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Michał Adamczyk

Buniewice 7: The Lithic Technology of the Ahrensburgian Hunting Camp

Buniewice 7: Technologia krzemieniarstwa na obozowisku łowieckim kultury ahrensburskiej

Abstract: The Ahrensburgian site in Buniewice is one of the largest collection of lithics of this culture in the Pomeranian Bay area. The article provides a detailed technological analysis of this assemblage.
Keywords: Western Pomerania, Late Palaeolithic, Ahrensburgian culture, lithic technology
Abstrakt: Ahrensburskie stanowisko w Buniewicach to jedna z największych kolekcji narzędzi krzemiennych tej kultury z rejonu Zatoki Pomorskiej. W artykule zaprezentowano wyniki szczegółowych badań technologicznych tego zbioru.
Słowa kluczowe: Pomorze Zachodnie, późny paleolit, kultura ahrensburska, technologia krzemieniarstwa

Introduction

In 2011, the multicultural Stone Age site known as Buniewice 7 was discovered by a team of archaeologists and students from the University of Szczecin and the Adam Mickiewicz University in Poznań, led by Mikołaj Urbanowski, Katarzyna Pyżewicz, Radosław Szemelak and Michał Adamczyk. The site was registered as AZP 18-07/10. Among 611 artefacts collected from surface ground in 2011–2012, 174 were initially identified as from the Ahrensburg Culture of the Late Palaeolithic Age due to the presence of tanged points (predominantly without a ventral face retouch) and their being made using a soft hammer technique used for detachment of blades from double-platform cores. Although a surface collection, it is the biggest Late Palaeolithic assemblage from the area.

The site is an Ahrensburgian hunting camp located north of Buniewice (Kamień Pomorski Commune, Kamień Pomorski District, West Pomeranian Voivodeship), in the northern part of the Chrząszczewska Island (Figs. 1 and 2). It is one of few islands in the Szczecin and Kamień Lagoons in northwest Poland, with Wolin Island being the biggest and the most well-known of these. Prior to the 2011 research, the region was not considered to be settled before the Neolithic Age (e.g. Cnotliwy 1966, 7). Since discovery of Buniewice 7, a number of other Palaeolithic sites have been found, albeit the majority containing rather small inventories; even, single soft-hammer blades (Adamczyk 2016, 98). This makes the site the most important in the area, despite the fact it is a surface collection. It is relatively large, with different stages of the *chaîne opératoire* present. More importantly, it contains tanged points and other typological elements, linking it without doubt to the Ahrensburgian Culture. Thus, it is a good starting point to initiate the research on Ahrensburgian lithic technology in Western Pomerania.

The Buniewice 7 site is without doubt a hunting camp belonging to a larger cluster of Ahrensburgian sites. On one hand, the location is very favourable, granting inhabitants access to potential seasonal migration routes (Adamczyk 2014; 2016; 2021). On the other, the composition of the assemblage strongly indicates hunting activities. Despite the random nature of a surface collection, there are eight tanged points and their fragments, with an additional Zonhoven point and possibly other arrowheads (backed blades). Moreover, the points have distinctive traces of usage, such as damaged tips. This suggests repair, such as changing damaged points. Also, the presence of tools associated with meat extraction (cutting tools), skin working (cutting tools, end scrapers, perforators) and bone working (burins, possibly Zinkens) is typical of hunting activities.

Goals and Aims

The purpose of this article is the detailed technological analysis of the Ahrensburgian seasonal hunting camp in Buniewice 7. Therefore, it is intended to both supplement and verify results from previous research on this assemblage (Adamczyk 2014; 2016). Included are some remarks on technology. However, the main goals of that research were different and there remains much to say. It is worth mentioning that detailed information about tool typology of the assemblage has been published previously. Thus, it will be limited only to issues relevant to the discussion at hand in this paper.

Some of the more important questions undertaken in the research include: What methods of blade production were used? Was there a separate method of flake production? What type of core preparation was used? What type of a soft hammer (organic or mineral) was used for blade production? Were different techniques used for blade production and correction? What type of edge preparation was used? What was the waste management strategy? Answering these questions can bring knowledge of the technological behaviour and production-related activities of users of the site.

A separate issue is the potential and limits of a surface collection for more detailed technological studies. The lithic technology of the Late Tanged Point cultures (i.e. the Ahrensburgian and the Sviderian) in other areas is rather well-described. Thus, it would be interesting to compare the results obtained through the analysis based on the same principles and research methodology, and with more complete assemblages originating from excavated sites elsewhere (e.g. Hartz 1987; Fiedorczuk 1995; Dziewanowski 2006; Migal 2007; Sobkowiak-Tabaka 2011; Grużdź *et al.* 2012; Sobkowiak-Tabaka, Winkler 2017; Berg-Hansen 2018; 2019; Grużdź 2018; Berg-Hansen *et al.* 2019; Przeździecki 2019).

Data and Method

The Ahrensburgian assemblage from Buniewice 7 contains 189 lithics, including five cores and core fragments, 157 blades, blade tools and wastes from blade tool production, nine flakes and flake tools, eight tools made on undefined debitage (either flakes or blades), as well as 10 burin spalls. The number of artefacts is larger than that of the previous study (Adamczyk 2014) due to re-analysis. Table 1 presents the data on quantity of the main groups of lithics present in the assemblage. However, it must be noted that this is a surface collection, and therefore the proportions of said groups differ significantly from the assemblages originating from excavated sites. This is illustrated by a relatively large number of blade tools and a very low number of flakes and flake tools. As most are not really distinctive, they could be linked to various cultures present at the site. For this reason, most were excluded from the study (for the criteria of material selection see: Adamczyk 2014, 181–182).

The raw material used in the assemblage is a mix of Cretaceous flints that are available locally. These are mostly Campanian and Upper Turonian flints in shades of grey that span from almost white to black, of generally very good quality, and with glassy structure and low numbers of inclusions that make them highly desirable raw materials for blade production (Adamczyk 2014, 183). It is worth mentioning that the whole of both Wolin and Chrząszczewska Island are covered with rich deposits of flint (Alexandrowicz 1966; Czebreszuk, Kozłowska-Skoczka 2008, 14–18), some representing the best raw knapping material types in all Western Pomerania. Moreover, many of these deposits are located within layers of chalk and limestone, meaning they are neither as weathered nor as cracked as flint collected from the surface. It is possible that prehistoric peoples extracted some nodules from either natural or man-made openings in the earth, or from stream beds. This explanation accounts for the excellent quality of raw material noted in the Buniewice 7 assemblage.

The basis of modern technological analysis is the concept of *chaîne opératoire*, or chain of operations. It means, in general, that every artefact is placed in the technological context of its function and purpose (e.g. whether a tool, a half-made product, a blank, or waste), as well as a position within a production sequence (i.e. early- or late-stage). The collected data allows for construction of a *schema opératoire*, or scheme of operations, which is more or less synonymous with a method used by knappers in the past (e.g. Inizian *et al.* 1999, 15–16). Thus, the goal in modern technological studies is to use the physical objects to interpret non-material cultural values.

The main research method used in this study is the Dynamical Technological Classification (DTC). This method was developed by Scandinavian authors, notably Bo Madsen (1992; 1996) and Mikkel Sørensen (2006a; 2006b), but its origins derive from the Dynamic Classification first used by Romuald Schild, Maria Marczak and Halina Królik (1975). DTC has become more popular in the last decade (e.g. Damlien 2015; Berg-Hansen 2018; 2019; Berg-Hansen *et al.* 2019). DTC makes classification of attributes, such as blade curvature or ripple type, the subject of statistical measure. In the case of larger assemblages, it permits the drawing of conclusions based on strike technique and method, among other factors. The 189 lithics from Buniewice 7, including the 157 blades, blade fragments and blade tools, provide an opportunity to draw conclusions about the blade technology at work in the assemblage. The DTC questionnaire is presented in Table 2.

As a supplementary method, Scar Pattern Analysis (SPA) was used. This method was created and first used by Mikołaj Urbanowski and Witold Migal (Migal, Urbanowski 2006; 2008), specifically for the technological analysis of asymmetrical knives from the Middle Palaeolithic Age. It is possible to use the method for analysing other lithic categories (e.g. Kot 2020) and in this study it will be applied to cores. SPA is based on establishing a relative chronology of negatives covering an object's surface, and a subsequent reconstruction of production sequences. This gives relatively detailed information when refitting is not possible. While core preparation is very important within the knapping process, SPA is better suited for analysing later stages of production. Nevertheless, strategies of core management in the later stages are important for this research, making it a useful method.

As stated above, an important question is whether organic or mineral soft hammers were used in Buniewice. Thus, some elements of Experimental Archaeology included the making for this purpose of a series of seven each of experimental blades knapped with organic and mineral soft hammer (148 organic hammer blades and 168 mineral hammer blades). Afterward, DTC analysis was performed on the experimental blades and compared with DTC analysis of the artefacts.

Results

The results of the DTC procedure are presented separately for cores, blades (including blade tools and crested blades) and correction blades. Due to the small number of flakes and flake tools, they will not be described here. However, they are included in the overall results for all debitage groups presented in Table 3. For cores, the results of SPA also are included.

Cores from Buniewice 7 are a diverse group, despite the fact that they are a small sample collected from the surface (Table 1). This group includes two prismatic cores (cores with two opposed platforms) (Figs. 3 and 4:1), two fragments of prismatic cores (Figs. 4:2 and 5), and one single platform core (Fig. 6). All of the prismatic cores and their fragments have surface-to-platform angles of ~70°, whilst that of the single platform is closer to 80°. In terms of edge preparation, the cores are surprisingly diverse: two cores were trimmed (including one moderately and one intensely), one was intensely facetted, one shows a combination of both light trimming and faceting, with one core presenting no edge preparation. Platforms either are prepared by a single strike negative (two cases) or by a series of small negatives (three cases). Two cores have natural backs; one a unifacial, crested back, and one a flat back. Three cores show flaking surfaces covering ~¾ of its circumference, thus their sides are covered with blade negatives. One core has a frontal surface and sides that are covered with preparation negatives. All of the cores are extremely exhausted and in a generally small size, with their height ranging from 43.94 mm to 48.06 mm (core fragments not included), suggesting they were fully exploited, with a proper hold barely possible and blades that are too short to be considered usable.

The SPA results suggest that, initially, all cores were prismatic, and that they later were reworked into a variety of types (Adamczyk 2016, 160–165). Detailed sequences of the *schema opératoire* are as follows: Prismatic core made by a novice knapper (Figs. 3 and 7): I. Raw pebble; II. Back preparation; III. Platform preparation (both main and secondary); IV. Preparation of sides (one series each); V–VII. Detachment of a series of blades from secondary platform, followed by a series detached from the main platform and again from the secondary platform; VIII. Main platform rejuvenation and correction of sides; IX and X. Blade detachment from the main platform (two series) and the secondary platform (one series); XI. Abandonment and post-depositional damage.

Exhausted prismatic core (Figs. 4:1 and 8): I. Raw pebble; II. Preparation of the platform, back and left side; III. Second series of back preparation; IV. Blade detachment (both from the main and secondary platforms); V. Front rejuvenation; VI. Platform rejuvenation, right-side repair; VII. Left-side repair; VIII. Edge trimming; IX. Abandonment of the core.

Fragment of a broken prismatic core (thus, rendering the sequence incomplete) (Figs. 5 and 9): I. Raw pebble; II–IV. Three series of side preparation, the main platform formation and possibly the secondary platform; V and VI. Preparation of the right side (one series) and the left side (two series); VII. Detachment of a series of blades from both main and secondary platforms; VII–IX. Detachment of two series of blades from the main platform; X. Edge trimming from the front to the right side, possibly in order to widen the front; XI. Breakage of the core; XII. Abandonment and post-depositional damage.

Single platform core, reworked from a prismatic core (Figs. 6 and 10): I. Raw pebble; preparation of the back and possibly the main platform; III and IV. Preparation of the right side (one series) and the left side (two series); V. Blade detachment from both main and secondary platforms; VI and VII. Secondary back preparation; the beginning of the reworking into a single platform core; VIII and IX. Secondary preparation of the right side (two series) and the left side (one series); X and XI. Failed attempts at blade detachment (two series); XII. Abandonment and post-depositional damage.

There are 138 serial blades (Figs. 11, 12 and 13:9), crested blades (Figs. 13:10,11) and blade tools (Figs. 14, 15, 20–22, 25 and 26) in the Buniewice assemblage. However, most are fragmented and not all features could be quantified. There are more or less equal numbers of blades with two, three and four or more negatives on their dorsal sides, with only single examples of other negative patterns (dorsal face fully covered with cortex). More than half of blades have negatives in only one direction, and around a quarter have two directions as a result of opposite-platform production. Due to a high ratio of incomplete blades, the blade termination, curvature and twist features should be treated carefully. But it is likely that the predominant combination is a straight blade with a proximal curve and ideal termination (i.e. a mostly symmetrical pointy end), with half of the specimens twisted. The blades are mostly (but not perfectly) regular, with the regular-to-irregular ratio being roughly 7:3. A majority of specimens have light, ventral ripples or no ripple at all; with ripples at distal ends and strong ripples noted occasionally. Over half of blades have a light lip, a third have a medium (visible) lip, and the rest no lip at all. A flat and spread bulb is a dominant feature, with single examples of other bulb forms. Bublar scars are absent in roughly half of specimens, with another half having either a small scar (i.e. shorter than half of the bulb’s length), or, a large scar (i.e. longer than half of the bulb's length). There is a single, split bulb (Fig. 30). Over three-quarters of the blades does not have any form of conus formation, with almost a fifth showing a combination of conus and ring-crack, and few cases of a detached bulb. The blades are a diverse group in terms of butt morphology, with all of them represented more or less equally and slightly larger share of punctiform butts, largely plain and some with ridges. With few exceptions, the purpose of faceting is not butt isolation (Figs. 29 and 30). Vast majority of blades have trimmed edges, and for over a third, the purpose of edge trimming was butt isolation. A typical striking angle is 60°–70°, with some ranging from 40°–90°.

Among 19 correction blades (Fig. 13:1–8) all but one are complete, and thus making some observations possible. Most have four or more negatives on their dorsal sides, with a third having only two negatives. The correction blade group has different combinations of negative directions (one, two or more) roughly in equal proportions. With one exception, correction blades have an ideal termination, are predominantly not twisted. They are more diverse in terms of profile, with both straight and different types of curved blades present. The blades are mostly irregular, with regular specimens consisting of around 40% of the group. The ventral sides of correction blades are covered mostly with only light ripples or no ripples at all. The majority of correction blades have only a light lip, with a smaller number presenting a medium lip. A dominating feature is a flat bulb with no scar. However, round ones and those with some form of scars are present. Most of the correction blades have no conus formation. However, some ring cracks and some ring-crack-and-conus combinations are present. They also present mostly plain, lens-shaped or broken butts and a rather lightly trimmed edge preparation. Typical angles are 70°–80°, with a notable group of blades possessing 50° striking angles.

