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# VALUE, SIGNIFICANCE AND USE OF 'EXOTIC' MATERIALS IN THE LIGHT OF THE PRESENCE OF OBSIDIAN AT NEOLITHIC SITES IN POLAND

**ABSTRACT**

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At Neolithic archaeological sites in Poland, obsidian stands out as the most common 'exotic' raw material. There are over several hundred Neolithic sites where artefacts made from this raw material have been recovered. Given the absence of natural obsidian outcrops in Poland, it is evident that these artefacts were imported to the sites through various means, such as direct procurement or exchanges.

One of the most extensive collections was found at Opatów, representing the Samborzec-Opatów group of the Late Neolithic. This collection forms the core of our discussion, in which we aim to explore the economic systems involved in the acquisition of obsidian. Results obtained from our analyses (technological, morphological, and traceological) constitute the foundation for considering various hypotheses regarding the significance and value of 'exotic' materials for Neolithic communities.

Keywords: obsidian, value, economy, exchange, import, long-distance contacts, use-wear analysis, Neolithic, Poland

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*Cultural facts do not exist as objective phenomena in contrast to natural ones. Cultural facts should be comprehended with due consideration of the perspective of the participants of the investigated culture.*

Małecka-Kukawka 1997, 245

# INTRODUCTION

Archaeology focuses on studying the material remains left by prehistoric communities and uses them to develop theories and models regarding the past. Additionally, archaeologists define prehistoric communities based on material remains, known as archaeological cultures. The main element defining these cultures is the material culture component most abundant at archaeological sites. In the case of Neolithic communities, this is often ceramics, such as the Linear Pottery culture, Funnel Beaker culture, or Corded Ware Culture (see Chapman 2007, 207). In this way, archaeologists define prehistoric communities, but was this indeed the determining factor in the Neolithic period for individual groups to affiliate with a particular community? Or it was not? Affiliation with a group could be determined by unique, rare elements, often called exotic items.

Obsidian is one of the most well-known and frequently discovered 'exotic' raw materials at archaeological sites on the northern side of the Carpathian and the Sudeten Mountains. In these areas, this material was particularly popular during the Neolithic period, specifically in its Early and Middle phases, being a reflection of intensive intercultural contacts maintained by local early agricultural communities with communities inhabiting the areas on the inner side of the Carpathians. Based on current research, these interactions were initiated by the communities of the Linear Pottery Culture (LBK) and underwent a significant intensification during the development of post-linear groups (*cf.* Kulczycka-Leciejewiczowa 1979; Kadrow 1990b; Szeliga 2007; 2009; 2021).

Considering the data so far known, the conveyance of obsidian from the Carpathian Mountains should be studied in terms of phenomena whose origins and nature are primarily non-economic and socio-culturally relevant and not purely practical or functional. New, essential data on this issue are provided by the results of interdisciplinary analyses of one of the most numerous obsidian inventories from the upper Vistula basin, from the archaeological site in Opatów, Świętokrzyskie Voivodeship. This paper aims to address this issue by presenting research on obsidian materials found at this site, as well as the results of the analysis of their technological, metric and traceological attributes.

# NEOLITHIC OBSIDIAN IN THE AREA OF PRESENT-DAY POLAND

Research on obsidian extraction, utilisation, and distribution is conducted globally. In the context of investigating the use of obsidian by prehistoric communities in East-Central Europe, the most significant sources of this material are the southeastern regions of Slovakia (known as Carpathian 1 chemical type), the northeastern regions of Hungary (Carpathian 2 chemical type), and deposits in Transcarpathian Ukraine (Carpathian 3 chemical type). The last one was identified relatively recently and appears to have been exploited by local prehistoric communities (Rosania *et al.* 2008; Přichystal 2013, 159; Werra *et al.* 2021; 2022; see Fig. 1).

The oldest Neolithic obsidian materials discovered in Poland are associated with the LBK communities; currently, at least 100 sites where products made of this raw material have been discovered (Fig. 1: A). These obsidian artefacts are rarely found at sites dated to the earliest phase (Ib – Zofipole), where they are mostly singular specimens (*e.g.*, Mateiciucová 2008, 126; Wilczyński 2016; Wilczyński and Kufel-Diakowska 2021, 169). As we move into the later phases, there is a gradual increase in their occurrence. Several to several dozen obsidian items have been documented in the second phase (classical, Music Note, Notenkopfkeramik phase). Those finds were widely distributed across uplands as well as lowlands, sometimes in considerably distant settlement clusters (Fig. 1: A). Despite a high number of such sites, finds dated to the period in question indicate that the import of obsidian north of the Carpathians and Sudetes was not intensive, which is mainly reflected in the modest quantities of obsidian in inventories, only sporadically exceeding 3% (*e.g.*, Kozłowski 1970, tab. I; Milisauskas 1986, 145; Kaczanowska *et al.* 1987, 94; Caspar *et al.* 1989, 159; Michalak-Ścibior and Taras 1995, tab. V; Wilczyński 2014a, tab. 2; 2015).

Exceptions are the sites of the Rzeszów and Przemyśl LBK clusters, where the participation of this raw material in inventories dated to the Music Note phase often reaches over ten per cent or even more (Kozłowski 1970, tab. I; Balcer 1983, tab. 4; Kadrow 1990a, fig. 24: a-c; 1990b, fig. 14: b; Pelisiak 2014, tab. 14).

An increased influx of obsidian into territories located north of the Carpathians is dated to the Želiezovce phase of the LBK, which is indicated by more numerous finds, concentrated mainly in southern Poland, especially in the Rzeszów and (to a considerably lesser degree) Nowa Huta settlement clusters of the LBK (Kulczycka-Leciejewiczowa 1979, tab. 5, fig. 26; Kaczanowska 1985, Abb. 22; Kadrow 1990a, fig. 24: d-e; Szeliga 2009, tab. I). This increase in the number of obsidian items remained unchanged in the subsequent period, linked with younger Danubian cultural groups developing in the drainage basins of the Upper Vistula and Oder Rivers after the decline of the LBK. This period – especially interesting in the context of the problems discussed in the present article – is currently represented by at least several dozen sites at which obsidian artefacts were found (Fig. 1: B). The

