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FIELD SURVEY AND MATERIALS

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OPTIONAL AND INCONVENIENT ADDITIONS: ROUNDED RETOUCHED TOOLS FROM THE MICOQUIAN SITE OF PIETRASZYN 49A, POLAND

We dedicate this article to Professor Stefan Karol Kozłowski, one of the more recent scientists to discuss the importance of rounded retouched tools in the Micoquian.

ABSTRACT

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The rounded retouched tools that have been singled out in the Micoquian assemblages ('Keilmessergruppe') have long been an enigma. Even though their presence was recognised as early as the early 20th century, they received their formal name, the so-called 'groszaki', much later. More recently, similar tools have been recorded at the open-air site Pietraszyn 49a, SW Poland. These examples are slightly larger than average. They were made from flakes and a chunk. During production, marginal and invasive retouch and thinning were used. The same technical means were used to produce bifacial tools. These specimens were compared with other tools of this type in Poland, both in metric and morphological terms. On this basis, the tools differed in this respect within and between assemblages. Nevertheless, the repetition of the oval forms suggests that they may be the result of the transmission of cultural information.

Keywords: 'Groszaki', Micoquian, technology, geometric-morphometric, function, cultural information
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1. INTRODUCTION

Rounded or only partially rounded retouched tools, commonly referred to as *groszaki*, are part of a Micoquian tool group ('Keilmessergruppe') (Kozłowski and Kozłowski 1977; Jöris 2006; Frick 2020). The publications mentioning 'groszaki' treat them typically as an optional and inconvenient element of a site inventory. They function as a general marker rather than an essential unit in considering the functional-technological significance and chronological position of the assemblages (Bosinski 1967; Chmielewski 1969; Koulakovska *et al.* 1993; Burdukiewicz 2000; Kozłowski 2014; Jöris *et al.* 2022; Münzel 2024). Thus, the authors identified 'groszaki' as tools that take on the function of documentary classes in J-C's Gardin view (1980, fig. 16).

The paper presents the rounded retouched artefacts from the Micoquian site of Pietraszyn 49a, compared to other selected finds from Poland (Fig. 1). We aim to determine whether the artefacts from Pietraszyn can be treated as the so-called groszaki in the same sense as in other places. In doing so, we shall discuss whether there is a solid formal similarity between the specimens that have so far been typologically described. Are they all formally separate, or can they be perceived as the so-called Frison Effect or reduction model (Frison 1968; Dibble 1995)?

2. BACKGROUND

It is widely accepted that the first archaeologist who distinguished rounded retouched forms in the Middle Palaeolithic was S. Krukowski (1939). Krukowski separated quasi-'groszaki' (1) and sub-'groszaki' (2), which he also found in the Aurignacian, and typical quasi-'groszaki' (3). The quasi-'groszaki', according to Krukowski, were mainly scrapers (slicing and scraping tools), while the sub-'groszaki' were end-scrapers (scraping points) (Krukowski 1939, 55). Between these groups, he distinguished intermediate types.

It should be noted that these tools were identified a few years earlier by L. Kozłowski, who called them rounded scrapers (Kozłowski 1922, 9). He based his interpretations,

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however, on finds from the Okiennik Cave excavated by Kuźniar. Kozłowski distinguished three tool types: 1. worked on both sides with a flat retouch; 2. worked only on the edge in the marginal parts (the majority); 3. flakes worked with a surface retouch on the dorsal side. In the formulation of his ideas, L. Kozłowski relied on information from a monograph by Demetrykiewicz and Kuźniar (1914). In the archaeological section, the latter noted the presence of rounded scrapers, which he illustrated in Fig. 7 and Tables 14-15. He treated them as one of the distinguishing features of the Okiennik industry. Given these facts, we should move the period of interest in rounded retouched tools to the early 20th century.

It is also worth mentioning that, following the discoveries in Heidenschmiede (Germany) in 1930, E. Peters (1931) distinguished rounded tools but classified them as Acheulean, Mousterian, and Mesolithic (see also Hillgruber 2006, 120). He could not correctly interpret the finds, partially due to the lack of data on the site stratigraphy (see Münzel and Çep 2021). A little later, G. Bosinski called the finds from Heidenschmiede as 'umlaufend perlretuschierte Abschläge,' all-over beaded, retouched flakes of the Heidenschmiede type (Bosinski 1967, 33; Debénath and Dibble 1994, 101). The term 'groszaki' was also adopted in the czech Republic and Ukraine (Valoch 1988).

Polish scholars have also studied these tools. Noteworthy is the contribution by S. K. Kozłowski (2006). Slightly later, the 'groszaki' were analysed by M. Sudoł-Procyk in her doctoral thesis (Sudoł 2013).

