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FLINT AXES FROM THE FUNNEL BEAKER AND FUNNEL BEAKER-BADEN SETTLEMENT PHASES AT SITE 1 IN KSIĄŻNICE WIELKIE, PROSZOWICE DISTRICT

ABSTRACT

Brzeska-Zastawna A. 2020. Flint axes from the Funnel Beaker and Funnel Beaker-Baden settlement phases at site 1 in Książnice Wielkie, Proszowice district. *Sprawozdania Archeologiczne* 72/1, 197-211.

Excavations at site 1 in Książnice Wielkie were conducted between 1921 and 1924 by Józef Żurowski. It is one of the most important sites of the Funnel Beaker culture (FBC) in western Lesser Poland (Zastawny and Brzeska-Zastawna 2020). The materials of the FBC with Baden elements were published by Barbara Burchard and Anna Eker, and graves of the Corded Ware culture were published by Jan Machnik (Burchard and Eker 1964; Machnik 1964). This article is focused on the issues related to flint axes discovered in the context of FBC and Funnel Beaker-Baden assemblages. So far they have not been the subject of detailed elaboration.

Keywords: flint axes, Jurassic G flint, Funnel Beaker culture, Funnel Beaker-Baden assemblages, Lesser Poland
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1. INTRODUCTION

Site 1 in Książnice Wielkie is located on the northern border of the Lesser Poland Upland, on the right side of the Szreniawa River valley, in the vicinity of its mouth to the Vistula River. At this site, materials of different cultures and ages were found. As regards the Neolithic, there were materials of the classic Funnel Beaker culture (FBC), Funnel

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Beaker-Baden (FB-B) and elements of the Wyciąże group (WG), not to mention graves of the Corded Ware culture. Based on general views on middle Neolithic ceramic development in western Lesser Poland, the FBC and FB-B materials perhaps belong to the BR I-IV/V phases. Frequently, these different ceramics were present in the same features.

The FBC and Baden materials from the site were elaborated by Barbara Burchard and Anna Eker in 1964. The artifacts from site 1 at Książnice Wielkie are stored in the collection of the Archaeological Museum in Kraków.

In 19 features at the site, flint axes and other artifacts relating to their use were discovered. The aim of this paper is their comprehensive examination. In total, 73 artifacts were analyzed: 8 axes (including 1 formal core), 1 chisel, 7 splintered pieces, 11 tools, 2 spalls from tools, 44 flakes, blades, blade-flakes, and chunks. It should be emphasized that chronologically and culturally diversified pottery materials were found in features where these artifacts were recorded.

2. ANALYSIS

2.1. Axes and chisel

Nine artifacts were included in Table 1: 5 (Tables 1-5 are at the end of this volume) whole axes, including 3 of original length (A1 – Fig. 4: 2, A2 – Fig. 2: 2, A4 – Fig. 5: 1) and 2 with a shortened length due to repair of the cutting edge (A3 – Fig. 2: 1, A9 – Fig. 3: 2), 1 with a strongly damaged cutting edge, but with the entire length of the axe preserved (A5 – Fig. 3: 1), 1 with only a part at the butt preserved (A8 – Fig. 7: 1), 1 chisel made from the blade of an axe (A7 – Fig. 4: 1), and 1 formal core made on a large fragment of an axe (A6 – Fig. 5: 2). All specimens were made from Jurassic G flint.

The axes have total lengths of 67-123 mm. Almost all specimens have a more or less widening cutting edge. Only in one case (A4 – Fig. 5: 1) the maximum width is not at the cutting edge, but rather just behind it. For 3 of the axes, the maximum thickness is at mid-length, about 2/3 of the length from the cutting edge; another 3 axes have maximum thickness at the butt; and for the remaining 2 axes, at 1/3 of the length from the cutting edge, the part at the cutting edge turns into a medial part. All eight specimens are axes with rectangular cross-sections. The chisel (A7), which was probably made from the blade of an axe, has a trihedral cross-section.

In the FBC, butts are most often poorly extracted and inaccurately formed (Balcer 1975, 118). Part of a specimen from Ksiażnice Wielkie had trimmed and thinned butts. Thinned butts (which result in an axe with a lenticular longitudinal section) – sometimes almost edge butts – are common in the FBC (Balcer 1975, 116; 1983, 142; Gumiński 1989, 137). Three axes had visibly separated butts (A1; A3; A9). Some specimens had a half-separated butt, which means that the butt was separated from one of the lateral surfaces,

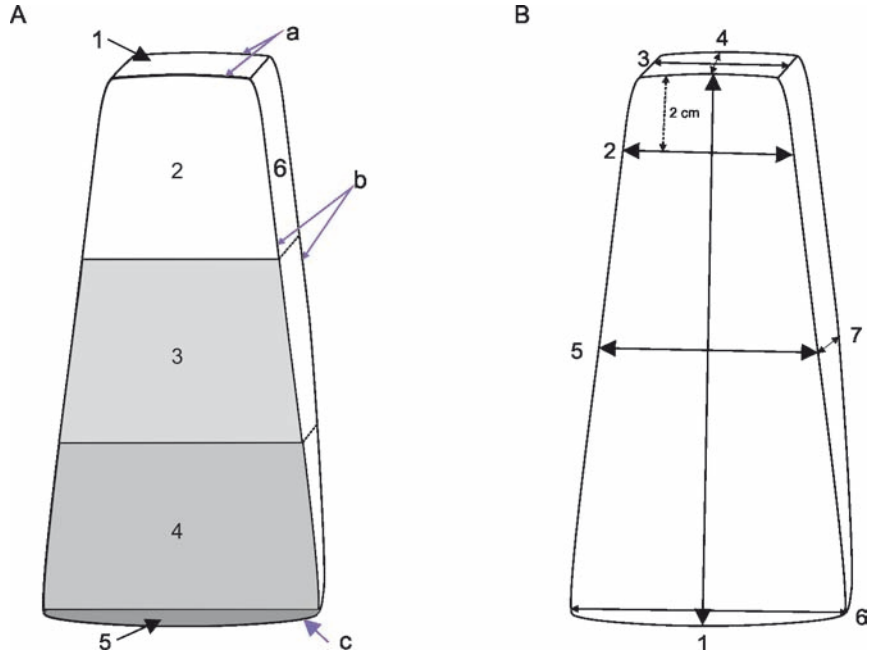

Fig. 1. A – schema: parts of an axe (the names used in the article): 1 – butt, 2 – part at butt, 3 – mid part, 4 – part at cutting edge, 5 – cutting edge, 6 – side, a – edges of a butt, b – lateral egdes, c – edge of cutting edge. B – dimensions of an axe: 1 – total length, 2 – width of the upper part of an ax, 3 – butt width, 4 – butt thickness, 5 – width of the mid-length of the specimen, 6 – cutting edge width, 7 – thickness in the mid-length of the specimen. Drawing: A. Brzeska-Zastawna

but trimming of the opposite surface was part of the preparation of the butt (A2, A6, A8, A9). Perhaps this was an intentional effort, which simplified putting the axe in a haft.

Most often (in 4 specimens), edges were shaped by centripetal blows from two main surfaces. Less often (in 3 specimens), edges were prepared by parallel blows from the opposite main surfaces. In a single case (A6), one edge was trimmed by parallel blows, but the second was trimmed from two main surfaces by centripetal blows. Frequently, edges converged quite strongly towards a butt, forming a regular and trapezoidal shape for the whole specimen. Axes with expanding cutting edges (usually with thick butts, but sometimes also with flat butts) are very typical for the FBC in Lesser Poland (Balcer 1983, 152).

