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RECHERCHES ARCHÉOLOGIQUES

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NOUVELLE SERIE

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NOUVELLE SERIE 8

KRAKÓW 2016

MAQUETTE DE COUVERTURE
Wydawnictwo i Pracownia Archeologiczna PROFIL-ARCHEO Magdalena Dzięgielewska

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Schéma d'analyse de réseau de 65 sites à partir de la fin de l'âge du Bronze moyen (principalement de 1700 à 1400 avant J.-C.). L' épaisseur du lien est proportionnelle à la valeur du coefficient de Pearson

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La version originale des Recherches Archéologique Nouvelle Serie est la version papier

"Recherches Archéologiques Nouvelle Serie" est régulièrement sur la liste dans The Central European Journal of Social Sciences and Humanities

ISSN 0137-3285

Publikacja finansowana przez Uniwersytet Jagielloński
Cette publication est financée par l'Université Jagellonne

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Recherches Archéologiques
NS 8, 2016, 185–204
ISSN 0137 – 3285

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Archaeological excavations in Żarska Cave in Żary, Kraków district, 2012–2015: an interim report

Abstract: This paper reports on the results of archaeological research carried out in the Main Chamber of Żarska Cave, Kraków district, in 2012 and 2014–2015. The excavations dealt with one trench (Trench 2), localized in the north-eastern part of the cave. The trench revealed a c. 350 cm deep sequence, which in total comprised 21 layers including four hearths. As regards archeological records the upper part of the cave filling was of major importance. It was composed of the Holocene humic layers 1 and 2, a large hearth (layer 3), redeposited loess (layers 4 and 5) and dark greyish, compact and greasy textured sediment (layer 6), which included three other hearths. The clayey loess layers beneath stratum 6 were archaeologically sterile. The layers 1 and 2 contained post-medieval and medieval pottery fragments, sherds of ceramics dated to the younger or late Roman Age/early Migrations Period (Przeworsk culture), several metal artifacts, human and animal bones. As regards human bones, three radiocarbon datings were made. Datings indicate that investigated human remains may correspond with younger or late Roman Age/early Migrations Period finds assemblage (1755±30 BP, 1755±25 BP, 1655±30 BP). Noteworthy are the remains of counterfeiters' workshop recorded in layers 1 and 2. Stratum 3 (a hearth) contained Medieval finds, while layers 4 and 5 did not produce any archaeological records. Layer 6 was a laminated structure, consisted of several varying shades of grey laminae. It is noteworthy that charcoal was frequently found within this layer and most likely it was associated with three recorded hearths (layer 19 – hearth 2, layer 20 – hearth 3 and layer 21 – hearth 4). Finds assemblages of layer 6 mostly consisted of pottery fragments of the Eneolithic Baden culture, flint and bone artifacts, a fragment of polished stone battle axe and numerous animal remains.

Keywords: Żarska Cave, speleoarchaeology, human remains in caves, Baden culture, Eneolithic, Roman Age/Migrations Period, Middle Ages

1. Introduction

Żarska Cave is one of a number of important archaeological cave sites situated within the southern part of Kraków-Częstochowa Upland, a region renowned for its rich speleoarchaeological

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landscape. The site is located on the south-eastern border of Żary village, Krzeszowice commune, Kraków district, roughly 650 m east of settlement and 1 km due west limits of Szklary village (Fig. 1). The region forms part of a limestone-built Szklarka river basin, a typical karstic area, nowadays partly forested with deciduous trees, mainly beech. The area is cut across and along by series of dry valleys, often edged on tops with short bends of rocks. In one of these, more than 20 m above the bottom of valley, the Żarska Cave is situated. The cave comprises a chamber with few narrow passages or fissures of unknown lenght (Fig. 2). Access into the chamber is via a narrow (roughly 50–100 cm) and long (at least 5 m) horizontal opening: the entrance is dominated by a large boulders which make difficult to get in the cave. The chamber is medium in size (aprox. 30×15–20 m) and for the most part it is possible to stand upright. Current surface of cave is uneven, rugged and steeply slopes eastwards. In the recent past the cave witnessed some earthworks, as is demonstrated by heaps of discarded earth and rubble.

A list of research activity at the site is short. Żarska Cave was one of the 32 caves explored in 1879 by a famous Polish prehistorian, Gotfryd Ossowski. As his investigation came to negative results (Ossowski 1880), the cave was considered archaeologically sterile (see: Kowalski 1951, 219). This opinion lasted no longer than 2008 when A. Górny and M. Szelerewicz led a survey concluded with a report published in speleological magazine. In the light of their data, the opinion about cave's small importance needed to be evaluated as they noted charcoal and pottery fragments (Górny, Szelerewicz 2008, 30). These promising results were the basis of small-scale fieldwork undertaken by J. Wilczyński, M. Wojenka and D. Sobieraj in August 2011 outside the east-facing cave entrance (Trench 1). The work succeeded in verifying archaeological potential of the site and shed light on dating the course of its use. The artifacts discovered during the 2011 works represented Eneolithic, Roman Age or early Migrations Period, medieval and post-medieval finds; mostly pottery and bones (Wojenka *et al*. 2011; 2012). Stratigraphically, the finds corresponded to fragmentarily preserved filling of sunken structure which consisted of humus mixed with limestone rubble. In view of these arguments, the structure was recognised as filling of an older trench, most likely of Gotfryd Ossowski's excavation in 1879. It is worth noting, incidentally, that dozens of similar finds and several human bones were recovered from inside the cave when the heaps of exploration that took place in recent past were fine sieved. Bearing in mind these evidences, the same authors decided to start fieldwork inside the cave, which took place in 2012, 2014 and 2015.

The excavations in the Main Chamber dealt with one trench (Trench 2), localized in the north-eastern part of the cave, where ceiling was evidently lower – this made access to explored layers more difficult. This was due to a need to avoid remains of Gotfryd Ossowski's exploration which were assumed to be carried out in easily accessible parts of the cave. Thus, the trench was dug in order to assess intact stratigraphic sequence.

Trench 2, roughly 4 m by 3.5 m, laid in the north-eastern part of the cave and measured aproximately 12.5 square meters. At first, in 2012, work took place on space of 2 m by 3.5 m, but in 2014 the trench was expanded to encompass the whole north-eastern part of the cave. Thanks to this it was possible to document the cross-section at its middle part. During the excavations the trench was sectioned off into 1 meter grid squares. All sediments including heaps of recently discarded earth were excavated by hand. Recovery methods included hand-collection and wet-sieving of all sediment using nesting screens of different mesh size. The positions of all pottery fragments, lithic finds and animal remains over 2 cm in size were recorded in 3D.

The purpose of this interim report is to outline the most important results achieved thanks to the excavations carried out in 2012–2015.

Fig. 1. Żarska Cave in Żary, Kraków district. Location of the research area

2. Stratigraphic summary

The sedimentary sequence of Żarska Cave in total comprises 21 layers including four hearths (Fig. 3).

Layer 1 – mixed dark brown recent humus, roughly 20 cm thick, with medium admixture of limestone rubble, both sharp-edged and weathered. The layer contained mostly post-medieval and medieval pottery material, animal and human bones as well as recent garbage.

Layer 2 – brown or greyish brown humic layer, 30–40 cm thick. Structurally, it is similar to the layer 1, but contained more sharp-edged limestone rubble. The layer contained post-medieval and medieval pottery fragments, sherds of ceramics dated to the younger or late Roman Age/early Migrations Period (Przeworsk culture), several metal artifacts, human and animal bones. Although the general impression is given that the layer was mixed, it is noteworthy that distribution of finds indicates a predominance of fragments of the Przeworsk culture pottery at the base of layer 2.