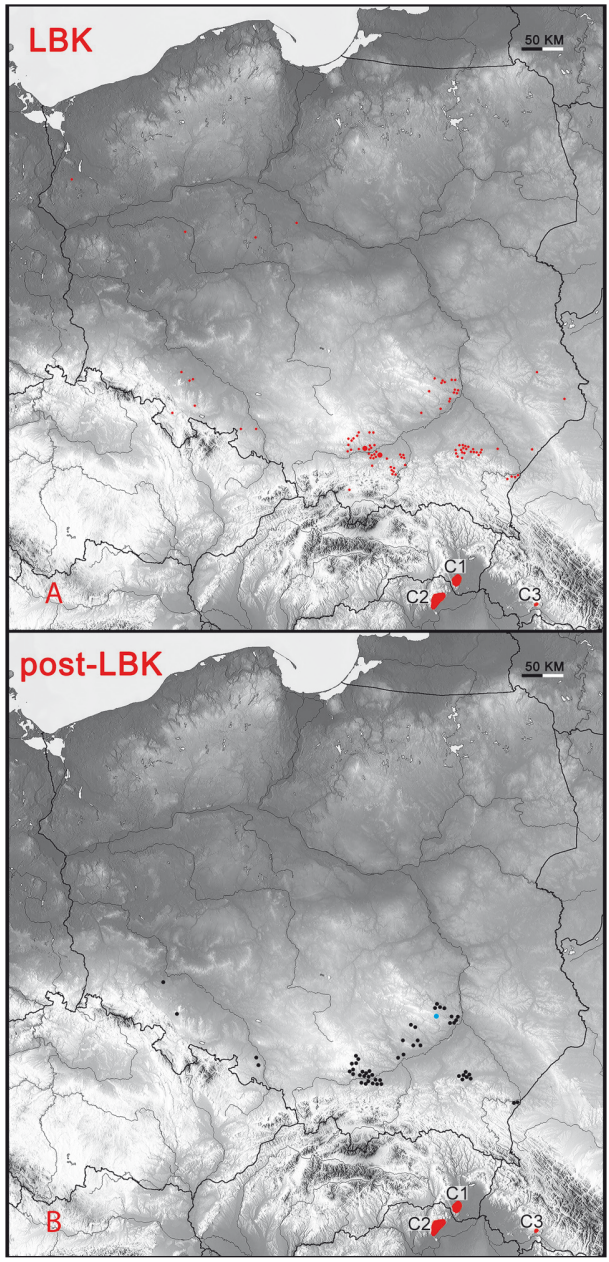



**Fig. 1**. Location of LBK (A) and post-Linear (B) sites with obsidian artefacts in archaeological inventories. Blue dot – location of Opatów, Site 2, Świętokrzyskie Voivodeship. C1 – Carpathian 1 geological obsidian outcrops; C2 – Carpathian 2 geological obsidian outcrops; C3 – Carpathian 3 geological obsidian outcrops. Graphic design by M. Szeliga. Map background prepared by Ł. Figura

discussed process increase in obsidian imports was the most distinctive in the first half of the 5th millennium BC. It was mainly linked with the early Lengyel cultural groups (the Samborzec-Opatów group [hereafter SOG] and the early phase of Pleszów-Modlnica group), and especially Phase Ib of the Malice culture (MLC; Szeliga 2007, 298-300; 2021, 74-77; Wilczyński 2015). During this period, the influx of obsidian still encompassed all the main settlement clusters in the drainage basin of the Upper Vistula (Fig. 1: B). The most significant numbers of products made of this raw material were recorded in the Rzeszów and Targowisko settlement microregions (*cf.* Kadrow 1990a, fig. 24: f; Wilczyński 2010, 26; 2018, tab. 1; Dębiec and Pelisiak 2022), whereas in the Sandomierz, Nowa Huta and Przemyśl microregions their quantities did not exceed 5%. (*e.g.*, Cabalska 1964, 124-125; Kozłowski 1969; Kaczanowska 1971, 16; 1985, 139; Więckowska 1971, 128; Kamieńska and Kozłowski 1990, 19, 28; Michalak-Ścibior 1992, 39; Szeliga 2021, fig. 6). A similar tendency continued in the second half of the 5th millennium BC. However, the intensity of obsidian influx into southern Poland dramatically decreased and was limited mainly to settlement clusters associated with the late classical and Rzeszów phases of the MLC around the middle Wisłok and San Rivers (Szeliga 2021, figs 7, 9). Nevertheless, a considerably low number of those finds (Kadrow 1990a, fig. 24: g; Dębiec 2003, tab. 8; Mitura 2004, tab. II) may result mainly from insufficient state of research. We must remember that the distribution of obsidian artefacts was still wide-range in nature, which is confirmed by single finds linked with the Brześć Kujawski group in Kuyavia and the younger Lengyel groups in Upper Silesia and western Lesser Poland (Fig. 1: B; see Kozłowski 1966: 15; 1972: 113, 177, 178; Kulczycka-Leciejewiczowa 1979, 111, fig. 50, p. 112).

For the entire period discussed above, obsidian was delivered to settlement clusters across southern Poland, mainly in the form of concretions and, sometimes, of prepared blade cores. There, they were processed, and the products were redistributed further in the settlement clusters (*e.g.*, Kozłowski 1969, 138; Kaczanowska 1985, 65; Michalak-Ścibior 1992, 44; Szeliga 2009, 298; 2021, 82-83). It appears that this tradition's decline occurred as late as in the last quarter of the 5th millennium BC in the environment of the late MLC. A change in the distribution pattern of obsidian north of the Carpathians probably occurred at the same time, which is indicated by triangular bifacial arrowheads discovered at a dozen or so sites located on the left side of the Vistula, between the Sandomierz Upland and Olkusz Highland. Those arrowheads are associated with the late MLC (Sałacińska and Zakościelna 2007, 83). However, in part, they may be linked to the Lublin-Volhynian culture and Wyciąże-Złotniki group as an effect of strong influences from the Transcarpathian Bodrogkeresztúr culture (Kaczanowska 1980, 40-41; 2006, 114; Szeliga 2021, 80-81). Unfortunately, for the majority of such discoveries, lacking the context of features makes it impossible to precisely and definitely determine their cultural association.

# OPATÓW. HISTORY OF RESEARCH

The site of Opatów is situated on the Sandomierz Upland, on the slope of the left bank of the Opatówka River, a left tributary of the Vistula River (see Fig. 1: B). The prehistory of the Opatów region was initially studied between 1913 and 1915 by Józef Milicer, an amateur archaeologist and in the interwar period, from 1922 to 1929, was excavated by Zofia Podkowińska (1894-1975). During these excavations in the interwar period, 38 features related to the activities of Neolithic (post-linear) communities and the Bronze Age (Trzciniec culture) were examined (see Fig. 2; Kulczyński and Pyzik 1959; Kosterski-Spalski 1963; Podkowińska 1968; Jędrzejczyk 2013).