The last stage of finishing included treatments that increased the effectiveness of these tools (Balcer 1983, 39). The analyzed axes were ground, smoothed and polished. These treatments left some characteristic traces visible on surfaces of the axes (Hansen and Madsen 1983; Madsen 1984; Borkowski and Migal 1996). Traces of grinding are visible only on parts of the main surfaces, because, after grinding, the other parts were successively

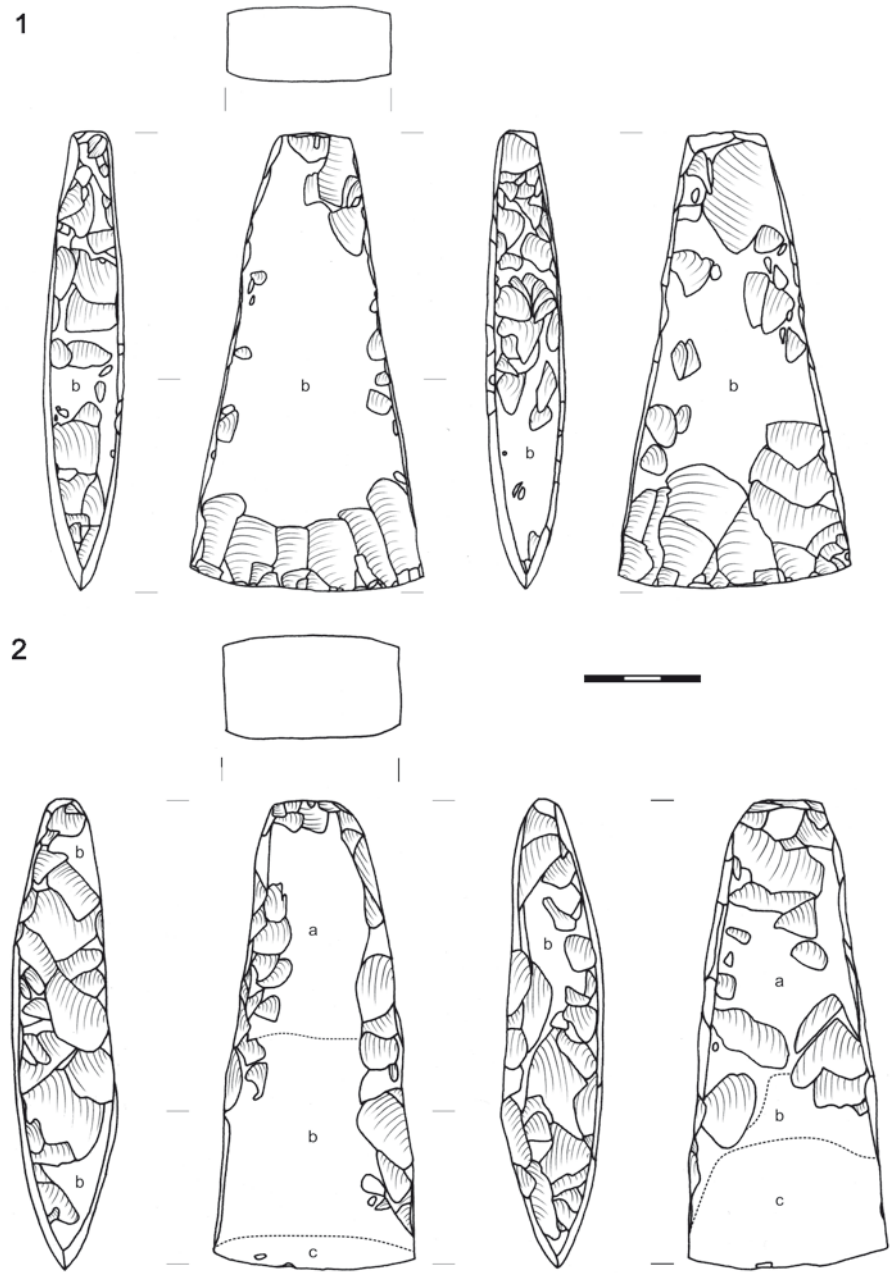

Fig. 2. Książnice Wielkie, site 1, Proszowice district. The axes made from Jurassic G flint: 1 – A3; 2 – A2 (from the collection of the Archaeological Museum in Kraków); a – grinding; b – smoothing; c – polishing. Drawing: A. Brzeska-Zastawna

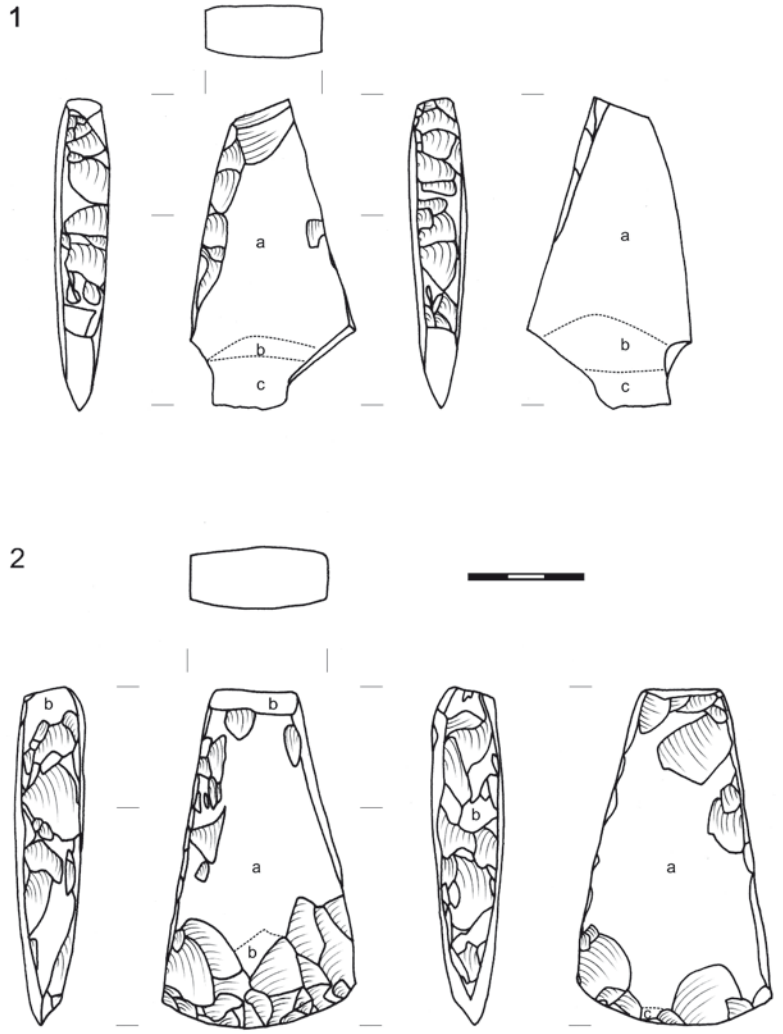

Fig. 3. Książnice Wielkie, site 1, Proszowice district. The axes made from Jurassic G flint: 1 – A5; 2 – A9 (from the collection of the Archaeological Museum in Kraków); a – grinding; b – smoothing; c – polishing. Drawing: A. Brzeska-Zastawna

subject to the treatments mentioned above. Most often, sides as well as surfaces at the cutting edge were smoothed. Three specimens were smoothed along the whole surface (however, sometimes smoothing was inaccurate, in particular on parts further from the cutting edge). Five axes had visible traces of polishing. Frequently, axes were polished only at the cutting edge. Sometimes (in 3 of the 5 examples mentioned above), polishing encompassed