Layer 3 – a large hearth (hearth 1) found in the southern part of trench 2 (sections A-C/1-2), roughly 10–20 cm thick. The hearth comprised of several thin layers of ash and charcoal. Finds assemblage included several fragments of the medieval and Przeworsk culture pottery as well as animal bones. Similarly to layer 2, the Roman Age/early Migration Period sherds were found at the base of hearth.

Layer 4 – a layer of yellow clayey loess with fine limestone gravel and sharp-edged rubble, 30–50 cm thick, revealed beneath humic layer 2 and hearth 1 (layer 3). The stratigraphical sequence and its characteristic features are to suggest that the layer 4 must have been redeposited from outside the cave.

Layer 5 – dark yellow clayey loess, roughly 40 cm thick, identified in the northern part of trench 2. Contrary to layer 4, less limestone gravel and rubble was found. The level contained only several animal bones.

Layer 6 – dark greyish, compact and greasy textured sediment, slightly sloping to the eastern and south-eastern part of cave (Fig. 3). The thickness varied considerably from 15–20 cm

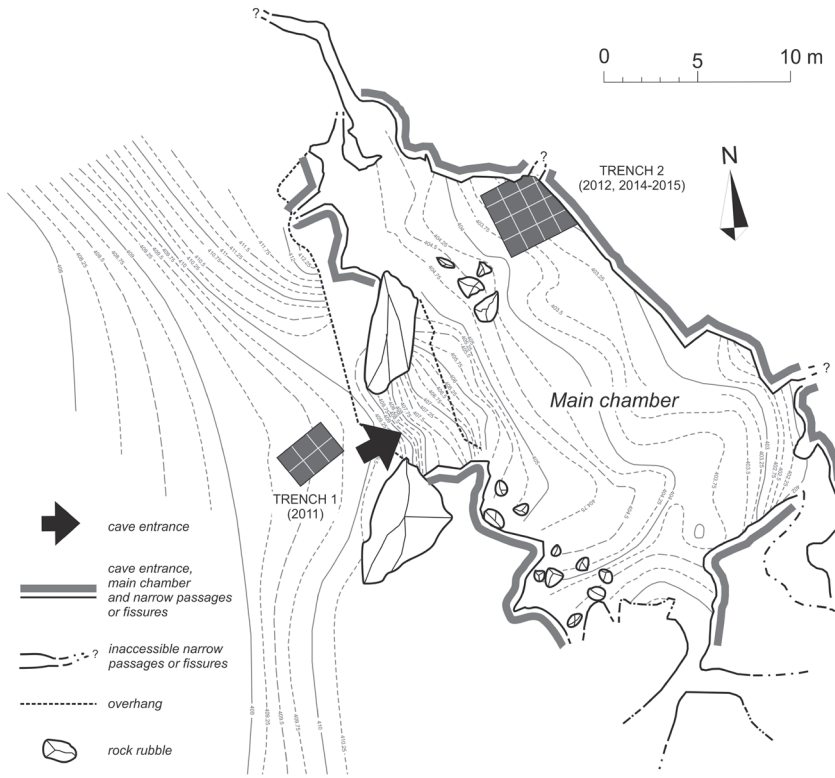

Fig. 2. Plan of Żarska Cave (drawn by M. Wojenka)

in the north to *c*. 80 cm in the south-eastern part of the trench (sections C-D/1-2). The layer held weathered limestone rubble of different size, especially numerous in the southern part of trench. At the base of level 6 a thin layer of limestone gravel was noted. The southern section of trench revealed that layer 6 was a laminated structure, consisted of several varying shades of grey laminae (Fig. 3). It is noteworthy that charcoal was frequently found within this layer and most likely it was associated with three recorded hearths (layer 19 – hearth 2, layer 20 – hearth 3 and layer 21 – hearth 4; see below). Finds assemblages of layer 6 mostly consisted of pottery fragments of Eneolithic Baden culture, flint and bone artifacts, a fragment of polished stone battle axe and numerous animal remains.

Layer 7 – dark yellow clayey loess, *c*. 20–50 cm thick, which included larger quantities of sharp-edged limestone rubble of various size. Layer 7 yielded several animal bones.

Layer 8 – dark yellow clayey loess *c*. 40–50 cm thick revealed in the northern part of trench 2, containing sharp-edged limestone rubble, usually large in size. Layer yielded only animal remains.

Layer 9 – dark yellow clayey loess with medium size sharp-edged limestone rubble, recorded in the northern and the western part of trench. The layer was *c*. 30–50 cm thick and contained animal bones.

Layer 10 – yellow grey clayey loess *c*. 30 cm thick, with sharp-edged limestone rubble of various size, found in the northern part of trench.

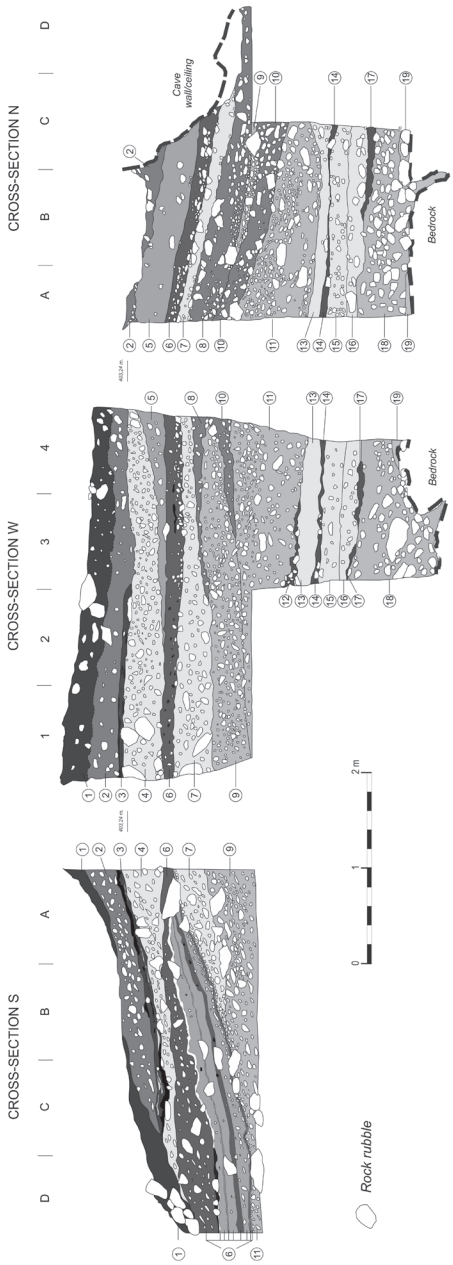

Fig. 3. Żarska Cave, trench 2. Cross-sections S, W and N (computer design by M. Wojenka)

Layer 11 – dark yellow clayey loess with larger amount of sharp-edged limestone rubble of smaller size, *c*. 50–80 cm thick.

Layer 12 – dark greyish layer with small amount of limestone rubble, *c*. 5–10 cm thick.

Layer 13 – dark yellow clayey loess with smaller quantities of limestone rubble, *c*. 25 cm thick.

Layer 14 – dark greyish clayey loess layer *c*. 5–10 cm thick, basically without limestone rubble, similar to the layer 12. This layer contained remains of a large mammal of the Pleistocene age, i.e. cave bear bones and teeth.

Layer 15 – dark yellow clayey loess with medium size sharp-edged rubble, *c*. 20 cm thick.

Layer 16 – dark yellow clayey loess with medium size sharp-edged rubble, *c*. 20 cm thick.

