

Late Bronze Age Flint Assemblage from Open-pit Mine Reichwalde in Saxony, Germany

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Abstract: The article presents the Late Bronze Age flint assemblage from Hammerstadt 06 (HAS-06) – site situated in an open-pit mine Reichwalde (Tagebau Reichwalde) in Saxony, Germany. The material constitutes a good basis for comparison with Hallstatt flint assemblages known from Poland so it was compared with a little smaller collection from the remains of a stronghold from Lusatian culture in Wicina in Poland, situated ca. 40 km to the north-east from Reichwalde. Both sites are placed into a broader context of European Late Bronze Age flint knapping phenomenon.

Keywords: Late Bronze Age flint knapping, Hammerstadt, Wicina

Introduction¹

It has been assumed that the end of the Bronze Age in Europe brought about the decline and collapse of flintworking both in terms of technology and typology. To an extent this was caused by the increase in the dynamics of circulation of metal products effectively replacing 'obsolete' stone tools. According to the researchers who subscribe to this view, availability of metal products hindered production of tools from stone, in principle restricting them only to the utilitarian sphere and depriving them of aesthetic and symbolic qualities (Humphrey 2004). The use of metal is claimed to be responsible for the fact that the knowledge of advanced flintworking techniques sank into oblivion. Stone was still used by the Late Bronze Age communities, but it degenerated into solely opportunistic, *ad hoc* forms. The range of formal tools was gradually reduced to the minimum, rendering flint products solely functional and utilitarian, while more technologically advanced metal products were attributed with symbolic significance (Edmonds 1995). However, there are examples proving that in the Late Bronze Age the use of flint still had extra-utilitarian significance (Oliva 2011; Masojć 2014; Lech *et al.* 2015).

The Late Bronze Age flintworking, while undergoing technological deterioration, became surprisingly uniform in most of Europe (Lech and Piotrowska 1997; van Gijn and Niekus 2001; Bronowicki and Masojć 2008, 2010; Högberg 2009; Ballin 2010; Eriksen 2010, in press;

Masojć and Bech 2011; Masojć *et al.* 2013; Goldhammer 2015; Masojć 2016). To simplify, it is characterised by the predominant use of the hard hammerstone, reduction of the exclusively flake core – mainly amorphous or multidirectional, without preparation. This type of reduction yielded massive, frequently cortical flakes with a considerable contribution of chunks from broken-up flint blocks. Blades occur only occasionally as an unintentional by-product. Many classes of formal tools were abandoned and replaced by extensively produced *ad hoc* tools and sharp-edged flakes commonly used without secondary modification. Identical homogeneity is seen in the areas situated further away from central Europe, e.g. in the Middle East (Rosen 1996).

Publications concerning flint assemblages from the Late Bronze Age are still rare. The German sources familiar to the author are occasional texts briefly discussing flint product from the Late Bronze Age or the Early Iron Age (Arora 1985, 1986; Bolus 1999). An extensive description of the flint assemblage from the Late Bronze Age and the Early Iron Age from Rodenkirchen-Hahnenknooper Mühle is an exception (Goldhammer 2014). In this paper the assemblage from site Hammerstadt 06 will be presented. This material constitutes also a good basis for comparison with Halstatt flint assemblages known from Poland Zakrzów, Krapkowitz district 41 (Bronowicki and Masojć 2008, 2010) and Wicina, Żary district (Masojć 2013).

Site Hammerstadt 06 (HAS-06), Görlitz district

The site is situated in an open-pit mine Reichwalde (Tagebau Reichwalde) in Saxony (Fig. 1). The excavations, supervised by Peter Schöneburg, were carried out in 2008. The author of the report on the excavations is Nadine Baumann (2009). Altogether

¹ The material from site Hammerstadt 06 (HAS-06) in Reichwalde, Görlitz district was analysed following the agreement from 2012 between the author and the Landesamt für Archäologie, Sachsen in Reichwalde represented by dr Regina Smolik as part of the Polish National Science Centre's project in the programme 2012/05/B/HS3/03829. I wish to thank dr Regina Smolik and the colleagues from the Landesamt für Archäologie, Dresden: dr Stefan Krabath, dr Carmen Liebermann and dr Harald Stäuble for making the flint material and the field records available for the analysis.