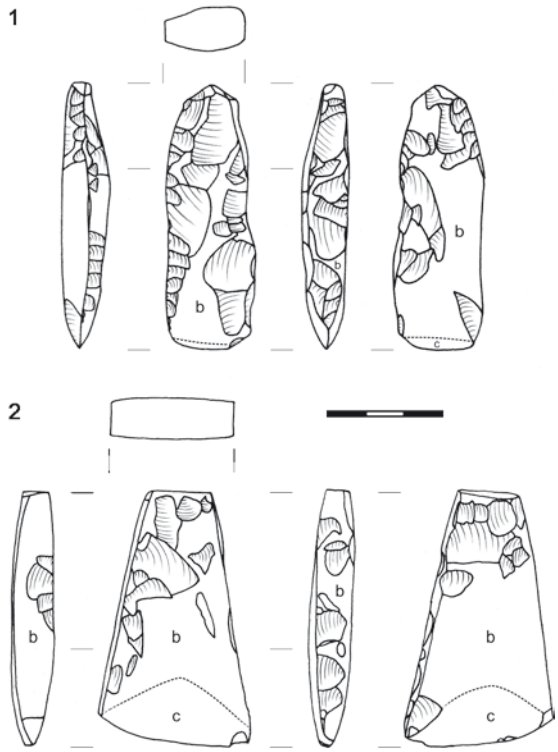

Fig. 4. Książnice Wielkie, site 1, Proszowice district. 1 – the chisel (A7) made from Jurassic G flint; 2 – the axe (A1) made from Jurassic G flint (from the collection of the Archaeological Museum in Kraków); a – grinding; b – smoothing; c – polishing. Drawing: A. Brzeska-Zastawna

also further surfaces at the cutting edge. On these same axes, there are traces visible on the part where the tools were put in a handle. In macroscopic view, this sometimes looks like wiping, gloss or traces of smoothing in the part at the butt. Most often in the FBC, axes were only partially smoothed (Balcer 1975, 122) – a portion of each axe was not smoothed at all. Total surface smoothing and polishing of the axes shows great care and willingness to maximize the technical value of the tools.

Cutting and adjacent edges were the parts most exposed to damage. Traces of repair of these parts are clearly visible on two specimens (A3, A9) and in a fragmentary way, on one-specimen (A6). The cutting edge was repaired by a very precise technique using a punch, as well as by the pressure technique. From the cutting edge towards the butt, small and flat bladelets were removed alternately (Fig. 2: 1; 6: 2). The same technique was used in forming a cutting edge (Sałaciński and Migal 1997, 341). According to W. Migal and S. Sałaciński, this was the most effective approach to forming of this part of an axe (1996, 127). One of these axes (A3; Fig. 2: 1) is similar in shape and longitudinal section to specimens of half-pro-

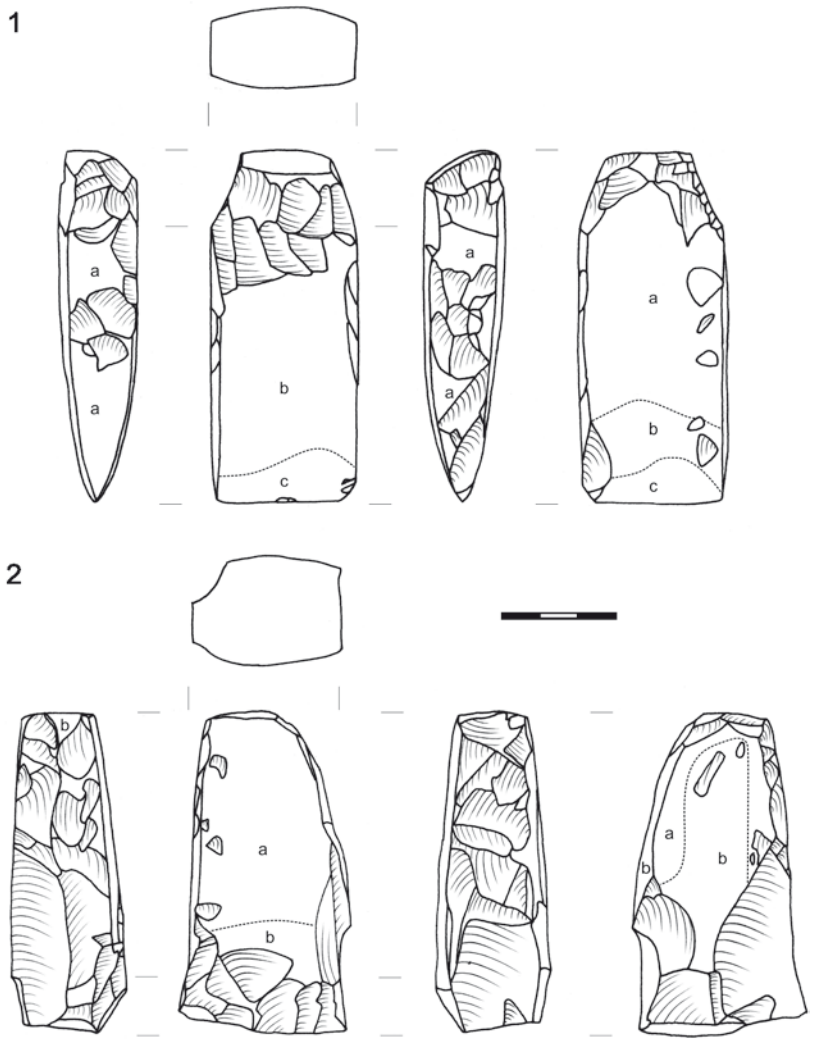

Fig. 5. Książnice Wielkie, site 1, Proszowice district. 1 – the axe (A4) made from Jurassic G flint; 2 – the formal core made from a fragment of the axe (A6) made from Jurassic G flint (from the collection of the Archaeological Museum in Kraków); a – grinding; b – smoothing; c – polishing.
Drawing: A. Brzeska-Zastawna

ducts of the Globular Amphora culture (GAC) from Koszyce (Konopka *et al.* 2016, 80: fig. 9: A). The presence of GAC artefacts at the discussed site is indicated by the identification of a fragment of the amphora of this culture in materials from J. Żurowski's research (Zastawny and Brzeska-Zastawna 2020). Very regular, rectangular transverse sections, strongly widening cutting edges, separated flat butts, meticulous smoothing on all surfaces, and small di-