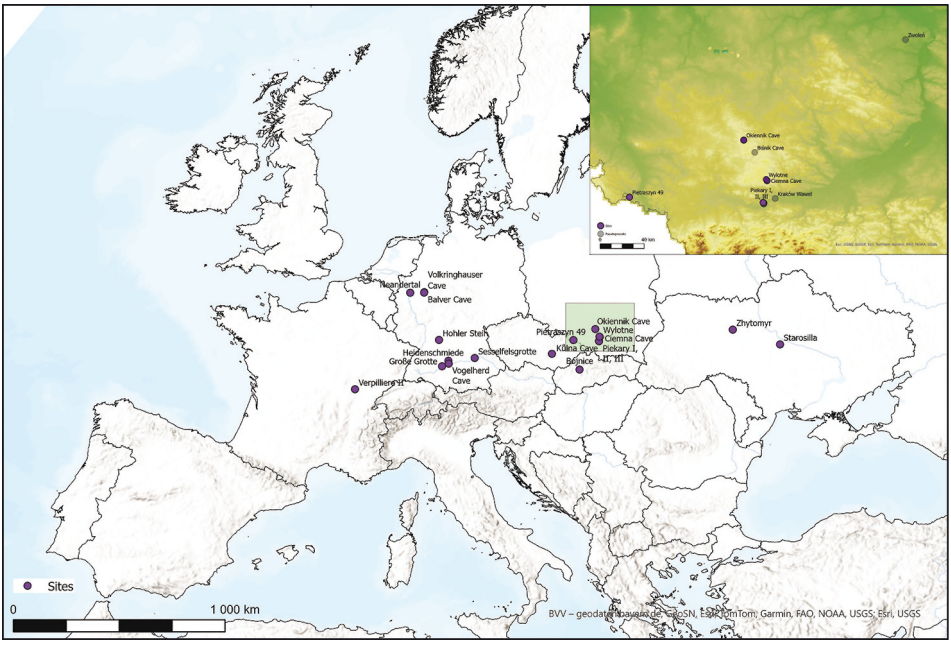

Fig. 1. Map showing sites with rounded retouched tools. Purple dot – Group 1 sites, 2 – white dot – Group 2 sites with uncertain specimens. Prepared by A. Kobyłka and D. Tokarz

Table 1. Middle Palaeolithic sites were attributed to Micoquian ('Keilmessergruppe'), where rounded retouched tools were identified (The list comprises Polish sites of Group 1)

Site	Country	Number	Reference
Kůlna Cave	CZ	?	Valoch 1988
Balver Höhle	DE	?	Günther 1964; Hillgruber 2007
Große Grotte	DE	1	Frick *et al. et al.* 2022
Heidenschmiede	DE	8	Münzel and Çep 2021
Hohlen Stein	DE	9	Freund 1968
Neandertal	DE	67	Hillgruber 2006, 2007
Sesselfelsgrotte	DE	67	Richter 1997; Freund 1968
Vogelherd Cave	DE	?	Schürch and Conard 2021
Volkringhauser Höhle	DE	67	Tafelmaier 2011
Grotte de la Verpillière II	FR	3	Frick 2016
Ciemna Cave	PL	1	Sudoł-Procyk 2014
Okiennik Cave	PL	11	Demetrykiewicz and Kużniar 1914; Kozłowski 1922; Krukowski 1939
Piekary I	PL	14	Kozłowski 2004
Piekary II	PL	3	Kozłowski 2004
Piekary III	PL	8	Kozłowski 2004
Pietraszyn 49a	PL	3	Fajer *et al*. 2000; this work
Wylotne Rockshelter	PL	14	Chmielewski 1970; Kozłowski 2006
Bojnice	SVK	1	Neruda and Kaminská 2013
Starosillia (rus. Sarosele, pl. Starosilla)	UA	?	Rybakov and Boriskovskiy1984
Zhitomir (rus. Zhitomir, pl. Żytomierz)	UA	?	Rybakov and Boriskovskiy1984

Table 2. Middle Palaeolithic sites from Poland that have provided ambiguously interpreted tools (Group 2)

Site	Number	Reference
Ciemna Cave	4	Sudoł 2013; Sudoł-Procyk 2014
Okiennik Cave	3	Demetrykiewicz and Kużniar 1914; Kozłowski 1922; Krukowski 1939
Biśnik Cave	6	Sudoł 2013; Cyrek 2013
Zwoleń	1	Schild 2006
Kraków Wawel	1	Sawicki 1955

The geographic distribution of 'groszaki' essentially overlaps with that of the Micoquian (Fig. 1, Tables 1 and 2). They were recorded in eastern France (Frick 2016), Germany (Richter 1997; 2000; Hillgruber 2006; Jöris *et al.* 2022), Poland (Chmielewski 1969; Chmielewski 1975; Kozłowski and Kozłowski 1977), the Czech Republic (Valoch 1988; Neruda 2011), Slovakia (Neruda and Kaminská 2013), and Ukraine (Rybakov and Boriskovskiy 1984). They occurred in assemblages dated to MIS 5, MIS 4 and MIS 3.