Layer 17 – dark greyish layer without rubble, *c*. 5–8 cm thick, similar to the layers 12 and 14. Similarly to layer 14, this sediment contained remains of Pleistocene large mammals.

Layer 18 – dark yellow clayey loess with larger quantities of medium and large size limestone rubble, *c*. 60–80 cm thick, lying on the bedrock.

Layer 19 – a small hearth (hearth 2), recorded within layer 6 at a depth of *c*. 60 cm (section A3).

Layer 20 – a small hearth (hearth 3), recorded within layer 6 at a depth of *c*. 80 cm (sections C-D/1-2).

Layer 21 – remains of a hearth (hearth 4), found at the base of layer 6, at a depth *c*. 110 cm (section D2).

3. Sequence of human activity in cave

Basically, five principal phases of human activity were identified. These comprise: 1) Eneolithic occupation deposits, including Baden culture assemblages; 2) Eneolithic/early Bronze Age materials, probably of

Strzyżów culture; 3) younger or late Roman Age/early Migrations Period materials (Przeworsk culture), most likely related to the human bones discovered inside the cave, see below; 4) medieval finds assemblages and 5) post-medieval finds assemblages.

The oldest artefacts deriving from the research into sediments of Żarska Cave registered within trench 2 are dated to the Eneolithic. Excavations conducted in this cave in 2012, 2014 and 2015 proved on this account results of the first research in 2011 (Wojenka *et al.* 2012). Among artefacts with chronology possible to determine, the most numerous specimens are dated to the Baden culture. The large part of materials can be only ambiguously determined as Eneolithic, several fragments of vessels are linked with the turn of Eneolithic and the Bronze Age – most probably with the Strzyżów culture. The lack of any ceramic finds older than the Eneolithic, connected with Neolithic groups, i.e. with the Linear Pottery culture, the Malice culture and the Lengyel-Polgár circle – numerous in other caves of the Polish Jura (Rook 1980) is very characteristic. The presence of younger or late Roman Age/early Migrations period artifacts as well as medieval and post-medieval vessels is a rather common phenomenon in caves of the southern part of Kraków-Częstochowa Upland. It is beyond doubt that this is not the case of remains of counterfeiters' workshop, recorded in upper levels of cave filling – this type of finds is unusual and rare at cave sites.

3.1. Phase 1 – Eneolithic

3.1.a. The Baden culture

The most expressive assemblage – taking into account its decoration and forms – is the pottery of the Baden culture. Except for one fragment of a hemi-spherical cup, discovered in the cave in a backdirt left by speleologists (Wojenka *et al.* 2012, pl. 2: 1), the rest of materials was registered during exploration of sediments within trench 2. The vast majority of more than 60 potsherds of the Baden culture derive from layer no. 6 (see: Fig. 3). Materials were discovered almost exclusively in its ceiling part at the depth of 70–110 cm. Single fragments of pottery were registered as secondary deposits within younger layers, for example in a medieval hearth (layer no. 3) as well as in the ceiling part of sediments at the depth of 0–40 cm. Analysing their horizontal distribution, materials of the Baden culture were distinctly concentrated by the southern profile of the trench – in the area where layer no. 6 was the deepest (ca. 80 cm; meters C1, B1, D1, and D2). It should be mentioned that layer no. 6 included several broken vessels which we were able to reconstruct. Their fragments were registered in various locations and at different depths within this layer (Fig. 4: 1). On the account of typology, this pottery represents almost each basic form of vessels typical of the Baden culture in Lesser Poland (Zastawny 2015a), i.e.: cups (Fig. 4: 2, 6), amphorae (Fig. 4: 1, 7), bowls (Fig. 4: 5) and pots (Fig. 4: 3, 4). No fragments of large storage vessels of the amphora type and sharp-bottomed cups or bipartite bowls were found at the site. The last two forms of vessels are essential for taxonomical and chronological determinations. Also the ornamentation of vessels does not differ from typical techniques and motifs of decoration applied in the Baden culture. As usually, there predominates the ornamentation of vertical and oblique grooves as well as the pit ornamentation in form of small, impressed or punctured pits or typical fingertips impressions. These techniques applied on amphorae and bowls form combinations of decorative motifs such as so-called "hanging" triangles and surfaces filled with grooves and surrounded with pits (Fig. 4: 1, 5). The plastic ornamentation is rarer and limited to small knobs placed under the edge of vessels (Fig. 4: 3). The most numerous fragments derive from S-shaped or bag-shaped pots, often decorated with

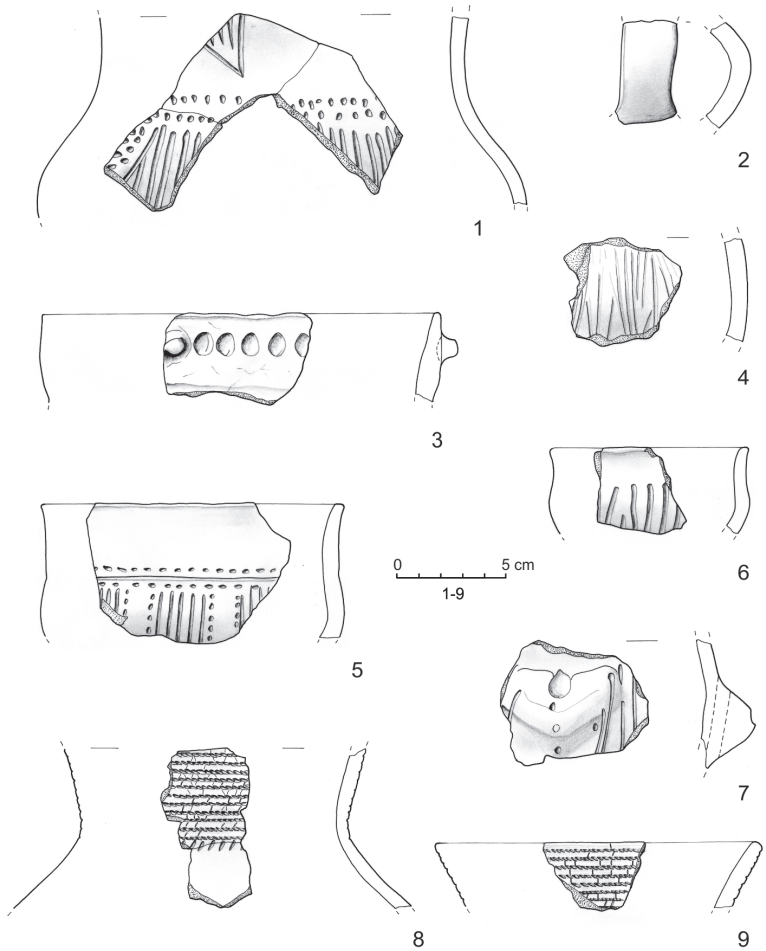

Fig. 4. Żarska Cave. The selection of pottery materials: 1–7 – Eneolithic, the Baden culture; 8–9 – Eneolithic/the Early Bronze Age (drawn by B. Grabowska)

fingertips impressions below the edge or knobs (Fig. 4: 3). The most typical characteristics of pots are their walls – coarse because of oblique, irregular smearing of their surface (Fig. 4: 4). The pottery of the Baden culture is characterized with a standardized technology of production. Within ceramic mass we observe thin-grained and medium-grained clay chamotte with a small amount of fine sand. Multicolored surfaces are well smoothed and prepared but not glossed. The pottery assemblage from the discussed site is hard and well-burnt. Its characteristic feature is the presence of whitish coating, i.e. calcite precipitates, noticeable on outer and inner walls and on fractures. Such traces are visible in case of 60% potsherds of the described culture.