Podkowińska continued her research in Opatów after World War II, conducting excavations in 1965 with Leokadia Wrotek (1934-2017). Some articles have been published based on the results (Podkowińska 1953, 1968). The only comprehensive study of the materials from Opatów, apart from interim reporting articles, is the study of lithic inventories compiled by Hanna Więckowska (1927-2013; Więckowska 1971; Kowalewska-Marszałek 2004, 2007, 2012).

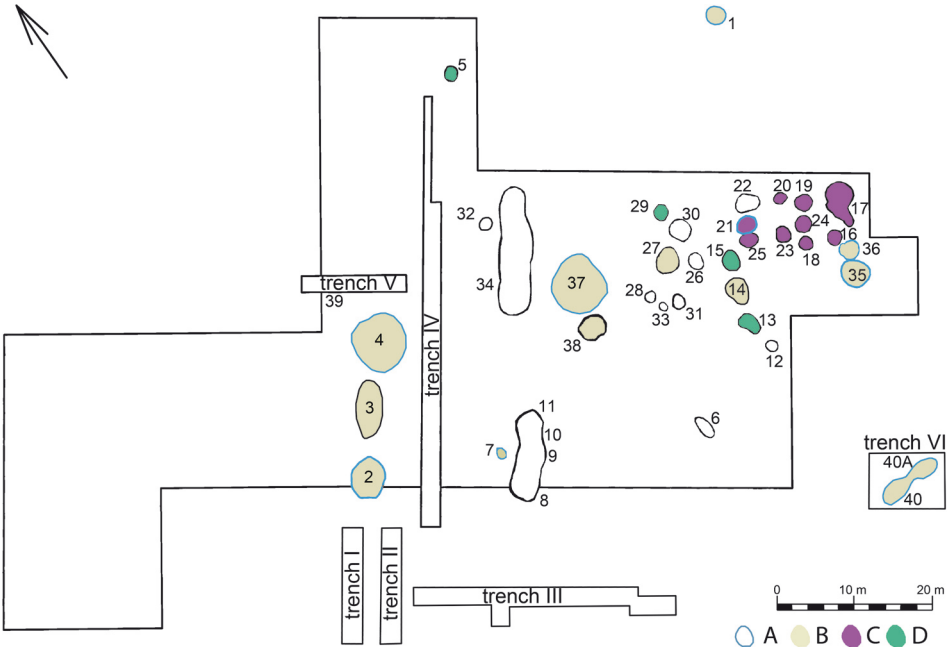



**Fig. 2.** Opatów, Site 2, Świętokrzyskie Voivodeship. Site plan with features no. 1-40A and trenches from 1924, 1929 and 1965. A – features with obsidian; B – features connected with Samborzec-Opatów group domestic activities; C – features associated with Trzciniec culture communities' activities; D – features of unspecified chronology. After Więckowska 1971, fig. 1. Graphic by P. Burgert, D.H. Werra

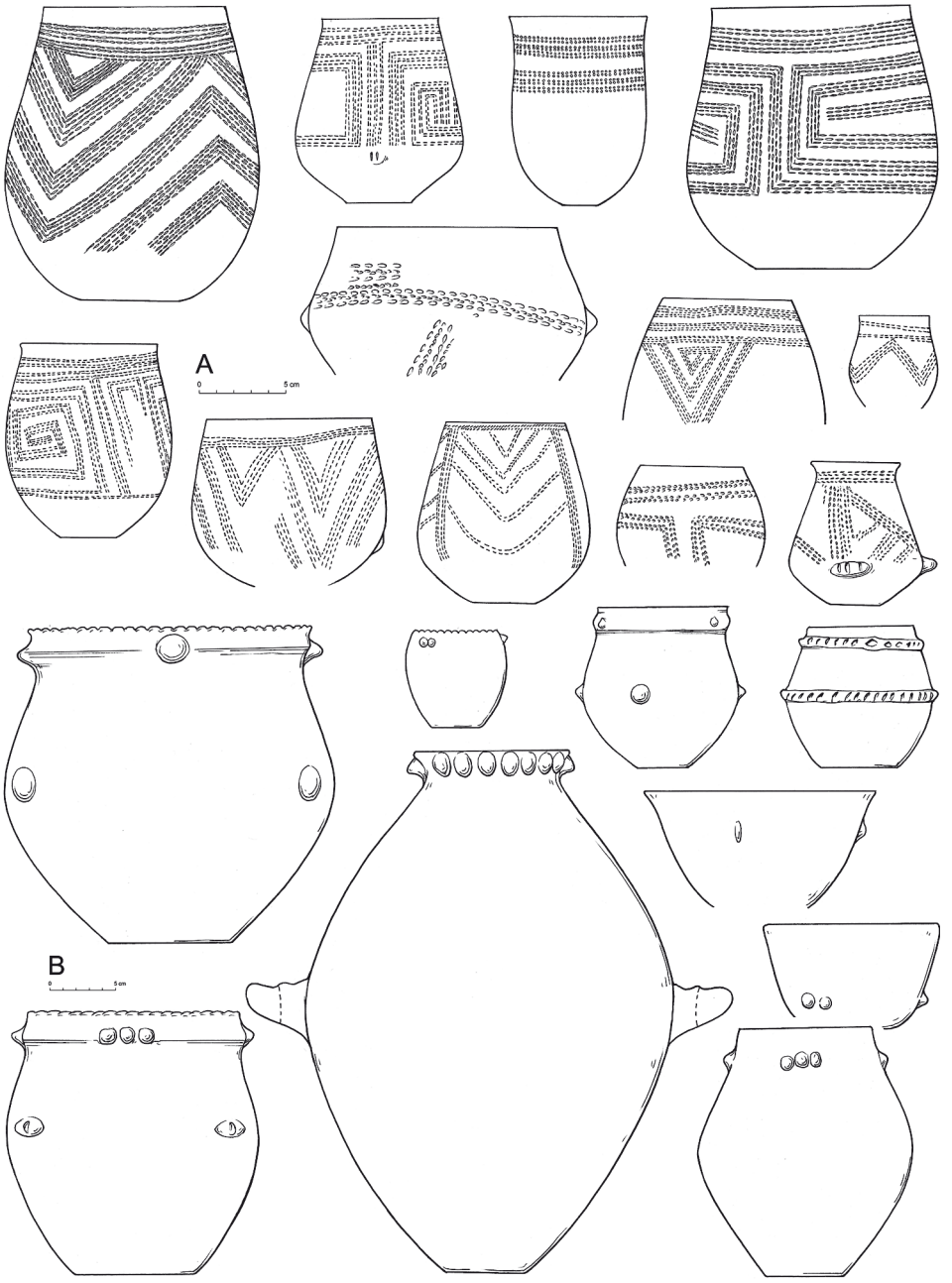



**Fig. 3.** Selection of typical ceramic shapes from Opatów, Site 2, Świętokrzyskie Voivodeship. A – scale for decorated vessels (upper part); B – scale for undecorated vessels (lower part). Drawing by P. Burgert, M. Černý, T. Davidová

The unclassified nature of the archaeological materials from the Samborzec and Opatów sites prompted Podkowińska to establish the SOG within the Lengyel culture (c. 4900-4700 BC). This cultural group represents the oldest horizon of the Danubian communities on the northern side of the Carpathians after the decline of the LBK. According to Podkowińska, it developed under the strong influences of the Lengyel culture, the Stroked Pottery culture (hereafter SPC), and the socio-cultural systems from the Upper Tisza River basin. These diverse cultural interactions significantly impacted the syncretic nature of the SOG, primarily reflected in its ceramics (Podkowińska 1953, 32-44). We present our current insight into the degree of involvement of individual cultural elements in this group in the discussion of this article.