3. MATERIALS AND METHODS

The discussed finds come from the northern part of Site 49a in Pietraszyn 49a, known since the 1990s (Wiśniewski *et al.* 2019; Wiśniewski *et al.* 2020). Two of these artefacts were found in Layer 9, where clusters of finds associated mainly with the production of bifacial tools were documented. Currently, an assemblage of approximately 25,000 artefacts is known from this layer. The assemblage is dominated by fine waste (<2 cm) created during the various stages of tool production. Pre-forms and tools unfinished for multiple reasons are present in the collection, as well as diverse bifacial tools (Wiśniewski *et al.* 2020). The group also includes retouched flakes and scrapers. The third rounded retouched tool discussed here is currently in the collection of the Racibórz Museum, where it was donated by an amateur who discovered the site in the 1990s. The item was published by E. Foltyn and his team (Foltyn *et al.* 2000; Fajer *et al.* 2001a; 2001b).

Before the study, we developed 3D models of each object using photogrammetric techniques to facilitate the description of morphological and metric features. The two finds from Layer 9 were then microscopically analysed to check if they displayed use-wear traces and traces of using retouch techniques. For this purpose, we used a Keyence VHX-7000 series digital microscope (VHX-S770E; lenses VH-Z100R and VH-Z20R). The magnification (for the digital microscope) ranged from ×50 to ×300. The microscopic image was interpreted using a trace reference database. The reference base is located at the Faculty of Archaeology of the University of Warsaw and includes flint items made with techniques and methods known in the Stone Age and tools used by hunter-gatherer groups for various activities.

In the next step, the finds from Pietraszyn 49a were analysed morphometrically and technologically against a collection of similar specimens from Polish Micoquian sites (Ciemna Cave, Okiennik Cave, Piekary I, Piekary II, Piekary III and Wylotne Rockshelter). Unfortunately, we were not able to access all recorded finds. First, a geometric-morphometric analysis was performed, taking into account the outline of the tools. For recording each tool outline, we used 75 pseudo-landmarks. Then, by applying the Procrustes superimposition technique 2D, we reduced the objects to a single size using the traditional protocol (Richtsmeier *et al.* 2002; Zelditch *et al.* 2004; Buchanan and Collard 2010). Finally,

the data matrix was analysed using Principal Component Analysis (PCA). In addition, a set of metric-morphological and technological features was included in the study variation. We sought to record the type of tool treatment and its extent. Correlating these data with the metric features yielded some exciting insights.

4. RESULTS

4.1. Morphometric and technological analysis of the finds from Pietraszyn 49a

The tools were made from erratic flint of the same quality as the rest of the assemblage. Art 23296 was made from grey-coloured flint, while Art 23205 was made from a more brown-coloured raw material reminiscent of the Groszowice-type (Přichystal *et al.* 2022). The third specimen (MR-A-995-1) represents dull grey-brown flints (Fig. 2). Two tools were made from flakes and one from a flat chunk. The tools' diameters ranged from 49.7 mm to 63.9 mm, and were 13.8 mm to 21.9 mm thick. They were almost free of cortex or unworked surfaces. In two specimens, remains of natural surfaces were preserved near the edges. One tool was formed unifacially, while the other two showed traces of bifacial shaping.

Using the protocol for describing tool shaping at Pietraszyna 49a (Wiśniewski *et al.* 2020), three types of shaping-thinning patterns can be recorded on a tool made of a flake (Figs 2: A and 3: A, Art 23296). Traces of surface and edge forming are present primarily on the dorsal side. Bulbar thining is present on the ventral side in the butt region. The scars have been used as a striking platform to remove some flakes from the dorsal side. The first is the presence of inwards-directed scars adjoining a triangular or elongated oval outline in the central part. The second type represents invasive-short retouch, while the third is marginal. The cross-section is asymmetrical, with the dorsal side being convex.

The second find (Art 23205) is shaped bifacially but was created from a flake (Figs 2: B and 3: B). On one side, it features long scars with an oval outline. There are also isolated invasive short scars and traces of marginal retouching modifying the edge. In some cases, they were probably remains of a striking platform preparation for flaking. The other side displays scars reaching the central part. They are elongated (blade-like) and arranged in opposite directions. The invasive short and marginal retouches were also present. The cross-section is plano-convex.

The third tool (MR-A-995-1) is also bifacially worked (Figs 2: C and 3: C). It features the already listed types of scars on both sides. On one side, the invasive short traces prevail. The adjoining scars left rectangular or fan-shaped negatives. The cross-section is biconvex.

Tool-making, whether it concerns chunks or flakes, involves similar methods. First, the shaping and thinning were made, and thin striking platforms were sometimes prepared.