The assemblage of the Baden culture from Żarska Cave looks quite uniformly and it exemplifies a quite typical inventory for the Classic horizon of the Baden culture development in western Lesser Poland (*c*. 3100–2900 BC; Zastawny 2015b), although we should mention several distinctive stylistic and chronological features to specify this classification. One of them is the lack of sharp-bottomed cups. Żarska Cave is a subsequent site of the discussed culture in

Polish Jura, excavated in last years (apart from Smardzowice, Kraków district, site 38; Zastawny 2012) without these vessels. Such situation corroborates the conception made by Ewa Rook (Rook 1980) of differences in ceramic style of the Baden culture in the Polish Jura and settlements of the Zesławice-Pleszów group situated along the Vistula river. The sharp-bottomed cup with a band-shaped handle protruding the edge of a vessel is a basic taxonomical distinguishing feature of this group (Zastawny 2015a, Fig. 12). The zone of the Polish Jura represents, as it seems, the settlement of a different character (see comments on so-called Mogiła group in the Polish Jura and Wieliczka-Bochnia region: Zastawny 2000; 2006; 2011). Fragments of amphorae and bowls from the Żarska Cave are sumptuously ornamented with grooves and pits decoration. The high share of impressed decoration (pits and stamp impressions) is typical for the final stage of Classic horizon of the Baden culture. The style and techniques of ornamentation of pottery at the discussed site match this stage of the development of the Baden culture in Lesser Poland.

Summarizing comments on traces of Baden settlement in the Żarska Cave, we should take into consideration its location. Now it is the most westward site of the Baden culture in its compact range in Lesser Poland. According to Zdzisław Sochacki, the Baden settlement survived the longest in the Polish Jura and Wieliczka Foothills, i.e. in areas remote from the Vistula river zone. In the latter zone the disappearance of large Baden settlements came the earliest what is linked with, among others, penetration of the population of the Corded Ware culture in this area (Sochacki 1980, 112). The location of the Żarska Cave and "late" character of pottery materials may prove this conception.

3.1.b. Materials ambiguously determined as Eneolithic

The large part of pottery finds linked with the Eneolithic cannot be unambiguously determined as a part of any specific archaeological culture. That is why at the current state of the research we describe them as "materials only ambiguously determined as Eneolithic". Such description results from deficiency of any diagnostic features in ornamentation and morphology of vessels. Two exceptions are upper parts of two large pots: a widely-opened vessel resembling a beaker, decorated with a large band-shaped, vertically pricked handle placed below the edge of a mouth (Fig. 5: 1) and a vessel with a high and slender neck and slightly splayed mouth with the same massive band-shaped handle (Fig. 5: 2). The technology of their production resembles the pottery of the Funnel Beaker culture (well burnt, well prepared and glossed surfaces of walls). Morphological features, such as a funnel-shaped, splayed neck or slender neck narrowing up also match this culture, i.e. they resemble large funnel beakers and amphorae. The alien features in this case are massive, band-shaped handles placed on necks below the edge of a mouth of both vessels. These determinants have no analogies not only in the Funnel Beaker culture but also in the Eneolithic of Lesser Poland. The technology of the discussed pottery differs as well from fragments of vessels dated to the Baden culture. The only materials that may a point of reference for this collection (although still not completely) are so-called assemblages of the Modlnica type, set apart in 2011 as a result of elaboration of site 5 in Modlnica, Kraków district (Zastawny, Grabowska 2011). These assemblages display "alien" features, different than in case of local cultural groups and linked with Early-Eneolithic groups from Moravia and south-western Slovakia. It should be mentioned that if only these analogies are confirmed in the course of former analyzes, the assemblage from the discussed site will be the second in Lesser Poland of such a type. For the chronology of settlement and usage of the Żarska Cave is crucial that the described assemblage of pottery finds would be the oldest (*c.* 3600–3500

BC), distinctly overtaking appearance of the Baden culture population (*c*. 3100–3000 BC). The stratigraphic position of at least part of potsherds only ambiguously determined as Eneolithic (base of layer no. 6) would certify this opinion.

It is worth noting that the layer 6 (Eneolithic) yielded not only pottery fragments, but also bone and stone artifacts. Within the layer three awls made of the long bones of a goat or a sheep and single artefact made on fragment of a rib of large mammal (probably cattle) were discovered. They had been made of a longitudinal fragment of a shaft of bone, and working edge (a point) had been formed by scraping against an abrasive stone. Such a tools were probably used for leatherwork, sewing and basketry.

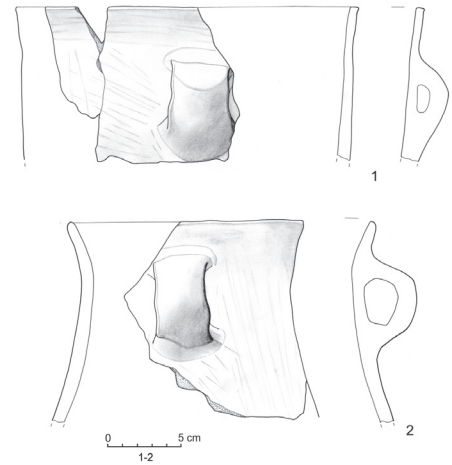

Fig. 5. Żarska Cave. Examples of vessels presumably dated to the Eneolithic (drawn by B. Grabowska)

As regards lithics, the excavations carried out in 2012–2015 at the Main Chamber of Żarska Cave yielded 320 stone finds (Fig. 6). All artifacts were found in three main stratigraphic units: layer 1–3 (Holocene humus and hearth 1), layer 6 (mostly Eneolithic), where the most numerous assemblage was described, and mixed layer 6/7 (Table 1). Moreover, 13 lithic finds have no stratigraphic context. Whole lithic inventory is homogenous in terms of the raw material used, its technology and typology, therefore we can conclude that it could be associated with the single occupation episode. Based on this determination, characteristic of the lithic inventory and presence of the numerous lithic finds altogether with Baden culture artifacts within layer 6, the whole assemblage has been described as a residue of the Eneolithic settlement. According to this interpretation presence of the artefacts (especially small chips) at the level below and under layer 6 we could interpreted as a result of redeposition resulting of the human and/or animal activity, recorded especially in the NE part of the trench, close to the cave wall.

Almost whole lithic inventory was made on local Jurassic flint, only single flake was made on erratic Cretaceous flint (Table 2). Additionally 12 artefacts were burned or strongly heated, and it is not possible to determine the type of flint used for their production (probably they were made on local Jurassic flint). Other lithic finds like grinding stones were made on sandstones, whereas for the production of the battle axe an extralocal metamorphic rock was used.

The larger part of the lithic inventory consisted of small chips and chunks, made during core shaping, retouching of the tools and secondary, non-intentional heating of the artifacts. If we omit this group of the inventory, the most numerous are flakes that constitute nearly half of the whole lithic assemblage (N=45 – 49.5%). The next numerous inventory group are blades (N=28 – 30.8%) and retouched tools (N=14 – 15.4%). Other finds like core, grinding stones and battle axe are represented as single finds (Table 1).