The SOG group was first defined by Podkowińska (1953, 32-44) and has since been redefined several times (Kozłowski 1966; Kamieńska 1967; Kamieńska and Kozłowski 1970; Kozłowski and Kozłowski 1977; Kaczanowska and Kozłowski 1994; Kadrow and Zakościelna 2000; Kowalewska-Marszałek 2004; Kozłowski 2004; Kulczycka-Leciejewiczowa 2004; Zápotocká 2004).

In the Sandomierz Upland, the pottery assemblages are characterised by the frequent presence of vessels with bulging necks and thick walls, with horizontal bands dominating


**Fig. 4.** Blades and their fragments from Opatów, Site 2, Świętokrzyskie Voivodeship. Photo by D.H. Werra

the ornamentation (Fig. 3). The lithic industry is dominated by chocolate flint, with a frequent presence of obsidian items (Fig. 4; Kaczanowska 1990; Kaczanowska and Kozłowski 1994; Kadrow and Zakościelna 2000, 196).

This unique character of the ceramic materials, in turn, significantly influences the classification of this cultural group within the basic cultural taxonomy. The materials of the SOG from western Lesser Poland (Southern Poland) have been classified as part of the Lengyel culture. At the same time, those from the Sandomierz Upland (including the Opatów site) have been defined as an "early Malice – Lengyel mixed group" (see references in Kadrow and Zakościelna 2000).

Regardless of recent discussions on the cultural classification of the SOG and the archaeological site in Opatów, this obsidian assemblage has played a vital role in the study of obsidian distribution to the north of the Carpathians during the Neolithic period, including the continuity and intensity of this phenomenon after the disappearance of the LBK (Szeliga 2007, 297-298; 2021, 74-75; Werra *et al.* in print).

## OBSIDIAN FROM OPATÓW – DECOMPOSED INTO PRIMARY FACTORS

During the excavations at the Opatów site of the 1920s and the 1960s, 292 obsidian artefacts were recovered (5.04% of the entire lithic assemblage). This is the largest and most chronologically homogeneous obsidian assemblage so far, related to the oldest post-linear cultural horizon in the upper Vistula basin (Więckowska 1971; Szeliga 2007, 297; Werra *et al.* in print).

Technological, morphological, and refitting analyses were conducted, along with the observations of use-wear, all to understand the methods of obsidian knapping used by Middle Neolithic communities. These analyses aim to gain insight into the daily life of these prehistoric communities and explore obsidian's presence within their socio-cultural context.

Furthermore, these items underwent energy dispersive x-ray fluorescence (EDXRF) analysis using a QuanX EDXRF spectrometer (Hughes and Werra 2014; Hughes *et al.* 2018). Among them, 69 artefacts were of sufficient size to allow for quantitative composition estimates, while the other 195 artefacts were too small for reliable quantitative analysis (see Hughes 2010). The EDXRF analyses were conducted in the Geochemical Research Laboratory by Richard E. Hughes. The results indicated that all artefacts were made from obsidian of the Carpathian 1 chemical type found in the Zemplén Mountains in southeast Slovakia (Werra *et al.*, in print). Those results, showing the domination of the Carpathian 1 chemical type obsidian in the inventories, correspond closely to those obtained from neighbouring regions (see Biró 2014; 2018; Constantinescu *et al.* 2014, 148; Kabaciński *et al.* 2015; Burgert *et al.* 2017; Riebe 2019; Szeliga *et al.* 2021; Werra *et al.* 2021).

## Morphometric and typological analysis

In total, 264 items out of the entire number of artefacts discovered during excavations were available for analysis (*cf*. Więckowska 1971). Their morphological analysis indicates that blades are clearly predominant. They are nearly twice as numerous as flakes. Cores and prepared tools are very rare (Fig. 5). All the cores are partly exploited or even vestigial forms used in blade production, having considerably small or even microlithic sizes (length: 17.5-29 mm) and masses (3.99-21.83 g). The sizes of blade scars preserved on their flaking surfaces are also very small (usually 18-22 mm in length; Werra *et al*., in print). All cores from the collection are single platform forms (typologically, mainly subconical and conical) with prepared striking platforms. They bear traces of intensive repair, concentrated mainly on correcting the core angle. This correction also included *ad hoc*, careful and intensive polishing of the edges of the striking platforms prior to removing new blades, as well as delicate or complete rejuvenation of the striking platforms. The commonness of these repair procedures is corroborated by the results of analyses conducted on blade butts (*i.e*., frequent traces of polishing) as well as by the presence of rejuvenation flakes. On specific cores, traces of changing the orientation of exploitation were detected (Werra *et al*. in print).

The most numerous category of obsidian artefacts is blades (Fig. 5), represented mainly by various fragments. Complete blades are very rare (Fig. 6). They are tiny, with a length ranging from 20 to 30 mm. This precisely corresponds to the sizes of the cores and negative scars formed on their flaking surfaces. Specimens with dorsal surfaces covered entirely by negative scars – detached at advanced stages of core exploitation – are clearly predominant. Most of them are blades having a trapezoidal or triangular cross-section.

