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Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań



Location of the main research areas.
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Adam Mickiewicz University
Poznań



Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań

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FACULTY OF ARCHAEOLOGY AMU

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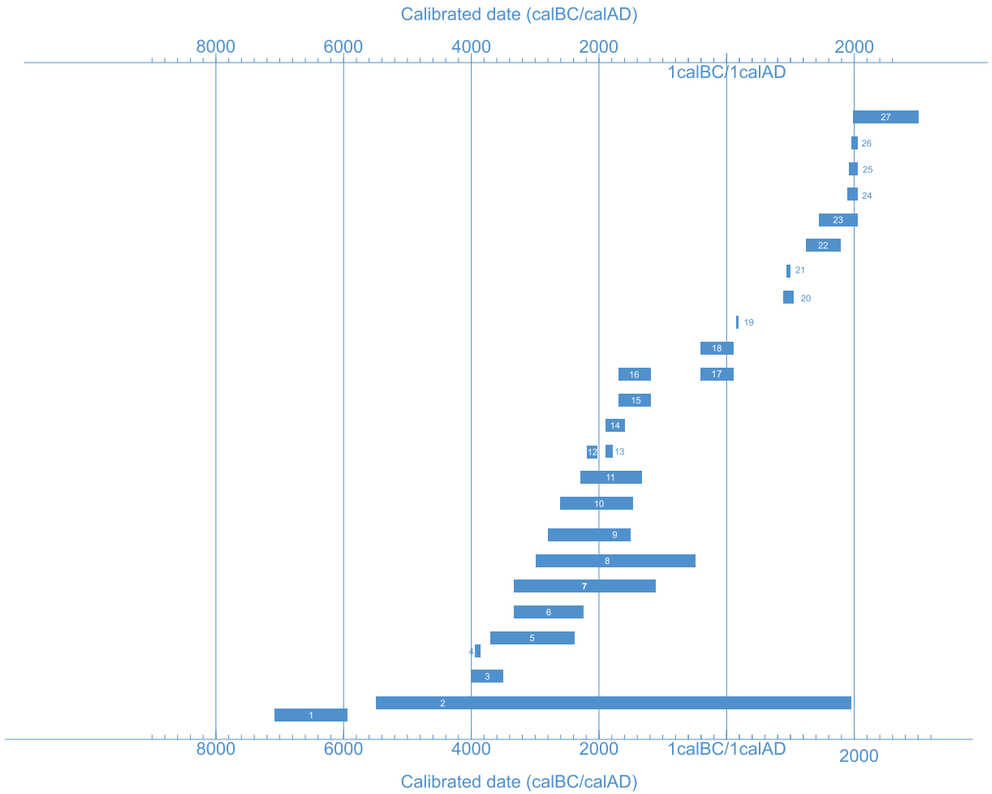
FACULTY OF ARCHAEOLOGY AMU

Treasures of Time: Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

Introduction

In 2019, archaeology at the Adam Mickiewicz University in Poznan celebrated its honourable 100th anniversary! The establishment of archaeology at this university was associated with the strong influence of the authority of Prof. Józef Kostrzewski and a succession of eminent scholars, many of whom we today call Masters.

The year 2019 was a real breakthrough. We started the second century of existence within the Alma Mater Posnaniensis with a new structural independence and quality that the academic archaeology of Poznań had not yet known for its one hundred years of existence. This change, the formation of the first Polish Faculty of Archaeology, has opened new chances and possibilities of which we are now taking advantage.



Calibrated date
(calBC/calAD)



Prof. Józef Kostrzewski
(1885-1969)

Currently, the Faculty of Archaeology of Adam Mickiewicz University is formed by a number of teams, each with their own leaders. In the majority of cases, these teams are united by interdisciplinarity, which integrates within selected projects the experience of many so-called 'auxiliary' sciences of archaeology. This trend is paralleled by the development of specialised laboratories armed with the latest equipment in the Faculty of Archaeology.

This publication presents the current scientific interests creatively developed by such teams at the Faculty of Archaeology of Adam Mickiewicz University. The research of these teams covers vast areas in time and space, summing up at least the last 9,000 years of prehistory. The following articles, arranged in chronological order, allow us to explore the prehistory of various areas.

The adventure begins around 7100 BC, in the Neolithic settlement of Çatalhöyük located in Turkey. Then, we move on to the loess uplands near Krakow, where the first farmers from the south of Europe had just arrived (5500 BC). A little later (4000-3500 BC), and a little farther north, in the area of Greater Poland, some of the first megalithic constructions in this part of the world were built. Around the same time, about 800 km to the southeast, a settlement

of the Trypillia culture remains in the phase of development (3950 BC). The end of the Stone Age in Poland was described in the history of Late Neolithic communities on a hill in the center of Kujawy region (3700-2400 BC). Farther east, in the forest-steppe area of Ukraine, significant cultural and social changes resulted in the formation of the Yamnaya culture (3350-2250 BC), beginning the Bronze Age.