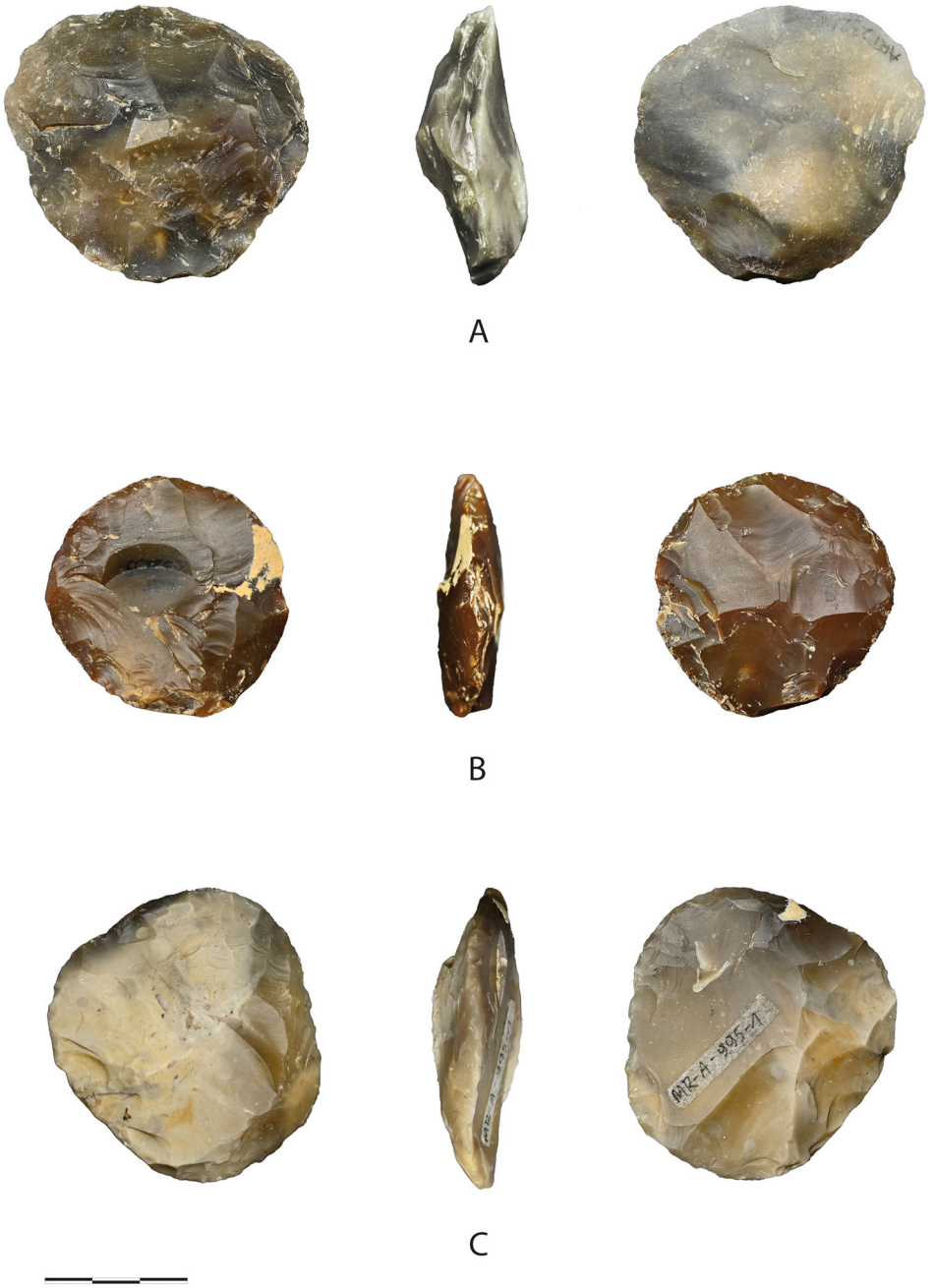

Fig. 2. Rounded retouched tools from Petraszyn 49a. Photos by D. Tokarz

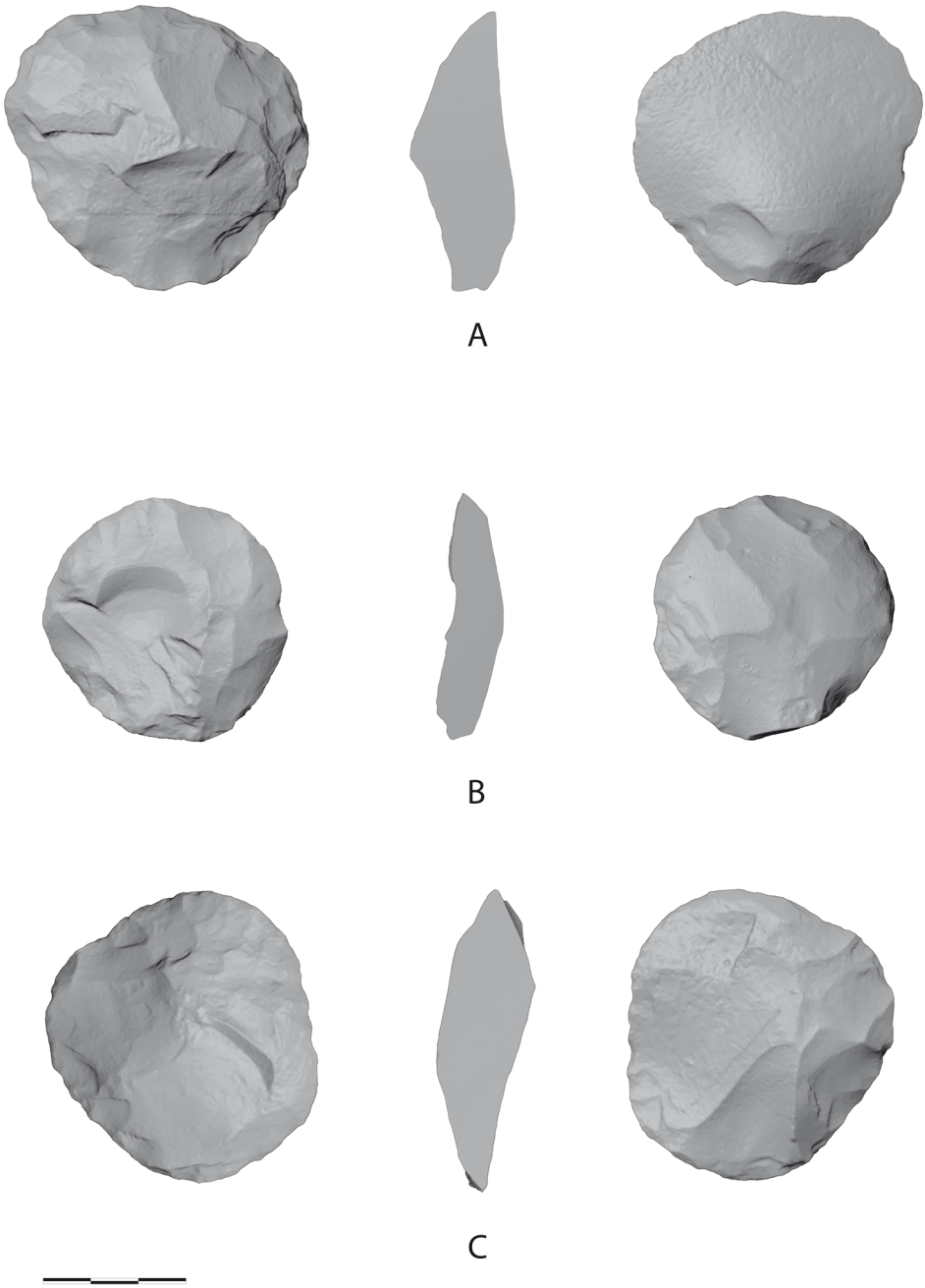

Fig. 3. 3D models of rounded retouched tools from Pietraszyn 49a.
Prepared by A. Kobyłka and A. Wiśniewski

The regularisation of selected edge parts followed these operations. The chain of operations is not as multifaceted as in the case of bifacial tools, but the technical requirements were no less complex. In addition, last year, an attempt to refit the studied items was made for several hours, unfortunately, without success. Theoretically, this could suggest that the tools were made outside the discovered clusters or the site.

4.2. Microscopic investigation