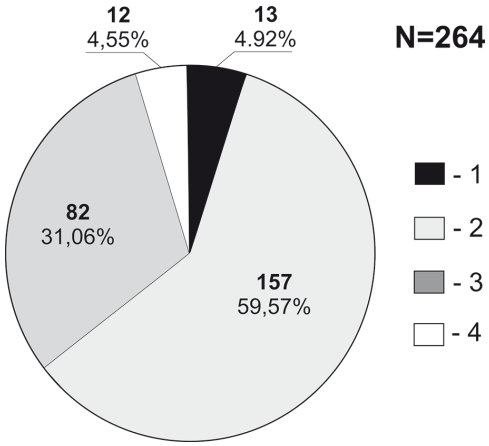



**Fig. 5**. Opatów, Site 2, Świętokrzyskie Voivodeship. Morphological structure of the obsidian artefacts: 1 – cores; 2 – flakes and chips; 3 – blades and their fragments; 4 – retouched tools. Graphic by M. Szeliga

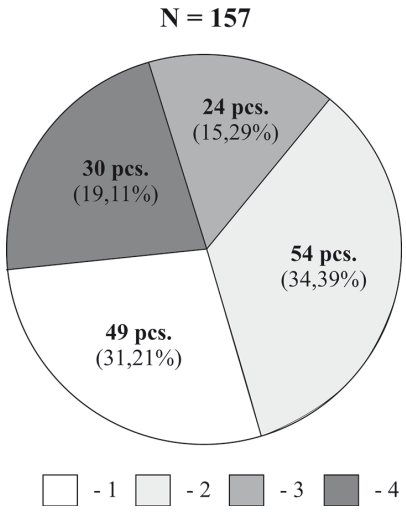



**Fig. 6**. Opatów, Site 2, Świętokrzyskie Voivodeship. State of preservation of blades:
1 – complete blades; 2 – proximal parts; 3 – median parts; 4 – distal parts. Graphic by M. Szeliga

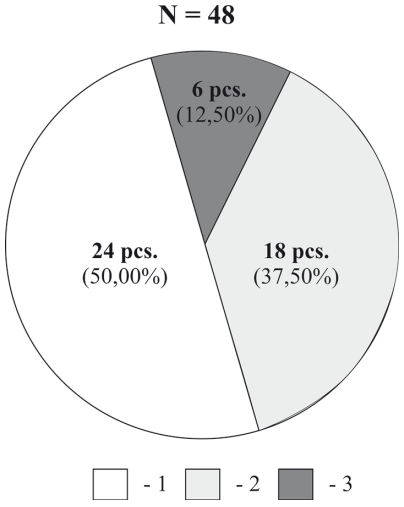



**Fig. 7**. Opatów, Site 2, Świętokrzyskie Voivodeship. Differentiation of the dorsal surfaces of flakes:
1 – partially cortical flakes; 2 – completely cortical flakes; 3 – completely scar flakes. Graphic by M. Szeliga

Specimens wholly or partly covered with cortical surface are represented by 53 specimens, which jointly makes 32.71% of the entire number of the blades. Among them, the most numerous are partially cortical specimens formed during expanding flaking surfaces to the sides of the cores (27 specimens; 17.20%).

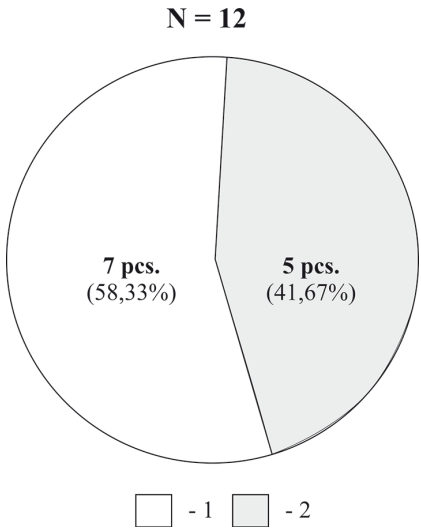



**Fig. 8.** Opatów, Site 2, Świętokrzyskie Voivodeship. Structure of the prepared (retouched) tools: 1 – retouched blades; 2 – retouched flakes. Graphic by M. Szeliga

Flakes (48 specimens), together with chips (33 specimens) and a single spall, are the second most numerous group of the inventory, jointly constituting c. 31.06% of the collection (Fig. 5). An analysis conducted on the dorsal surfaces of flakes indicated that a large part of them are cortical and partly cortical items (30 specimens; 62.5%; *cf.* Fig. 7). They are represented on the one hand by the products of initial preparation of cores, and on the other hand by remains of their repairs performed during exploitation. The characteristic remains of core repairs (core tablets and rejuvenation flakes) were also found among specimens with dorsal surfaces completely covered with negative scars (Werra *et al.* in print).

The least numerous category of obsidian artefacts is prepared (retouched) tools, represented by the total number of 12 specimens (4.55% of the collection; see: Fig. 5), mainly retouched blades (7 specimens) and, to a lesser degree, retouched flakes (5 specimens; Fig. 8). They appear not to show any regularity as to the technology of their production, sizes of particular specimens as well as locations and outlines of the retouched edges.

## Microscopic analysis

Microscopic studies were performed on 264 obsidian artefacts. The group included all artefacts made of obsidian obtained from the Opatów site, *i.e.*, debitage products, blades, bladelets, flakes, and their fragments, as well as single technical forms, splintered pieces, chips and cores. The analyses were performed based on the standard methodology of use-wear studies (Marreiros *et al.* 2015; Pyżewicz 2021). The study was conducted using the

digital microscope Keyence VHX-7000 series (VHX-S770E; VH-Z100R and VH-Z20R lens). The magnification range (according to digital microscopes) used was ×50 to ×300. The obsidian artefacts were washed with acetone before microscopic analysis. The analysis focused on identifying any kind of traces: micro-flake scars, fractures, rounding, abrasion, striations and potential polishes. The interpretation of the traces was made primarily based on comparisons with traces identified on experimental specimens made of obsidian – made and used during experiments conducted at the Faculty of Archaeology, Warsaw University and the archaeological reserve at the Archaeological Museum in Biskupin. During the experimental tests, direct percussion with a stone hammer, indirect percussion and pressure techniques (with antler tools) were used. Blades, flakes, and other items made of obsidian were used for various activities, such as processing of plants, wood, meat, skin, and bones. The reference collection is kept at the Faculty of Archaeology, Warsaw University.

As a result of the microscopic analyses, it can be concluded that some of the analysed artefacts bear technological traces (produced in the manufacturing process), but most of them do not.

To summarize the data on technological traces, linear traces were recorded on 44 specimens as sets of relatively wide scratches running more or less parallel to each other and deeply penetrating into the surface of the raw material. They were recorded primarily on the butts of blades (14 items), bladelets (seven items; Fig. 9: 1-2), and flakes (12 items; Fig. 9: 3-4), but also on the butt of a splintered piece, the surface of a rejuvenation flake, a crested blade and the striking platforms of cores (eight items; Fig. 9: 5-6). Based on the experimental reference, these traces were most likely caused by such actions as abrading or trimming an edge with a stone hammer for preparing a point of percussion before flake/blade detachment, but also by detaching the flake or blade. Unfortunately, it is challenging to identify technological traces caused by the use of antler/bone tools due to the low possibility of preservation of such traces (which is confirmed by experimental tests).