Intense elements of this era can be traced in the area of southern Europe in the Greek Anthemous Valley (3350-1150 BC), in Attica (3000-500 BC) on the plains of the Hungarian Lowlands (2600-1450 BC) and to the Upper Dniester Valley, where numerous burial mounds were formed (2800-1500 BC). A similar chronological range is presented in the articles devoted to a unique site in Bruszczewo, Greater Poland (2300-1350 BC), which not only accumulates valuable metal artefacts, but is also the subject of interest of an interdisciplinary team focused on reconstructing its environmental context.

The next text take us far to the east, to the area of Iraqi Kurdistan, where we can appreciate the importance of Mesopotamian influences in shaping the picture of the Early Bronze Age (2200-2150 BC).

Subsequent texts describe the discoveries of Poznań scientists in Syria (1906-1787 BC) and in Greater Poland (1900-1600 BC). These two distant points describe various aspects of life in contemporary communities in the Middle and Early Bronze Age.

The characteristic archaeological materials of the later centuries of the Bronze Age (1800-1200 BC) reveal an intensification of military conflicts and migration processes (1700-1200 BC). The turn of the eras is illustrated in this volume by texts on the interpretation of representations on ancient Greek and Roman sculpture (400 BC-100 AD), as well as the cultural situation in the Polish lands (400 BC-100 AD).

We are introduced to the new era by an article on the funerary customs of communities from the Polish lowlands describing discoveries at the site of Mirosław (160-175 AD). Moments of the formation of elements of Polish statehood are referred to in texts describing towns at Grzybowo (919-1050 AD) and Poznań in the early Middle Ages (950-1000 AD).

Later parts of the Middle Ages are described by sacral monuments located also in the area of the contemporary city of Poznań: the Collegiate Church of St Mary Magdalene (1263-1802 AD) and the still extant Church of the Blessed Virgin Mary on Ostrów Tumski, founded around 1431 AD in the immediate vicinity of the previously described early medieval site of the ‘origin’ of the city of Poznań.

The final texts of the volume do not refer directly to a particular period of prehistory, but present the history of Polish archaeological research on the Iberian Peninsula, the contemporary perception of prehistoric art by the inhabitants of present-day Canada and Siberia, and the development of methodological thought among Poznań archaeologists.

The volume closes with a text describing one of the many perspectives currently faced by the staff of the Faculty of Archaeology of Adam Mickiewicz University in Poznań: the new ArchaeoMicroLab.

We look to the future with great hope that the Staff of the Faculty will provide ideas for many more volumes of Treasures of Time. We trust that this set of articles will present archaeology at the Adam Mickiewicz University in Poznań in its new structure as a Faculty and show its potential. We would thus like to encourage you to get acquainted with our Poznań perspective on archaeological studies, and to reflect on ways of exploring the past.

Andrzej Michałowski

Danuta Żurkiewicz



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Late Neolithic and post-Neolithic settlements and burial grounds in the TPC Area at Çatalhöyük: The research project of the archaeological team from Adam Mickiewicz University in Poznań

Patrycja Filipowicz, Katarzyna Harabasz, Jędrzej Hordecki, Karolina Joka, Arkadiusz Marciniak

Abstract

The chapter presents the results of the research project conducted by the team of archaeologists from Adam Mickiewicz University at the World Heritage site of Çatalhöyük in Turkey. The section of this large Neolithic settlement located in the uppermost part of the south eminence of East mound is named the Team Poznań Connection (TPC) Area and was excavated in the years 2012-2017. The unearthed stratigraphic sequence is dated to the period from ca. 6350 to 6000 BC. The project led to the discovery of nine Late Neolithic houses with associated built-in structures and numerous burials. The paper outlines the most important discoveries in house architecture, burial practice, and material culture. The research has contributed significantly to a better understanding of the last centuries of the settlement's occupation, as well as enhanced our knowledge of the Near Eastern Neolithic. This paper provides an overview of the major transformations of Neolithic lifeways in this period. In addition to architecture, the organization of space, burial practices, and material culture, the changes also affected farming, husbandry practices, landscape exploitation, procurement of raw materials, exchange patterns, demography, and social organization. The paper also provides an overview of the Hellenistic settlement as well as the Ottoman burial ground located above the Neolithic strata.