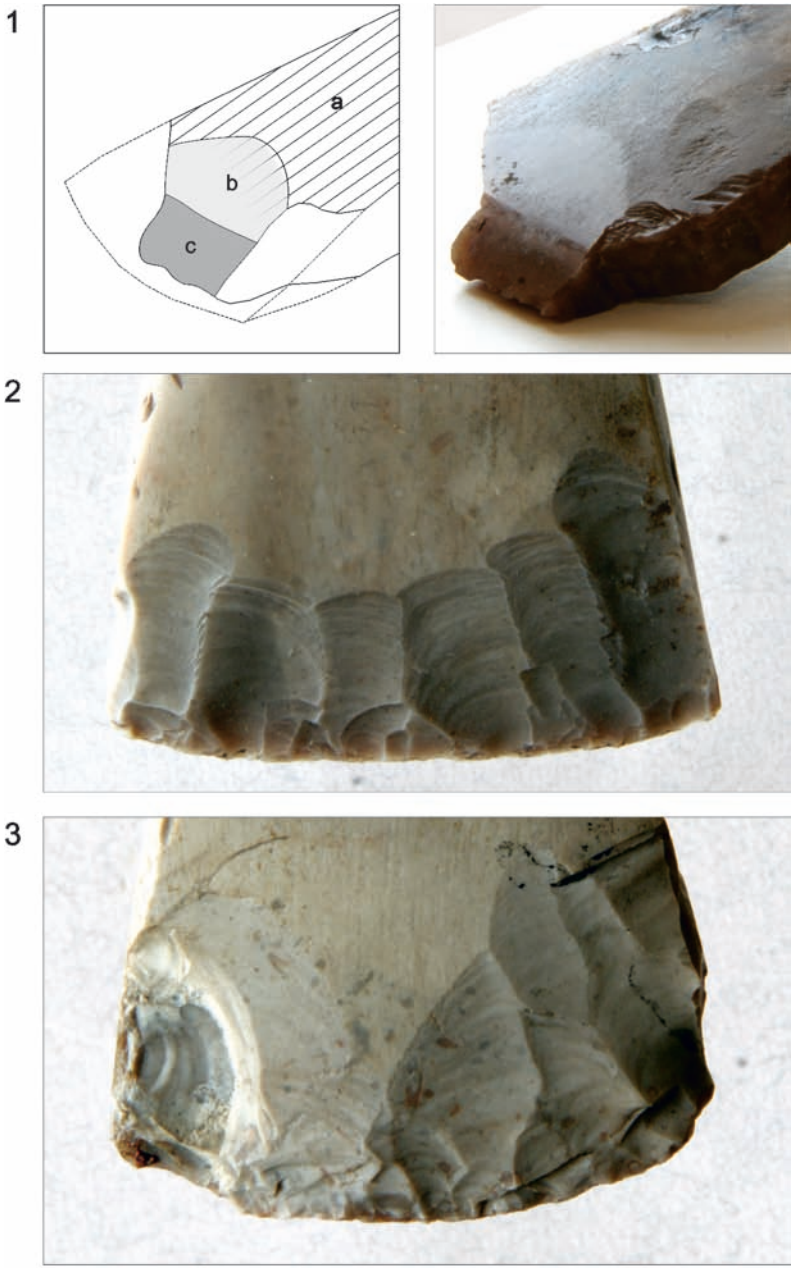

Fig. 6. Książnice Wielkie, site 1, Proszowice district. Detail of the parts of the flint axes: 1 – the part at the cutting edge of the axe (A5) with visible traces of grinding (a), smoothing (b) and polishing (c), 2-3 – the parts at the cutting edge of the axes (A3, A9) with traces of repair (from the collection of the Archaeological Museum in Kraków). Drawing and photo: A. Brzeska-Zastawna

mensions (A1; Fig. 4: 2) are also common in axes of the GAC (Balcer 1983, 209, 210, fig. 40: 5-6). In this example, the differences concern the raw material. In the GAC, axes were most often made of striped flint from the Krzemionki region. The function of such axes in the GAC was also different than in the case of specimen A1 from Książnice Wielkie 1. In the GAC, such specimens most often relate to a "prestigious" function, due to the context of discoveries (graves); often, there are no traces of use, and the quality of striped flint is fairly poor. Such is not the case of the analyzed axe (A1), which was made from Jurassic G flint. Some similarities to specimens from Książnice Wielkie 1 are visible not only in the GAC, but also in the Corded Ware (CWC) and Baden cultures, which were using Jurassic G flint in axe making. For example, similarities are visible in the case of flat specimens with parallel main surfaces and edges converging towards the butt (*e.g.* A3, A9). A similar type is known from the CWC, but on the whole, with a smaller difference (than in the case of examples A3 and A9 mentioned above) between the width of the butt and the cutting edge (Włodarczak 2006, 25, Fig. 10; 27, 245, IB type). However, specimens with lentiform longitudinal sections are not very frequent in the CWC, because axes have the thickset butt (as in the case of the A6) and, in relation to it, they have a wedge-shaped cross-section. Some similarities to flint axes from Książnice Wielkie 1 can also be seen in axes made from Jurassic G flint in the Baden culture in western Lesser Poland. This is probably due to the derivation of flint-axe-making technology from the FB-B. For example, it relates to tetrahedral specimens in the Baden culture with thinned butts, lentiform longitudinal sections, and with regular edges that converge in the direction of the butt, forming the trapezoidal shape of the axe in horizontal projections (Kaczanowska 1982/83, 79, fig. 5: f). Similarities are especially visible in the case of axes relating to variant A in the FBC (Balcer 1975; 2002, 90; Valde-Nowak 1988, 31). In the analyzed materials, there is only the one example of an axe of consistent width from the cutting edge to the part at the butt. It is the only specimen that relates to variant B in the FBC, according to B. Balcer (1975, 116). It is necessary to elaborate a larger set of flint axes of FB-B assemblages, which will enable comparative studies that will help to distinguish different features of axes of this culture and the other mentioned above.

The small axe with an asymmetrical cutting edge (A1), along with specimen A5 and the chisel (A7) were probably used in minor works, such as the making of wooden handicrafts. One of the axes (A4) stands out among the others in terms of its longitudinal section, which is the most wedge-shaped of the group.

All analyzed axes are the finished and redone forms. There are no traces (*e.g.* initial forms, half-products or unfinished axes) of axe production on the site. Fan-shaped flakes most often display faint traces of smoothed surfaces (Fig. 7: 5), indicating that they derive from the reutilization of axes. They were made outside the settlement sites in specialized workshops. Finishing treatments (grinding, smoothing and polishing) were made within the settlement sites, on supplied final-shape forms, to improve the efficiency of axes. This is confirmed by – among other evidence – the lack of traces of grinding in typical workshop sites (Kopacz and Pelisiak 1992, 110).

2.2. Other findings relating to the repair and processing of axes

The other artifacts (44 specimens; Tables 2-5; Fig. 7: 2-10) related to axes or axe-like tools are metrical flakes, blades, blade-flakes, etc. Most of them derived from the processing, reutilization and repairing stages of axes. Moreover, among the materials from site 1 in Książnice Wielkie related to the reuse of axes, there were 7 splintered pieces, 2 spalls from tools and 11 tools made from fragments of the axes (Brzeska-Zastawna 2018).