Among retouched tools the most numerous are truncation blades (N=7), which constitute half of the inventory (Fig. 6: 2, 5–7). The next frequent group are endscrapers and retouched flakes (Table 3) (Fig. 6: 1, 3). A very valuable find discovered during our research is a single arrowhead, made on a local Jurassic flint (Fig. 6: 4). The proximal part is broken off. This

specimens have small notches on the both sides, which created a neck separating the base from the point. On ventral side of a tip, and partially also on dorsal side, a regular flat retouch is visible. In Poland, similar specimens are known from Eneolithic context, from the Bronocice, Pińczów district and Cieszyn-Krasna, Cieszyn district, site 14. Isolated find was also discovered in Kraków-Bieżanów, Kraków district, site 30 (Kruk, Milisauskas 1985; Chorąży 2002; Wilczyński 2012). Such finds are more numerous in the Czech Republic and Slovakia.

The Żarska Cave assemblage includes also single fragment of the battle axe. It was made on extralocal metamorphic rock, greenish in color and shiny, and is represented only by a fragment of the asymmetrical cutting edge, without preserved perforation.

3.2. Phase 2 – Eneolithic/Early Bronze Age

Fragments of pottery decorated with corded ornament, discovered in meters C1, C2 and B3 are also debatable. The first fragment is a conically splayed neck (devoid of the edge of a mouth, reconstructed from three potsherds) decorated with corded ornament in carpet arrangement and a row of wedge-shaped stamps at the bottom (Fig. 4: 8). Surfaces of walls between horizontal imprints of cord have traces of short, thin notches – oblique and vertical. They are distinct and surely not accidental but it is hard to determine if they are traces of preparation of surfaces of

Table 1. Żarska Cave, Main Chamber (excavations 2012, 2014–2015). Stratigraphical context and general structure of the lithic assemblage

Artefact	Stratigraphical context				Total (N)	Total (%) without chips and chunks
	Layer 1	Layer 3	Layer 3/5	Without context		
Cores	–	1	–	–	1	1.1
Flakes	13	28	4	–	45	49.5
Blades	4	19	4	1	28	30.8
Retouched tools	1	10	3	–	14	15.4
Grinding stones	–	1	–	1	2	2.2
Battle axe	–	1	–	–	1	1.1
Chips and chunks	52	139	27	11	229	–
Total	70	199	38	13	320	100

Table 2. Żarska Cave, Main Chamber (excavations 2012–2015). Raw material used for the production of the lithic assemblage (without chips and chunks)

Artefact	Raw material					Total (N)	Total (%)
	Local Jurassic flint	Erratic Crataceous flint	Burned and heated undeterminated flint	Sand-stones	Meta-mor-phic rock		
Cores	1	–	–	–	–	1	1.1
Flakes	38	1	6	–	–	45	49.5
Blades	22	–	6	–	–	28	30.8
Retouched tools	14	–	–	–	–	14	15.4
Grinding stones	–	–	–	2	–	2	2.2
Battle axe	–	–	–	–	1	1	1.1
Total (N)	75	–	12	2	1	91	100
Total (%)	82.4	1.1	13.2	2.2	1.1	–	–

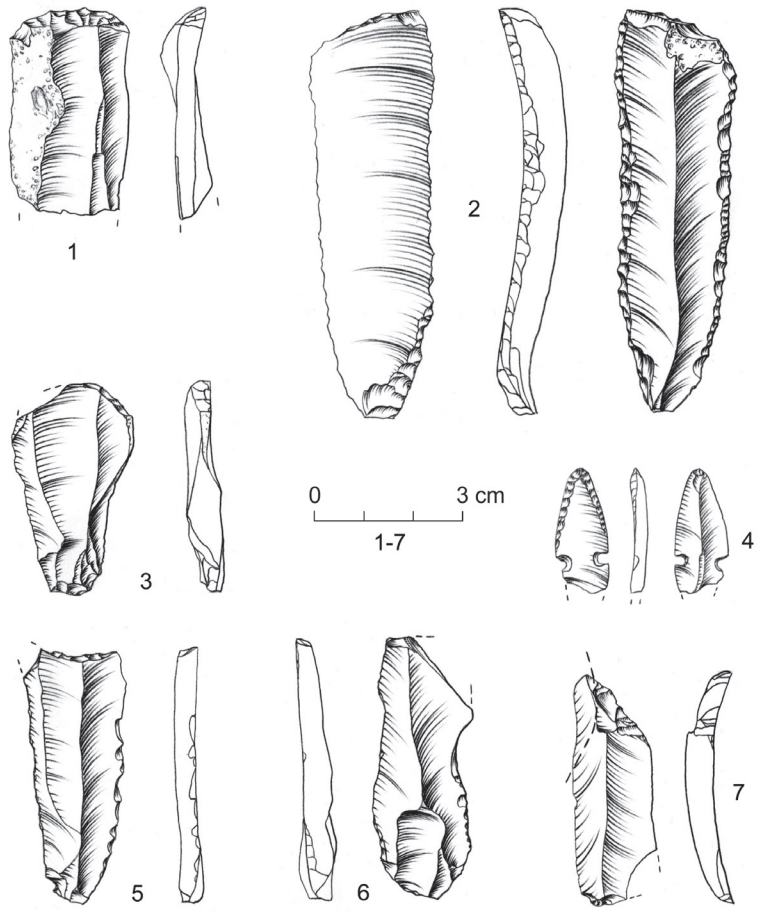

Fig. 6. Żarska Cave. The selection of flint artifacts (drawn by J. Wilczyński)

walls or were intended as a kind of ornamentation. The second fragment (Fig. 4: 9) is the edge of a straight mouth, decorated identically as the first one but without stamp ornamentation. Both fragments represent the form of a beaker and are almost identical on account of their morphology and technology. They differ with the color of walls (brownish and brick-orange) and the angle of necks inclination. In the Polish Jura, the pottery decorated with cord imprints is linked with three cultures: the Corded Ware culture, the Mierzanowice culture and the Strzyżów culture (Witkowska 2010). With some reservations (lack of, among others, a bulbous neck and stone rubble), we are inclined to assign discussed fragments to the Strzyżów culture. The arguments that weigh in favor of this thesis are the technology of pottery production differ than in case of typical of the Corded Ware culture and the Mierzanowice culture (minimum amount of sand, loam chamotte, smoothed and glossed surfaces) as well as very characteristic traces of short notches between cord impressions (see: Witkowska 2010, fig. 4: 7). From this area, such findings are known only from three more sites: Cave III in Złoty Potok, Częstochowa district and Ciemna Cave in Ojców, Kraków district (Witkowska 2010) and from Puchacza Skała in Smardzowice (Zastawny, Nowak 2012).

3.3. Phase 3 – younger or late Roman Age/ early Migrations Period

Table 3. Żarska Cave, Main Chamber (excavations 2012, 2014–2015). Retouched tools

	On flake	On blade	Total
Endscrapers	1	2	3
Truncation blades	–	7	7
Arrowhead	1	–	1
Retouched flakes	3	–	3
Total	5	9	14

This group of finds is represented by about 500 pottery fragments. In some cases a partial reconstruction of ceramics was possible, forming the basis for identifying ca. 470 "vessels". It is beyond doubt, however, that this number is highly disproportionate, as wet sieving of sediments affected much of recovery of very small pieces of rather low-quality and highly eroded pottery. Roman Age/Migrations Period pottery was recorded mostly in layers 1 and 2. In case of the latter one, a remarkable amount of pottery sherds were found at the base part of layer.

The assemblage comprise of wheel-made vessels, which vary in form, size and fabric group. Examining raw material three distinctive fabric groups were distinguished: 1) smooth surface, well lavigated loamy clay with hardly visible temper or deprived of intentionally added temper (23 pottery sherds), 2) coarse fabric with high quantities of temper (gravel and sand, possibly chamotte; ca. 1–2 mm; roughly 450 pottery fragments) and 3) coarse fabric with smaller quantity temper, but of considerable size (gravel, up to 5 mm). The latter group is represented by 28 fragments, probably of one or two different vessels. It should also be noted that sherds of the first and the third fabric group are hard and well fired.