Discussion

Considering the results presented above, questions about the technology arise that can be discussed in detail. A good starting point is core preparation, repairs and re-use. Unfortunately, there is not much to say about an initial preparation process as traces were removed to a great extent in later stages. The results of the SPA suggest that at least some repairs were made to sides and platforms. Side repairs point to the maintaining of certain proportions of the flaking platform (length-to-width ratio) as among principles of the method used and in order to produce long, narrow and straight blades. The same observation was made by Inger Marie Berg-Hansen (2018, 72; 2019, 177–181) concerning examples of Ahrensburgian flintknapping found at Alt Duvenstedt LA 121, Teltwisch 2, Eskebjerg and Sølbjerg, where side correction was a common practice;

often conducted by detachment of massive flakes in order to maintain a narrow flaking surface. These flakes are common in other, more complete Ahrensburgian assemblages from Western Pomerania.

Similarly to other Ahrensburgian sites (e.g. Berg-Hansen 2019, 181), a variety of back forms is present in a small sample at Buniewice. This indicates that backs of the cores are not very important in the Ahrensburgian concept of flintknapping and thus offers a multitude of ways of forming this part of a core, depending on, for example, a knapper's individual preferences and shape of the pebble. As suggested by Witold Grużdź *et al.* (2012, 247), a general rule of Sviderian practice was the more irregular the pebble, the more preparation was noted, with use of narrow, tabular pebbles simplifying preparation.

The cores from Buniewice 7 are extremely exhausted, reaching their limits of size and mass. Due to this and to an absence of typical byproducts (e.g. large flakes, primary platform tablets, etc.), it is impossible to deduce their core preparation processes. The only evidence of early-stage production is the presence of three unifacial crested blades. This suggests that one-sided cresting was a procedure used for shaping of the flaking surfaces, which confirms I.M. Berg-Hansen's (2019, 185) observations on preparation in Ahrensburgian assemblages from Northern Germany and Denmark.

Most probably, there is a division into main platforms used for striking long blades (tool blanks) and secondary platforms for corrections such as removing hinges, maintaining straight profiles of blades, and forming distal ends of blanks for certain tools (e.g. Migal 2006, 191–197; Grużdź 2018, 53). This also is confirmed by the presence of correction blades.

As stated in previous reports on Buniewice 7 (Adamczyk 2014, 186; 2016, 163), there is evidence of reworking used cores. An interesting example is a single platform core, which originally was a double-platform, prismatic core (Figs. 6 and 10). Such examples of waste management strategy are known in Ahrensburg flintknapping (Berg-Hansen 2018, 72; 2019, 183). However, only a sample of materials are available in Buniewice 7, making it is impossible to say if this was a general rule at the site. Nonetheless, the behaviour has analogies in other assemblages.

The Ahrensburgian knappers from Buniewice appear to have paid great attention to edge preparation. There are 42 blades with trimming, including 22 with butts separated by trimming, three with light faceting, 14 with combination of trimming and faceting, as well as 13 blades without preparation. It seems possible that the primary mode of edge preparation was trimming. Faceting likely was a supporting mode. In some cases, the presence of negatives on butts might result from platform maintenance, rather than intentional faceting; especially in the case of blades with one ridge present on the butt. Overall, that edge preparation was mostly careful is suggested by a high number of punctiform, isolated butts. This is a typical trait of Late Palaeolithic flintknapping, especially in Tanged Point Cultures like the Ahrensburgian and the Sviderian (Grużdź 2018, 53; Berg-Hansen 2018, 73).

There are some differences between serial and correction blades. In general, there are more straight blades with proximal curvature in the serial blades group. Whilst almost half of correction blades are straight. There also are significantly more correction blades without a twist, as compared to serial blades. Serial blades are more regular, and correction blades more irregular. Differences also appear in bulb morphology, with serial blades having almost universally flat, spread bulbs. Among the majority of correction blades, a significant number feature short, spherical bulbs. Serial blades have more bulbar scars (small and large), whilst scars are seldom seen on correction blades. More careful edge preparation is given to serial blades (both trimming and faceting), resulting in smaller, more isolated and even, punctiform butts. The final difference is striking angles, typically 60°–70° for serial blades and 50°– or 70°–80° for correction blades. All of these features suggest diversified approaches to serial blade production, which appears more careful and curated than for correction blades, which were made when needed; opportunistically and without unnecessary emphasis. This might mean that the correction blades were never intended to be used as tools and Ahrensburgian knappers viewed them purely as waste. There is also a possible difference in a soft hammer technique (organic or mineral), which supports this hypothesis.

This question of technique in Late Palaeolithic flintknapping is key (e.g. Madsen 1992; 1996; Grużdź *et al.* 2012; Berg-Hansen 2018; 2019). Preliminary results of the experimental study (Table 4) suggest that the main difference between organic and mineral soft-hammer features is presence and a form of both bulbar scar and conus. In the case of experimental organic soft hammer blades, the vast majority have neither bulb scar nor conus. For the mineral soft hammer blades, typical features are large scars and ring-cracks combined with conus formations. Moreover, some differences are present in the case of a lip (larger, often visible and even pronounced lips for organic hammers; usually smaller, or none at all, for mineral hammer), ripple (more of the organic hammer blades have heavy, pronounced ripples, or, none at all, compared with rather smooth and delicate ripples of mineral hammer blades) and bulb (where blades without any form of a bulb in the case of organic hammer, especially combined with visible lip, predominate).

In the case of the Buniewice 7 assemblage, a relatively high ratio of blades with conus and ring-crack suggests that both organic and mineral soft hammers were used for blade production. Although it is hard to estimate the exact quantity of organic and mineral soft hammer blade production, it appears the organic soft hammer was preferred in serial production, but both types were used to some degree. In cases of correction blade detachment, both soft hammer types were used as well, although most probably mineral hammers were used more often than with serial blades. This is in contrast to observations made by Grużdź *et al.* (2012, 254), who stated on the basis of microscopic research that all blades from the Sviderian site at Suchodółka (Świętokrzyskie Mountains, southeast Poland) were detached with a mineral soft hammer. Importantly, contrary to the previous hypothesis stating that large blades in Buniewice were probably detached with large and heavy organic hammers, while small and light mineral hammers were used to produce smaller blades (Adamczyk 2014, 186), the DTC results strongly indicate that there is no correlation between hammer type and blade size. This means that differences in technique do not result from their positions within the *chaîne opératoire* and may have other causes. Because both groups of blades are impossible to distinguish without a detailed analysis of technological features and thus represent a similar style, reasons are likely not related to an intended function, either. Due to the absence of refittings, it is impossible to say for sure if both techniques were used for reduction of the same cores. Or, if separate cores were used.

One of the important issues to address when analysing lithics is the length of the *chaîne opératoire* present in the assemblage. In the case of the Buniewice 7 site, this is especially difficult due to the mixed and rather random nature that is typical of a surface collection. Nevertheless, there are some suggestions that the majority of the production took place on the spot. There are numerous pieces with cortex, crested blades and secondary crested blades, as well as some big flakes reworked into tools (e.g. Fig. 17). Also, there are some big blades (>30 mm wide) present in the materials, suggesting a continuous production that started with big cores (Figs. 27 and 28). Overall, the lithics seem to be smaller than, for example, those from Kocierz (Czarnecki 1971; Galiński 1999; 2019, 19–29). The number of large pieces in Buniewice 7 is limited and this may be due to the presence of a later settlement, during the Mesolithic and Neolithic. As suggested by the presence of an Early Mesolithic core formed on a large core tablet, people in later periods might have treated the Palaeolithic site as a source of raw material; hence, only relatively smaller pieces survived to this day.

There remains a question of whether the pre-cores were prepared in mining or workshop sites, where raw material extraction and initial shaping took place? The presence of high quality flint nearby is previously noted (Adamczyk 2014, 183). Thus, both full production in the camp and separate workshop strategy were possible, even as a workshop site has yet been found in the area.

The presence of typical waste from preparation and repairs of tools is evidence of local production and use. These include microburins (Fig. 14:11,12) and burin spalls (Fig. 24), also detached from different types of retouched tools, indicating the chain of operations was complex and included the very last stages of tool production, as well as reworking different types of tools into others. This suggests careful economy with raw materials.

There is no evidence of specialised flake production. Flake tools appear produced from the leftover materials of preparation and repair. This strategy of waste management is considered typical of the Late Palaeolithic flintknappers (e.g. Berg-Hansen *et al.* 2019, 15; Adamczyk 2022, 13) whose desired products were blades and used flakes in an opportunistic manner. However, there are few flakes and flake tools in the assemblage.

Overall, production methods used in the Buniewice 7 assemblage have numerous analogies in other sites of Tanged Point cultures. The prismatic core method is one of the basic for both Sviderian and Ahrensburgian flintknapping. Core reworking is a common phenomenon, as is very careful edge preparation before serial blade detachment. So, too, the focus on blade production with little to no interest in planned flake production. Additionally, opportunistic use of wastes for flake tools appears a main trait of the Late Palaeolithic (Berg-Hansen 2018; 2019; Berg-Hansen *et al.* 2019). As W. Migal (2006; 2007) stated, an occasional use of predefined blades for tanged-point production is also known in this period. In Buniewice 7, most probably this strategy was not used as all serial blades are of the same style, and tools (including tanged points) were produced from selected serial blades. A similar strategy is noted in the Sviderian assemblage from Salaspils Laukskola in Latvia (Berg-Hansen *et al.* 2019, 16). As evidenced by presence of burin spalls with retouch (the reworking of end scrapers and other retouched tools into burins; Fig. 24:5–8) and production of multitools (e.g. Kostienki knife + perforator + burin; Fig. 26:3,4), tool reworking is also very common across the whole of Central Europe during the last stages of the Vistulian glaciation.

Conclusions

The Ahrensburgian hunting camp in Buniewice 7 is an example of a typical site of this culture, with numerous technological traits that are present in other assemblages from Northern Europe (e.g. Hartz 1987; Berg-Hansen 2018; 2019; Berg-Hansen *et al.* 2019). There are also elements typical of the Sviderian (e.g. some of the tanged points having a ventral retouch), which is a common feature in the mixing zone between the two cultures (Sobkowiak-Tabaka 2011, 103–108; Sobkowiak-Tabaka, Winkler 2017; Adamczyk 2021).

Despite being merely a surface collection, the assemblage is big enough to permit conclusions about aspects of blade technology using DTC and SPA methods. Even as many questions stated at the beginning of this paper simply cannot be answered without more complete materials from excavation. For example, those about waste management and core preparation strategies. Because the site was obviously destroyed by Mesolithic peoples, there is no guarantee that answers will be found.

Obtaining new data on the lithic technology of the Late Palaeolithic is always worth the effort. In the case of the Western Pomerania, this is the most important task for the near future as organic materials are almost absent. This makes lithic technology a most promising field of research. With numerous surface collections, large and small, as well as sites excavated by Tadeusz Galiński and Maciej Czarnecki, such as Kocierz, Płoty, Rotnowo and Bolków (e.g. Czarnecki 1971; Galiński 1997; 1999; 2019), there is a lot of potential for more research on the technology of the Late Palaeolithic in Western Pomerania.

Table 1. Structure of the Ahrensburgian assemblage from Buniewice 7
Tabela 1. Struktura inwentarza ahrensburskiego z Buniewic 7

No. Lp.	**Main category Główna kategoria**	**Type Typ**	**Total Suma**
1	Cores and core fragments	Single platform cores	1
		Prismatic cores	2
		Prismatic core fragments	2
2	Blades	Serial blades	99
		Correction blades	19
		Crested blades	1
3	Blade tools	Ahrensburg tanged points	5
		Sviderian tanged points	1
		Bromme tanged points	1
		Undefined tanged points	1
		Zonhoven points	1
		Backed blades	1
		Blade end scrapers	8
		Blade burins	6
		Blade Zinken perforators	2
		Blade multitools (cutting tool + perforator)	1
		Blade multitools (Kostienki knife + perforator + burin)	1
		Retouched tools	1
		Blades with working retouch (cutting tools)	7
4	Flakes	Platform rejuvenation flakes	1
		Flake fragments	1
5	Flake tools	Flake end scrapers	5
		Flake burins	2
6	Undefined debitage tools	Undefined debitage end scrapers	8
7	Tool production wastes	Microburins	2
		Primary burin spalls (end scrapers)	1
		Primary burin spalls (other retouched tools)	4
		Primary burin spalls (unretouched debitage)	1
		Secondary burin spalls (burins)	4
	Artefacts in total		**189**

Table 2. List of features described in the Dynamical Technological Classification (DTM) method used in this study. Different sets of data are marked with colours: grey – site and artefact number; red – basic classification; yellow – measurements; blue – debitage features; orange – edge and preparation features; green – core features. After: Madsen 1992; 1996; Sørensen 2006a; Damlien 2015; Berg-Hansen *et al.* 2019; Adamczyk 2022
Tabela 2. Lista cech opisywanych w metodzie Dynamicznej Klasyfikacji Technologicznej (DTM) użytej w badaniach. Kolory odpowiadają różnym zestawom danych: szary – nazwa stanowiska i numer zabytku; czerwony – podstawowa klasyfikacja; żółty – wymiary; niebieski – cechy debitażu; pomarańczowy – cechy krawędzi i jej przygotowania; zielony – cechy rdzeni. Za: Madsen 1992; 1996; Sørensen 2006a; Damlien 2015; Berg-Hansen *et al.* 2019; Adamczyk 2022

