. Among the preserved marks we note pointed depressions made during the separation of the antler beam, traces where the brow and bay tines were cut off, and concentric rings from the drilling of the perforation. A small scar on the axe's blade was identified as resulting from the tool's use. Radiocarbon dating placed the origins of the axe in Boreal period. Such tools are known from western Poland and the north-western European Mesolithic as well as from the Neolithic and the Early Bronze Age.

Keywords: antler-base axe, Mesolithic, Boreal period, Lower Silesia, microscopic analysis
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INTRODUCTION

Knowledge of the Mesolithic in the lowland segment of south-west Poland comes chiefly from sites located on top of sandy deposits, formed during deglaciation and through dune-formation processes (Bagniewski 1987). Such sedimentation conditions only rarely allow for the preservation of items made of organic materials, hence our knowledge of the material culture of Mesolithic hunter-gatherers is based chiefly upon lithics. It is rare for sites with organogenic sediment to be explored (Pobiel, site 10, Góra district), these yielding well preserved Mesolithic artefacts from organic materials (Bagniewski 1990; 1992). Hence every new find of a Mesolithic artefact made from bone or antler in this area attracts understandable interest.

On 30 September 2017, Tomasz Piotrowski, resident of Krzydlina Wielka (Wołów district), was fishing in the Oder River. During this angling expedition he found an antler axe (Fig. 1) in shallow water next to the riverbank. The discovery was made within the limits of the village of Domaszków (Wołów district) in the Lower Silesian Voievodship (Fig. 2). After finding the artefact, he wrapped it in a damp cloth, thus protecting the find from rapid dehydration, a process which almost certainly would have led to serious damage, *i.e.* the antler cracking and the surface flaking. On 12 October 2017, Mr Piotrowski handed over the find to the Provincial Heritage Monuments Protection Office in Wrocław. The authors of this paper make use of this opportunity to express their gratitude to the finder for his quick thinking which protected the artefact from destruction.

METHODS

The type of artefacts discussed in this paper appear in the pertinent literature under various names, most commonly "axe" – for items where the blade is parallel or set at an oblique angle to the axis of the handle, or"mattocks" or "adzes" when the blade is perpendicular to the axis of the handle" (Smith 1989; Elliott 2015; Orłowska and Osipowicz 2017). This specific specimen fits the definition of "axe". The item was studied and analysed with an eye to the fullest discovery of its "life history", from the moment it had been made, through its use, discarding, up to post-deposition changes. Thus we strived to identify, during analysis, characteristic traces and microtraces made at various stages of the artefact's existence. The axe's surface was subject to both macroscopic and microscopic examination, the latter with an optical microscope Olympus SZX9 stereomicroscope (6.3-57×) and a Hirox 3D Digital Microscope RH-2000 at the Laboratory for Archaeometry and Archaeological Conservation of the University of Wrocław Institute of Archaeology. The next stage involved the taking of two samples from the part next to the burr – one for ^{14}C dating, the other for paleogenetic analysis. Radiocarbon dating was carried out at the Poznań Radiocarbon Laboratory, while paleogenetic analysis was done at the Laboratory