It is quite problematic to determine the function of obsidian specimens from Opatów. Most of the analysed specimens do not show any sign of use. Possible use-wears were identified on 30 specimens, occurring in the forms of micro-flake scars, abrasion, and linear traces. These traces are difficult to interpret, mainly due to the nature of the raw material – on obsidian specimens, use-wear is in general not distinctive (see works by Hurcombe 1992; Korobkowa 1999; Clemente Conte *et al.* 2015). In the case of nine specimens (seven blades, one bladelet, one flake) small chipping, abrasion, and numerous striations were noted along the edges, aligned obliquely and parallel to the edges with a relatively high degree of regularity (Fig. 10: 3-4). These blanks may have been used for cutting organic materials. Another six specimens (four blades, one bladelet, one flake), show similar traces, except for striations that are perpendicular to the edges, which may indicate scraping motion (Fig. 10: 1-2, 5-6). Another blade bears the two categories of traces described above. Therefore, it could be used by transverse and parallel motion to the working edge. For the

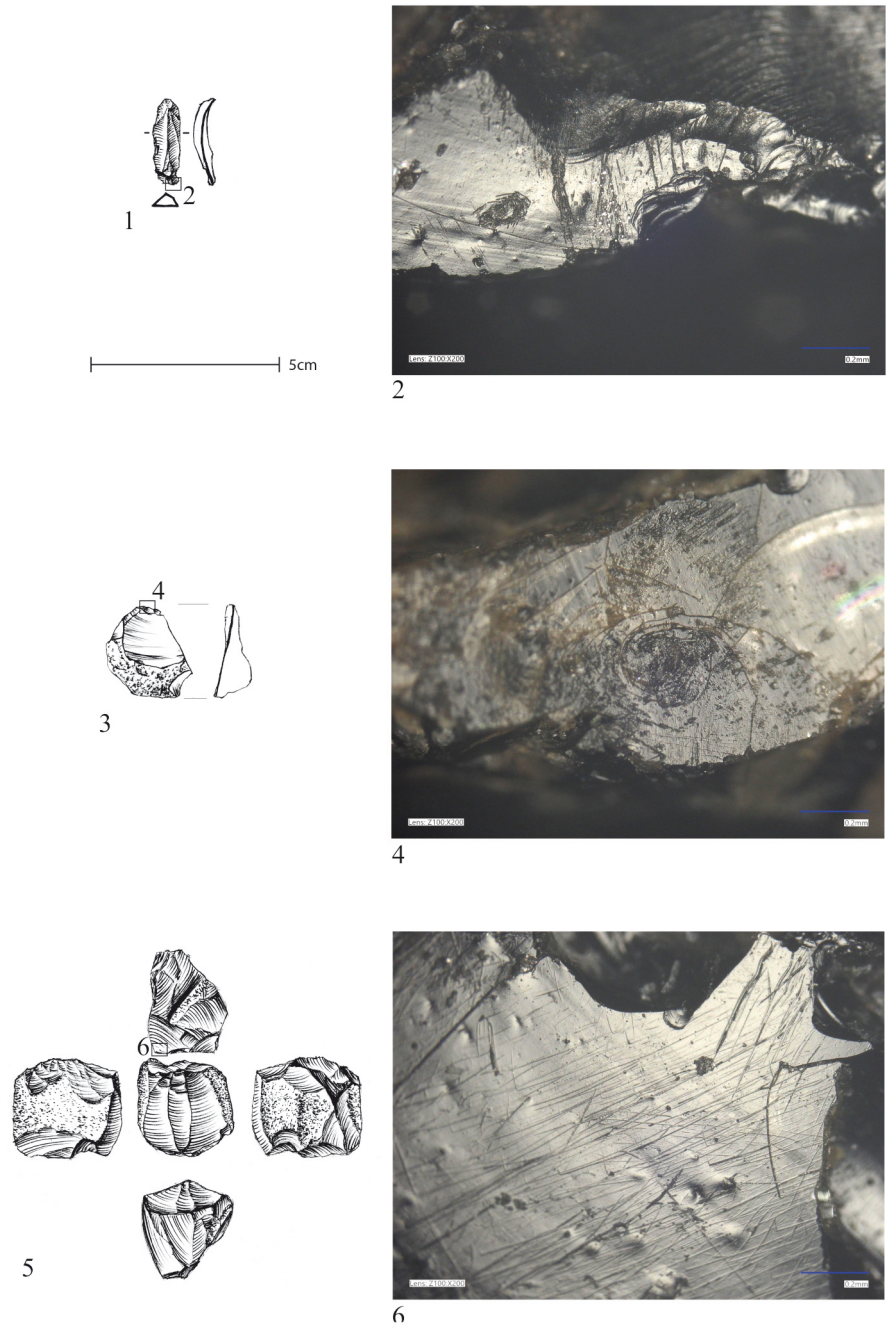
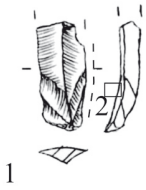
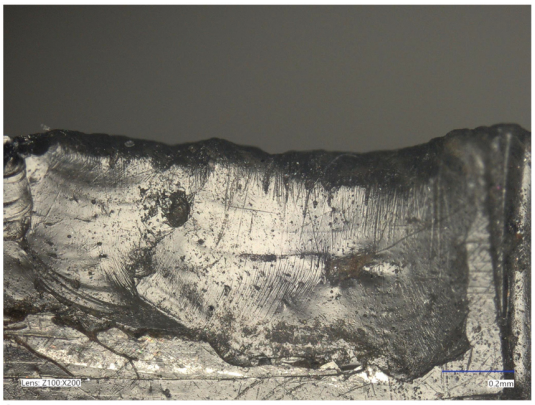



**Fig. 9**. Microscopic technological traces visible on bladelet butt (1-2), flake butt (3-4), and striking platform (5-6). Photos by K. Pyżewicz. Drawing by E. Gumińska, D.H. Werra

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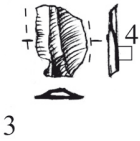