Most of this material was derived from trihedral or tetrahedral forms. Almost all specimens (except for 5 undetermined) were made from Jurassic G flint: 35 flakes, including 7 fan-shaped flakes (Kopacz and Pelisiak 1989, 348; Fig. 7: 5) and 3 flakes from splintered pieces, 4 blades (*e.g.* Fig. 7: 8, 10), including 1 technical specimen (formal burin spall or resharpening spall), 2 blade-flakes and 1 burned chip. A burin spall could derive from renovation or direct percussion on a back surface of the axe. The upper sides of flakes, on which there are visible, unambiguous surfaces of axes, most often displayed portions of a main surface (65%; *e.g.* Fig. 7: 2, 4, 5) or an edge of an axe (59%; *e.g.* Fig. 7: 4). Twenty-two percent of flakes had surfaces from portions adjoining the cutting edges (Fig. 7: 3, 6, 9), whereas 14% of specimens derive from the part at the butt (*e.g.* Fig. 7: 7). The same number (14%) had a fragment of the butt and also preserved two main surfaces. Only 2 fragments derive from the cutting edge, and 1 flake preserved two lateral edges of an axe. Most of the flakes chipped from the edge of an axe (excessive flakes), displayed a lateral surface and sometimes one of the main surfaces of the axe (*e.g.* Fig. 7: 5). Some specimens were chipped from an axe already shortened, as evidenced by the surface of a flake butt, and which is also visible on a flake edge and on the main surfaces of the axe (*e.g.* Fig. 7: 6). Flakes most often had a straight or bent to bottom side longitudinal section. Traces of breakages on 2 flakes probably indicate they were chipped from the butt or from a part of an axe used as a hammer. Some smoothed axes or axe-like tools may have retained residue from the cortex. This is indicated by some flakes with a partial covering of this material. As in the case of flakes, blades most often took portions of lateral edges and main surfaces of axes. All blades had a trihedral transverse section. Most of the blades and flakes had *lisse* and flat butts of a triangular shape. Right angles of butts are prevailing. The thickness of a butt is most often similar to the average thickness of the specimen, but in the case of flakes, the butt is also often thick. The flakes have frequently damaged or invisible bulbs. Both flakes and blades have flake scars on the upper side, arranged parallel and diagonally or transverse. Sometimes, flakes and blades derived from axes were used as tools *ad hoc* (2 "use-flakes" and 1 "use-blade" with slanted cracks). The analyzed flakes and blades come from repairs and reutilization of axes, and almost all have traces of grinding and smoothing (variant IVB; Balcer 1975, 83).

Generally, in the FBC, fragments of axes were reutilized for cores, splintered pieces and tools (Budziszewski 2000, 262). Apart from one core already mentioned above (Table 1, A6; Fig. 5: 2), there are also 7 splintered pieces (two-sided multipolar and bipolar) and tools

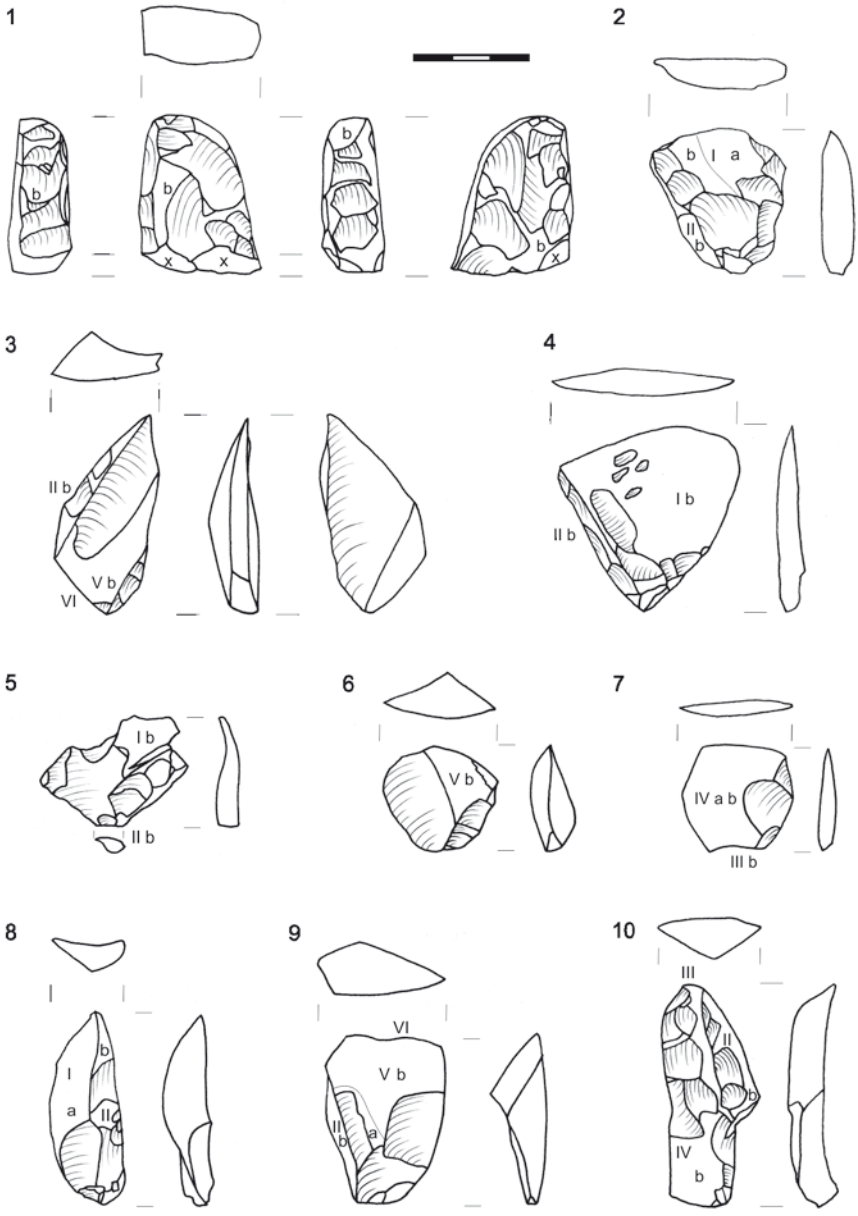

Fig. 7. Książnice Wielkie, site 1, Proszowice district. 1 – The part at the butt (A8) from the axe made from Jurassic G flint; 2-7, 9 – flakes from the axe; 8, 10 – blades from the axe (from the collection of the Archaeological Museum in Kraków); a – grinding, b – smoothing, c – polishing, x – thermal cracking; I – the main surface of the axe, II – the side of the axe, III – the butt of the axe; IV – the surface of the part at the butt of the axe, V – the surface at the cutting edge of the axe, VI – the cutting edge of the axe.
Drawing: A. Brzeska-Zastawna

(1 burin, 4 retouched flakes, 1 trapeze, 2 hammerstones, 2 retouched blades and 1 combined tool) among the analyzed artifacts. Formally, in the group of tools made from axe fragments, there is also the chisel mentioned above (A7). All artifacts were made from Jurassic G flint.

3. SUMMARY

All analyzed artifacts (except for the undetermined ones) were made from Jurassic flint of the G variant (Kaczanowska and Kozłowski 1976). Its outcrops and workshops, where flint axes were made, were identified in the central part of the Polish Jura. Part of them probably relate to the FBC and/or FB-B. More specifically, the workshops likely correspond to the "Late Funnel Beaker" identified in the vicinity of the Krztynia River (Pradła and Huta Szklana), Jasna Cave in Strzegowa, Barańskie Mountains (Kopacz and Pelisiak 1987; 1990; Rybicka and Cyrek 1997; Pelisiak 2006, 79, 80). Some of the workshops mentioned above might also have been used by the Lengyel-Polgár and other cultures that made flint axes, such as the Baden culture or Corded Ware culture.