Fig. 1. Domaszków. Antler axe.
Photo T. Gąsior

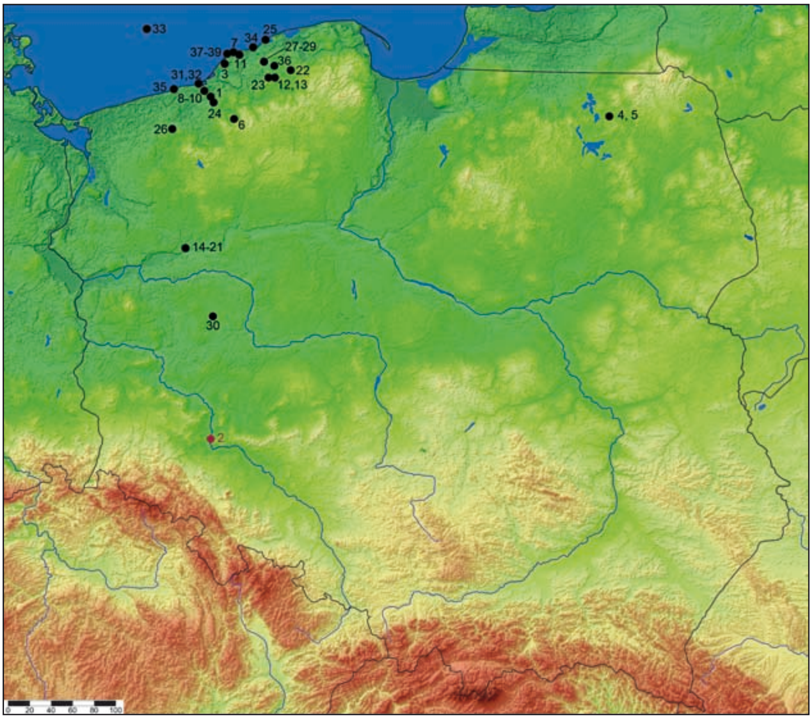

Fig. 2. Antler-base axes and adzes in western and northern Poland (numbering as per Table 1). Computer processing by N. Lenkow

of Paleogenetics and Conservation Genetics Centre of New Technologies of the University of Warsaw. Finally the axe underwent conservation treatment at the Laboratory for Archaeometry and Archaeological Conservaon of the University of Wrocław Institute of Archaeology.

Dimensions of antler axes from sites inside Poland's current borders are given partly as listed in source materials (Kabaciński *et al.* 2008; Ilkiewicz 2010) and partly from measuring drawings in said publications (Fiedorczuk 1995). Width was measured on the plane where the perforation is located; maximum width was used, this occasionally including stumps of removed tines.

DESCRIPTION

The axe was made from the right antler of a red deer *Cervus elaphus* Linnaeus, 1758. It is representative of the antler-base axe type (Fig. 1). Its length is 18.79 cm, width in the craniocaudal plane is 5.8 cm and in the medial-lateral plane 4.75 cm, and circumference –

17 cm. This size places the antlers used for the crafting of this artefact among the smallest specimens known from Quaternary sites (Fig. 3), including antlers from the Holocene (Stefaniak 2017). However, in this case the tool's dimensions might have been significantly decreased through abrasion during its depositing in water.

The axe was made from an antler of an animal killed on a hunt or dead from other causes – as evidenced by the preserved stem. During crafting the brow and bay tines were removed – leaving visible marks on the item's sides. A perforation was made in the medial and lateral sides of the beam, with internal diameter of 2.57-2.66 cm, with the external width of the opening being 3.32-3.55 cm. The distal section of the beam was used for the formation of a blade, set at an angle to the axis of the opening. The blade's length was 5.63 cm, while the width was 3.89 cm. The thickness of the compacta alongside the blade varies from 0.22 to 0.37 cm. Under the Smith (1989) classification such specimens are classified as Type B, described as "laterally perforated antler-base mattocks", versus Type A where the perforation is in the same plane as the tines.

The object is heavily eroded, with all surfaces and edges evidently polished as a result of natural processes. In the blade section – as well as where the brow and bay tines were cut off the spongiosa was partly removed by abrasion, leading to the formation of pits with smooth sides and bottom (Fig. 1). As the axe was found in the Oder River, it may be assumed that it owes this state of preservation to being intensively worked over by flowing water. However, this process does not extend to the scar on the blade where the scar's edges along the bottom are evidently uneven. Microscopic examination of the blade additionally revealed small, flat microchippings doubtlessly formed at the end of the item's depositing in the river. These traces are fresh and stand out versus the surrounding surface of the item, which in turn show significant polishing. The blade and antler beam sections show significant cracks, that are the result of partial dehydration after the artefact's discovery.