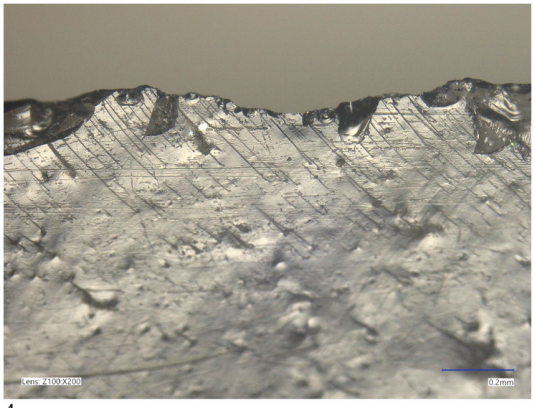


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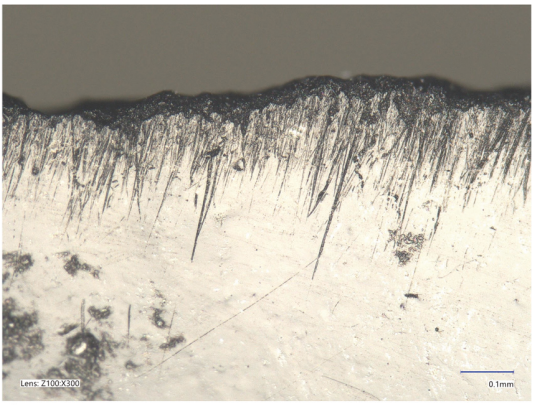


6

**Fig. 10.** Use-wear traces – micro-flake scars, abrasion, and striations visible along the edges of the bladelets. Photos by K. Pyżewicz. Drawing by E. Gumińska, M. Szeliga, D.H. Werra

remaining 14 specimens, it is difficult to determine whether the traces are post-depositional or anthropogenic in nature.

It should be emphasized that none of the recorded traces described above are intensive or distinctive, so it is difficult to consider with certainty that we are dealing with tools used for some kind of repetitive work in subsistence or domestic activities, which is likely to cause distinctive wear. These data differ from the results of the use-wear analysis of flint materials obtained from the same Opatów site. In the sample of 100 flint specimens, formal tools and blades, 53 show use-wear traces (Pyżewicz 2022). These tools were used primarily to process plants, mainly as sickle inserts, and to process skin (including scraping).

## DISCUSSION

The conducted use-wear analysis did not provide a conclusive answer regarding the purpose of obsidian conveyance (exchange). The detected usage traces were infrequent, weak, and lacked diagnostic characteristics. Several factors may account for this situation. First, the preservation state of the materials is a critical factor to consider. The earliest obsidian artefacts were excavated nearly a hundred years ago. Throughout the time, artefacts have been handled and studied by numerous archaeologists. This may have blurred the traces. Nevertheless, most of the specimens have suitable surface conditions for use-wear analysis. Hence, the import of obsidian, as well as the low occurrence and faintness of usage traces on the obsidian tools, are more likely to be attributable to the nature of activities practised in the prehistoric communities.

The distribution and use of obsidian should not be considered as depending only on the accessibility to the sources and on the quality of the raw material. However, local value systems should also be taken into account. One of the motivations for its acquisition seems to be that obsidian could be a status symbol, as its presence or absence could indicate alliances or affiliations, hierarchy or heterarchy (Burger *et al.* 2006, 110; Carrignon *et al.* 2023, 2).

Research on the use of obsidian in Albania in the Late Neolithic and the Bronze Age showed that this raw material was of low interest to the prehistoric communities there. The reasons for this can be because the local material is of high quality, so there was no need for imported materials, or because there was a geographical gap between the distribution zones of obsidian. Nevertheless, Ruka *et al.* (2019) proposed a socio-cultural point of view on this distribution pattern. Looking at the distribution pattern at that time, they observed that materials other than obsidian were transported, even in huge amounts (*i.e.*, pottery). Therefore, obsidian was unnecessary or there could be an "embargo" on this raw material. The communities in this region most probably were not interested in activities connected with the use of this raw material. The authors follow Carter's suggestion that Early Bronze Age Aegean individuals used obsidian blades for depilation and/or scarification and they were commonly deposited in burials. Apparently, western Balkan

peoples did not practice these forms of body modification (Ruka *et al.* 2019, 46; see Carter 1994, 1997).

Considering obsidian artefacts as used for a rare practice, connected maybe with personal use, can shed light on the question of infrequent and weak usage traces without diagnostic characteristics. Experimental research on grooming and shaving human skin with obsidian showed that thin and sharp edges are efficient for this task only for a very short time (2 to 5 minutes) before the edges become blunted (Kononenko 2011, 34). Shaving human skin produced very few if any, extremely short and thin striations restricted to the tool edge visible on the ventral surface. The results of all undertaken experiments reveal that use-wear analysts will likely be unable to identify personal grooming as an activity on archaeological tool specimens (Hurcombe 1992: 46; Kononenko 2011, 34; Walton 2019, 927, 937). The same conclusions regarding all activities with skin/hide were undertaken for a short duration and did not leave clear and unambiguously characteristic traces. This may suggest the use of sharp obsidian flakes in conjunction with the human body, *i.e.*, for tattooing and scarification, cutting and shaving human bodies for personal adornment or medical treatment (Kononenko 2011, 70; 2012; Walton 2021, 275, 281) and so on. All these indicate the treatment of 'exotic' material "not according to the production conditions, but according to the rules of communication, constant mutual services and reciprocation regulated by cultural norms and the form of common consciousness. Eventually, it established solid social ties" (Małecka-Kukawka 1994, 50).

## Obsidian as an intercultural link with Western Neolithic communities?

The Opatów site has extraordinary importance in relation to the western range of the Central European Neolithic (Fig. 11). This is the eponymous locality of the SOG, which in the evolution of ceramic decoration suggests genetic relationships with the SPC (5100/5000 – 4500/4400 cal BC), the Lengyel culture and the Tisza River basin cultural environment (especially Tisza and Herpalý cultures; *cf. e.g.*, Kaczanowska and Kozłowski 2006). The place of presumed origin of the SPC was located on the border of northwestern Bohemia and Saxony, where it followed-on from the late phase of the LBK – the so-called Šárka type (*cf.* Zápotocká 1998; 2007). During its later evolution, it occupied the whole of Bohemia, Saxony, Bavaria, western Moravia, Upper and Lower Silesia, and isolated localities are known from Austria and even Kuyavia. This post-LBK evolution is part of the Western European contemporary cultural range. This is characterised by the decoration of the surface of the pottery by hollow decoration (*e.g.*, Rössen culture, Obelauterbach group).