Fig. 1. Location of sites HAS-06 in Germany (black dot) and Wicina, Żary dist., in Poland (black square).
 Drawn: M. Masojć

1284 functionally diversified archaeological objects were excavated within seven trenches (Schnitt 1-7), whose area comprised ca. 1.3 hectare (Fig. 2 and 3). While occasional finds from the site are connected with the Neolithic Corded Ware culture, most objects and pottery sherds come from Lusatian culture of the Late Bronze Age (Ha A2 - Ha B2); a few finds also indicate at the earlier period (Br D, Ha A1).

The flint assemblage from site HAS-06 includes 2482 artefacts and natural fragments of flint (Baumann 2009: 39-40). Preliminary inspection of the assemblage was carried out by dr Carmen Liebermann. The author analysed the assemblage of intentional product including 1615 artefacts. On the basis of their technological and typological features, 41 were determined as connected with earlier episodes of the site's occupation - mainly from the Stone Age (Mesolithic and Neolithic). The remaining artefacts - 1574 - were connected with the settlement functioning in the site in the Late Bronze Age (Tab. 1). The artefacts were found mainly within the objects as well as from the surrounded excavated area. Only Baltic erratic flint was recorded in the site. A considerable part of the assemblage - 570 items (36% of the analysed collection) - bears evidence of burning. The author of the report does not explain such a considerable contribution of burnt artefacts. It may have resulted from post-

depositional processes in the site (intentional burning of forests growing in the site's area or accidental fires). However, small flint assemblages from the objects, totally burnt (e.g. object no. 1700 in trench 5 - 39 burnt flint artefacts), prove that the preservation status of the flint also results from the activities of the inhabitants of a Lusatian culture settlement.

The overall structure of the Lusatian culture flint assemblage reflects the specific technological nature of European flintworking from the Late Bronze Age. Nearly 6% of the assemblage is constituted by cores, which was caused by short-lived use of blocks and separation of individual flakes. Common absence of preparation resulted in quick abandonment of blocks and use of other in short production runs. Flint in the site was plentiful - numerous flint concretions were excavated within the trenches. Flintworking took place in the site, which is substantiated by numerous chips. Flakes were intentional products of core reduction. Sharp-edged, characteristic flakes with spacious and cortical butt areas were used without a secondary modification. Some of them, as well as numerous chunks, were used as *ad hoc*, retouched tools. Nearly half of the assemblage is constituted by chunks, which resulted from breaking up of flint blocks. For the inhabitants of the settlement it did not matter whether flakes or sharp-edged chunks were used as *ad hoc* functional tools.

Wicina 1, Żary district. Remains of a stronghold from Lusatian culture

The flint assemblage from site HAS-06 was compared with a little smaller collection from the remains of a stronghold from Lusatian culture in Wicina in Poland (Fig. 4), situated ca. 40km to the north-east from Reichwalde (Tab. 2). It is a spacious defensive structure functioning from the mid-8th century till the mid-6th century (about 160–180 years). After 571 BC it was destroyed during an invasion of the nomadic tribe of Scythians, who murdered the inhabitants and burnt the stronghold (Jaszevska and Kałagate 2013). It is a homogenous site from Lusatian culture, whose layers provided ca. 200 flint artefacts (Masojć 2013).



Fig. 4. Wicina, site no 1, Żary dist. The view on the stronghold from the south. Photo: S. Kałagate.

Table 2. Dynamic picture of assemblages from HAS-06 and Wicina, Żary dist.