The distinguished fabrics reflect a certain types of vessels. Fabric group 1 is exclusively represented by smooth tablewares (Fig. 7: 1–3), finely ornamented with glossed stripes and diagonal chequered pattern (Fig. 7: 2). The thin sections of fabric 1 wares are light grey. This kind of pottery was fired in reducing atmosphere and so was the fabric group 2, representing coarse "grey" kitchen wares or storage pots, ornamented with horizontal grooves (Fig. 7: 4, 6**).** Thin sections of these are light grey, inner and outer surfaces are frequently calcite-covered. This feature is a direct argument in favour of long term lying on the cave surface. The last fabric group is reserved for big storage vessels of the so-called *Krausengefässe* type (Rodzińska-Nowak 2006, 131–138). These group of thick-walled pottery (*c*. 14 mm) was fired in oxidizing atmosphere, inner and outer surfaces of vessels are brick-red in colour (Fig. 7: 5).

Investigated pottery sources shall be considered typical of Przeworsk culture. In parallel, the technological features of analysed assemblage indicate its younger or late Roman Age chronology, or, alternatively, its dating to the early phases of the Migrations Period (stages C1, C2 and C3/D). This chronology corresponds with dating of an iron buckle found in layer 2/3 (Fig. 9: 1**)**, most likely representing Madyda Legutko type H.9 of buckles, dated to phases C2–D (Madyda-Legutko 1986, 62–63, 72, pl. 18). It is quite possible that the buckle (and so the pottery?) is associated with radiocarbon dated human bones recorded in the layers 1 and 2. If this is indeed so, Żarska Cave would be the first acknowledged Polish cave site with recorded ritual or funerary activity during the Roman Age or Migrations Period (see below). Prior to the radiocarbon dating of human remains almost nothing was known regarding such activities in that particular period, not to mention some older comments concerning Kroczycka Cave in Kroczyce, Zawiercie district, believed to be a Roman Age "burial ground" (*Odkrycie groty* 1936; *Odkrycie bogatej* 1936; comp. Mycielska, Rook 1966; Wrzesiński 2006) or presumptions about chronological provenance of human bones recorded in Łokietka Cave in Ojców, Kraków district (Sobczyk, Sitlivy 2001, 459).

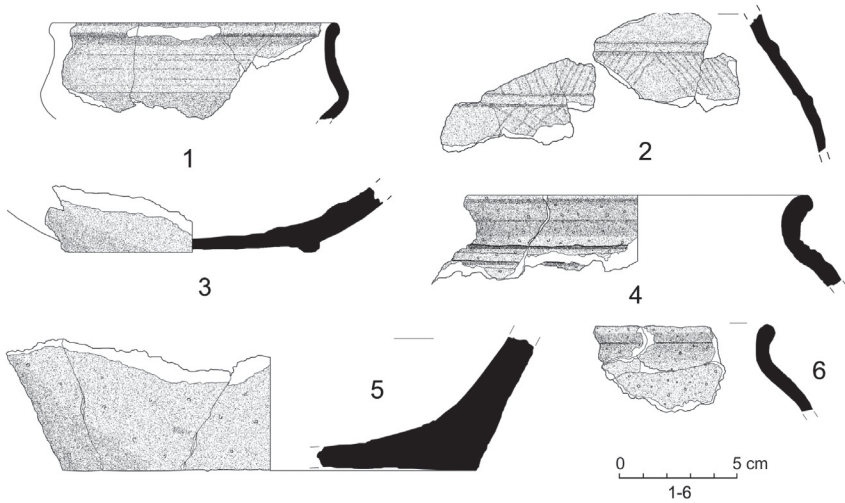

Fig. 7. Żarska Cave. The selection of younger or late Roman Age/early Migrations Period pottery (drawn by M. Wojenka)

3.4. Phase 4 – the Middle Ages

Excavations in Żarska Cave yielded a significant number of medieval pottery fragments. These were mostly found in humic layers 1 and 2 and within the hearth no. 1 (layer 3), directly dating the latter structure to the Middle Ages. It is worth mentioning also that in contrast to Neolithic and Eneolithic fireplaces (Rook 1980), analogous structures are rarely recorded in caves. Not counting the fireplace from Pod Rękawicą rockshelter in Ojców (Czarnowski 1924), some hearths containing sherds of medieval pottery were discovered in Jasna Smoleńska Cave in Smoleń, Olkusz district (Stefaniak *et al.* 2009, 263), in Złodziejska Cave in Kroczyce, Zawiercie district (Cyrek 2007, 20) and in Cave no. 4 in Birów, Zawiercie district (Mirosław-Grabowska *et al.* 2007, 25).

In total more than 460 medieval pottery sherds were recovered, which have been classified into a bit more than 350 units, theoretically identical with different vessels. The ceramics sherds were rather well-preserved and the level of fragmentation was relatively low, giving the impression that post-depositional processes had not affected much of the upper parts of cave's filling.

The analysis of these artifacts can give insight into the technology of their production. All the ceramic artifacts were made of iron-rich clays, commonly observed in Lesser Poland.

Pottery sources from Żarska Cave represent vessels based on the form of wheel-thrown pot, made using the techniques of kneading and jointing succesive coils or strips. The fabric of the medieval pottery from Żarska Cave included hard coarse vessels tempered with fine grained sand (roughly 0.1-0.5 mm) in varying quantities. The quantity of sand formed the basis for determining types of fabric. Examining the pottery sources three essential fabric groups of ceramic paste have been distinguished: 1) hard coarse vessels with medium quantity of sandy temper (roughly 44%), 2) hard coarse vessels with low quantity of sandy temper (roughly 43%) and 3) well lavigated fabric, fairly fine with sparse inclusions of sandy grit (roughly 13% of medieval pottery sources). It is important to note that that in some cases a small amount of limestone temper was recorded, which may say something about the local origin of at least some of these artifacts (7 vessels).

The pots were fired mostly in oxidizing hearth or kiln atmosphere.

Medieval pottery from Żarska Cave is richly ornamented, mainly with more or less regular horizontal stripes or wave decoration (Fig. 8). Noteworthy is small but important admixture of glazed wares (21 units), mainly with patchy olive glaze.

The pottery represents a typical household assemblage, in most cases cooking pots, with rims clearly everted and highly profiled. Noticeable is the large size of the pots (Fig. 8: 1, 4, 11), which leads to a tempting conclusion about their storage function.

When considering the characteristics of the vessels from Żarska Cave, namely fabric, rim profiles and the presence of an olive-green glaze, it is possible to state that medieval activity took place at the site during second half of the 13th and the first half of the 14th century. What is interesting, however, is that medieval assemblage lacks younger finds, what might suggest that the cave was basically used for a relatively short period.

Regrettably, it is not possible to attribute a few metal artefacts found in the cave strictly to the Middle Ages (Fig. 9).

3.5. Phase 5 – post-medieval period

Post-medieval period is represented by a small number of pottery fragments (about 60 sherds), encountered within the upper part of cave's filling, in layers 1 and 2. Post-medieval finds assemblages comprise of pottery sherds representing different phases of human activity, from the 16th century onwards. The earliest examples are represented by vessels with medium or high quantity of sandy temper, fired in oxidizing atmosphere, occasionally glazed with green, yellow green or olive green glaze. As regards the youngest finds, these are represented by cooking pots glazed with light brown glaze (roughly 20 sherds). In several cases the inner parts of vessels show shallow grooves, made by the fingers as the pot was turned on a wheel. The dating of these specimens is, most likely, the 19th or, occasionally, even the beginnings of the 20th century.