Traces made during the manufacture of the item and its subsequent usage are preserved to a minimal degree, this being due to the general condition of the artefact. The first stage of manufacture involved the removal of the antler from the animal's skull, this leaving scars in the proximal section of the artefact, where a fragment of a pedicle is still preserved, and pointed depressions in its base (Fig. 4: 1). It should be assumed that at this stage the surface of the antler was not subjected to modifications. Microscopic examination revealed the existence of the original surface of the antler, subjected to polishing by water. Only the burr might have been modified by the craftsman, yet no traces of cutting or of pearling were found. The abraded traces of removed tines (irregular depressions on the edges) point to the compacta being probably sawed and then the tines broken off (Fig. 4: 2). The perforation was drilled from both sides.This activity left characteristic concentric traces (Fig. 4: 3). The perforation's perimeter and part of its internal section are smoothed and polished through use and water action. On one side the perforation widens towards the base (Fig. 1), this probably being due to damage later smoothed over during the item's depositing in an aquatic environment.

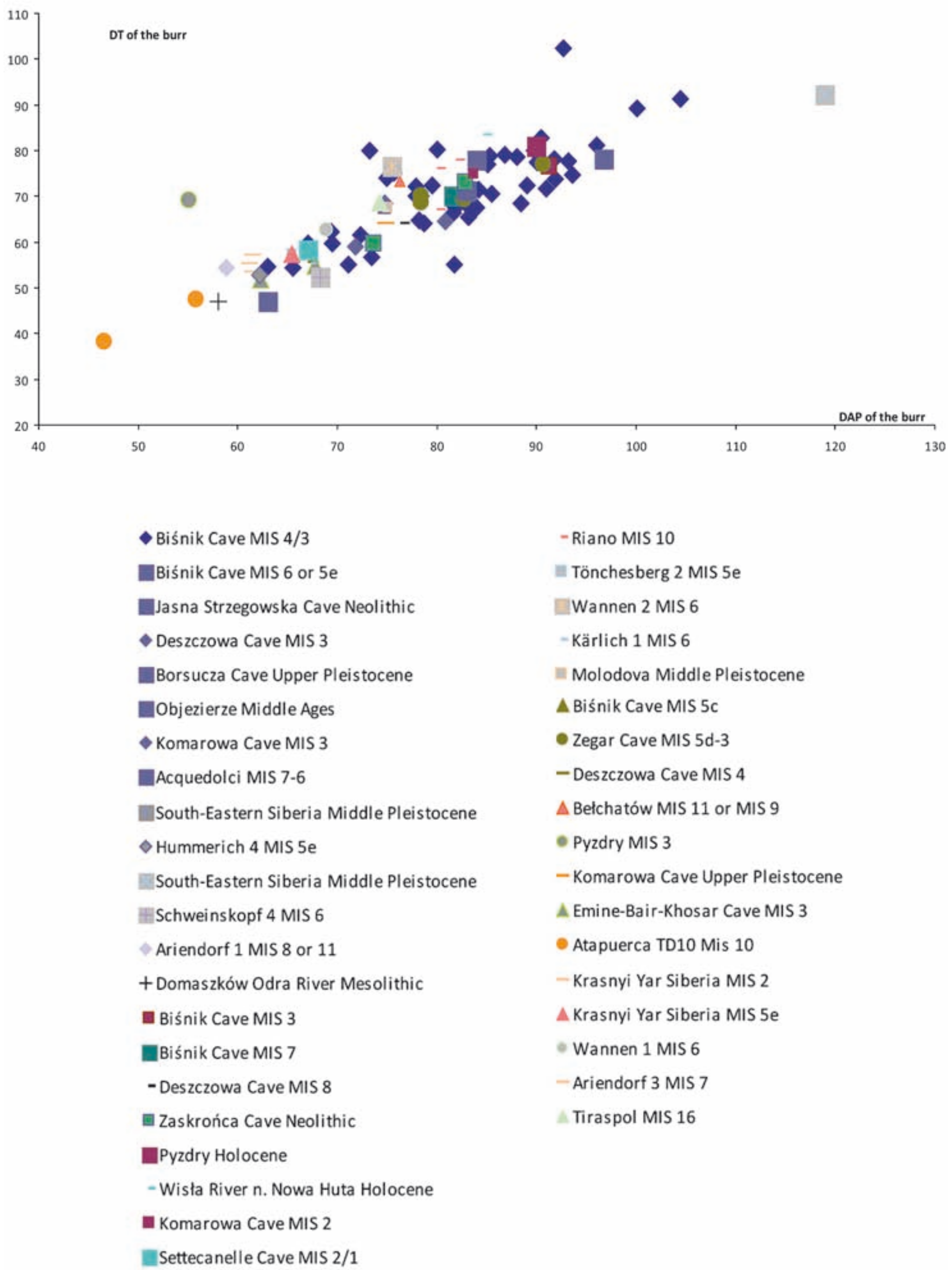

Fig. 3. Comparison of measurements of the burr in *Cervus elaphus* Linnaeus, 1758 from Quaternary localities of Eurasia. Domaszków – black cross. Prepared by K. Stefaniak