Code Kod	**Feature Cecha**	**Attribute Atrybut**
–	Site	–
–	Artefact number	–
X1	Type	Description
X2	Subtype	Description
X3	Blank type	Description
X4	Raw material	Description
M1	Length	Measurement
M2	Width	Measurement
M3	Thickness	Measurement
A1	Dorsal debitage face	1. Cortex/natural surface; 2. Cortex + negative; 3. Cortex + Two or more negatives; 4. Two negatives; 5. Three negatives (prismatic); 6. Four or more negatives; 7. Unifacial crested blade; 8. Bifacial crested blade
A2	Dorsal negative direction	0. Cortex; 1. Unidirectional; 2. Two directions (or different than on ventral side); 3. More than two directions
B	Debitage termination	1. Ideal; 2. Feathered; 3. Plunging; 4. Hinged
C1	Debitage curvature	1. Straight; 2. Distal curvature; 3. Even curvature; 4. Proximal curvature; 5. Curvature with belly
C2	Twist	0. No twist; 1. Right-hand twist; 2. Left-hand twist
D	Regularity	0. Irregular; 1. Mostly regular; 2. Extremely regular
E	Ventral ripples	0. Smooth ventral face; 1. Distal end ripple; 2. Flat ripple; 3. Pronounced ripple
F1	Lip	0. No lip; 1. Weak lip (felt under fingers); 2. Medium lip (visible); 3. Pronounced lip
F2	Bulb morphology	0. No bulb; 1. Flat and spread bulb; 2. Round bulb; 3. Pronounced bulb; 4. Multiple bulbs
G	Bulbar scar	0. No scar; 1. Small scar; 2. Large scar; 3. Split bulb and/or long scar
H	Conus formation	0. No conus; 1. Ring crack; 2. Ring crack + conus; 3. Detached bulb
I	Butt morphology	1. Large thick butt; 2. Large oval butt; 3. Thin oval butt; 4. Small thick butt; 5. Small butt; 6. Punctiform butt; 7. Broken butt
J	Butt preparation	0. No preparation; 1. Two negatives; 2. More than two negatives
K	Debitage preparation	0. No preparation; 1. Light preparation; 2. Intense preparation; 3. Point isolation
L	Debitage fragmentation	1. Complete debitage; 2. Distal end; 3. No distal end; 4. Proximal end; 5. No proximal end; 6. Medial fragment; 7. Split debitage
Q1	Angle	Description
Q2	Edge trimming	0. No trimming; 1. Light trimming; 2. Intense trimming; 3. Point isolation
Q3	Edge faceting	0. No faceting; 1. Light faceting; 2. Intense faceting; 3. Point isolation
N1	Number of platforms	1. One platform; 2. Two platforms; 3. Three or more platforms
N2	Platform preparation	1. Single flake; 2. Few large flakes; 3. Many small flakes
O1	Core morphology	1. Single platform subconical; 2. Single platform conical; 3. Dual platform cylindrical; 4. Dual platform prismatic; 5. Multiplatform; 6. Discoidal

O2	Front morphology	1. Cortex/natural; 2. Unifacial crest; 3. Bifacial crest; 4. Flat surface (one negative); 5. Flat surface (two or more negatives); 6. Blade negatives
O3	Back morphology	1. Cortex/natural; 2. Unifacial crest; 3. Bifacial crest; 4. Flat surface (one negative); 5. Flat surface (two or more negatives); 6. Blade negatives
O4	Sides morphology	1. Cortex/natural; 2. Crest formation negatives; 3. Preparation from platform; 4. Other preparation; 5. Blade negatives
P	Core front exploitation	1. Circular exploitation; 2. Up to ¾ exploitation; 3. Single front exploitation
R	Platform rejuvenation	1. Full rejuvenation (core tablet removal); 2. Partial rejuvenation (rejuvenation flake removal)
S	Core rejuvenation	1. Front rejuvenation flake; 2. Distal blade rejuvenation flake; 3. Side rejuvenation flake

Table 3. Results of the DTC analysis. Percentage values are counted within given categories
Tabela 3. Wyniki analizy metodą DTC. Wartości procentowe zostały zliczone w ramach poszczególnych kategorii

Code Kod	Feature Cecha	Attribute Atrybut	Serial blades Wióry seryjne	Correction blades Wióry korekcyjne	Flakes Odłupki
A1	Dorsal debitage face	1. Cortex/natural surface	1 (1%)	0 (0%)	0 (0%)
		2. Cortex + negative	5 (4%)	0 (0%)	2 (29%)
		3. Cortex + two or more negatives	9 (7%)	1 (5%)	2 (29%)
		4. Two negatives	47 (35%)	6 (32%)	1 (14%)
		5. Three negatives (prismatic)	39 (29%)	1 (5%)	0 (0%)
		6. Four or more negatives	30 (22%)	11 (58%)	2 (29%)
		7. Unifacial crested blade	3 (2%)	0 (0%)	0 (0%)
		8. Bifacial crested blade	0 (0%)	0 (0%)	0 (0%)
		Total	134	19	7
A2	Dorsal negative direction	0. Cortex	1 (1%)	0 (0%)	0 (0%)
		1. Unidirectional	76 (57%)	6 (32%)	5 (63%)
		2. Two directions (or different than on ventral side)	35 (26%)	8 (42%)	0 (0%)
		3. More than two directions	21 (16%)	5 (26%)	3 (38%)
		Total	133	19	8
B	Debitage termination	1. Ideal	33 (77%)	17 (94%)	1 (100%)
		2. Feathered	0 (0%)	0 (0%)	0 (0%)
		3. Plunging	0 (0%)	0 (0%)	0 (0%)
		4. Hinged	10 (23%)	1 (6%)	0 (0%)
		Total	43	18	1
C1	Debitage curvature	1. Straight	7 (26%)	9 (47%)	6 (86%)
		2. Distal curvature	1 (4%)	2 (11%)	0 (0%)
		3. Even curvature	2 (7%)	4 (21%)	1 (14%)
		4. Proximal curvature	17 (63%)	4 (21%)	0 (0%)
		5. Curvature with belly	0 (0%)	0 (0%)	0 (0%)
		Total	27	19	7
C2	Twist	0. No twist	20 (47%)	14 (74%)	6 (75%)
		1. Right-hand twist	14 (33%)	2 (11%)	2 (25%)
		2. Left-hand twist	9 (21%)	3 (16%)	0 (0%)
		Total	43	19	8
D	Regularity	1. Irregular	32 (31%)	11 (58%)	7 (88%)
		2. Mostly regular	71 (69%)	8 (42%)	1 (13%)
		3. Extremely regular	0 (0%)	0 (0%)	0 (0%)
		Total	103	19	8
E	Ventral ripples	0. Smooth ventral face	29 (26%)	6 (32%)	2 (25%)
		1. Distal end ripple	12 (11%)	1 (5%)	0 (0%)
		2. Flat ripple	69 (62%)	12 (63%)	5 (63%)
		3. Pronounced ripple	2 (2%)	0 (0%)	1 (13%)
		Total	112	19	8
F1	Lip	0. No lip	11 (15%)	2 (12%)	0 (0%)
		1. Weak lip (felt under a finger)	38 (52%)	10 (59%)	1 (25%)
		2. Medium lip (visible)	24 (33%)	5 (29%)	3 (75%)
		3. Pronounced lip	0 (0%)	0 (0%)	0 (0%)
		Total	73	17	4
F2	Bulb morphology	0. No bulb	5 (7%)	0 (0%)	1 (14%)
		1. Flat and spread bulb	59 (81%)	11 (73%)	6 (86%)
		2. Round bulb	4 (5%)	4 (27%)	0 (0%)
		3. Pronounced bulb	3 (4%)	0 (0%)	0 (0%)
		4. Multiple bulbs	2 (3%)	0 (0%)	0 (0%)
		Total	73	15	7

G	Bulbar scar	0. No scar	40 (54%)	15 (83%)	3 (43%)
		1. Small scar	13 (18%)	2 (11%)	1 (14%)
		2. Large scar	20 (27%)	1 (6%)	3 (43%)
		3. Split bulb	1 (1%)	0 (0%)	0 (0%)
		Total	74	18	7
H	Conus formation	0. No conus	58 (77%)	13 (68%)	6 (86%)
		1. Ring crack	0 (0%)	2 (11%)	1 (14%)
		2. Ring crack + conus	14 (19%)	3 (16%)	0 (0%)
		3. Detached bulb	3 (4%)	1 (5%)	0 (0%)
		Total	75	19	7
I	Butt morphology	1. Large thick butt	2 (3%)	0 (0%)	1 (14%)
		2. Large oval butt	10 (13%)	0 (0%)	1 (14%)
		3. Thin oval butt	8 (11%)	3 (16%)	0 (0%)
		4. Small thick butt	13 (17%)	0 (0%)	1 (14%)
		5. Small butt	10 (13%)	7 (37%)	0 (0%)
		6. Punctiform butt	26 (35%)	2 (11%)	0 (0%)
		7. Broken butt	6 (8%)	7 (37%)	4 (57%)
		Total	75	19	7
J	Butt preparation	0. No preparation	55 (76%)	13 (87%)	3 (60%)
		1. Two negatives	8 (11%)	1 (7%)	1 (20%)
		2. More than two negatives	9 (13%)	1 (7%)	1 (20%)
		Total	72	15	5
K	Debitage preparation	0. No preparation	16 (22%)	4 (27%)	2 (40%)
		1. Light preparation	12 (17%)	6 (40%)	3 (60%)
		2. Intense preparation	19 (26%)	3 (20%)	0 (0%)
		3. Point isolation	25 (35%)	2 (13%)	0 (0%)
		Total	72	15	5
L	Debitage fragmentation	1. Complete debitage	14 (10%)	18 (95%)	7 (88%)
		2. Distal end	30 (22%)	0 (0%)	1 (13%)
		3. No distal end	11 (8%)	1 (5%)	0 (0%)
		4. Proximal end	46 (33%)	0 (0%)	0 (0%)
		5. No proximal end	8 (6%)	0 (0%)	0 (0%)
		6. Medial fragment	29 (21%)	0 (0%)	0 (0%)
		7. Split blade	0 (0%)	0 (0%)	0 (0%)
		Total	138	19	8
Q1	Angle	30	0 (0%)	1 (6%)	0 (0%)
		40	1 (1%)	0 (0%)	0 (0%)
		50	8 (11%)	4 (25%)	1 (25%)
		60	31 (43%)	1 (6%)	0 (0%)
		70	25 (35%)	7 (44%)	2 (50%)
		80	6 (8%)	3 (19%)	1 (25%)
		90	1 (1%)	0 (0%)	0 (0%)
		Total	72	16	4
Q2	Edge trimming	0. No trimming	16 (27%)	4 (27%)	1 (25%)
		1. Light trimming	12 (17%)	6 (40%)	3 (75%)
		2. Intense trimming	19 (26%)	3 (20%)	0 (0%)
		3. Point isolation	25 (35%)	2 (13%)	0 (0%)
		Total	72	15	4
Q3	Edge faceting	0. No faceting	55 (76%)	13 (87%)	2 (50%)
		1. Light faceting	7 (10%)	1 (7%)	1 (25%)
		2. Intense faceting	6 (8%)	1 (7%)	1 (25%)
		3. Point isolation	4 (6%)	0 (0%)	0 (0%)
		Total	72	15	4
Q2+Q3	Edge trimming + Edge faceting	1. Preparation by trimming	42 (58%)	10 (67%)	-
		2. Preparation by faceting	3 (4%)	1 (7%)	-
		3. Preparation by both trimming and faceting	14 (19%)	1 (7%)	-
		4. None	13 (18%)	3 (20%)	-
		Total	72	15	-

Table 4. Comparison of selected technological features of artefacts (serial and correction blades) and experimental blades detached with organic and mineral soft hammers. Percentage (full values) are counted within given categories

Tabela 4. Porównanie wybranych cech technologicznych materiałów zabytkowych (wióry seryjne i korekcyjne) oraz eksperymentalnych (wióry odbite miękkim tłukiem organicznym i mineralnym. Wartości procentowe (zaokrąglone do pełnych wartości) zostały zliczone w ramach poszczególnych kategorii

Code Kod	Feature Cecha	Attribute Atrybut	Artifact Zabytki				Experimental Materiały eksperymentalne			
			Serial blades Wióry seryjne		Corection blades Wióry korekcyjne		Organic hammer Tłuk organiczny		Mineral hammer Tłuk mineralny	
			n	%	n	%	n	%	n	%
E	Ventral ripples	0. Smooth ventral face	29	26	6	32	46	33	35	22
		1. Distal end ripple	12	11	1	5	20	14	23	14
		2. Flat ripple	69	62	12	6	58	42	92	57
		3. Pronounced ripple	2	2	0	63	15	11	11	7
		Total	**112**		**19**		**139**		**161**	
F1	Lip	0. No lip	11	15	2	12	9	7	31	21
		1. Weak lip (felt under a finger)	38	52	10	59	52	41	86	57
		2. Medium lip (visible)	24	33	5	29	57	45	28	19
		3. Pronounced lip	0	0	0	0	8	6	6	4
		Total	**73**		**17**		**126**		**151**	
F2	Bulb morphology	0. No bulb	5	7	0	0	20	15	10	6
		1. Flat and spread bulb	59	81	11	73	97	72	134	84
		2. Round bulb	4	5	4	27	14	10	14	9
		3. Pronounced bulb	3	4	0	0	3	2	2	1
		4. Multiple bulbs	2	3	0	0	0	0	0	0
		Total	**73**		**15**		**134**		**160**	
G	Bulbar scar	0. No scar	40	54	15	83	97	74	69	43
		1. Small scar	13	18	2	11	10	8	16	10
		2. Large scar	20	27	1	6	20	15	61	38
		3. Split bulb	1	1	0	0	4	3	13	8
		Total	**74**		**18**		**131**		**159**	
H	Conus formation	0. No conus	58	77	13	68	117	86	65	41
		1. Ring crack	0	0	2	11	4	3	18	11
		2. Ring crack + conus	14	19	3	16	9	7	65	41
		3. Detached bulb	3	4	1	5	6	4	12	8
		Total	**75**		**19**		**136**		**160**	

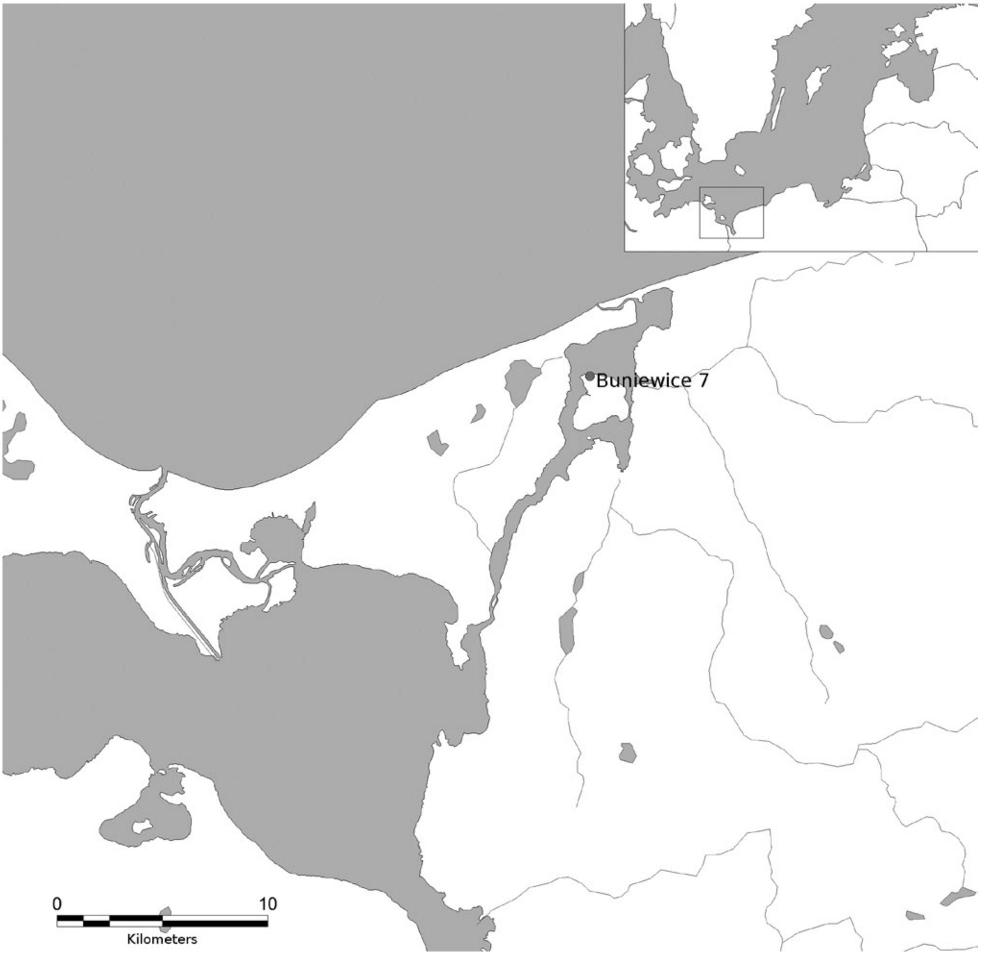

Fig. 1. Location of the site in the Bay of Pomerania and Szczecin Lagoon area. After: Adamczyk 2014, 179, Fig. 1
Ryc. 1. Lokalizacja stanowiska na obszarze Zatoki Pomorskiej i Zalewu Szczecińskiego. Za: Adamczyk 2014, 179, Fig. 1