Categories	HAS-06		Wicina	
	N	%	N	%
I. Raw material				
I.1. Pebbles, concretions	-	-	-	-
II. Early phase of coring				
II.1. Initial core, pre-core	8	0,5	5	2,55
II.2. Cortical blanks	-	-	-	-
II.2.1 Cortex flake > 50% cortex	151	9,59	27	13,83
II.2.2 Cortex blade > 50% cortex	-	-	-	-
II.3. Preparation products	-	-	-	-
II.3.1. Crested blades	-	-	-	-
II.3.1.1. Unifacial crested blade	2	0,12	4	2,04
II.3.1.2. Bifacial crested blade	-	-	2	1,02
II.3.2. Secondary crested blade	-	-	-	-
II.3.3. Other preparation products, fragments	9	0,57	-	-
II.4. Cortex chips	112	7,11	2	1,02
III. Advanced exploitation				
III.1. Cores	-	-	-	-
III.1.1 Single-platform cores	-	-	-	-
III.1.1.1. flake cores	9	0,57	6	3,06
III.1.1.2. blade cores	-	-	1	0,5
III.1.2 Cores of two equivalent flaking surfaces/striking platforms, including classic double-platform cores				
III.1.2.1. flake cores	2	0,12	1	0,5
III.1.2.2. blade cores	-	-	-	-
III.1.3 Flake disc cores	-	-	-	-
III.1.3.1. non-prepared cores	4	0,24	2	1,02
III.1.3.2. cores with prepared striking platforms	3	0,19	-	-
III.1.4 Flake block-like cores with changing orientation	2	0,12	7	3,57

Categories	HAS-06		Wicina	
	N	%	N	%
III.1.5 Flake amorphous cores, multidirectional	18	1,14	14	7,16
III.1.6 Splintered cores	3	0,19	-	-
III.2. Blanks	-	-	-	-
III.2. Flakes (cortex <50% and non-cortical)				
III.2.1. flakes with removals on dorsal face consistent with the direction of flake's removal	98	6,22	16	8,16
III.2.2. flakes with removals on dorsal face opposite to or consistent with and opposite to the direction of flake's removal	4	0,24	5	2,55
III.2.3. flakes with removals on dorsal face shifted to the direction of flake's removal by acute to right angle	12	0,76	8	4,08
III.2.4. multidirectional flakes – flakes with multidirectional removals	18	1,14	5	2,55
III.2.5. Flakes/splintered blades	10	0,63	-	-
III.3. Blades (cortex <50% and non-cortical)	-	-	-	-
III.3.1. blades with removals on dorsal face consistent with the direction of removal	1	0,06	2	1,02
III.3.2. two-directional	-	-	-	-
III.3.3. multidirectional	-	-	-	-
IV. Final exploitation				
IV.1. Products of core repair	-	-	-	-
IV.2. Exhausted cores/fragments	42	2,66	2	1,02
V. Other flakes and undetermined products				
V.1. Undetermined flakes/blades	113	7,18	12	6,12
V.2. Non-cortical chips	167	10,62	-	-
V.3. Chunks	727	46,28	62	31,73
VI. Tools				
VI.1. Retouched tools	-	-	-	-
VI.1.1. Backed knives	-	-	1	0,5
VI.1.2. Partially backed knives	-	-	-	-
VI.1.3. End-scrapers	3	0,19	-	-
VI.1.4. Burins	-	-	-	-
VI.1.5. Tools with bifacial retouch	-	-	-	-
VI.1.6. Perforators and borers	5	0,31	3	1,5
VI.1.7. Notched and denticulated tools	12	0,76	5	2,5
VI.1.8. Flakes, blades, retouched chunks	27	1,74	3	1,5
VI.1.9. Fragments of undetermined retouched tools	5	,31	1	0,5
VI.2. Functional tools				
VI.2.1. Flakes, blades, chunks with traces of use	7	0,44	-	-
VI.3. Flintworking tools	-	-	-	-
VI.3.1. Hammerstones, stone retouchers	-	-	-	-
Total:	1574	100	196	100