Noteworthy is the presence of vessels made of white, kaolinite clay (more than 5 sherds), fired both in oxidizing and reducing atmosphere.

It is important to point out that post-medieval assemblages from Żarska Cave does not represent a phase *per se*, but most likely the irregular and temporarily use of, or visits to the cave over several hundred years.

3.6. Metal finds of unknown or uncertain chronology

Not all the sources could have been attributed to particular phases. For example, the excavations resulted in the recovery of a few metal objects, discovered in layers 1 and 2. Regrettably, it is not possible to date most of these finds. Of metal finds, only an iron buckle (Fig. 9: 1), which basically corresponds with Madyda-Legutko H.9 type of buckles can be accurately dated to the younger or late Roman Age or early stages of Migrations Period (phases C2-D; Madyda-Legutko 1986, 62-63, 72, pl. 18). Less can be said about two iron knives (Fig. 9: 5, 6**)** which are not closely datable, as well as an undetermined arrow-like and bar-like iron objects (Fig. 9: 2, 8). Bronze or copper object with a rivet hole (Fig. 9: 7) can be recognised as a fitting, but its chronology is likewise unknown (at stake are Roman Age or, more likely, the Middle Ages or post-medieval period).

The most intriguing metal objects are three copper (or bronze?) metal strips, found in layers 1 and 2 thanks to wet sifting of sediment (two are listed in Fig. 9: 3, 4). Doubtless, these finds represent remains of counterfeiters' workshop. The metal strips evidently have holes

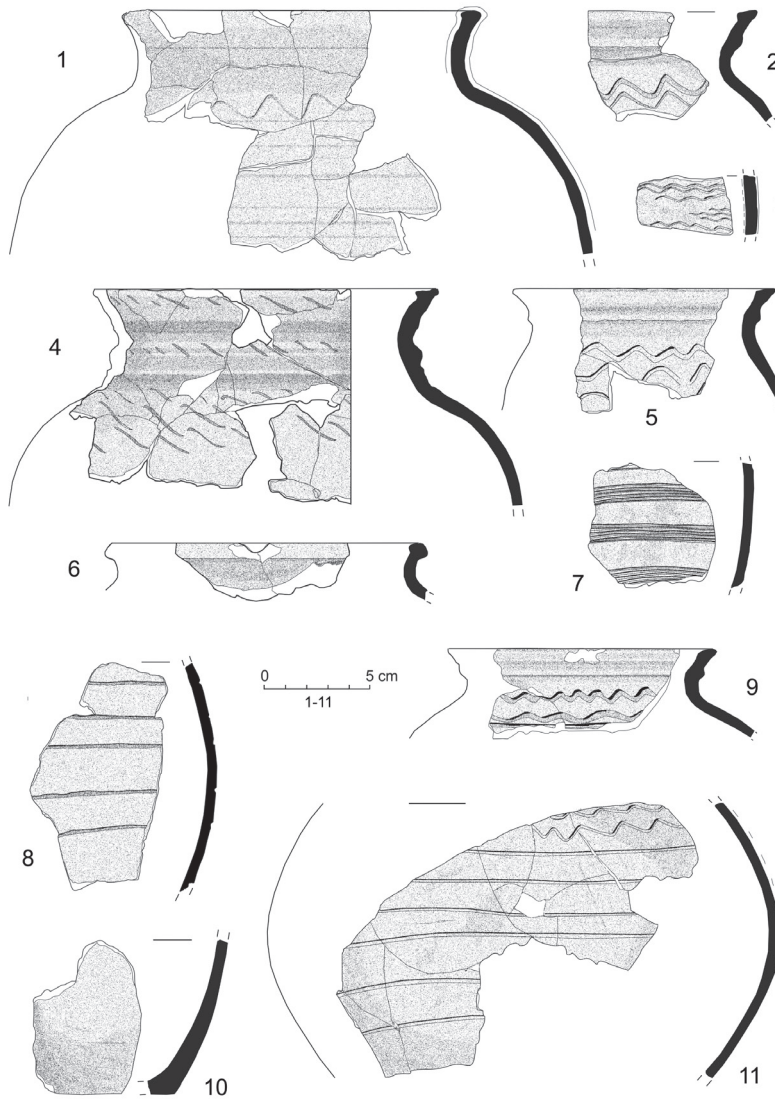

Fig. 8. Żarska Cave. The selection of medieval artifacts. 5, 9: finds recorded in sifted heaps inside the cave; 1–4, 6–8, 10–11: Trench 2 (drawn by M. Wojenka)

left template after cutting the false coins. Unfortunately, at the moment it is impossible to determine whether these metal strips are medieval or post-medieval. Such medieval workshops in caves are known from Slovakia and Czech Republic (Bárta 1960, 28; Matoušek *et al.* 2005, 35; Soják 2007, 63-64). The diameters of false coins were 15-16 mm. Obviously this corresponds to different emissions, but regarding raw material, counterfeiting of copper shillings of John Casimir at the second half of the 17th century is the most probable hypothesis (see: Wnęk 2013).

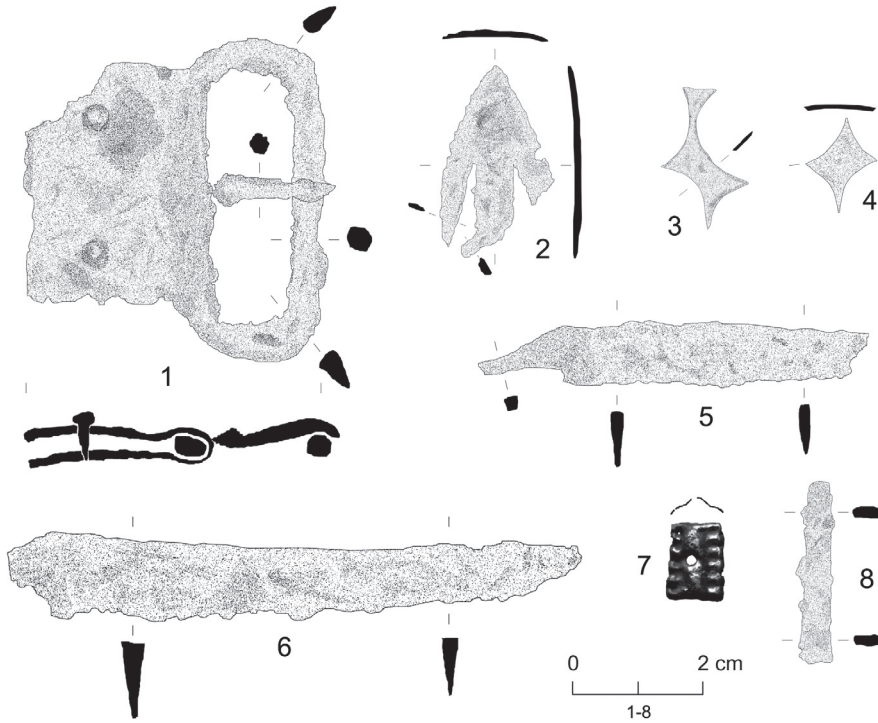

Fig. 9. Żarska Cave. Metal finds. 1, 2, 5, 6, 8: iron; 3, 4, 7: copper or bronze (drawn by M. Wojenka)

4. Human bones

A total of 57 human bones were recovered during the excavations. These were found scattered in humic layers 1 and 2, out of anatomical position. It is difficult to say precisely how the skeletons were redeposited. Human remains from Żarska Cave are currently under analysis and for this reason it is impossible to demonstrate all data (the full report is in preparation), but the remains comprise at least three individuals of different age (*Infans* I, *Infans* II and *Adultus*). Radiocarbon dating indicate that investigated human remains may correspond with pottery dated to younger or late Roman Age/early Migrations Period and the iron buckle of Madyda-Legutko H.9 type. *Infans* I and *Adultus* produced practically identical dates: 1755±30 BP (Poz-67070) and 1755±25 BP (Poz-58069), while *Infans* II produced a bit younger date 1655±30 BP (Poz-67069).