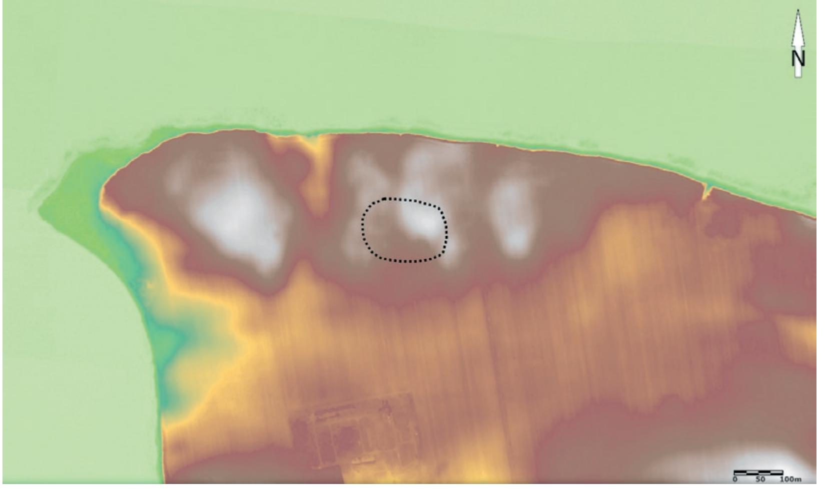

Fig. 2. Topography in the area of the site. Dotted lines mark the approximate range of the site. ALS image after: <geoportal.gov.pl> [accessed: 15 VI 2023]. Prepared by M. Adamczyk
Ryc. 2. Ukształtowanie terenu w okolicy stanowiska. Przerywaną linią oznaczono orientacyjny zasięg stanowiska. Zobrazowanie ALS za: <geoportal.gov.pl> [dostęp: 15 VI 2023]. Wyk. M. Adamczyk

Fig. 3. Prismatic core. Photograph by M. Adamczyk
Ryc. 3. Rdzeń pryzmatyczny. Fot. M. Adamczyk

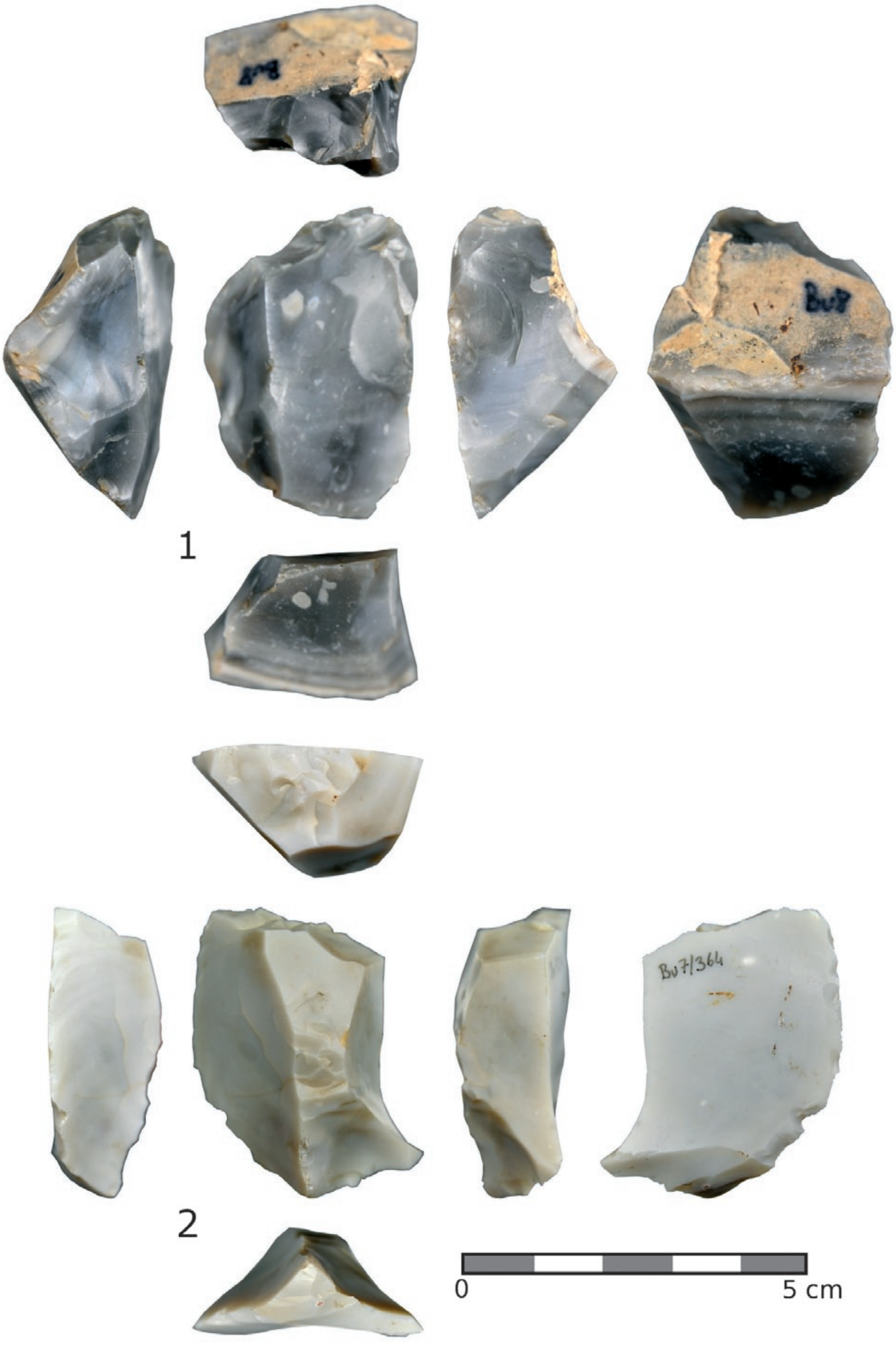

Fig. 4. Cores: 1 – Prismatic core; 2 – Fragment of a prismatic core. Photograph by M. Adamczyk
Ryc. 4. Rdzenie: 1 – rdzeń pryzmatyczny; 2 – fragment rdzenia pryzmatycznego. Fot. M. Adamczyk

Fig. 5. Fragment of a prismatic core. Photograph by M. Adamczyk
Ryc. 5. Fragment rdzenia pryzmatycznego. Fot. M. Adamczyk

Fig. 6. Single platform core. Photograph by M. Adamczyk
Ryc. 6. Rdzeń jednopiętowy. Fot. M. Adamczyk

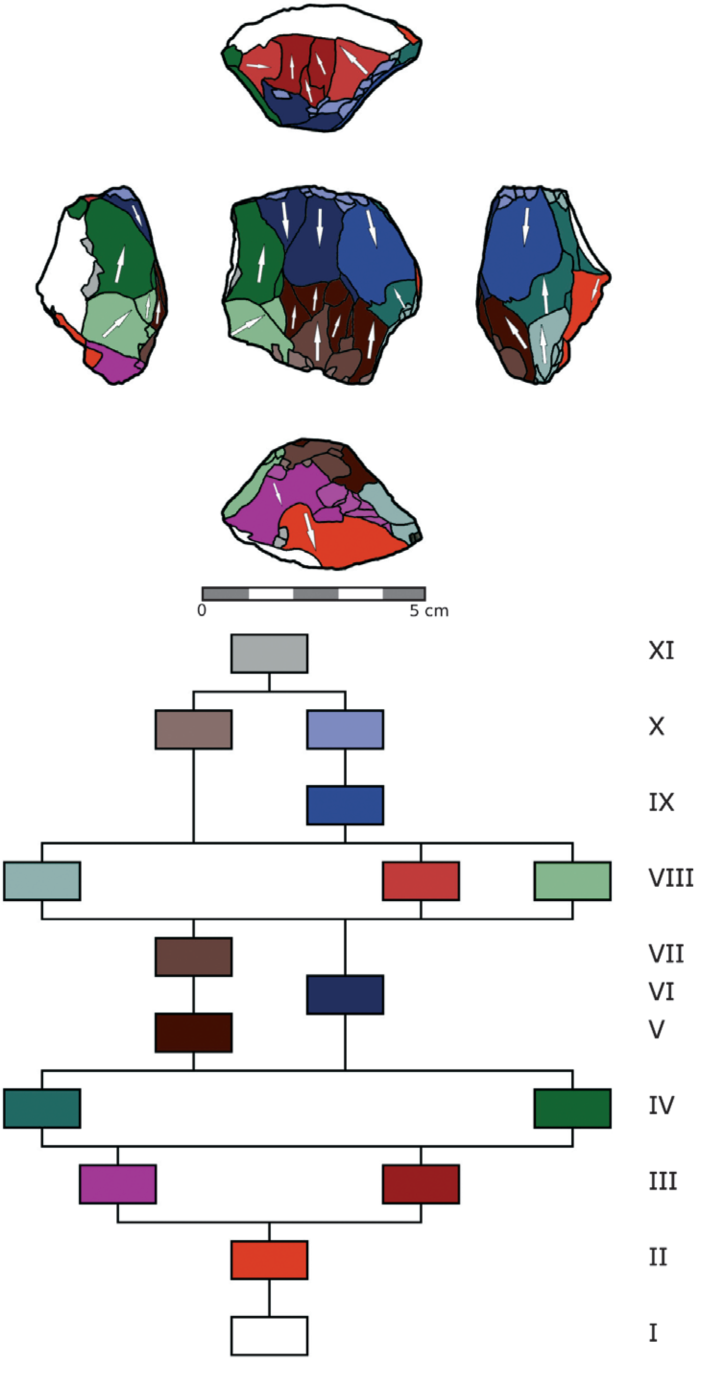

Fig. 7. SP analysis of a prismatic core. After: Adamczyk 2016, 165, ryc. 144
Ryc. 7. Analiza SP rdzenia pryzmatycznego. Za: Adamczyk 2016, 165, ryc. 144

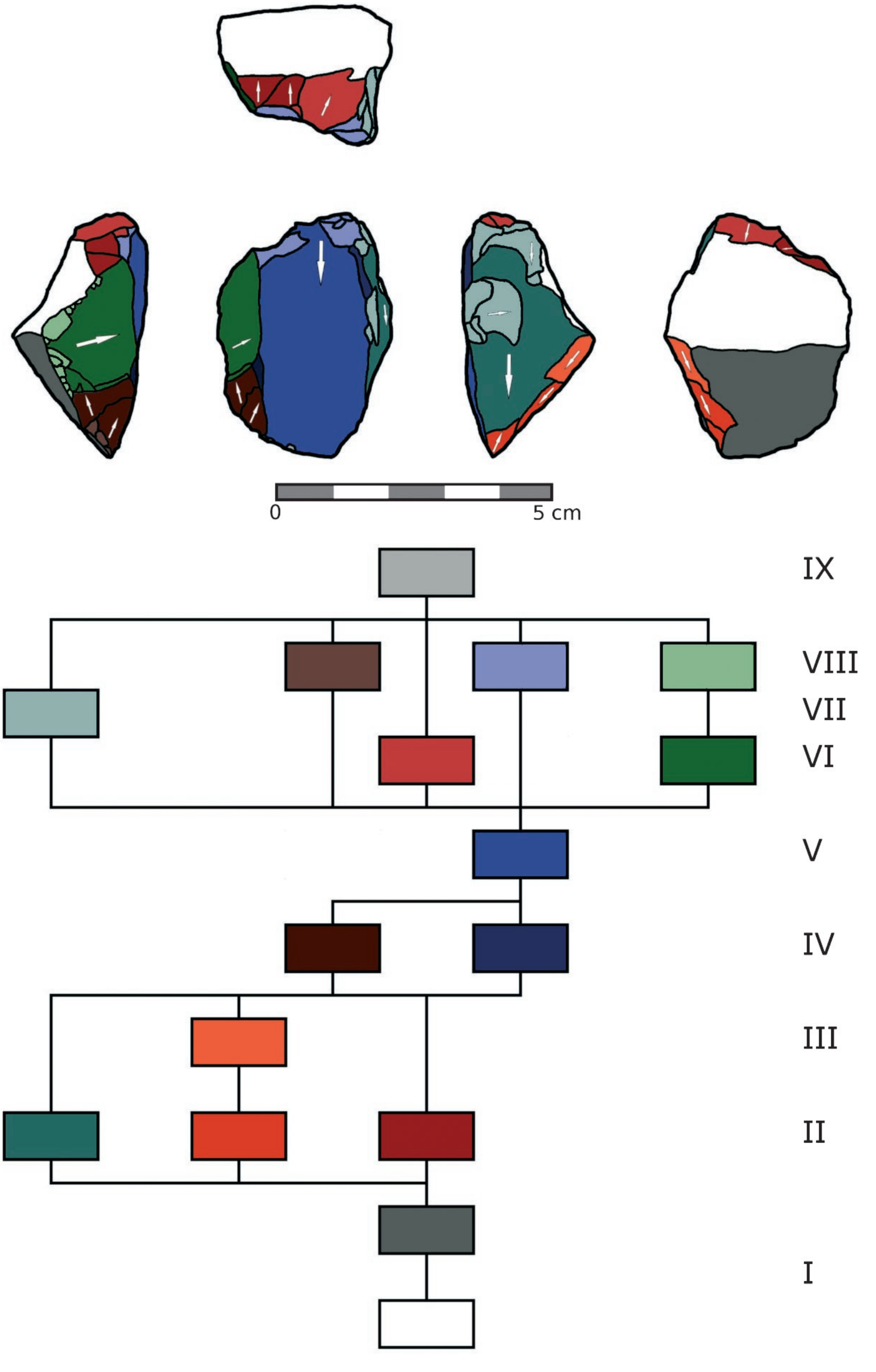

Fig. 8. SP analysis of a prismatic core. After: Adamczyk 2016, 164, ryc. 143
Ryc. 8. Analiza SP rdzenia pryzmatycznego. Za: Adamczyk 2016, 164, ryc. 143