Jurassic raw materials of the G variant were used in the utmost scale in the BR III-V (Kopacz and Pelisiak 1991, 171). Its share in inventories of the "late phase of the Bronocice settlement microregion" reached from 60 to 100% (Pelisiak 2006, 81). According to A. Pelisiak, the apogee (100%) of the use of this raw material occurred in phase V at Bronocice (Pelisiak 2008, 149). Thus, Jurassic flint of the G variant was intensively used in FB-B assemblages in western Lesser Poland. Also, it was used in the WG, which developed in the vicinity of the FB-B, in the BR III-IV (Brzeska-Pasek 2018, 513). At site 1 in Książnice Wielkie, the pottery typical for the WG was present in some of the features with pottery of the FB-B. A very interesting tendency to "repossess" tradition in the flint industry, *e.g*. the use of Jurassic flint of the G variant and the use of flint axes, can be observed in the WG. Beyond Książnice Wielkie 1 we only have one published site (site 17 in Kraków-Pleszów) where features of both the FB-B (in the oldest horizon of the FB-B, of the Niedźwiedź type) and the WG were found. However, features of both units constituted two separated groups there, contrary to the situation in Książnice Wielkie (Godłowska 1976, 55-56).

Generally, the analyzed axes display visible differentiation in typology, but not the use of raw material. The same differentiation in typology, but with the use of various raw materials (*e.g*. Świeciechów, Volhynian, striped flints) is visible in all flint axes in the Lesser Poland industry of the FBC (*e.g*. Ćmielów, Gródek Nadbużny, Bronocice, Mozgawa; Balcer 1975; Kruk and Milisauskas 1981, 83; 1983, 268, table 4; Gumiński 1989, 135-137; Florek and Wiśniewski 2008). All axes correspond to variants distinguished at the other sites of the FBC (*e.g*. Balcer 1975; 2002). However, assuming similar proportions, they are generally smaller and flatter than the majority of their analogous shapes in the classic FBC (in particular variant A according to B. Balcer; 1975). Probably, it is one of the characteristic

features of the production of flint axes in the FB-B horizon, in the western Lesser Poland Loess Upland. These are the features that make these axes similar to GAC forms, not to mention the similarities to Baden axes. These are interesting observations, especially in the context of changes at the end of the 4th and the beginning of the 3rd millennium BC. Most typical for the FB-B assemblages is the use of Jurassic raw material of the G variant. For example, in "classic FB-B phases" (BR IV, V) in Bronocice, this is almost the only kind of raw material that was used (Kruk, Milisauskas 1981: 83; 1983). In the same timeframe, raw material at this site was used very sparingly (Kruk and Milisauskas 1981, 83). A quite similar tendency is visible at Książnice Wielkie 1, where – as in Bronocice – splinters or cores were made from parts of axes. This is probably related to the high quality of Jurassic G flint. However, it could be assumed that Bronocice had better access to outcrops of this kind of raw material (Kopacz and Pelisiak 1992, 111). Perhaps the settlement in Książnice Wielkie received this raw material indirectly from the other (production?) settlements, where artifacts such as those with traces of cortex were found (Balcer 1983, 144, fig. 24: 6; Kopacz and Pelisiak 1991, 167, fig. 4: a). Damaged axes were repaired or processed into cores, splintered pieces and tools. These kinds of remains (flakes from repairs and reutilized forms from axes) are typical for a "settlement of users" (Balcer 1983, 30). The remaining flint inventory from Książnice Wielkie 1 indicates such a type of settlement.

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Table 1. Książnice Wielkie, site 1, Proszowice district. Characteristic features of axes (whole axes, fragments > approx. 30% preserved of axe), the core on the axe with approx. 70% preserved axe and the chisel

Order No.		**A1**	**A2**	**A3**	**A4**	**A5**	**A6**[1]	**A7**[2]	**A8**	**A9**
Generally quantity of preservation state (approx.)		100%	100%	100%	100%	80%	70%	100%	30%	100%
Inventory No.		MAK/6399	MAK/6622	MAK/6637	MAK/6660	MAK/6576	MAK/6369	MAK/6369	MAK/6637	MAK/7235
Figure No.		Fig. 4.2	Fig. 2.2	Fig. 2.1	Fig. 5.1	Fig. 3.1	Fig. 5.2	Fig. 4.1	Fig. 7.1	Fig. 3.2
Dimensions[3] (mm); Fig. 1:2	total lenght	67	123	120	91	78	83	68	41	87
	width in the upper part of the ax	25	32	28	33	24	34	21	27	29
	butt width	18	23	20	24	18	24	13	20	22
	butt thickness	7	10	10	18	10	21	71	12	13
	width in the ½ of the specimen lenght	30	42	42	39	35	41	21	○	38
	cutting edge width	40	53	59	39	○	○	24	○	50
	maximum thickness	11	27	20	21	13	29	12	15	18
	thickness in the ½ of the specimen lenght	11	27	20	20	13	28	11	○	17
Raw material	Jurassic G	•	•	•	•	•	•	•	•	•
Transverse section	tetrahedral	•	•	•	•	•	•		•	•
	trihedral							•		
Longitudinal section	wedge-shaped	•			•	•				•
	lentiform		•	•				•		
Part of the axe with maximum thickness	a half of length (medial part)			•		•	•			
	1/3 of length from the cutting edge (a part at cutting edge cross in medial part)	•	•							
	2/3 of length from the cutting edge (part at butt)				•			•		•
Shape of the cutting edge with surfaces at cutting edge	wedge-shaped							•		
	rectangular				•					
	trapezoid	•	•	•						•
shape of the cutting edge	symmetrical, slightly arched		•	•						•
	asymmetrical	•								
	stright				•			•		
Butt	irregular		•							
	oval									
	hemispherical				•					
	rectangular	•		•			•			
	rectangular, angular									•
	quarter of an ellipse								•	
	triangular							•		
	regular	•			•		•		•	•
	narrow thinned		•	•				•		
preparation of a butt	Formed	•			•					
	thinned from surface of a butt in the direct of cutting edge		•	•	•			•		•
	trimmed		•	•			•	•	•	•
	trimming of edge is joint with trimming of a butt		•				•	•	•	
Preparation of sides	parallel blows							•		
	parallel blows from opposed surfaces (one side from first main surface, a second side from second main surface)	•				•			•	
	sides trimmed for centripetal blows (from two main surfaces)		•	•	•					•
	one side trimmed by one direction blows (from one main surface) and a second side trimmed from two main surfaces						•			
course of lateral edges	moderately coinciding to direction of a butt		•							
	coinciding quite strongly to direction of a butt	•		•		•				•
	parallel, coinciding in butt part				•			•		
Shape of an axe	regular, trapezoid	•	•	•						•
	chisel-shaped							•		
	wedge-shaped				•					
Grinding	main surfaces		•			•	•			•
Smoothing	sides		•	•			•			•
	butt						•			•
	surfaces at cutting edge					•	•			•
	main surfaces		•	•						
	total	•			•			•	•	
Polishing	cutting edge	•	•		•	•		•		•
	surfaces at cutting edge	•	•		•					
Damage	cutting edge	•	•		•	•		•	•	
	side				•	•				•
	butt					•	•			•
	lack of medial part and part at cutting edge								•	
Thermal cracking						•			•	
Patina							•			
Breakage	butt				•		•			
Repair	cutting edge			•			•			•
	side			•						•
	butt					•				
Feature No.		28	63	stray find	stray find	58	14a		stray find	„*feature No 41, humus*", probably from the upper destroyed part of the pit (Zabłocki, Żurowski 1934:2, 17, Ryc.19)
Pottery		Lack of pottery	Lack of pottery			FB-B WG	mainly "pure" FBC pottery			

[1] formal core on the axe
[2] chisel made on a blade
[3] Fig. 1

Table 2. Książnice Wielkie, site 1, Proszowice district. Characteristic features of the other remains related to the use, repair and processing of an axe: flakes, blades, blade-flakes