5. Animal remains

Excavations in 2012–2015 led to the recovery of animal remains collected from almost all layers recorded in the cave; from the recent surface till the Pleistocene layers covered cave bedrock. Additionally all sediment were taken for wet sieving, what succeeded in obtaining numerous remains of small mammals, including rodents, bats, and insectivores extremely useful in reconstruction of paleoenvironmental changes. The most abundant animal remains were obtained from the Holocene layers connected with the Medieval/Roman Age period (layers 1–3) and Eneolithic settlement (layer 6) as well as devoid of artefacts Pleistocene layer 14

and 17. In the layers 1–3 among domestic animals the most abundant are bones of pig (*Sus scrofa* f. *domestica*) – especially remains belonging to young individuals, and cattle (*Bos taurus*). Those remains are accompanied by numerous bird bones. Different faunal assemblage were discovered in layer 6 (Eneolithic), where among remains of domestic animals goat/sheep bones (*Capra hircus*/*Ovis aries*) dominate. They represent the whole parts of skeleton and bear numerous marks of human activity. Other domestic specimens are represent only as a small admixture. In this layer four bone awls were discovered, made from bones belonging to animals of medium (goat/sheep) and large size (cattle). In turn among Pleistocene layers 14 and 17 where more numerous paleontological material were collected, remains of cave bear (*Ursus ingressus*) prevail and bones of other large and medium animals are few.

6. Conclusion

Żarska Cave has a 'biography' of human activity spanning approximately 5000 years. During that time a cave was penetrated or utilized by people representing distinct cultural models and different attitude to the landscape. In case of Eneolithic and, to some extent, the Middle Ages we might consider the possibility of economic use of the cave. Finds dated to the younger or late Roman Age or early Migrations Period might suggest the contrary: the use of Żarska Cave as a sacred place, situated outside the domain of profane life. Interestingly, as a remote place the cave received attention in historical times: it was the location on the edge of inhabited area which was a strong argument in favour of placing counterfeiter's workshop at the cave. It is no doubt that all these important issues require more detailed investigation.

Acknowledgements

The research of Żarska Cave form part of a larger ongoing studies supported and financed by the National Science Center, Poland (grant decision No. UMO-2013/11/D/HS3/01877 awarded to M. Wojenka). Microscopic analyses of the Baden culture vessels are a part of the research project of the National Science Center, Poland (grant decision No. DEC-2013/09/B/HS3/03401 awarded to A. Zastawny). The authors are grateful to the NCN for providing funding for excavations, research and radiocarbon dates.

Wstępne sprawozdanie z badań wykopaliskowych w Jaskini Żarskiej w Żarach, powiat Kraków (2012–2015 r.)

Niniejszy artykuł stanowi wstępne sprawozdanie z badań wykopaliskowych przeprowadzonych w Komorze Głównej Jaskini Żarskiej w Żarach w latach 2012–2015. Prace wykopaliskowe prowadzono w obrębie jednego wykopu badawczego (wykop 2), zlokalizowanego w północno-wschodniej partii jaskini. Wykop 2 ujawnił złożoną sytuację stratygraficzną. Zarejestrowano tu 21 nawarstwień (w tym cztery paleniska), przy czym na zabytki archeologiczne natrafiano wyłącznie w górnych partiach wypełniska jaskini. Warstwy 1 i 2 określić można jako poziomy próchnicze. Zawierały one liczne ułamki naczyń datowanych na okres nowożytny, średniowiecze oraz na młodszy lub późny okres rzymski, względnie na wczesne fazy okresu wędrówek ludów (kultura przeworska). Warstwy te dostarczyły ponadto pojedynczych zabytków metalowych oraz ludzkich i zwierzęcych szczątków kostnych. Na uwagę zasługują tu charakterystyczne okrawki metalu (miedziane lub brązowe), świadczące o praktykowanym w jaskini procederze bicia fałszywej monety.

Warto nadmienić, iż wiek trzech kości ludzkich datowano ^{14}C techniką akceleratorową (AMS). Uzyskane wyniki odpowiadają odkrytym w jaskini zabytkom ruchomym reprezentującym inwentarz kultury przeworskiej i wynoszą odpowiednio 1755±30 BP (Poz-67070), 1755±25 BP (Poz-58069) oraz 1655±30 BP (Poz-67069). Warstwa 3 (palenisko 1) zawierała głównie zabytki średniowieczne (poł. XIII – poł. XIV w.). Przekładki warstw zgruzowionego lessu (warstwy 4 i 5) nie zawierały zabytków archeologicznych. Bardzo interesujących inwentarzy dostarczyła natomiast laminowana, ciemnoszara i tłusta warstwa nr 6, której sedymentacja, jak wskazuje inwentarz ruchomy, przypadła głównie na czas eneolitu. W nawarstwieniu tym stwierdzono ułamki naczyń (w tym kultury badeńskiej) oraz pojedyncze zabytki krzemienne, kamienne i kościane.

Zalegający poniżej warstwy 6. pakiet osadów jaskiniowych nie dostarczył zabytków archeologicznych. Skalne dno jaskini zarejestrowano na głębokości ok. 350 cm, licząc od współczesnego poziomu deptaniska.

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Page No.	is:	should be:
p. 185	The trench revealed a c. 350 cm deep sequence, which in total comprised 21 layers including four hearths.	The trench revealed a c. 350 cm deep sequence, which in total comprised 22 layers including four hearths.
p. 185	(layer 19 – hearth 2, layer 20 – hearth 3 and layer 21 – hearth 4)	(layer 20 – hearth 2, layer 21 – hearth 3 and layer 22 – hearth 4)
p. 187	The sedimentary sequence of Żarska Cave in total comprises 21 layers including four hearths	The sedimentary sequence of Żarska Cave in total comprises 22 layers including four hearths
p. 188	(layer 19 – hearth 2, layer 20 – hearth 3 and layer 21 – hearth 4; see below)	(layer 20 – hearth 2, layer 21 – hearth 3 and layer 22 – hearth 4; see below)
p. 189	Layer 19 – a small hearth (hearth 2), recorded within layer 6 at a depth of c. 60 cm (section A3).	Layer 19 − Light gray silty clay on the limestone bedrock.
p. 189	Layer 20 − a small hearth (hearth 3), recorded within layer 6 at a depth of c. 80 cm (sections C-D/1-2).	Layer 20 − a small hearth (hearth 2), recorded within layer 6 at a depth of c. 60 cm (section A3).
p. 189	Layer 21 – remains of a hearth (hearth 4), found at the base of layer 6, at a depth c. 110 cm (section D2).	Layer 21 − a small hearth (hearth 3), recorded within layer 6 at a depth of c. 80 cm (sections C-D/1-2). Layer 22 − remains of a hearth (hearth 4), found at the base of layer 6, at a depth c. 110 cm (section D2).
p. 201	Zarejestrowano tu 21 nawarstwień (w tym cztery paleniska)	Zarejestrowano tu 22 nawarstwienia (w tym cztery paleniska)

ISSN 0137-3285