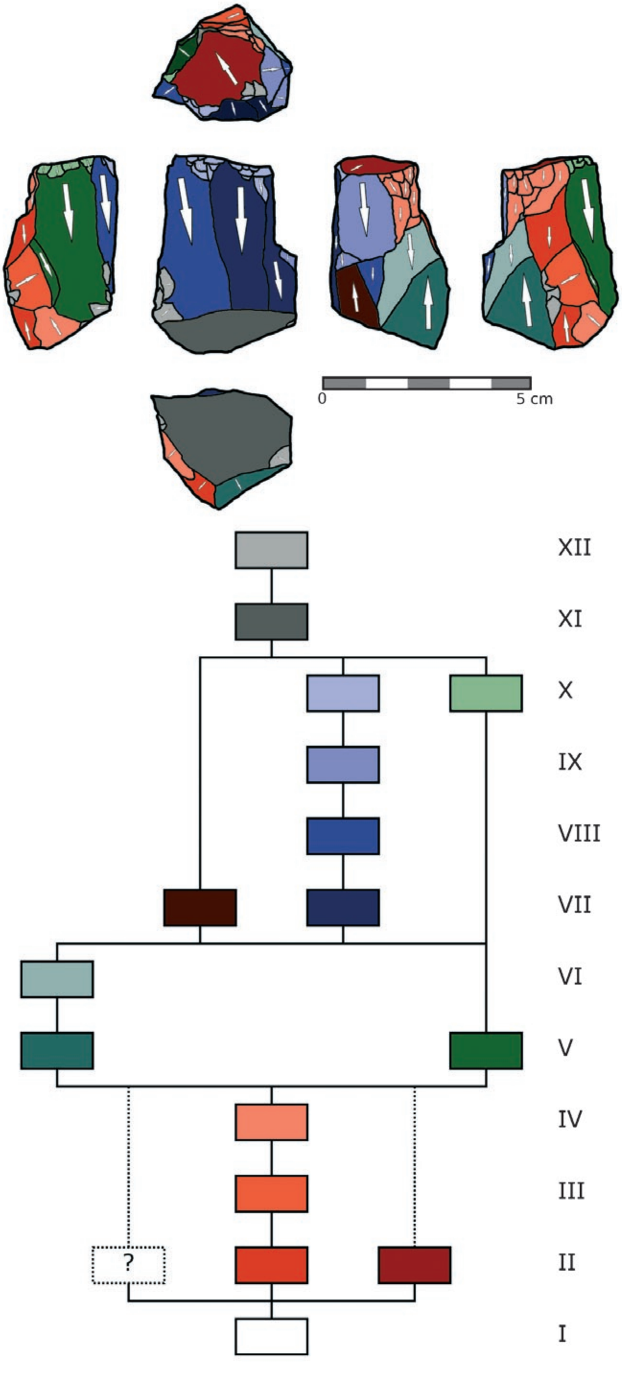

Fig. 9. SP analysis of a prismatic core fragment. After: Adamczyk 2016, 160, ryc. 141
Ryc. 9. Analiza SP fragmentu rdzenia pryzmatycznego. Za: Adamczyk 2016, 160, ryc. 141

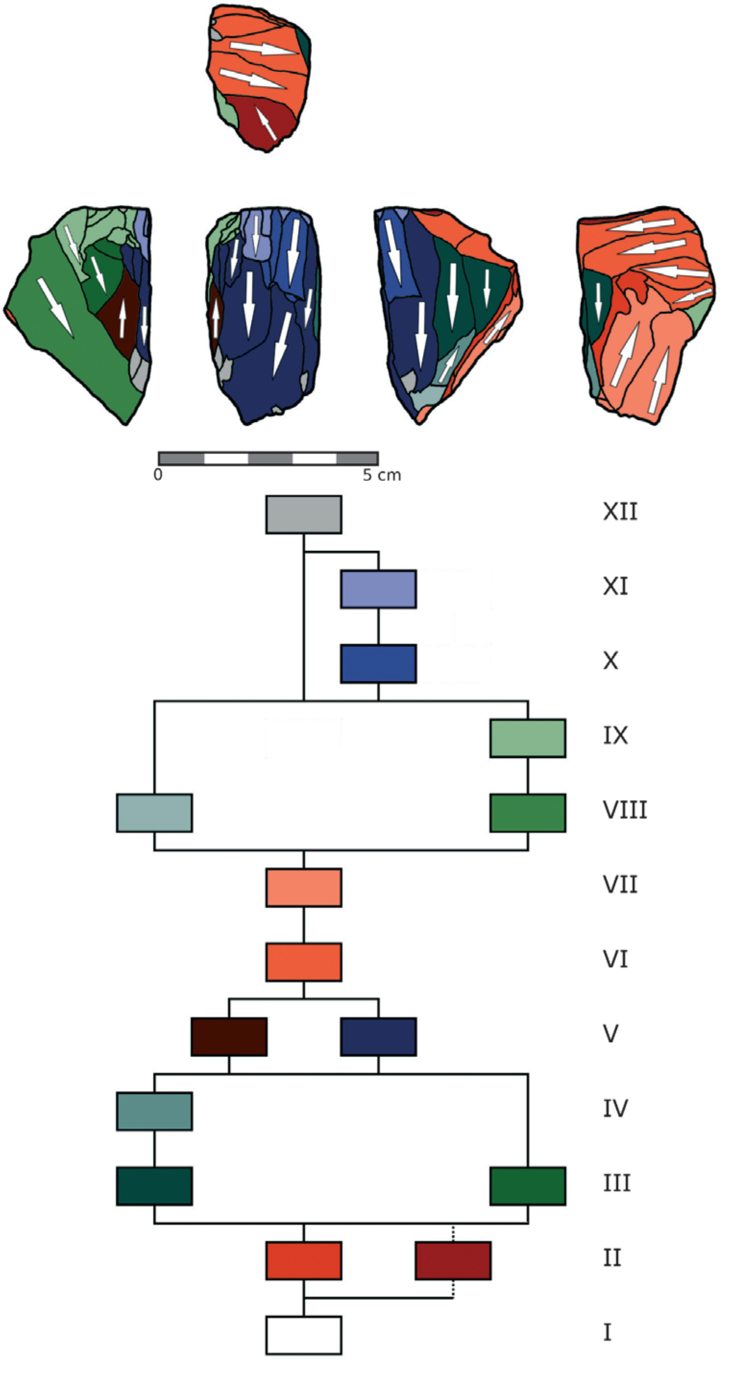

Fig. 10. SP analysis of a single platform core. After: Adamczyk 2016, 161, ryc. 142
Ryc. 10. Analiza SP rdzenia jednopiętowego. Za: Adamczyk 2016, 161, ryc. 142

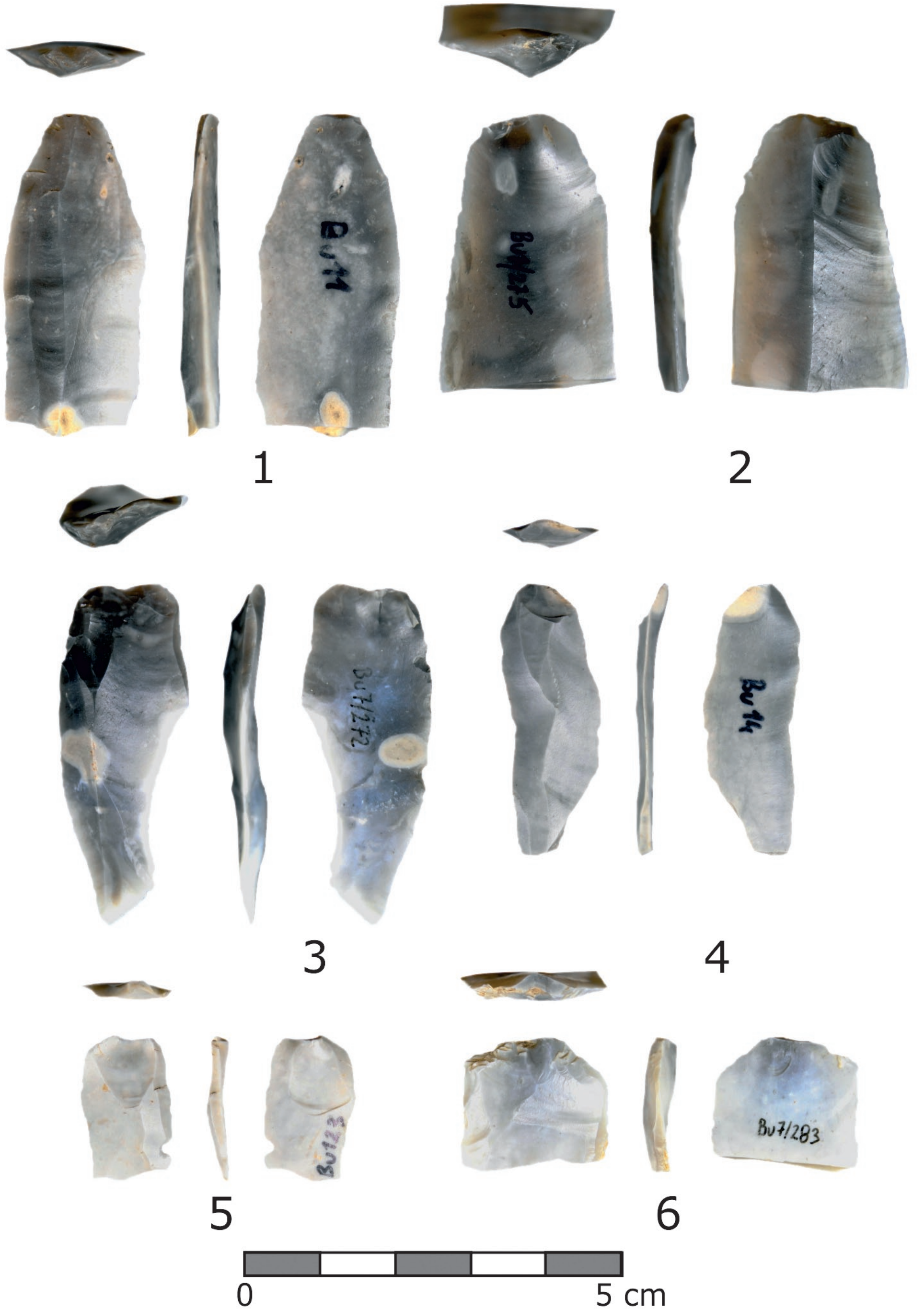

Fig. 11. Serial blades. Photograph by M. Adamczyk
Ryc. 11. Wióry seryjne. Fot. M. Adamczyk

Fig. 12. Serial blades. Photograph by M. Adamczyk
Ryc. 12. Wióry seryjne. Fot. M. Adamczyk

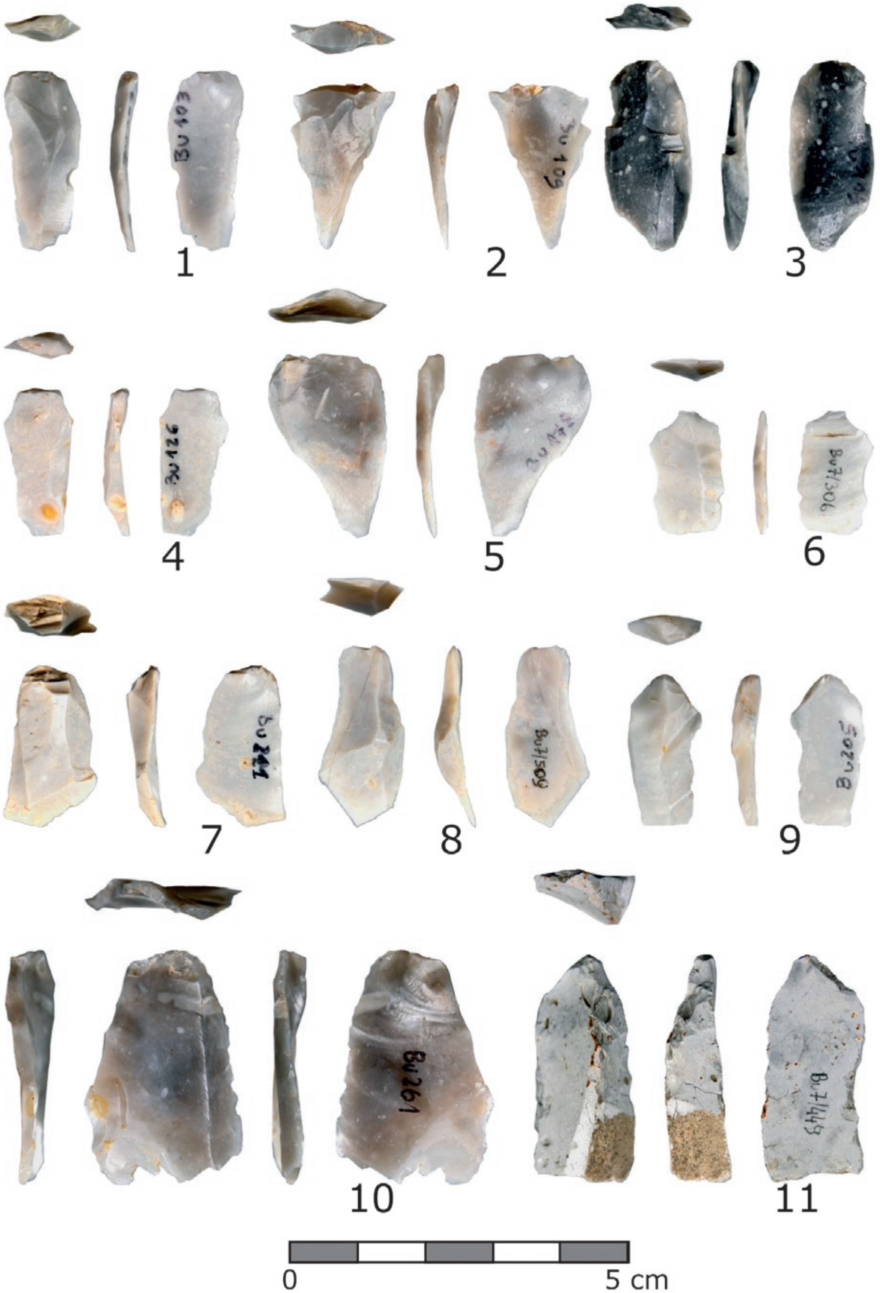

Fig. 13. Blades: 1–8 – Correction blades; 9 – Serial blade; 10 – Secondary crested blade; 11 – crested blade. Photograph by M. Adamczyk
Ryc. 13. Wióry: 1–8 – wióry korekcyjne; 9 – wiór seryjny; 10 – podtępiec; 11 – zatępiec. Fot. M. Adamczyk