The first analysed flint tool (Art 23205) shows no preserved traces of use (Fig. 4). Its surface has not undergone significant post-depositional alterations that would affect the state of preservation of the potential use-wear. Only a very light, glossy patina was noted in some spots. The butt displays striations and a locally visible 'metallic' shine, which indicates that a stone hammer was used during the abrasion of the flaking surface edge and flake detachment (Fig. 4: A, B). In addition, one of the lateral edges on the protruding part of the retouch shows traces that may have been created using a soft organic hammer made of antler/bone (Fig. 4: C).

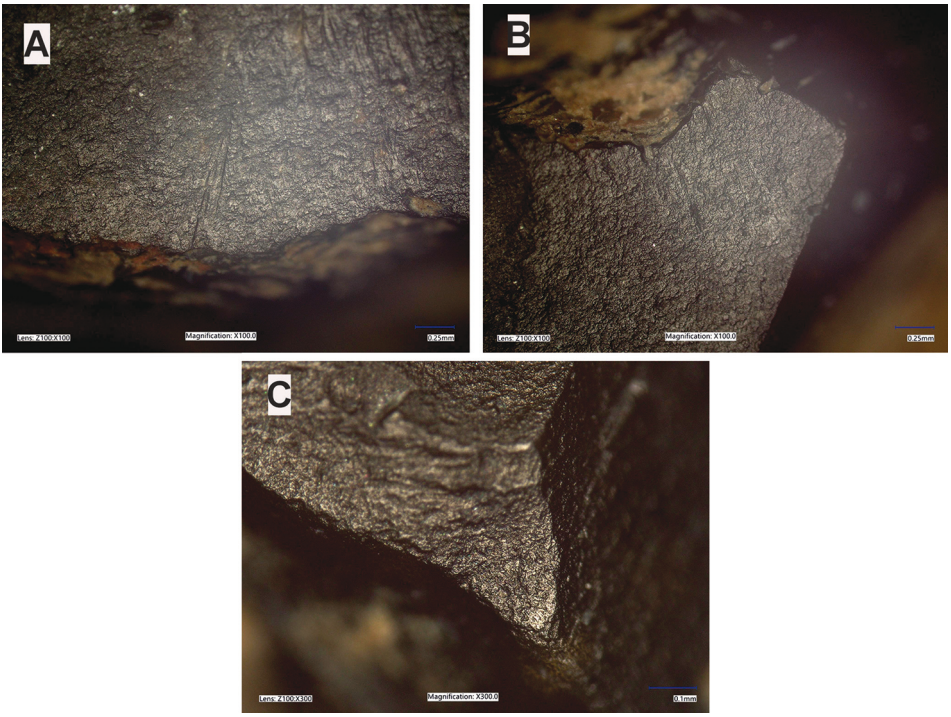

Fig. 4. Photographs showing technical marks (A, B) and changes due to contact with bone/ antler (C) on one of the artefacts (Art 23205) from Pietraszyna 49a. Photos by K. Pyżewicz