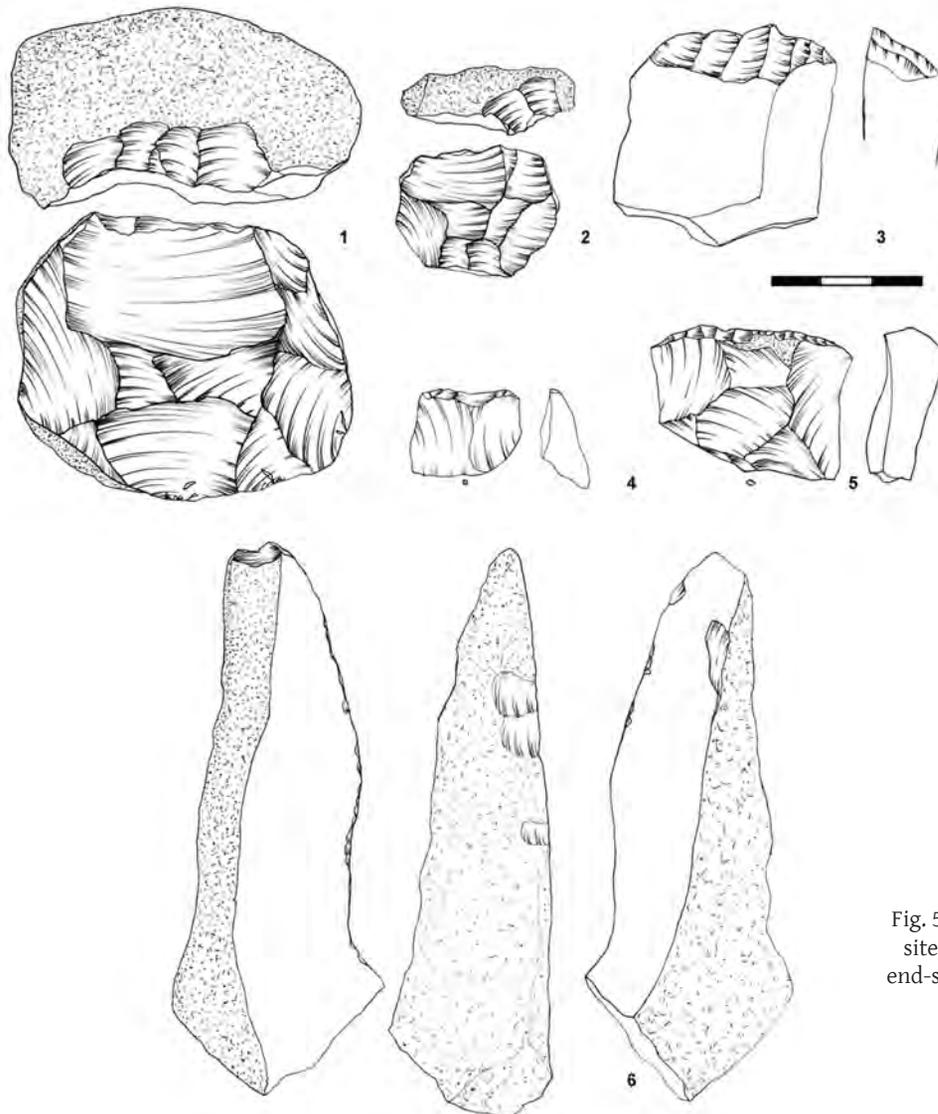


Fig. 5. Chosen artifacts from the site HAS-06. a-b – cores, c-e – end-scrapers, 7 – functional tool. Drawn: M. Masojć.

Analysis and the comparison of the flint material from HAS-06 and Wicina 1

Comparison of the assemblages from HAS-06 and Wicina is given in Table 2. Several hundred specimens of natural flint were found in site HAS-06. Some of them could have been used as raw material for flintworking (big flint blocks). Due to the considerable size of the collection acquired in the site, this analysis does not make an allowance for potential concretions brought to the site for further use. Only rocks evidently used in the flint knapping, bearing traces of smashing and crashing into chunks, were taken into consideration and included in the table (category V). No blocks of flint raw material were observed in the remains of a stronghold in Wicina.