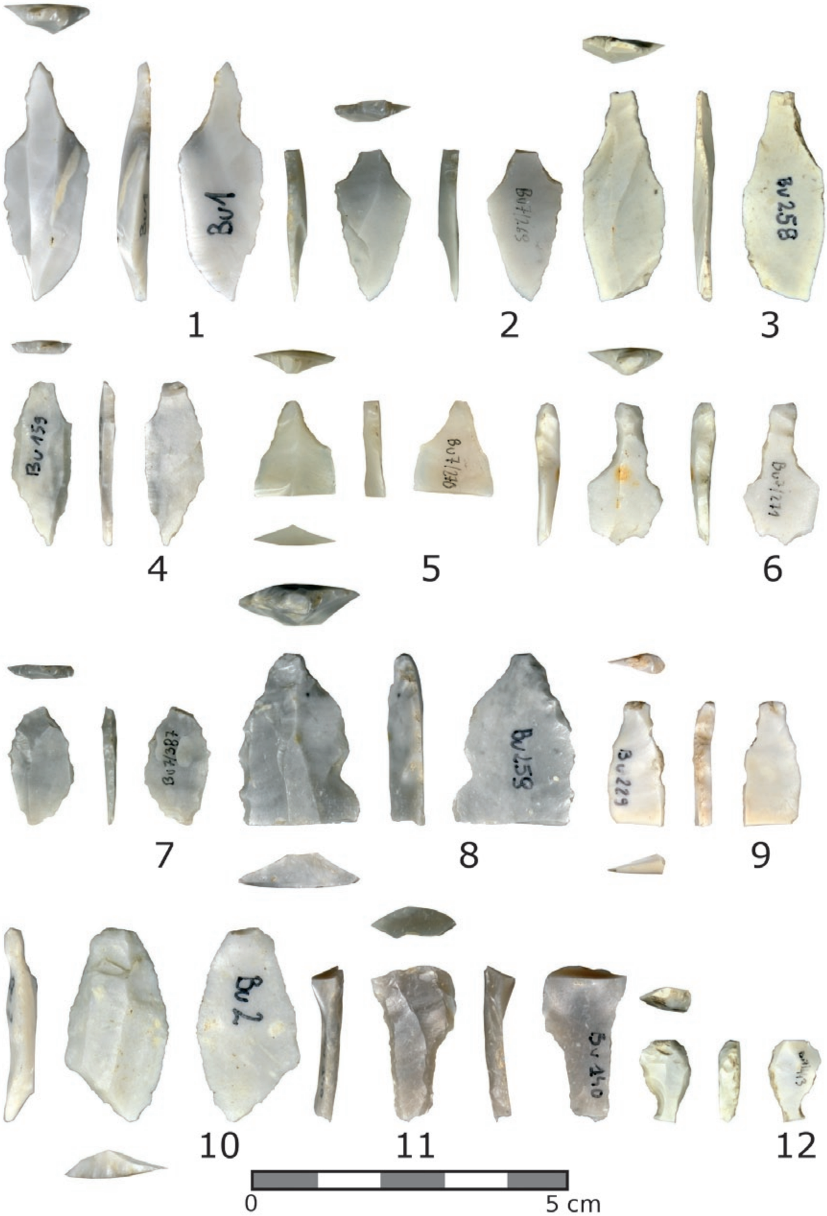

Fig. 14. Projectile points and typical production wastes: 1–5 – Ahrensburgian points and fragments; 6 – Sviderian point fragment; 7 – Undefined tanged point fragment; 8 – Bromme point fragment; 9 – Backed blade fragment; 10 – Zonhoven point; 11 and 12 – Microburins. Photograph by M. Adamczyk

Ryc. 14. Groty i typowe odpady z produkcji: 1–5 – liściaki ahrensburskie i ich fragmenty; 6 – fragment liściaka świderskiego; 7 – fragment nieokreślonego liściaka; 8 – fragment liściaka Bromme; 9 – fragment tylczaka; 10 – półtylczak Zonhoven; 11 i 12 – mikrorylce. Fot. M. Adamczyk

Fig. 15. Blade end scrapers. Photograph by M. Adamczyk
Ryc. 15. Drapacze wiórowe. Fot. M. Adamczyk

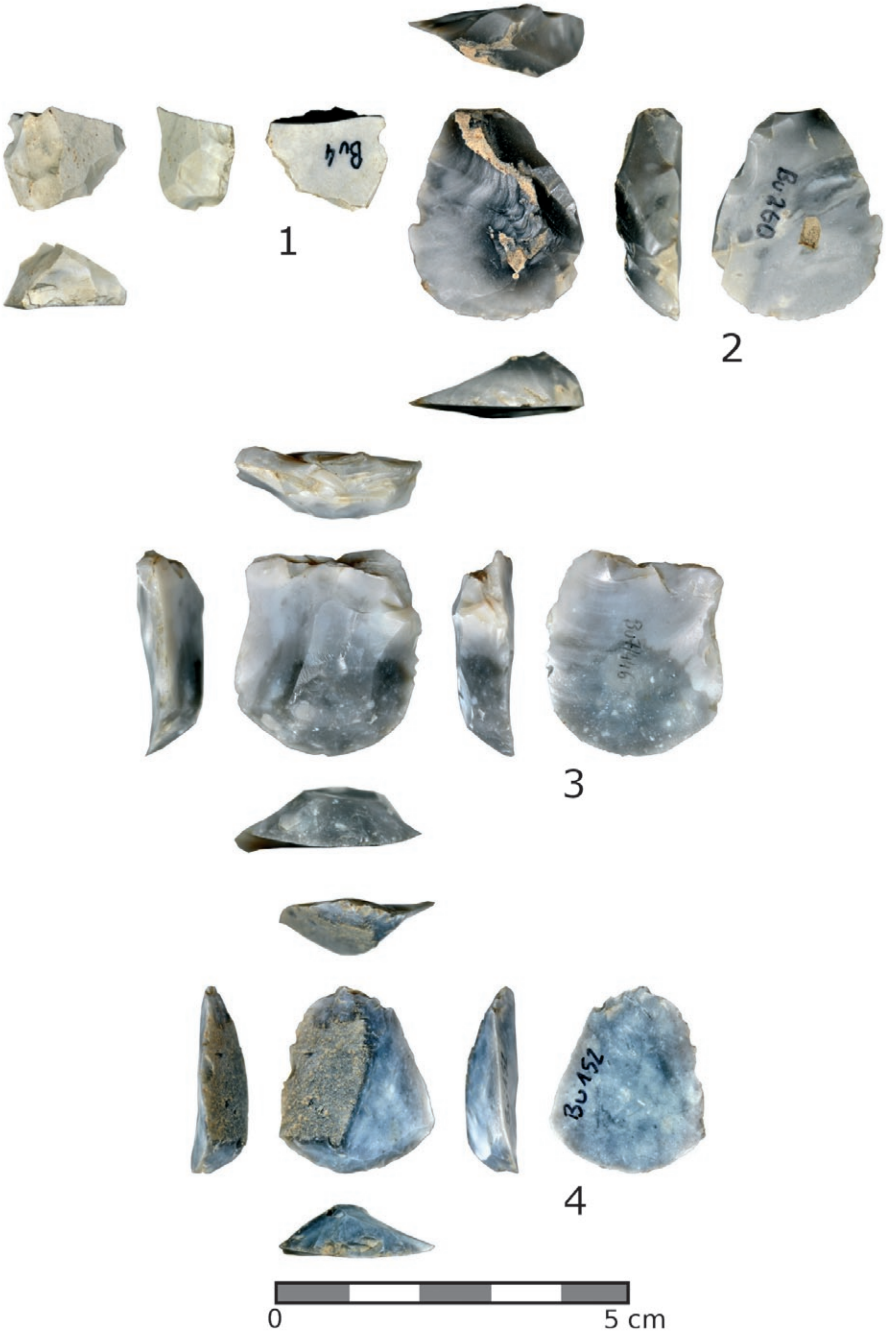

Fig. 16. End scrapers: 1 – Blade end scraper fragment; 2–4 – Flake end scrapers. Photograph by M. Adamczyk
Ryc. 16. Drapacze: 1 – fragment drapacza wiórowego; 2–4 – drapacze odłupkowe. Fot. M. Adamczyk

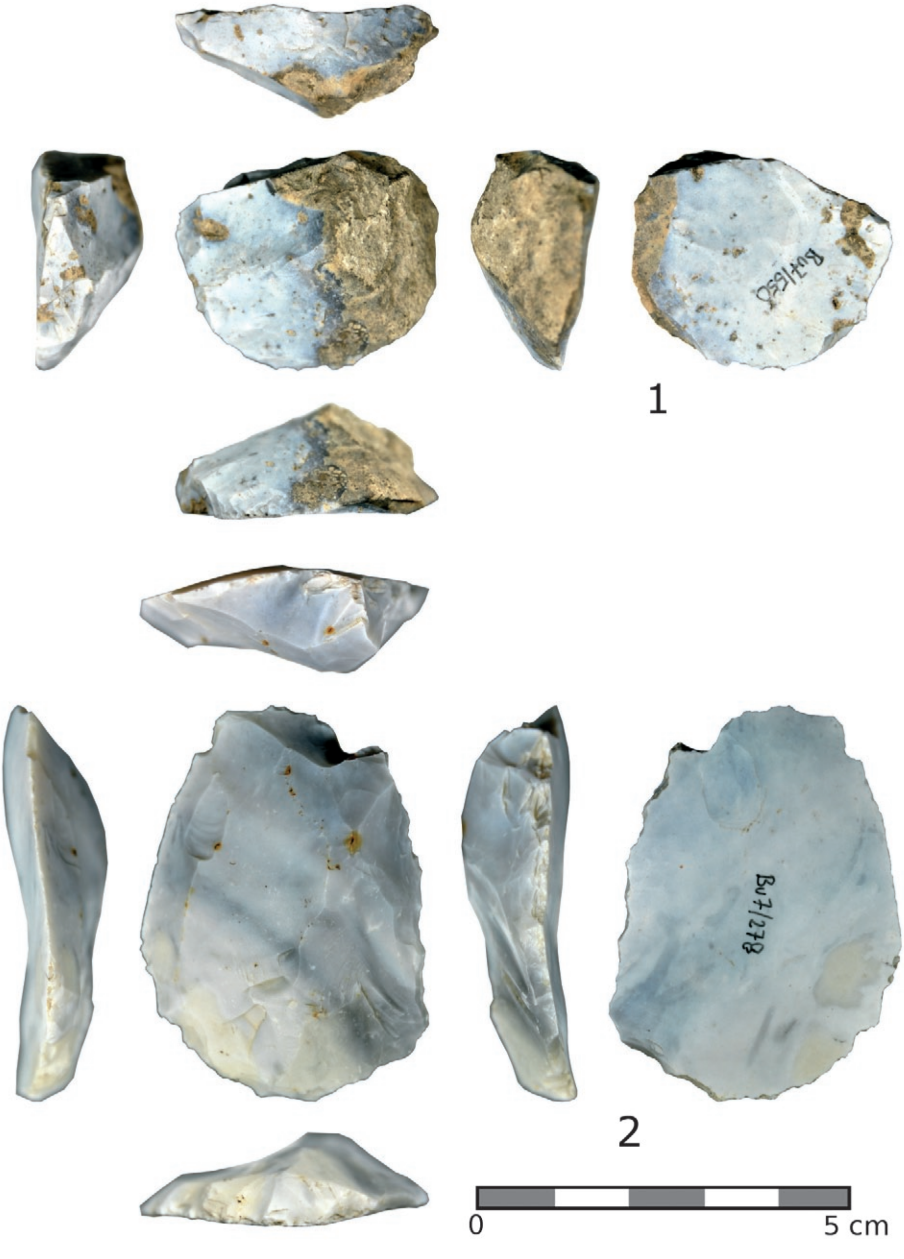

Fig. 17. Flake end scrapers. Photograph by M. Adamczyk
Ryc. 17. Drapacze odłupkowe. Fot. M. Adamczyk

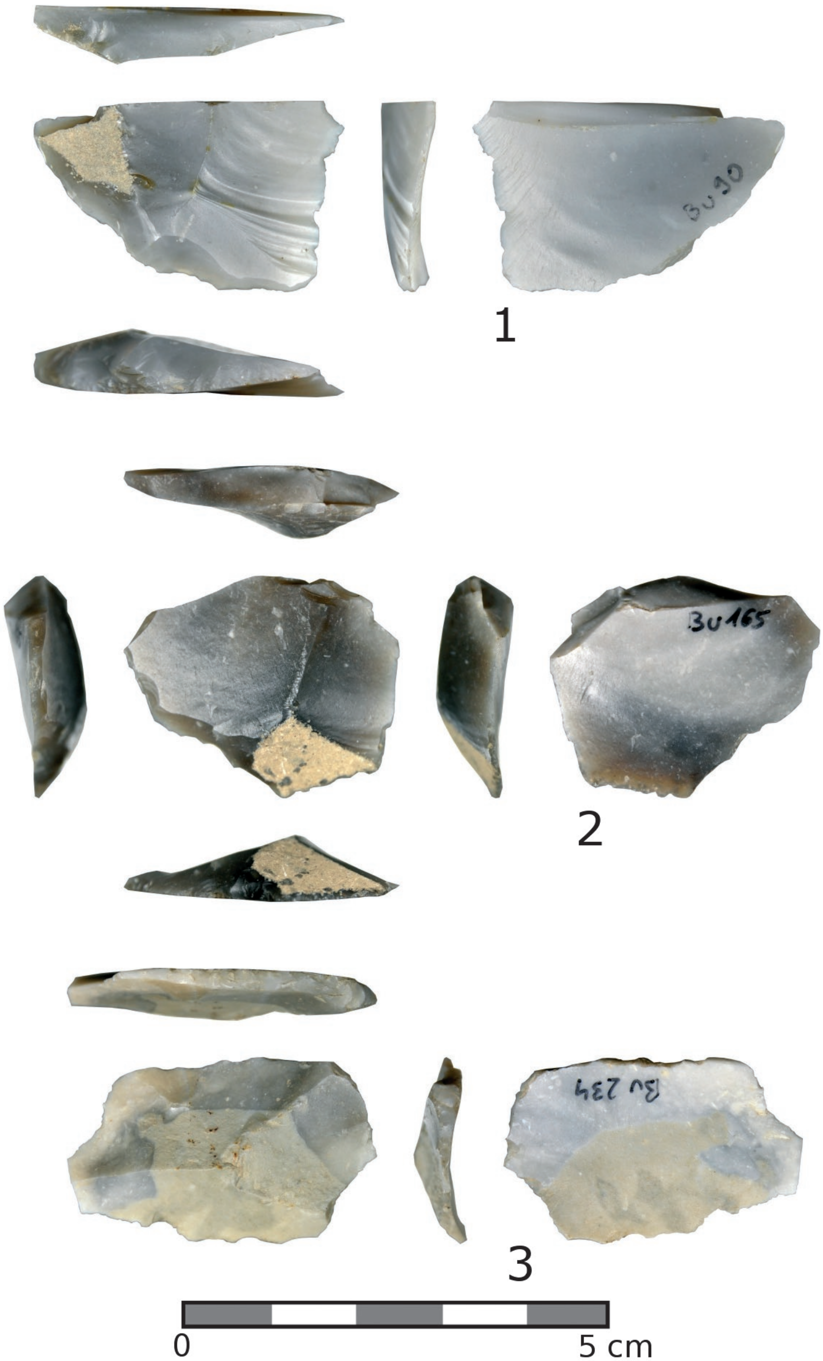

Fig. 18. Undefined debitage end scrapers. Photograph by M. Adamczyk
Ryc. 18. Nieokreślone drapacze. Fot. M. Adamczyk