Fig. 4. Domaszków. Traces on axe surface:
1 – pointed traces on stem; 2 – remnants of brow tine; 3 – concentric marks in perforation; 4 – nick on axe blade. Photo T. Gąsior (1-3), M. Diakowski (4), computer processing by N. Lenkow

The blade was formed obliquely to the antler's shaft. No traces of the action are visible, having been removed due to the deposition. However, despite post-depositional polish, a small depression is preserved in part of the blade (Fig. 4: 4), possibly a fragment of the use scar (see below).

The sample taken from the axe was dated to 8510 ± 50 BP (Poz-101613), a date almost identical to ones of the axes from Krzyż Wielkopolski, site 7 (Czarnków-Trzcianka district) (Kabaciński *et al.* 2008). Hence it may be said that the antler from which the artefact had been crafted comes from 7600-7500 cal BC, *i.e.* the younger phase of the Boreal period.

DNA analysis was used in an effort to establish paleogenetic information. DNA was extracted from the bone powder and transformed into two independent double-stranded and double-indexed sequencing libraries. Target enrichment of the mitochondrial DNA was performed using hybridization in solution with the bait consisted of modern DNA of red deer (*Cervus elaphus*) and elk (*Alces alces*). High-throughput sequencing was performed on the NextSeq Illumina platform. The two sequencing approach showed that the DNA is very poorly preserved and not suitable for analysis.

CONSERVATION OF THE FIND

Evaluation of the state of preservation of the find at the point of its handover established that it was wet, waterlogged, with visible cracking of its surface (Fig. 5). Preservation efforts were preceded by the taking of samples for specialist archaeometric analysis (*e.g.* cutting out a fragment for radiocarbon dating) and paleogenetic analysis.

The programme of preservation tasks developed for the axe included a dehydration process combined with structural reinforcement to prevent uncontrolled shrinking. As a result the surface of the artefact should be hard and with a light gloss (due to use of resin).

Specific conservation tasks included washing off dirt with tap water and a soft brush, and then drying the artefact with an acetone solution. The axe was immersed several times in a water-acetone wash, with increasing concentrations of acetone. Structural impregnation was effected using a Paraloid B72 acetone solution with gradually increased concentration. Impregnation with resin began with a 1% solution, the concentration being increased on a weekly basis. Impregnation was concluded when the Paraloid concentration reached 30%. The reason behind use of such a highly concentrated solution were the visibly growing cracks that were observed from the onset of the impregnation process. Here, the artefact was protected with hydraulic steel clasps, clamped on top of protective covers made from a soft polymer material. The clasps remained clamped around the artefact throughout the slow-dry process, yet failed to protect it from the deepening of the cracks. The surface of the axe, glossy from the use of Paraloid, was matted using mechanical means as well as with the use of non-acidic wax Cosmoloid H80 (Fig. 1).

Fig. 5. Domaszków. The axe before preservation (cracks identified with arrows; marked area – source of samples). Photo B. Miazga, computer processing by N. Lenkow

CULTURAL AND CHRONOLOGICAL CONTEXT

Deer antler axes are rare finds at sites located in Poland (Fig. 2, Table 1). Specimens manufactured from the sections next to the antler stem have been found at only two excavated sites: at Krzyż Wielkopolski, site 7 (Kabaciński *et al*. 2008; Kabaciński 2009) and Dudka (Giżycko district), site 1 (Fiedorczuk 1995). A common feature of these finds is the material from which they are made, the existence of a perforation and one-side bevelled blade (Table 1). The axes from Krzyż Wielkopolski are more or less of equal age to the Domaszków axe, whereas one of those from Dudka is unquestionably younger, dating to the 2^{nd} half of the 7^{th} millennium cal BC.