In HAS-06 the artefacts determined as belonging to the early coring phase (II) are represented primarily by cortical flakes. This group includes individual initial

cores and the products of core preparation. Occasional technical forms include crested blades, usually unifacial with cortical surfaces. They are simplified forms in comparison with the crested blades known from the industries with advanced initial preparation. Their crests consist of individual negatives of chippings. The group also includes numerous chips and occasional initial cores.²

The group of products determined as advanced coring (III) includes the cores with more than one chipping, additionally comprising a considerable surface of cores (Fig. 5: a, b). It is interesting that multidirectional amorphous cores predominate in HAS-06 (18 specimens). Flake, single-platform cores are also relatively numerous (9 specimens). Contrary to the assemblage from Wicina, the bipolar technique

² Absence of chips in Wicina probably results from the applied method of site's exploration (no sifting).

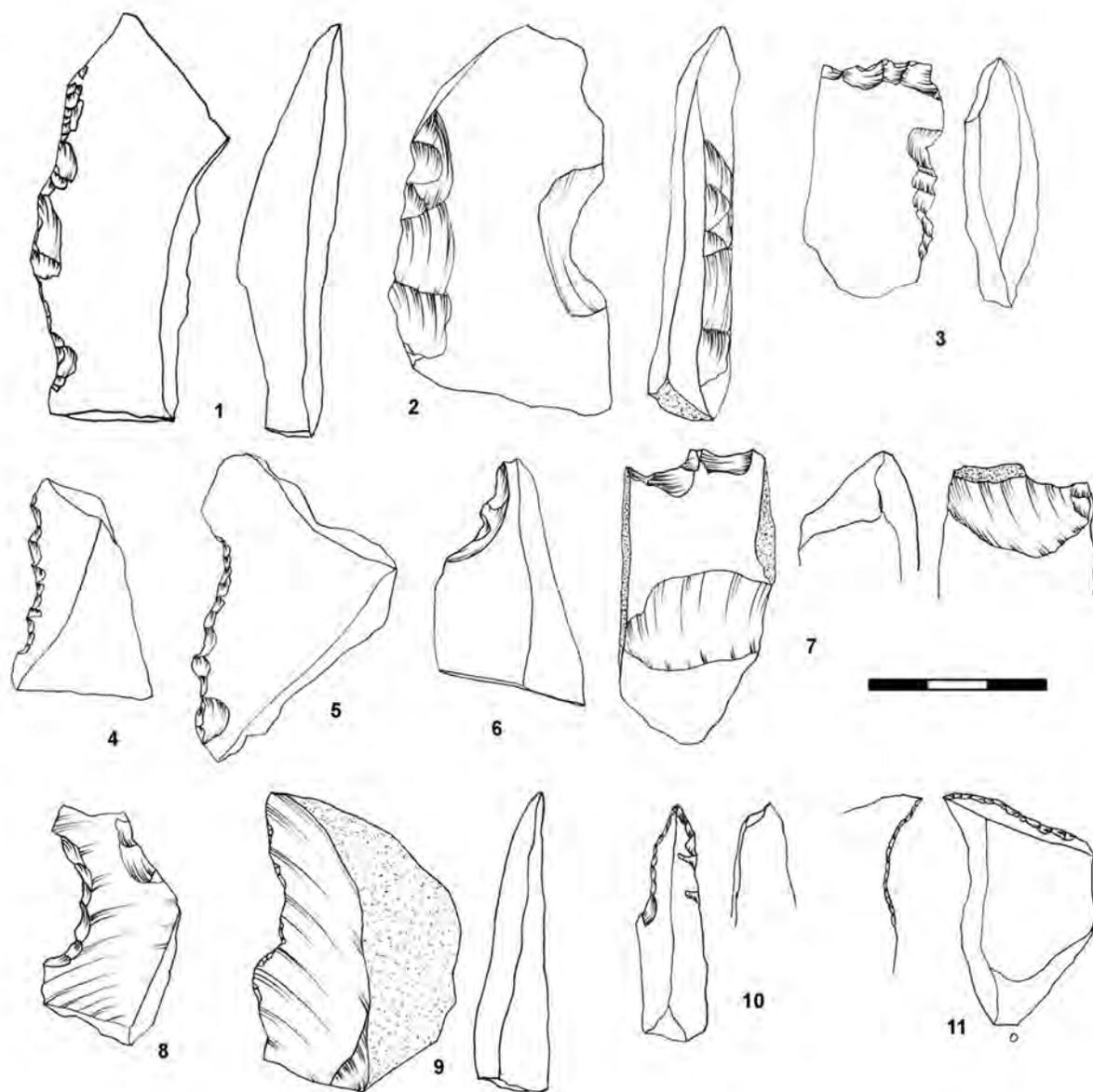


Fig. 6. Tools from the site HAS-06. Drawn: M. Masojć.

was applied in the analysed assemblage (3 splinter cores, 10 splinter flakes). The technique is in principle a permanent element of many assemblages connected with the so-called late stoneworking.

The specific character of coring is reflected in the categories of blanks which included non-cortical flakes or the flakes possessing cortex (natural surface) comprising less than 50% of the dorsal surface. The most frequent are the flakes with removals on dorsal face consistent with the direction of flake's removal. The flakes with the directions of flake's removals other than consistent are less frequent (III.2.2 - III.2.4 in Table 2). Two forms displaying blade proportions also belong to the group of the former above (III.3.1). In principle

the only difference between HAS-06 and Wicina within this technological group is the presence of splinter flakes in the collection from Reichwalde.