Fig. 19. Undefined debitage end scrapers. Photograph by M. Adamczyk
Ryc. 19. Nieokreślone drapacze. Fot. M. Adamczyk

Fig. 20. Blade burins. Photograph by M. Adamczyk
Ryc. 20. Rylce wiórowe. Fot. M. Adamczyk

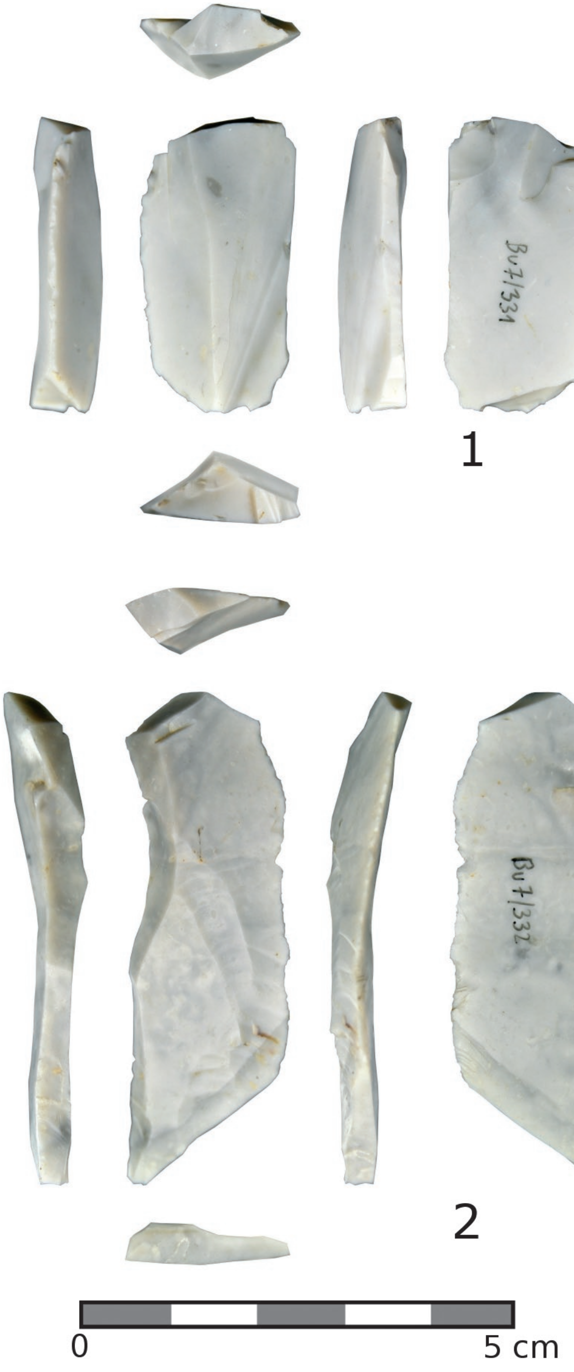

Fig. 21. Blade burins. Photograph by M. Adamczyk
Ryc. 21. Rylce wiórowe. Fot. M. Adamczyk

Fig. 22. Blade burins. Photograph by M. Adamczyk
Ryc. 22. Rylce wiórowe. Fot. M. Adamczyk

Fig. 23. Flake burins. Photograph by M. Adamczyk
Ryc. 23. Rylce odłupkowe. Fot. M. Adamczyk

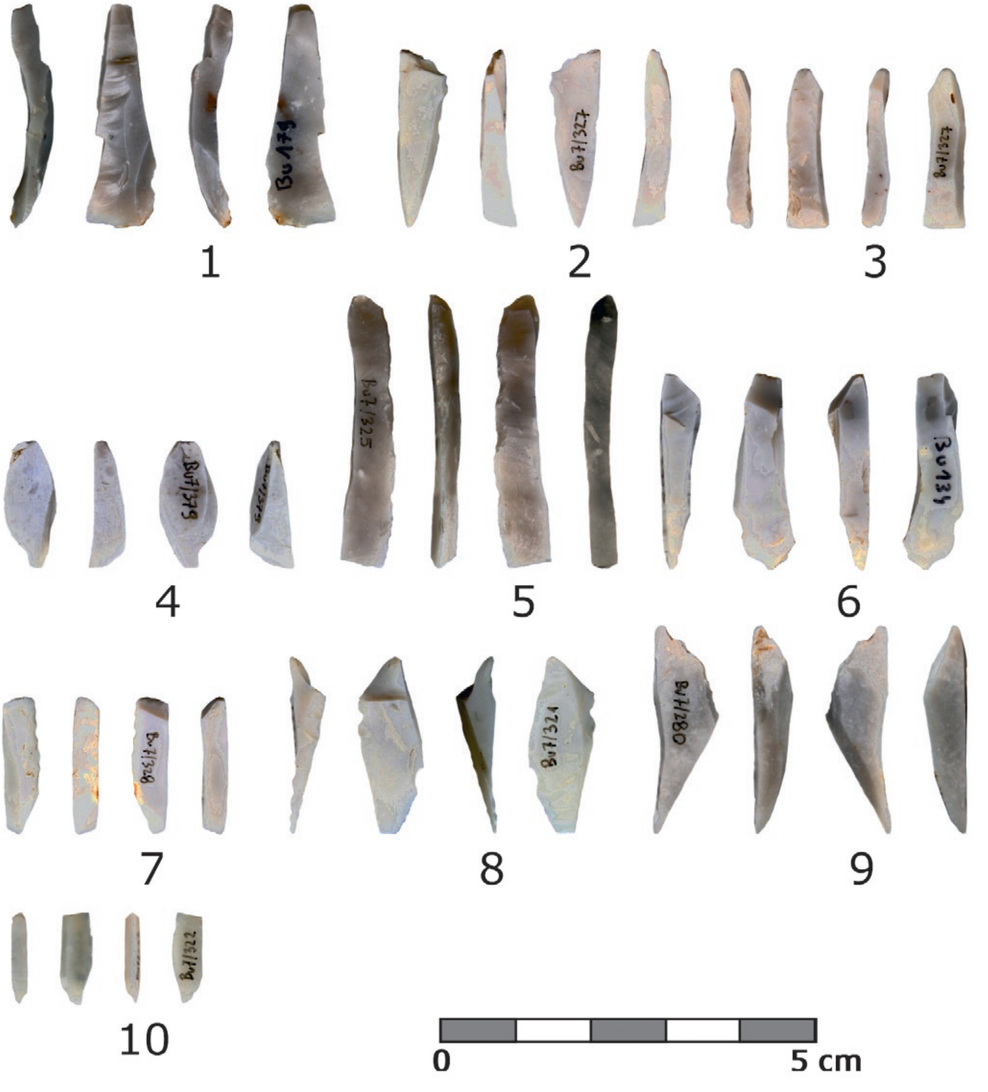

Fig. 24. Burin spalls: 1–4 – Detached from burins (secondary spalls); 5–8 – Detached from retouched tools; 9 – Detached from end scraper; 10 – Detached from unretouched debitage. Photograph by M. Adamczyk

Ryc. 24. Rylczaki: 1–4 – odbite od rylców; 5–8 – odbite od narzędzi retuszowanych; 9 – odbity od drapacza; 10 – odbity od nieretuszowanego debitażu. Fot. M. Adamczyk

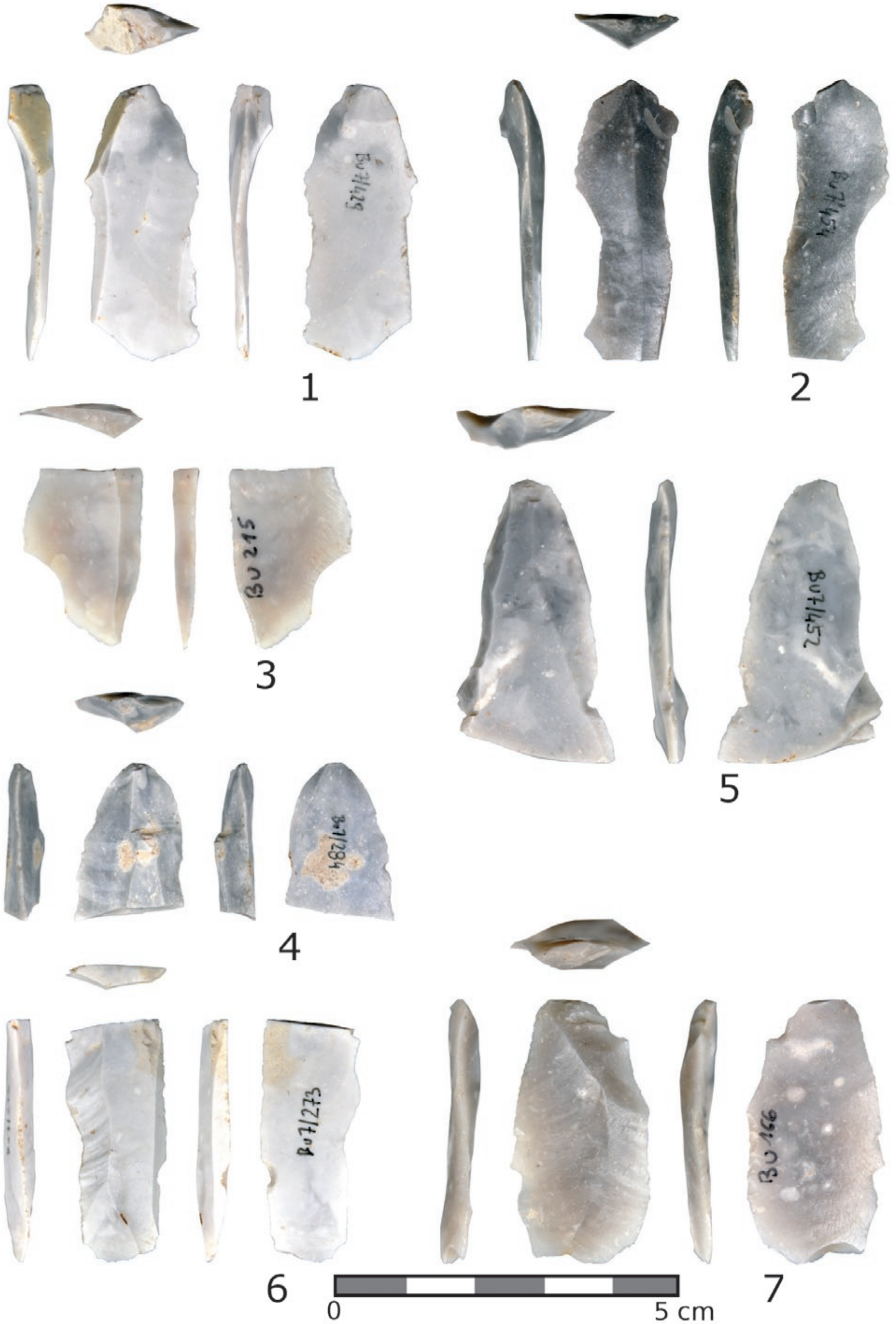

Fig. 25. Blades with working retouch (cutting tools). Photograph by M. Adamczyk
Ryc. 25. Wióry z retuszem użytkowym (narzędzia tnące). Fot. M. Adamczyk

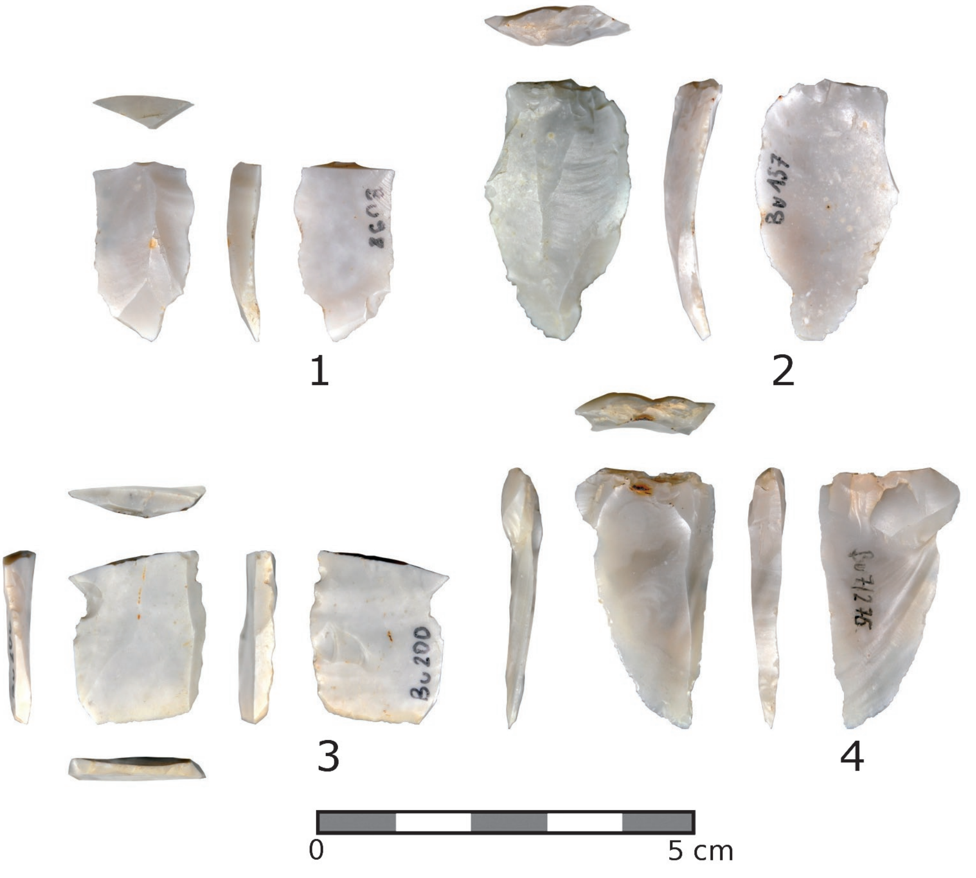

Fig. 26. Blade tools: 1 and 2 – Zinkens; 3 – Multitool (Kostienki knife + perforator + burin); 4 – multitool (cutting tool + perforator). Photograph by M. Adamczyk
Ryc. 26. Narzędzia wiórowe: 1 i 2 – Zinkeny; 3 – narzędzie wielofunkcyjne (nóż typu Kostienki + przekłuwacz + rylec); 4 – narzędzie zwielokrotnione (narzędzie tnące + przekłuwacz). Fot. M. Adamczyk