Forms of similar type are commonly found in a Mesolithic context across north-western Europe (Mathiassen 1948; Clark 1975; Smith 1989; Elliott 2015). In Germany, besides the well documented finds yielded by excavations at Hohen Viecheln (Mecklenburg) and Friesack (Brandenburg), site 4 (Schuldt 1961; Gramsch 1973; Pratsch 1994), also numerous stray finds exist (Gramsch 1973, 40-41; Heidelk-Schacht 1984; Cziesla and Pettitt 2003). The well stratified finds from Friesack, site 4 point to such axes being encountered

Table 1. Antler-base axes and adzes from western Poland

No.	Site	District	Length [cm]	Breadth [cm]	Thickness [cm]	Diameter of perforation [cm]	Angle (blade vs. axis of perforation)	Cast off	Radiocarbon date BP	Calibration (2σ) BC	Remarks	Reference
1	Bonin	Koszalin	13.5	?	?	?	almost parallel	+	-	-	stray find	Ilkiewicz 2010, 24, Fig. 4: 1
2	Domaszków	Wołów	18.8	6.0	4.8	2.6-2.7	acute	-	8510±50 (Poz-101613)	7599-7500	stray find	-
3	Drozdowo	Sławno	17.0	7.1	5.8	2.5-2.8	paralel	+	-	-	stray find	Ilkiewicz 2010, 21, Fig. 5: 1
4	Dudka, site 1, layer B5	Giżycko	14.1	5.7	4.6	2.3	acute	?	-	-	in a small pit; next to a Wieliszew point	Fiedorczuk 1995, 51, Fig. 4: e
5	Dudka, site 1, cut III	Giżycko	14.6	6.1	5.4	2.3	*ca* 90°	?	7420±80 (Gd-5575)	6435-6097	date from burnt pine next to the axe; an X-shaped mark	Fiedorczuk 1995, 51, Fig. 4: f
6	Gołogóra	Koszalin	?	?	?	?	90° ?	?	-	-	stray find	Ilkiewicz 2010, 24
7	Jarosławiec	Sławno	14.0	5.7	4.2	2.5	acute	+	-	-	stray find	Ilkiewicz 2010, 24, Fig. 6: 1
8	Koszalin	Koszalin	14.5	6.6	?	?	*ca* 90°	+	-	-	stray find	Ilkiewicz 2010, 25, Fig. 4: 4
9	Koszalin	Koszalin	21.0	6.7	4.1	?	90°	+	-	-	stray find	Ilkiewicz 2010, 25, Fig. 4: 6
10	Koszalin District	Koszalin	?	?	?	?	90° ?	?	-	-	stray find	Ilkiewicz 2010, 25
11	Królewice	Slawno	15.3	7.4	4.7	2.3-2.5	acute	+	-	-	stray find	Ilkiewicz 2010, 22, Fig. 5: 2
12	Krzynia	Słupsk	16.0	9.0	6.0	2.4-2.5	acute	+	-	-	stray find	Ilkiewicz 2010, 25, Fig. 6: 3
13	Krzynia	Słupsk	?	?	?	?	90° ?	?	-	-	stray find	Ilkiewicz 2010, 25
14	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	11.3	7.9	5.8	2.7-2.9	*ca* 90°	-	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 4