The group of final coring (IV) includes the products resulting from occasional attempts of repairing cores. Apart from the products of repair, another category is the cores at final stages of exploitation. Exhausted cores are usually considerably reduced, where numerous surfaces display the negatives indicating multiple change of block's orientation.

The flint products from sequence V can not be easily attributed to a concrete stage of coring. It includes undetermined blanks, which escape any closer

characteristics due to their fragmentation. Debris in the flint assemblages from the Late Bronze Age constitutes a constant and significant component. It was treated in the same way as blanks, which is substantiated by their frequent use as tools – both as retouched ones and as *ad hoc* functional forms. The attitude to coring, based on fragmentation and acquisition of sharp-edged rock fragments, resulted in the appearance of debris at various stages of the process. Therefore this category of artefacts was not attributed to any concrete sequence. It is the most numerous category in both collections – HAS-06 and Wicina. In the case of the former this category also includes non-cortical chips.

The category of tools (VI) includes all retouched products (Fig. 5: c–e; 6: j). Additionally, several functional tools were recorded in HAS-06 (Fig. 5: f). No artefacts bearing macroscopically visible evidence of use (functional tools) or objects used in flintworking (e.g. hammer stones or retouchers) were observed in the collection from Wicina. Apart from fragmentarily retouched forms (VI.1.8) three categories of tools were observed; the most numerous were notched tools, while perforators were less frequent. One backed knife was recorded in Wicina, while end-scrapers were recorded in HAS-06 (Fig. 5: c–e).

In the Late Bronze Age and the Early Iron Age multifunctional flint backed knives were in common use in vast areas in Europe; they assumed various forms – from the those described as big backed knives, especially in Scandinavia (Högberg 2009), to small-sized thick backed knives from central Europe (Bronowicki and Masojć 2010). With their proportions relatively standardised, they were mainly used as sickle inserts. Big backed knives, similar to those from Scandinavia, were also in use in continental Europe. In Poland their