The second microscopically analysed specimen (Art 23296) does not feature any preserved traces of use or applied production techniques. Due to the shiny, spotted patina covering the artefact's surface, it is difficult to determine whether it was used.

5. DISCUSSION

5.1. An attempt at metric comparative analysis

To make a preliminary comparison, we selected a group (48 items) of the finds often referred to as 'groszaki' from six Polish Middle Palaeolithic sites (Table 1, Group 1). Such items occurred most abundantly at the sites of Piekary I and the Wylotne Shelter (Kozłowski 2004). Isolated specimens are known from Ciemna Cave (Sudoł-Procyk 2014). All sites listed in Table 1 are classified as Central European Micoquian. We excluded from the analysis finds that were regarded as uncertain by some researchers (Group 2). These specimens are included in a separate table (see Table 2).

Regarding the essential dimensions (length x width), the averages from all cases (51) are very similar: 34.70 mm x 35.22 mm. As we did not have the opportunity to access all the finds, we skipped the thickness parameter. The maximum L/W is 66.36/68.48 mm, while the minimum is 12.93/12.25 mm. If we consider the averages for the individual sites, the outliers can be observed in the tools from Piekary I and finds from Pietraszyn 49a and Ciemna Cave (Fig. 5). The skewness is positive, so most of the data are above the accepted average, while the spread is relatively significant, at over 50 mm. Descriptive statistics indicate that the collection is quite diverse in its basic parameters. Such differences also occurred at other sites. In the collection from Neanderthal, for example, among the 67 finds, the length varies between 5.5 mm and 19.9 mm and the width from 5.1 to 20.00 mm. The size distribution appears bimodal (Hillgruber 2006, 120, 121, tab. 2).

Qualitative attributes such as the retouch type and range were also considered. No correlation was found between the tool size and the retouch type (unifacial, bifacial and alternating). Interestingly, bifacial forms receive a higher median than the other two. The correlation between the length and the retouch continuation or discontinuation proved surprising. Rounded retouched tools have a median length, which shows they were not obtained by reducing larger items. Except for the Okiennik Cave, it is reasonable to believe these items were created as independent projects.

5.2. Results of the geometric-morphometric comparison

The entire set of rounded retouched tools was analysed using the landmark matrix describing the 2D shape and the Procrust approach. Using the Principal Component Analysis (PCA) method, a scree plot (Fig. 6: A) was obtained, indicating significant variation

in the analysed set, as evidenced by the dispersion of principal components. The cut-off occurs after the 6th component, and the first component does not exceed 33%. The deformations in the plot for Component 1 run from the more irregular, elongated shapes towards those that are more flattened. PC2, on the other hand, ranges from diamond-like shapes to irregular ovals (Fig. 6: B). Regarding the tool distribution, the finds from