Keywords: Çatalhöyük, Anatolia, Late Neolithic, Hellenistic period, Ottoman period

The Çatalhöyük settlement

Çatalhöyük is one of the most important Neolithic settlements in the Near East. It is located on the Konya Plain in the central part of Turkey and was designated a World Heritage Site in 2012. The Neolithic settlement at Çatalhöyük was occupied for more than one thousand years from 7100 to 5950 BC. The site underwent a series of transformations throughout its long existence. Right from its emergence, it expanded and the population gradually increased. People constructed large buildings and subdivided them into multiple rooms. Buildings were constructed in clusters, were accessed through the roof, and included space to store food and areas for production activities. In the period between 6700 and 6500 BC, the settlement reached its climax. The buildings had numerous built-in structures, including platforms, benches, bins, and fire installations. Buildings were used intensively and rebuilt many times. At the peak of its existence, the settlement was occupied by ca. 1800 people.

This form of settlement organization came to an end at around 6400/6300 BC. Its abandonment marked the beginning of a 400-year-long period of steady disarrangement and reconstruction of building clusters in different settlement areas. The size of the population also significantly decreased (Marciniak, 2019). This complicated process was thoroughly investigated in the excavation zone named the Team Poznań Connection (TPC) Area by the team of archaeologists from Adam Mickiewicz University led by Prof. Arkadiusz Marciniak. The work was conducted in the years 2012-2017. The TPC Area excavation project is an intrinsic part of the continuous work of archaeologists from Adam Mickiewicz University in Poznań at Çatalhöyük that started in 2001.

The TPC excavation area at Çatalhöyük

The TPC excavation area comprises four interrelated trenches. It is located in a previously unexplored zone on the southwestern slope of the southern prominence of the East mound and is placed between the Team Poznań (TP) Area and Mellaart Area A to the east and north and the South Area to the west and south (Figure 1). Altogether, six chronological levels dated to the Late Neolithic were discovered. They were labelled using letters of the alphabet from TP.M through TP.R. The sequence is dated from ca. 6350 to 6000 BC.

The project led to the discovery of nine Late Neolithic houses with associated built-in structures and numerous burials. It revealed major transformations in the final centuries of settlement occupation. These comprised changes in house architecture, the organization of space, burial practices, and material culture, as well as farming, husbandry practices, landscape exploitation, procurement of raw materials, exchange patterns, demography, and social organization. The tempo and scale of these developments was revealed by meticulous recognition of the stratigraphic sequence and dating its subsequent stages. An important achievement involved the establishment of a stratigraphic connection between the TPC and South Area strata, making it possible to reconstruct a new and complete stratigraphy of the Neolithic occupation of the East mound settlement. In addition to the Neolithic deposits, this work also led to the discovery of a Hellenistic settlement as well as an Ottoman burial ground.

The Late Neolithic architecture

The earliest Late Neolithic houses unearthed in the TPC Area are dated to Level TP.M (ca. 6350-6300 BC). Altogether, four such buildings were unearthed: B.121, B.122, B.150, and B.166. These are large structures that were intensively used and rebuilt many times. The walls were plastered and decorated. Internal furnishing comprised distinct floors as well as numerous built-in structures such as platforms with burials underneath, benches, bins, and fire installations. Their internal division resembles the Early Neolithic tradition: the northern part of the structures served ceremonial purposes, while its southern counterpart was devoted to domestic tasks.

The most representative for this phase is Building 150 (B.150) in Trench 4 (Marciniak et al., 2019). This ca. 50 m^2 structure (Figure 2) was reconstructed at least four times, as indicated by a sequence of superimposed floors with corresponding platforms. The walls were plastered over and probably painted. An internal layout of the house comprised a series of platforms and benches alongside its eastern and northern walls and a sequence of superimposed ovens with solid bases in the southern part.