direct analogies are the knives of ‘Zełe’ type from the mining field in Wierzbica, Radom district, situated in the centre of the country (Lech 1997). They were produced from chocolate flint of excellent quality. In the areas lacking the raw material of appropriate quality the equivalent of big backed knives was thick flake forms, e.g. those from a Lusatian culture flint assemblage in site Zakrzów, near Opole in western Poland, where more than 70 thick backed knives were excavated (Fig. 8: a–c; Bronowicki and Masojć 2008, 2010). They are standardised forms with the sharp, penetrating working edge and the backed edge blunted with a retouch. Due to the arrangement of both edges their cross section approximates the shape of a triangle. Backed knives were produced solely from flake blanks. An analogous backed knife was also recorded in Wicina (Fig. 8: d). No flake backed knives were recorded in HAS-06; perhaps in the settlement they were replaced by thick knives (Fig. 6: a, b) – even more *ad hoc* in their character. Made on chunks, they do not have the abrupt retouch of the whole backed edge like the forms mentioned above, but they display a certain analogy to the standardised thick backed knives from Lusatian culture.

Conclusions

In terms of the manner of its production and technological features the flint assemblage from HAS-06 corresponds to the assemblages of flint products from the settlements from the Late Bronze Age and the Early Iron Age in Europe. As seen in Table 2, it is very similar and comparable to the assemblage from the defensive settlement in Wicina. It is thus an assemblage produced solely with the application of a hard hammerstone, which was used to break up flint blocks into pieces. Breaking up blocks resulted in the appearance of many cores – negative forms of amorphous shapes, frequently



Fig. 7. Tools and core from HAS-06. Photo: U. Wohmann, Landesamt für Archäologie Sachsen.

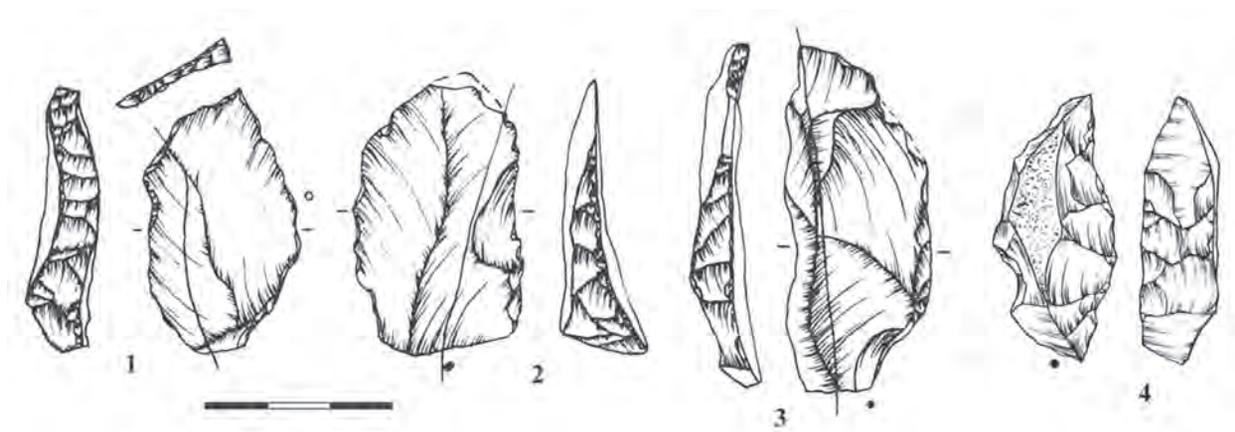


Fig. 8. Flake backed knives from Zakrzów, Krapkowice dist. (a–c) and Wicina, Żary dist. (d). Drawn: J. Bronowicki and M. Masojć.

with single negatives. Strong blows broke flint blocks into many sharp-edged fragments, which do not display the features of flakes, even though they appeared as a result of intentional breaking of the raw material. This fact is responsible for such a great contribution of industrial chunks. This type of coring aimed at acquiring sharp-edged flint fragments, not necessarily flakes, which were used as *ad hoc* tools. The character of the flintworking of that time proves that it was not carried out by specialist craftsmen. Opportunistic technology and lack of care concerning the form of the products, aiming at acquiring the specimens suitable for *ad hoc* purposes with a minimum effort, proves that the producers' skills were barely basic. To quote Berit V. Eriksen, production of such *ad hoc* flake tools could be carried out by 'anyone, anywhere and whenever' (2010: 89).

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