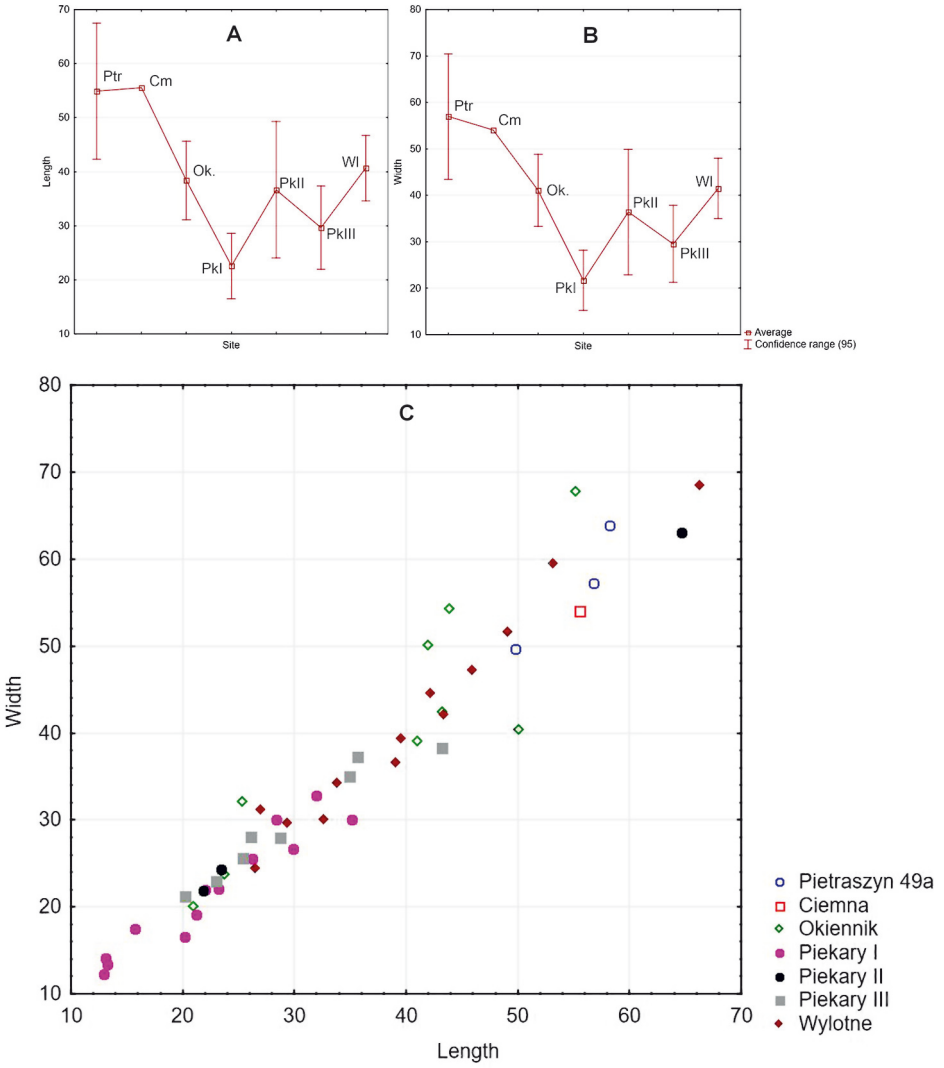

Fig. 5. A and B – scatter plot of mean length and width of all-round retouched tools from Poland (Group 1), Cm – Dark Cave, Ok – Okiennik, Pk – Piekary I-III, Ptr – Pietraszyn, Wl – Wylotne Rockshelter; B – scatter plot of length and width of rounded retouched tools from Poland (Group 1). Prepared by A. Kobyłka and A. Wiśniewski

Pietraszyn 49a are in the middle part of the graph. Specimens from Wylotne Shelter are also clustered in the central part of the diagram. The finds from Okiennik and Piekary I are the most varied. They also affect the overall variance of the assemblage.

If we consider only the characteristic 2D shape of the tools, it can be said that they form a homogeneous group. However, if we regard their technical characteristics and size, we must state that they are varied. Differences occur within sites (assemblages) as well as between them (Figs 5 and 6).

Assuming the makers manufactured this specific tool type by reproducing its production process, it did not result in 'standardisation' in the present understanding. Factors