15	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	11.9	9.5	6.6	2.6	*ca* 90°	-	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 5
16	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	15.5	9.7	5.3	3.0-3.6	acute	+ (?)	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 6
17	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	18.7	7.4	5.3	2.6-3.3	*ca* 90°	-	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 7
18	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	21.6	7.2	6.3	2.4-2.8	*ca* 90°	+	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 8
19	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	12.1	7.3	6.4	2.9-3.3	acute	- (?)	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 9
20	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	13.8	7.8	4.9	2.8-3.1	acute	- (?)	-	-	-	Kabaciński *et al.* 2008, Tab. 1, Fig. 10
21	Krzyż Wielkopolski, site 7	Czarnków-Trzcianka	15.2	7.5	4.7	2.8	acute	+	1. 8520±50 (Poz-12336) 2. 8530±50 (Poz-12593) 3. 8760±50 (Poz-12337)	1. 7602-7505 2. 7608-7505 3. 7974-7606[a]	axe; fragment of wooden shaft (the third date)	Kabaciński *et al.* 2008, Tab. 1, Fig. 12
22	Łupawa	Słupsk	23.0	6.0	5.5	2.3	acute	-	-	-	stray find	Ilkiewicz 2010, 22, Fig. 3
23	Łysomiczki	Słupsk	15.9	8.5	5.3	2.8	*ca* 90°	+	-	-	stray find	Ilkiewicz 2010, 24-25, Fig. 6: 2
24	Manowo	Koszalin	17.0	?	?	?	?	?	-	-	stray find	Ilkiewicz 2010, 21
25	Rowy, site 1	Słupsk	13.0	8.0	?	2.6-2.9	acute	+	-	-	stray find	Ilkiewicz 2010, 26, Fig. 4: 2
26	Sławoborze	Świdwin	18.7	3.1 ?	?	3.1 ?	90° ?	?	-	-	stray find	Ilkiewicz 2010, 26
27	Słupsk	Słupsk	22.5	8.3	6.4	2.1-2.4	acute	+	-	-	stray find	Ilkiewicz 2010, 22, Fig. 5: 3
28	Słupsk, site 29 **(30)**	Słupsk	12.5	7.3	4.3	3.0	almost parallel	+	-	-	stray find	Ilkiewicz 2010, 22, Fig. 5: 4
29	Słupsk, vicinity	Słupsk	22.3	6.8	9.0	2.5-3.5	acute	+	-	-	stray find	Ilkiewicz 2010, 23, Fig. 5: 5

Table 1.

No.	Site	District	Length [cm]	Breadth [cm]	Thickness [cm]	Diameter of perforation [cm]	Angle (blade vs. axis of perforation)	Cast off	Radiocarbon date BP	Calibration (2σ) BC	Remarks	Reference
30	Troszczyn	Nowy Tomyśl	15.6	8.6	6.1	2.8	90°	-	6610±40 (Poz-15119)	5619-5488	stray find	Goslar *et al.* 2006, 8-9, Figs 5, 6
31	Unieście	Koszalin	10.5	5.2	3.8	2.2	90°	+	-	-	stray find	Ilkiewicz 2010, 26, Fig. 6: 4
32	Unieście	Koszalin	?	?	?	?	?	?	-	-	stray find	Ilkiewicz 2010, 23
33	unknown site	-	?	6,7	5,9	?	*ca* 90°	+	-	-	stray find	Orłowska and Osipowicz 2017, Fig. 7
34	Ustka, site 2	Słupsk	11.5	ca. 8.0	?	?	90°	+	-	-	stray find	Ilkiewicz 2010, 26
35	Ustronie Morskie	Kołobrzeg	16.0	5.6	3.5	?	90° ?	?	-	-	stray find	Ilkiewicz 2010, 26
36	Warblewo	Słupsk	12.9	6.4	5.5	2.6	acute ?	+	-	-	stray find; repaired	Ilkiewicz 2010, 23, Fig. 5: 6
37	Wicie, site 1	Sławno	14.8	5.4	4.1	2.2-2.5	parallel	?	-	-	stray find	Ilkiewicz 2010, 23, Fig. 5: 7
38	Wicie, site 1	Sławno	19.1	6.4	4.9	1.9	acute	+	-	-	stray find	Ilkiewicz 2010, 24, Fig. 5: 8
39	Wicie, site 1	Sławno	13.9	6.8	5.1	3.0-3.3	parallel	+	-	-	stray find	Ilkiewicz 2010, 24, Fig. 5: 9

[a] 93.2% probablity

in layers of that site, starting from the late Preboreal/Early Boreal (*ca* 9400-9200 radiocarbon years BP) up to the final Boreal and early Atlantic period (*ca* 8200-7000 radiocarbon years BP) (Pratsch 1994, 33-34, Fig. 14).