Order No.		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
No. of inventory		MAK/6302	MAK/6353	MAK/6369	MAK/6369	MAK/6370	MAK/6370	MAK/6381	MAK/6402	MAK/6402	MAK/6402	MAK/6402	MAK/6402	MAK/6402
Figure No.		Fig. 7.8	-	Fig. 7.5	-	Fig. 7.10	-	-	-	-	-	-	-	-
Dimensions (mm)	length	48	23	29	35	58	42	30	34	31	27	22	17	15
	width	18	15	38	38	24	21	13	20	22	17	13	33	17
	thickness	8	8	6	8	11	10	16	3	3	2	4	6	6
Metrical type	flake		•	•	•				•	•	•		•	•
	blade-flake											•		
	blade	•				•	•							
Flake from splintered piece														
Chunk								•						
Using retouch														
Raw material	Jurassic G	•	•	•	•	•	•			•	•	•	•	•
	undetermined (burnt)							•	•					
Flake type	fan-shaped flake			•	•									
Part of axe	butt					•								
	surface at cutting edge		•							•		•		
	cutting edge		•											
	side	•		•		•	•	•	•				•	
	sides													
	main surface	•		•	•		•	•	•		•		•	•
	medial and/or at cutting edge surface													
	both main surfaces							•						
	unidentified													
	surface at butt					•								
Transverse section of the axe	tetrahedral or trihedral	•	•	•		•	•	•	•				•	
	tetrahedral													
	unidentified				•					•	•	•		•
Transverse section of a blade	triangular	•				•	•							
State of preservation	good	•	•	•	•	•	•			•	•	•	•	•
	burnt							•	•					
	cracked													
	patina													
	bruised													
Stage of preservation	whole	•	•	•		•			•	•	•		•	•
	lack of proximal part						•					•		
	proximal part													
	fractured in a distal part								•					
	fractured in several part				•									
	lateral fractured													
	fractured of proximal and distal part													
Share of a cortex surface	lack	•	•	•	•	•	•	•	•	•	•	•		•
	vestigial on a side												•	
Longitudinal section	bent to inner face			•		•	•		•	•		•	•	•
	straight		•		•						•			
	bent to upper face													
	curved													
	convoluted	•										•		
Butt	punctated													
	lisse	•		•	•	•					•		•	
	formed													
	trimmed								•	•				•
	damaged													
	edge		•											
	linear													
Butt altitude	flat	•		•		•			•	•	•		•	•
	concave				•									
	convex													
Butt shape	rhombus													
	lenticular			•										
	semicircular				•				•		•			
	triangular					•				•				
	elliptical													
	semi-elliptical													
	asymmetrical													
	trapezoidal	•												
Angle of a butt	straight	•		•					•	•	•			
	obtuse				•								•	•
	acute		•			•								
Butt thickness	thick			•						•				
	slight	•												
	regular				•	•			•		•		•	•
Bulb	damaged			•									•	
	convex	•							•					
	spilt				•	•				•	•			
	occlusive													
	invisible		•											
	concave													•
Scars on a dorsal side	blade					•	•		•	•				•
	flake	•			•	•	•		•		•		•	•
	Blade-flake	•			•							•		
	scaled blade													
	scaled flake													
Scars arrangement	centripetal													
	two-way													
	centrifugal													
	opposite										•			
	parallel with slanted or transverse	•		•	•	•			•					
	parallel with opposite													
	parallel									•		•	•	
	slanted/transverse						•							•
Grinded	main surface	•					•	•	•		•			•
	surface at cutting edge		•											
	surface at butt													
	surface of a butt/edge										•			
	side													
Smoothed	side	•		•		•	•	•	•				•	
	main surface			•		•		•					•	
	surface at cutting edge		•							•				
	surface at butt					•								
	butt					•								
Polished	surface at cutting edge											•		

Table 3. Książnice Wielkie, site 1, Proszowice district. Characteristic features of the other remains related to the use, repair and processing of an axe: flakes, blades, blade-flakes

Order No.		F14	F15	F16	F17	F18	F19	F20	F21	F22	F23
No. of inventory		MAK/6402	MAK/6402	MAK/6402	MAK/6402	MAK/6407	MAK/6407	MAK/6407	MAK/6407	MAK/6437	MAK/6437
Figure No.		-	-	-	-	-	-	-	Fig. 7.7	Fig. 7.4	Fig. 7.6
Dimensions (mm)	length	19	19	11	19	41	23	24	25	48	27
	width	20	35	16	26	23	28	21	28	47	29
	thickness	5	3	4	6	6	8	5	6	7	11
Metrical type	flake	•	•	•	•		•	•	•	•	•
	blade-flake					•					
	blade										
Flake from splintered piece		•		•							
Using retouch											
Raw material	Jurassic G	•	•	•	•	•	•	•	•	•	•
	undetermined (burnt)										
Flake type	fan-shaped flake		•		•						
Part of axe	butt					•			•		
	surface at cutting edge							•			•
	cutting edge										
	side		•		•	•				•	
	sides										
	main surface	•		•	•	•	•			•	
	both main surfaces										
	unidentified										
	surface at butt								•		
Transverse section of the axe	tetrahedral or trihedral									•	
	tetrahedral										
	unidentified	•	•	•	•	•	•	•	•		•
Transverse section of a blade	triangular										
State of preservation	good	•	•	•	•	•	•	•	•	•	•
	burnt										
	cracked										
	patina										
	bruised										
Stage of preservation	whole		•		•		•	•	•	•	•
	lack of proximal part	•									
	proximal part			•							
	fractured in a distal part					•					
	fractured in several part										
	lateral fractured								•		
	Fractured of proximal and distal part										
Share of a cortex surface	lack	•	•	•	•	•	•	•	•	•	•
	vestigial on a side										
Longitudinal section	bent to inner face		•			•					
	straight	•						•	•	•	
	bent to upper face				•		•				•
	bent to upper face										
	curved										
	convulted										
Butt	punctated									•	
	lisse				•			•			
	formed								•		
	trimmed		•	•		•					•
	damaged					•	•				
	edge										
	linear										
Butt altitude	flat			•		•		•		•	•
	concave				•				•		
	convex		•				•				
Butt shape	rhombus										
	lenticular										
	semicircular				•					•	
	triangular			•				•			
	elliptical										
	semi-elliptical					•					
	asymmetrical		•								•
	trapezoidal								•		
Angle of a butt	straight		•		•		•	•		•	•
	obtuse			•					•		
	acute										
Butt thickness	thick		•		•				•		
	regular			•		•	•				
	slight							•		•	•
Bulb	damaged			•	•				•		
	convex		•				•				
	spilt		•				•				
	occlusive					•					
	invisible							•		•	•
	concave										
Scars on a dorsal side	blade	•			•			•			
	flake	•	•	•	•	•	•		•	•	•
	blade-flake						•				
	scaled blade										
	scaled flake										
Scars arrangement	centripetal										
	two-way										
	centrifugal										
	opposite										
	parallel with slanted or transverse				•		•	•			
	parallel with opposite		•								
	parallel										
	slanted/transverse	•		•		•			•		•
Grinded	main surface			•				•		•	
	surface at cutting edge							•			
	surface at butt								•		
	Surface of a butt/edge										
	side										
Smoothed	side					•				•	
	main surface	•				•	•			•	
	surface at cutting edge							•			•
	surface at butt								•		
	butt								•		
Polished	surface at cutting edge										
Feature No.		30				31				39	