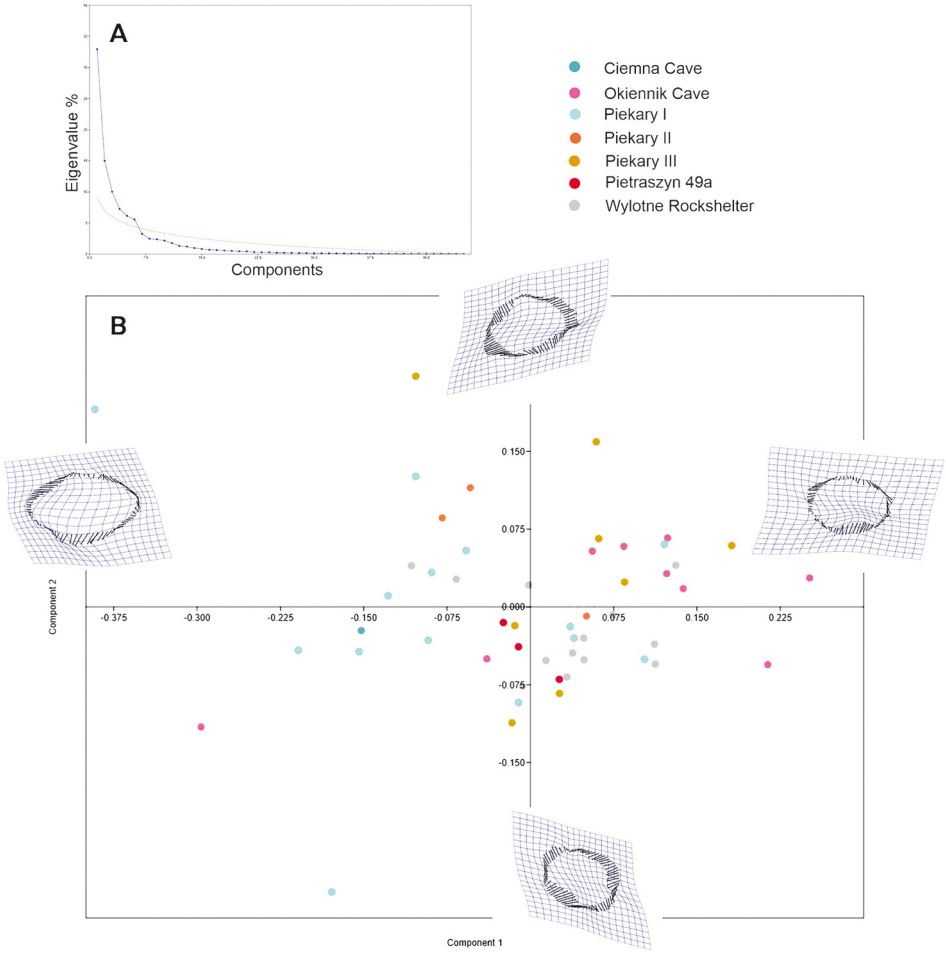

Fig. 6. Principal Component Analysis (PCA) of landmarks. A – Scree plot of components with the broken stick. B – Scatter plot with shape deformations. Prepared by A. Wiśniewski

such as the quality and access to the raw material may have effectively limited reproducibility. Some studies indicate that the standardisation level achieved by Middle Palaeolithic artisans for lithic raw materials did not differ from that attributed to anatomically modern humans producing Late Palaeolithic tools (Marks *et al.* 2001). In the Late Palaeolithic, it is possible to find other examples of the lack of modern metric standards. One of the most prominent examples comes from a Magdalenian camp at the site of Wilczyce 10. A group of 'female figurines' made of flint show a substantial morphological similarity but significant metrical differences (Boroń *et al.* 2013). The length discrepancy in the set of 50 specimens ranges from 27 mm to 83 mm. It is also worth noting that in the case of other Middle Palaeolithic craft areas, such as bone processing, regularity was sometimes maintained at an upper level (see Majkić *et al.* 2018) and sometimes at a lower level (Płonka *et al.* 2024). The reasons behind this behaviour are obscure. It does not seem, however, to have resulted from the different cognitive capacities of archaic and modern humans (*e.g.*, Monnier *et al.* 2010).

The presence of rounded retouched tools, primarily in the Micoquian assemblages, suggests that, like other tool types, they were the subject of social information transfer. The noticeable differences in 'groszaki' within the assemblages and between the sites are unsurprising, considering, for example, the variation in shaped tools. There seem to be several reasons for this. In addition to the apparent raw material and functional differences, the mode of social learning may come into play, which is sometimes crucial in transmitting specific patterns. Perhaps the information transfer became more liberal during the development of the classical Micoquian, or the observed picture results from the atomisation of social groups due to demographic problems (see Shennan 2002; Henrich 2004; Premo and Kuhn 2010; Wiśniewski 2012).

5.3. The problem of function

To date, it has not been possible to resolve whether rounded retouched tools were used in everyday practical activities. The finds are poorly preserved or lack use-wear traces. Traces were not found on the artefacts from Pietraszyn either, although they had previously been recorded on knives, scrapers and retouched flakes there (Wiśniewski *et al.* 2019). One of the authors (KP) conducted similar investigations of other Polish Micoquian culture collections, but with no more conclusive results. Studies of the most numerous collections from Neanderthal were impossible due to the patina (Hillgrube 2006, 121, 122). Only in Sesselfelsgrotte were positive results obtained for 43 pieces (Richter 1997, 184). The items displayed contact traces with 'soft, fleshy and sometimes woody plant material.'

Considering the size of 'groszaki', it was suggested that they may have been children's toys (Stapert 2007), which would also partly explain the lack of use-wear traces. Current research shows the important role that children's play plays in development (Dag *et al.*

2021; see also Riede *et al.* 2023). It is reasonable to believe that this was also important in the past.

The making of these objects seems intriguing. Tools from Pietraszyn, site 49a, must have been prepared by experienced knappers. All specimens contain traces of centripetal-directed invasive detachments, often preceded by preparing a striking platform.

6. CONCLUSION

The presence of rounded retouched objects at the site of Pietraszyn 49a was expected, as these tools have been previously recorded in the Micoquian contexts. It may be a surprise that they occurred at a site interpreted as a tool-shaping workshop.

The Pietraszyn tools, metrically compared to similar specimens from Poland, belong to the subset of larger objects. All three were prepared using thinning, invasive-short and marginal retouch oriented one- or two-sidedly. The combination of these three retouching methods in 'groszaki' is rare. Geometrically, the specimens from Pietraszyn are close to other oval tools of this type found at Poland's Micoquian sites.

Considering their technological and metric features, most of these tools were shaped to be oval. In individual cases, the possibility that they are reduced items made of less regular tools cannot be rejected. No use-wear traces were found on the finds from Pietraszyn, as on more than a dozen other specimens from central Europe. There are currently no premises to interpret them in purely utilitarian terms. In this situation, various other concepts must be considered, which, on the one hand, stimulate the imagination and, on the other, escape empirical evaluation.

It must be stated that 'groszaki' are, apparently, products of inter-generational and/or inter-group information transfer. Their variation probably does not differ from that observed in other tool categories used by the humans associated with Micoquian.

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