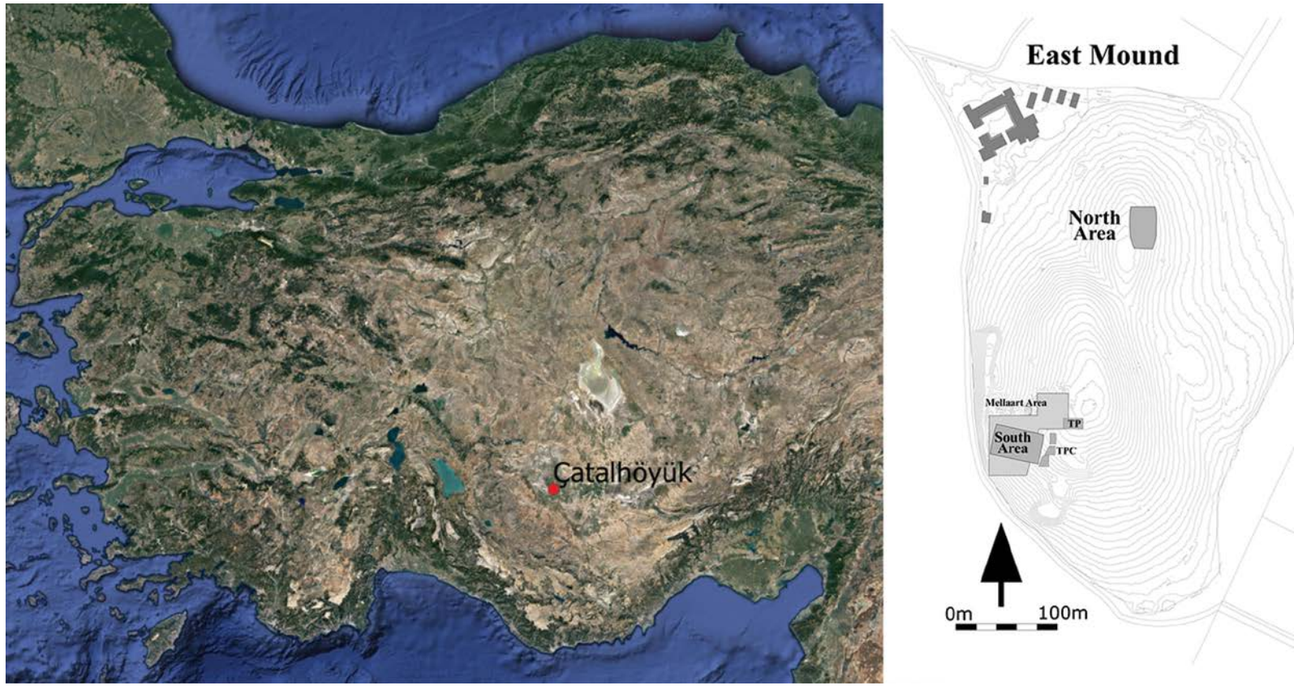


Figure 1. Çatalhöyük. TPC Area and other excavation areas in the southern part of the East Mound at Çatalhöyük (© Çatalhöyük Research Project).

Figure 2. Çatalhöyük. TPC Area, Building 150 – a general view (© Çatalhöyük Research Project).

The southwestern room of the house seemed to have a special significance as a rich concentration of various objects (more than 200) was deposited inside (Marciniak et al., 2019). These comprised numerous worked stones and a cluster of large animal bones. The most distinct was a cluster of unique finds, including a piece of a wooden pounding tool, two extremely well-preserved reed containers with seeds (lentils, barley, almond), and sheep and cattle astragali. Additionally, 35 stone tools and ground stones, including a polished mace-head made of red marble, were placed in a rectangular bin built on the floor. The most exceptional finds were a hand-shaped clay stamp seal with a carved geometric pattern and two large stone anthropomorphic figurines (Marciniak et al., 2019, Figure 3). The larger figurine is 25 cm high and depicts a standing woman, while the smaller one is around 10 cm high and depicts a seated, corpulent female.

Another distinct house from this phase is Building 122 from Trench 3 (Marciniak et al., 2019).This rectangular house was oriented along an east-west axis. It was 4 m wide and about 5 m long. The building's earlier phase comprised a storage room of approximately 3 m^2 with five rectangular bins, located in the north-eastern part. The room infill yielded a great number of carbonized botanical remains and a large deposit of hulled barley and wheat (Marciniak et



Figure 3. Çatalhöyük. TPC Area, Two female figurines from the south-western: room of Building 150 (© Çatalhöyük Research Project).

al., 2019).The later phase of the building's occupation involved the construction of the room west of the storage room (Figure 4). Its surface was painted with black and white geometric designs. The room had numerous internal features, such as platforms with burials (see below), benches and bucranium in its northern and eastern parts, and ovens and hearths in the southern section. Two unique features comprised small painted pillars constructed on the bench against the northern wall of the room.

These buildings are contemporary with the exposed, but not fully excavated Building 121 in Trench 2 (Marciniak, 2015). The eastern wall was plastered and painted with a black and white geometric design in the form of vertical and transverse sets of parallel lines (Figure 5). The solidly built structure followed a division into "clean" and "dirty" parts typical for the classic

Figure 4. Çatalhöyük. TPC Area, Building 122 (© Çatalhöyük Research Project).