Table 4. Książnice Wielkie, site 1, Proszowice district. Characteristic features of the other remains related to the use, repair and processing of an axe: flakes, blades, blade-flakes

Order No.		F24	F25	F26	F27	F28	F29	F30	F31	F32	F33
No. of inventory		MAK/6463	MAK/6467	MAK/6467	MAK/6489	MAK/6494	MAK/6533	MAK/6534	MAK/6534	MAK/6573	MAK/6573
Figure No.		-	Fig. 7.9	-	Fig. 7.3	-	-	-	-	-	-
Dimensions (mm)	length	34	42	29	46	25	39	32	24	45	40
	width	26	32	30	36	19	30	41	28	24	31
	thickness	16	13	16	14	7	15	7	6	4	7
Metrical type	flake	•	•	•	•	•	•	•	•	•	•
	blade-flake										
	blade										
Flake from splintered piece										•	
Chunk											
Using retouch											•
Raw material	Jurassic G	•	•		•	•	•	•	•	•	•
	undetermined (burnt)			•							
Flake type	fan-shaped flake							•	•		
Part of axe	butt	•				•	•				
	surface at cutting edge		•	•	•						
	cutting edge		•	•	•						
	side	•	•	•	•	•		•	•		•
	sides						•				
	main surface							•	•		•
	medial and/or at cutting edge surface										
	both main surfaces		•	•	•		•				
	unidentified										
	surface at butt	•				•	•			•	
Transverse section of the axe	tetrahedral or trihedral	•	•	•	•	•		•	•		•
	tetrahedral						•				
	unidenftified									•	
Transverse section of a blade	triangular										
State of preservation	good		•		•	•	•	•	•	•	•
	burnt			•							
	cracked				•						
	patina	•									
	bruised										
Stage of preservation	whole	•		•	•	•		•	•	•	•
	lack of proximal part		•								
	proximal part										
	fractured in a distal part										
	fractured in several part										
	lateral fractured										
	fractured of proximal and distal part										
Share of a cortex surface	lack	•	•	•	•	•	•	•	•	•	•
	vestigial on a side										
Longitudinal section	bent to inner face				•			•			
	straight	•	•			•			•	•	•
	bent to upper face										
	curved										
	convoluted										
Butt	punctated										
	lisse	•						•	•		•
	formed									•	
	trimmed				•	•					
	damaged										
	edge										
	linear										
Butt altitude	flat	•			•	•		•	•	•	
	concave										•
	convex										
Butt shape	rhombus										
	lenticular										
	semicircular										
	triangular	•				•				•	
	elliptical										
	semi-elliptical										
	asymmetrical							•	•		
	trapezoidal				•						•
Angle of a butt	straight	•			•			•			
	obtuse					•			•	•	
	acute										•
Butt thickness	thick					•		•	•	•	•
	slight	•									
	regular				•						
Bulb	damaged								•	•	
	convex							•			
	spilt				•						
	occlusive	•									•
	invisible					•				•	
	concave										•
Scars on a dorsal side	blade				•						
	flake	•	•		•	•		•	•	•	•
	Blade-flake										
	scaled blade					•					
	scaled flake										
Scars arrangement	centripetal								•		
	two-way										
	centrifugal										
	opposite										
	parallel with slanted or transverse					•		•			•
	parallel with opposite										
	parallel		•								
	slanted/transverse	•			•				•	•	
Grinded	main surface							•	•		•
	surface at cutting edge		•	•							
	surface at butt	•								•	
	surface of a butt/edge										
	side										•
Smoothed	side	•	•		•	•		•	•		
	main surface				•		•		•		
	surface at cutting edge		•	•	•						
	surface at butt					•					
	butt	•				•				•	
Polished	surface at cutting edge			•							
Feature No.		41	42		49		54			58	

Table 5. Książnice Wielkie, site 1, Proszowice district. Characteristic features of the other remains related to the use, repair and processing of an axe: flakes, blades, blade-flakes

Order No.		F34	F35	F36	F37	F38	F39	F40	F41	F42	F43	F44
No. of inventory		MAK/6573	MAK/6573	MAK/6573	MAK/6573	MAK/6588	MAK/6588	MAK/6588	MAK/6623	MAK/6629	MAK/6654	MAK/6653
Figure No.		-	-	-	-	-	-	-	Fig. 7.2	-	-	
Dimensions (mm)	length	45	20	22	66	31	19	33	38	61	19	40
	width	19	21	19	33	33	28	40	35	36	32	29
	thickness	12	3	3	15	8	6	10	8	15	4	9
Metrical type	flake		•	•	•	•	•	•	•	•	•	•
	blade-flake											
	blade	•										
Flake from splintered piece												•
Chunk												
Technical blade - burin spall												
Using retouch		•									•	
Raw material	Jurassic G	•	•	•		•	•	•	•		•	•
	undetermined (burnt)				•					•		
Flake type	fan-shaped flake						•					
Part of axe	butt											
	surface at cutting edge		•									
	cutting edge											
	side			•		•	•	•	•	•		
	sides				•							
	main surface			•		•	•	•	•	•	•	•
	medial and/or at cutting edge surface	•										
	both main surfaces				•							
	unidentified											
	surface at butt											
Transverse section of the axe	tetrahedral or trihedral	•				•	•	•	•	•		
	tetrahedral				•							
	unidenftified		•	•							•	•
Transverse section of a blade	triangular											
State of preservation	good	•	•	•	•	•	•	•	•		•	•
	burnt									•		
	cracked											
	patina											
	bruised								•	•		
Stage of preservation	whole	•	•		•	•	•	•	•		•	•
	lack of proximal part											
	proximal part											
	fractured in a distal part											
	fractured in several part											
	lateral fractured											
	fractured of proximal and distal part			•								
Share of a cortex surface	lack	•	•	•	•	•	•	•	•	•	•	•
	vestigial on a side											
Longitudinal section	bent to inner face										•	•
	straight	•	•	•					•			
	bent to upper face											
	curved											
	convoluted					•	•	•				
Butt	punctated											
	lisse	•	•				•	•	•			
	formed											
	trimmed					•						
	damaged											
	edge										•	
	linear											•
Butt altitude	flat	•	•			•	•	•				•
	concave											
	convex											
Butt shape	rhombus					•						
	lenticular											
	semicircular											
	triangular	•	•								•	
	elliptical							•				•
	semi-elliptical						•					
	asymmetrical								•			
Angle of a butt	straight	•	•			•	•				•	•
	obtuse							•	•			
	acute											
Butt thickness	thick											
	slight											
	regular	•	•			•	•					
Bulb	damaged						•		•			
	convex							•				
	spilt							•				
	occlusive								•			
	invisible	•	•			•						
	concave											
Scars on a dorsal side	blade	•		•				•		•		
	flake		•				•	•	•	•		
	Blade-flake											
	scaled blade											
	scaled flake										•	•
Scars arrangement	centripetal											
	two-way											
	centrifugal											
	opposite											
	parallel with slanted or transverse		•		•	•		•				
	parallel with opposite							•				
	parallel	•								•	•	•
	slanted/transverse			•			•		•			
Grinded	main surface	•		•	•	•		•	•	•	•	•
	surface at cutting edge											
	surface at butt											
	surface of a butt/edge											
	side	•		•	•			•				
Smoothed	side				•	•	•		•	•		
	main surface	•					•		•			
	surface at cutting edge	•	•									
	surface at butt											
	butt											
Polished	surface at cutting edge		•									
Feature No.		58							65	stray finds		