Finds from different regions of Europe show that axes crafted from the base segment of deer antlers are also present at sites dated to the late Mesolithic and later, to the Neolithic, in spite of the growing popularity of T-shaped axes (Smith 1989). The specimens from Altfriesack-Bützsee (Ostprignitz-Ruppin) were radiocarbon dated to 6910 ± 50 BP (OxA-8746) and 6855 ± 50 BP (OxA-8745) (Cziesla and Pettitt 2003, 26, Fig. 2: 1, 3). Hence it may be assumed that such axes were in use around 5900-5650 cal BC, *i.e.* in the late Mesolithic, during the older phase of the Atlantic period. Such dates are in line with radiocarbon dating results for the youngest layer with an antler-base axe at Friesack, site 4 (*Zeitstufe IV*) (Pratsch 1994, 26). Both examples, one larger, over 22 cm long (broken blade), the other shorter – 17.3 cm do not have the pearling removed and areas where the tines had been removed were less attentively worked. The adze from Troszczyn (Nowy Tomyśl district), held in the collection of the Archaeological Museum in Poznań is even younger, being dated to 6610 ± 40 (Poz-15119) (Goslar *et al.* 2006). Hence it may be placed in the 5600-5500 cal BC period. It is worth mentioning that none of the pearling has been removed – besides from the area around the blade; also, locations of where the brow and bay tines had been removed are very clearly discernable. Nevertheless, the degree of attention given to working the surface or eliminating the marks of removed tines are not characterising features of older axes from the Boreal period – here one may point to the series of artefacts of thus type from the site 7 at Krzyż Wielkopolski (Kabaciński *et al.* 2008).

Other axes from western Poland are stray finds, lacking in broader context and precise dating; these finds may be connected with either the Mesolithic or Neolithic (Ilkiewicz 2010). In central and south-east Poland forms of this type, at times differing in shape of head (button-shaped) or perforation (square) are occasionally found in a Middle Neolithic context (Kempisty 1958; Gajewski 1969; Gumiński 1989; Grygiel 2008).

Examination of marks on the surface of the axes from Krzyż Wielkopolski, site 7 and traces from their crafting provides an insight into the details of how they were made (Kabaciński *et al.* 2008, 251-266). Both shed and unshed antlers were used. The tines were removed by first making a groove in the antler and breaking it off. The groove itself was made in one of two manners: a. sawing (two axes from sheds); b. faceting with a flint tool (six axes from kills). The faceting technique was universally known across the north-west European Mesolithic, yet the axes from Krzyż Wielkopolski, site 7 stand out by having the groove not going all around, but being made only on the two opposite sides of the tine. The perforations (*ca* 2.5-2.8 cm diameter, wider in axes made from sheds) were made with a bow drill more or less at the height of the brow tine. The blade was formed by scraping with a stone tool. In the specimens from Friesack, the tines had been removed in similar manner (Pratsch 1994, 21). Two methods of preparing the surface before the holes were made were noted: removal of part of the compacta through strikes or by grinding. Then the entrance to the opening was formed, at both ends, and the spongiosa removed, either by chiselling or drilling (Pratsch 1994).

FUNCTION

Implements made from the proximal portion of a red deer antler and with a perforation belong to one of two main types: i. with a blade parallel to the handle (axes); ii. with a blade perpendicular to the handle (adzes/mattocks) (Smith 1989; Riedel *et al.* 2004). The specimen described herein belongs to the widely encountered intermediary group – the blade is at an angle to the handle; it seems that this variety is closer in functionality to axes.