In contrast, groups characterized by polychrome decorated ceramics (the Lengyel cultural range, as well as the Tisza and Herpalý cultures) were formed, in the eastern part of the Central European area. The SOG seems to combine these two essential traditions, representing, on the one hand, the periphery of the Western cultural scope and on the other hand (especially the Sandomierz subgroup) the northern range of the strong cultural influences

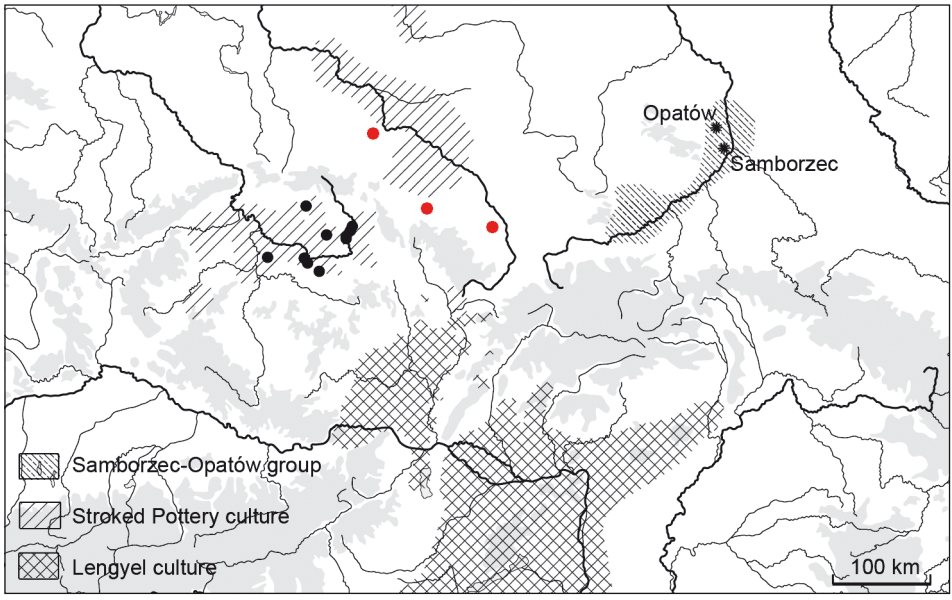


**Fig. 11.** Samborzec-Opatów group and other contemporary archaeological cultures approximately the first half of the 5th millennium BC. Red points: sites with obsidian from Silesia (after Furmanek 2010, fig. 9). Black points: localities with obsidian finds in settlements of the Stroked Pottery culture in Bohemia – about 100 pieces from approximately 15 sites. The absolute majority comes from two workshops, at other sites always 1-2 pieces. Drawing by P. Burgert

both from the Lengyel culture and the Tisza basin cultural environment (Fig. 3). Hence, it becomes pertinent to consider the role of this group in the transition of Eastern elements towards the West and vice versa, in the exchange of influences. Obsidian, in this context, emerges as a compelling factor for consideration.

In Bohemia, obsidian had been an exceptional raw material throughout prehistoric times (Fig. 11). We know about rare finds from the Mesolithic (Vencl *et al.* 2006, 61, 130). However, we observe a distinctive trend of increase in the number of artefacts from this raw material in the later phase of the SPC. In neighbouring Moravia, the appearance of obsidian is generally more common in the Lengyel culture. However, the peak of its distribution falls at the beginning of the older Lengyel (*c.* 4800-4700 BC). In Bohemia, this corresponds to the beginning of the late SPC (Trampota 2015; Trampota and Květina 2020). Based on the typology of ceramics, we also include the SOG in this period (Zápotocká 2004).

At this time, there is generally an increase in the amount of exotic raw materials in the assemblages (*e.g.*, chocolate flint, Bavarian Jurassic chert). The later SPC also brings about other changes observable in material culture (change of floor plan of houses, construction of rondels, new decorative styles and shapes of ceramics). The increase in the amount of exotic raw materials at sites probably has a more comprehensive social background.

Looking at the spatial cultural scheme of Central Europe (Fig. 11) raises the question of the routes by which obsidian, as an exotic raw material, was transported into the area of SPC. Based on previous analyses of Czech finds of this raw material, it is known that, with one exception, representing a Hungarian source, most of the finds came from the dominant prehistoric source in eastern Slovakia (Burgert *et al.* 2016). Due to the localization of sources, two schemes are possible. The first – most commonly assumed – is that obsidian was distributed to Bohemia through the neighbouring Lengyel culture. The second possibility is that the SOG played the role of an intermediary in this distribution. Given the genetic proximity of this group to the SPC, this hypothesis is not excluded. Obsidian products at the few SPC sites in Silesia have a crucial meaning in this context (Furmanek 2010, 179, Fig. 9).

## CONCLUSIONS

One of the most intriguing questions in the study of obsidian is the reasons behind the phenomenon of its significant and long-term popularity among early agricultural communities on the northern side of the Carpathian and the Sudeten Mountains. This may have been caused by the material's physical properties (sharpness and cutting ability of its edges), and perhaps its unique aesthetic qualities (colour, lustre, transparency; see Chapman 2006; 2007).

The aforementioned data and results allow us to consider the conveyance of obsidian as resulting primarily from other needs rather than the sole desire to obtain a high-quality raw material. This is also supported by the compositional structures of analysed Neolithic inventories, in which the percentage of obsidian rarely exceeds 5%. Higher amounts are sometimes recorded, but are only found in the southern and especially the southeastern regions of Poland (*e.g.*, Kulczycka-Leciejewiczowa 1979, table 5, fig. 26; Kaczanowska 1985, fig. 22; Kadrow 1990a fig. 24: a-i, 26: c; Pelisiak 2014, tab. 14; Wilczyński 2014b, fig. 12). It should be emphasized that the processing of obsidian at individual sites for the production of tiny, even microblade-like flakes and the minimal presence of retouched tools have been documented (*e.g.*, Szeliga 2009, 296-297; Wilczyński 2010, 4; Szeliga *et al.* 2021, fig. 4).

The results of existing, very limited functional analyses (Grygiel 2004, tab. LII, 582, fig. 461: B; Szeliga *et al.* 2021, 37-04; Wilczyński and Kufel-Diakowska 2021, 175) do not provide definitive confirmation of one, primary purpose of use of obsidian. This allows for consideration of numerous intended uses and scopes for utilising this material by Neolithic communities.

Yuval Noah Harari emphasises in his publications that human success is based on sharing collective myths. He points out that the ability to create stories, myths, symbols, and systems of shared belief was crucial to the success of *Homo sapiens* (Harari 2019, 28). We propose to move the research focus beyond the characterisation of the raw material for producing sharp and precise tools and move forward to questions concerning its value,

meaning and significance. Could an 'exotic' material (obsidian) have been a symbol or an element that indicated an affiliation to a specific community? Could it indicate the existence of a hierarchy or heterarchy among these communities? Did these artefacts have not only economic value but also, or perhaps above all, socio-cultural value (Chapman 2007; Pearce and Moutsiou 2014; Belfer-Cohen and Hovers 2020; Carrignon *et al.* 2023, 2)?

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