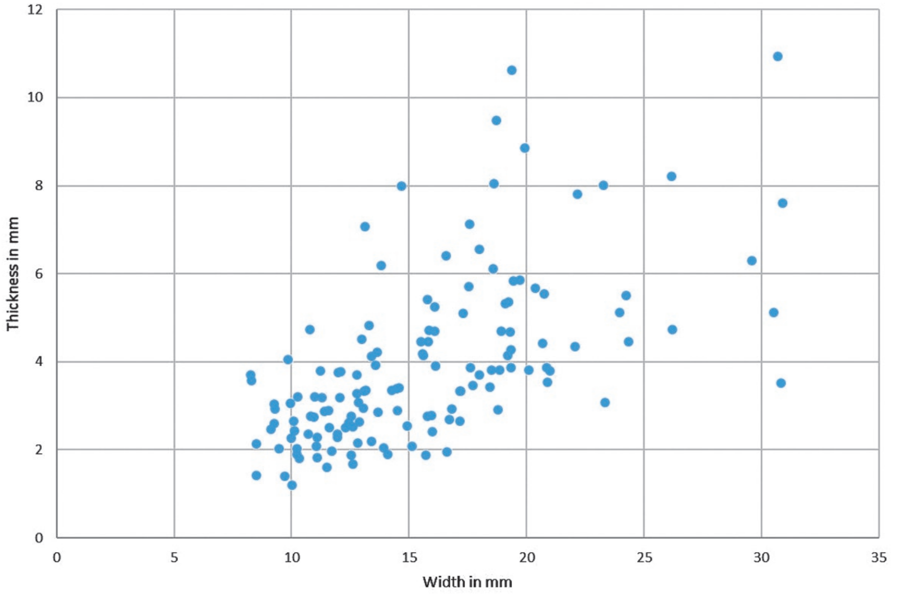

Fig. 27. Thickness-to-width ratios of the blades. Drawn by M. Adamczyk
Ryc. 27. Stosunek grubości do szerokości wiórów. Oprac. M. Adamczyk

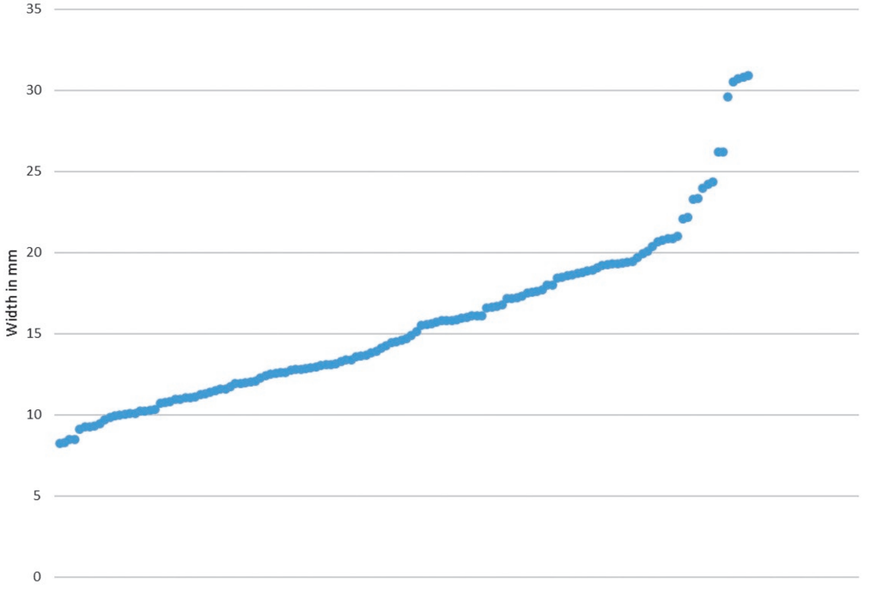

Fig. 28. Width range within blade group. Drawn by M. Adamczyk
Ryc. 28. Zakres szerokości wiórów. Oprac. M. Adamczyk

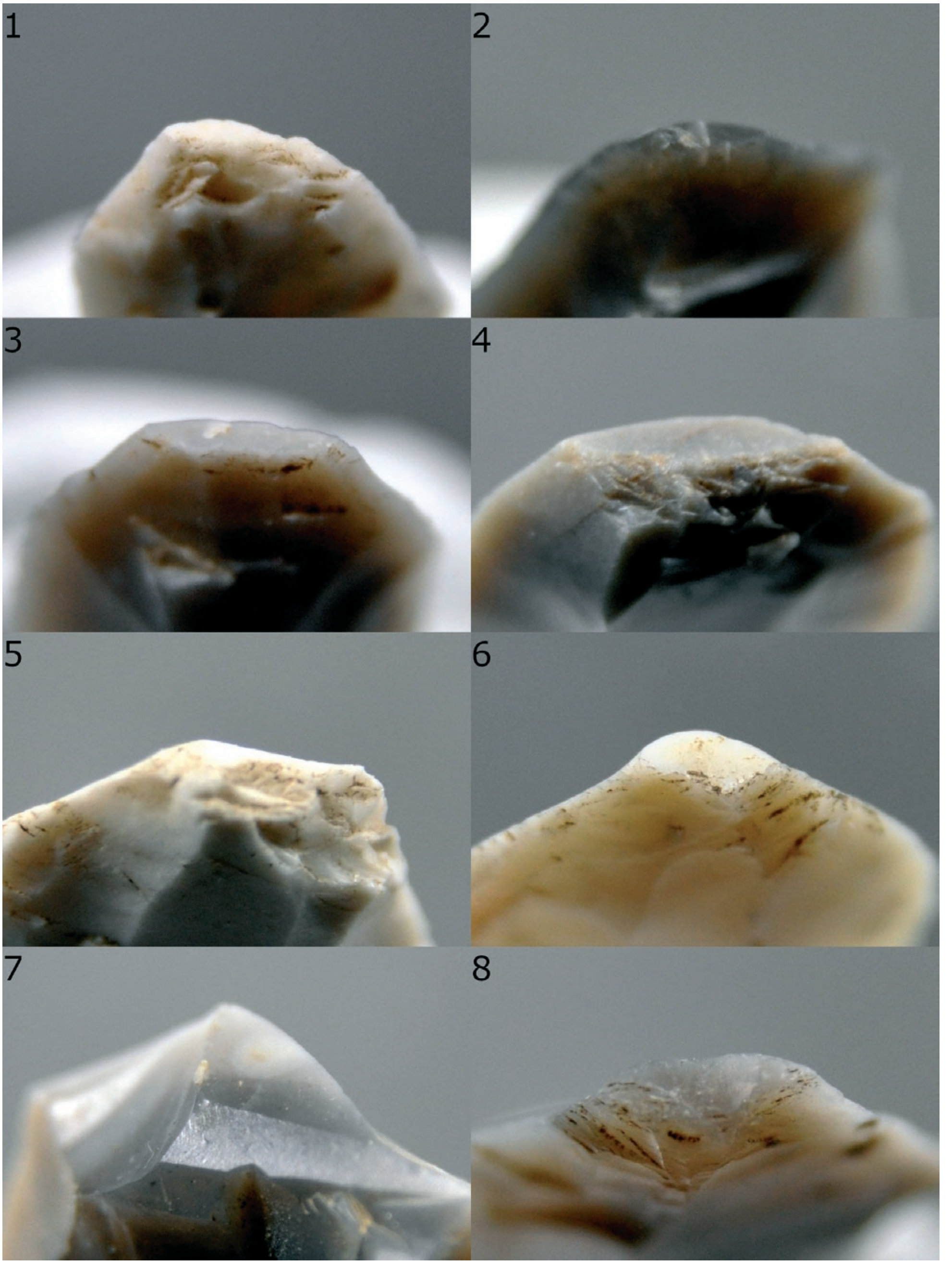

Fig. 29. Examples of proximal ends of blades, butt and dorsal sides with preparation details. Photograph by M. Adamczyk
Ryc. 29. Przykłady części przysęczkowych wiórów, strona wierzchnia, szczegóły piętek i przygotowania krawędzi. Fot. M. Adamczyk

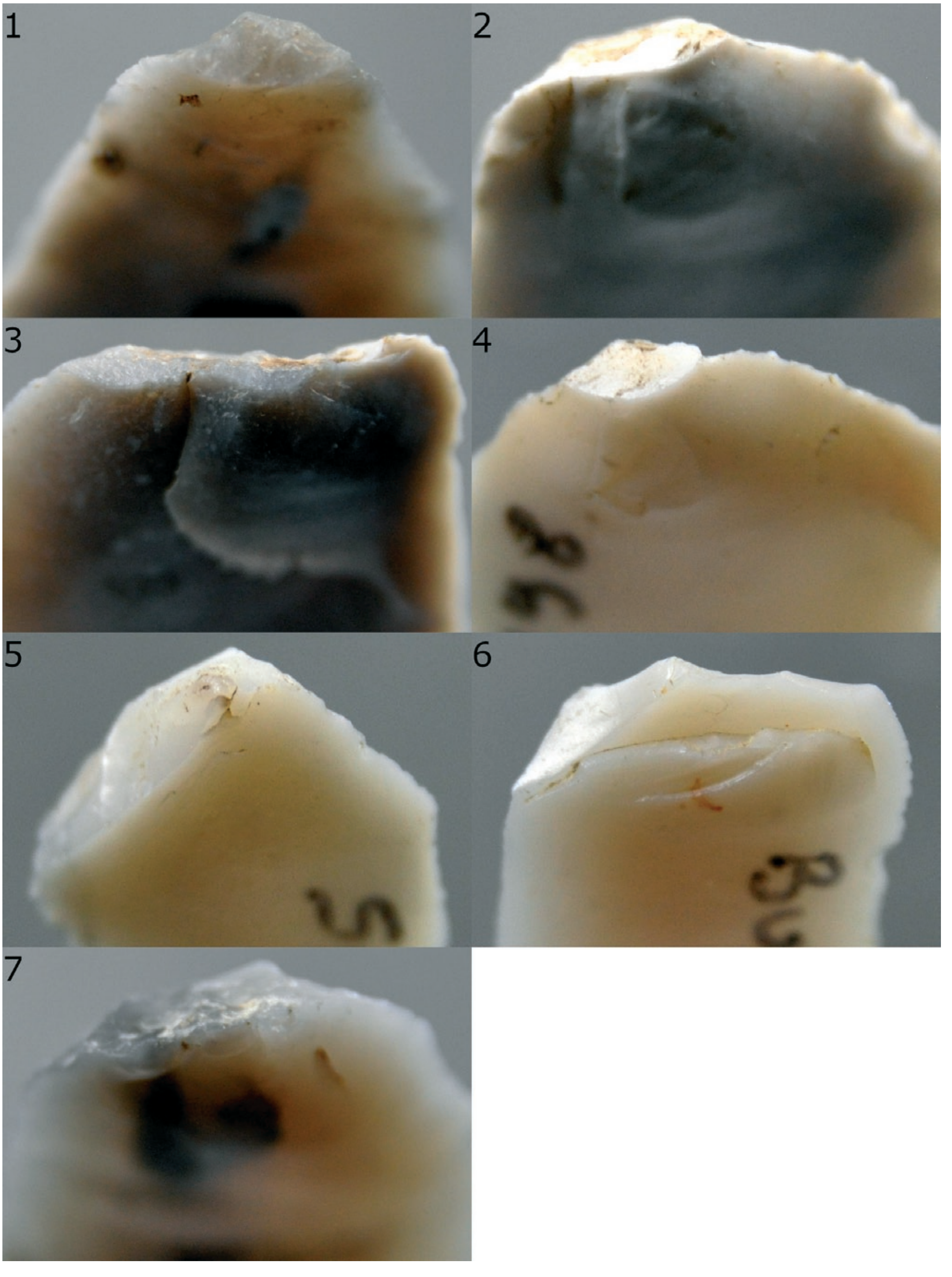

Fig. 30. Examples of proximal ends of blades, butt and ventral sides with bulbs. Photograph by M. Adamczyk
Ryc. 30. Przykłady części przysęczkowych wiórów, strona spodnia, szczegóły piętek i sęczków. Fot. M. Adamczyk

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Streszczenie

Stanowisko łowieckie (stan. 7) znajduje się na północ od miejscowości Buniewice, w północnej części Wyspy Chrząszczewskiej. Tutejszy zbiór – liczący 189 zabytków – należy do największych kolekcji narzędzi krzemiennych kultury ahrensburskiej w rejonie Zatoki Pomorskiej. Choć pochodzi z badań powierzchniowych, jego wielkość pozwala (ostrożnie) wyciągać wnioski na temat technologii krzemieniarstwa. Zawiera on pewne elementy świderskie (np. co najmniej jeden liściak świderski), co jest typowe dla strefy mieszania wpływów kultur ahrensburskiej i świderskiej.

Artykuł weryfikuje wyniki wcześniejszych badań nad zbiorem. Główną metodą badawczą jest analiza DTC. Wykonano także serię wiórów eksperymentalnych, które następnie porównano z materiałem zabytkowym. Odnotowano wiele podobieństw technologicznych do innych stanowisk liściakowych z Europy Północnej (np. Alt Duvenstedt LA 121 w Niemczech i Salaspils Laukskola na Łotwie).

dr Michał Adamczyk
Muzeum Narodowe w Szczecinie
m.adamczyk@muzeum.szczecin.pl
ORCID: 0000-0002-9996-578X