Axes and adzes found in western Poland are 10.5-23.1 cm long (Table 1, Figs 2, 6). Analogous Neolithic and Bronze Age finds from the Leine river valley, near Hannover, also come in varied sizes – 10-23.35 cm length and 3.75 or 4.75 cm diameter at the base (Riedel *et al.* 2004, 201). Here one should point out that finds from those two collections are in the same length range – this being dictated by deer antler morphology and the implement's functionality. The maximum length is limited by the need to form the blade below the antler's trez tine. Minimal length in turn is determined by the distance between the perforation used to attach the handle from the antler's base on one hand, and from the blade on the other – these dimensions dictating the item's functionality. This gives rise to the question – what were the drivers for these different dimensions? Do these differences stem from implements of different size being crafted for different tasks? Or is the difference in size a result not of their intended use, but of the dimensions of available raw materials? It

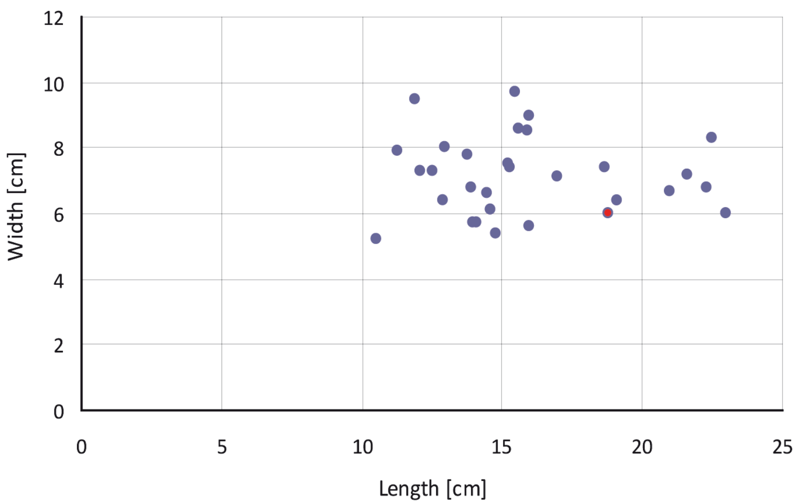

Fig. 6. Length and width diagram of axes and adzes from western and northern Poland (see Table 1, Domaszków axe as a red circle). Prepared by T. Płonka

also is possible that the shorter axe lengths are the result of longer usage – *i.e.* of being shortened at every repair of the blade. The aforementioned diameters are probably the outcome of conscious selection of material with parameters meeting some criteria used by the craftsmen.

In older literature – and going by macroscopic examination results, antler axes were considered as being principally earth digging tools, although capable of serving other roles as well (Smith 1989, 281-283). The results of analysis of the working surfaces of the axes, combined with experimental archaeology and examination of its effects, allow us to shed more light on the use of such a type of axe (Jensen 1991; Pratsch 1994, 26, 27; Orłowska and Osipowicz 2017). We may now affirm that these were indeed multitask implements. The axes could be used for many tasks: working wood, working leather, digging, possibly also for hewing ice holes. The use of such axes for working wood was proven by results of analysis of microscopic fragments preserved in the spongiosa, in the axes' blades (Riedel *et al.* 2004). These fragments were identified as coming from a deciduous tree subjected to being worked with the axe. Not much more was identified, as antler is quite resistant to being struck against wood. Additionally, different tasks occasionally produce very similar traces on tools. In the case of the Domaszków axe, the entire surface of the find was transformed by the conditions of its depositing – *i.e.* being transported by water had polished its surface. The sole trace of use seems to be a small scar on the blade, probably made before the artefact was deposited in the river, as it is polished to same degree as other sections of the axe (Fig. 4: 4). This only trace of use makes it difficult to draw any conclusions as to what activity had caused this scar. It could just as well have been the side effect of working soft wood, or digging in not very stony soil, or when hewing an ice hole (Orłowska and Osipowicz 2017, 107-109, Fig. 3).

CONCLUSION

The antler axe discovered in the Oder River proves that tools of this type were used in south-west Poland during the early Mesolithic. Similar tools are associated with the north-western circle of the Mesolithic, in Polish literature known as the Komornica culture (complex) or Komornica-Duvensee complex. The Domaszków artefact is related to the axes excavated at Krzyż Wielkopolski, site 7, and also is chronologically co-extant. The Domaszków axe, similarly to other artefacts of this type, was most likely extensively used for everyday activities such as working wood or digging. Unfortunately, not many traces of use have been preserved on the working edge. The circumstances of its deposition are not clear – it might have been eroded out from the layers of a Mesolithic site somewhere upriver and brought by the river current to the shoals where it was noticed by the angler.

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