Figure 5. Çatalhöyük. TPC Area, Geometric painting on the eastern wall of Building 121 (© Çatalhöyük Research Project).

phase of settlement occupation at this site. The house had five subsequently built platforms located in the eastern and western parts of the building, a hearth, a circular bin and a large, rectangular fire installation placed in the centre. The house was then deliberately abandoned, but shortly afterward, it was temporarily used, as suggested by the presence of a fire spot and two pits of unspecified character in its fill.

House architecture changed significantly in subsequent occupational phases. The following Level TP.N is represented by solid, multi-roomed houses with compound walls that lack floors and corresponding built-in features as well as burials inside the houses. Two buildings from this phase were identified: a large, two-roomed structure (8 x 6 m) Building 110 in Trench 2 (Figure 6) and Building 152 in Trench 4. Later, the architecture changed significantly. Levels TP.O and TP.P mark a major discontinuity in the occupational sequence in the TPC Area. This part of the settlement was turned into some kind of open space and, after some time, it fell out of use and was transformed into a midden (Marciniak, 2015). Levels TP.Q and TP.R are characterized by distinct, large multi-roomed dwellings, built directly on top of the open area from the preceding level. The latest dwelling structures in the TPC Area comprised Building 109 (Trench 2) and Building 133 (Trenches 3 and 4).However, their reconstruction is tentative due to the destruction caused by post-Neolithic occupation as well as erosion processes.



Figure 6. Çatalhöyük. TPC Area, Building 110
(© Çatalhöyük Research Project).

Living in the Late Neolithic house

One of the most hotly debated issues in Near Eastern Neolithic archaeology is the organization and use of house space. The recently developed heavy residue analysis offers unprecedented opportunities for these studies (Shillito, 2017). This method involves both qualitative and quantitative analysis of manufacturing debris (e.g., obsidian shards and clay fragments), microfaunal (e.g., bones, shells, and eggshells) and botanical remains, as well as microartefacts (e.g., beads and figurine fragments) acquired during the floatation of different types of deposits. These materials are obtained by sieving comparable samples from deposits originating from relevant contexts with water through 4.2 mm then 1.0 mm mesh screen, causing lighter materials (i.e., seeds and charcoal) to float on the water's surface. The organic and inorganic material left on the screen (i.e., the heavy fraction) is then sorted from the remaining soil for microscopic analysis. The rigorous application of this method makes it possible to recognize the details of spatial organization and how this changed through time (Mitrović & Vasić, 2013). Heavy residue analysis can recover very special artefacts and unique objects – such as refined beads (most smaller than 3mm) or small figurines – showing the elaborate skill sets of Neolithic craftsmen, but also their mistakes such as half-finished beads or tools. Therefore, heavy residue analysis does not simply show the distribution of material, but also enlivens the household. It shows that different people – a craftsman, cook, and potter – lived and worked there in the past.

In the Late Neolithic deposits in the TPC Area, animal bone, plant remains, mollusc shell, obsidian, stone, and eggshell are the most ubiquitous material categories on-site and occur as the vast majority of samples – over 60% – whilst the other categories referred to as non-ubiquitous (e.g., clay ball, clay figurine, clay object, shaped clay, flint, pottery, beads, worked bone, and worked stone) are less frequent (Joka, in press). It is worth noting that obsidian is much more common than flint and mollusc shells are much more common than eggshell, although the significance of eggshell grows through time, perhaps suggesting that the diet had changed. What is of interest is that pottery – a material classified as non-ubiquitous – occurs in nearly the same frequency in middens as ubiquitous materials. The occurrence of non-ubiquitous categories in middens is also higher than in other deposits. Interestingly, no clay objects (i.e., clay balls, figurines, or shaped clay) were detected in the final TP.Q-R levels – this may indicate that their manufacture had moved beyond the household area.

Placing the dead in the Late Neolithic house

Throughout the Çatalhöyük site occupation, the house was distinct as a place for both the living and the dead. The overwhelming majority of burials occurred within the house beneath its floors, mainly in the north and eastern parts of the central room (Haddow et al., 2020). The number of burials inside the houses varied considerably over time and space (Marciniak, 2015). The TPC Area brought about distinct insight into funeral practices in the Late Neolithic. Excavations in both TPC and adjacent contemporaneous TP Areas resulted in the discovery of a total of 53 burials in three houses and two tombs.

In three buildings (B.150, B.122, and B.166) from the TP.M Level, the remains of 37 individuals were identified (Marciniak et al., 2019). Altogether, 23 individuals were interred in B.150, another eight in B.122, and six others in B.166. Contrary to earlier practice, deceased of different sexes and age categories from the TPC Area were not buried in specific areas of the house. However, they were interred in deep pits in a specific area of the house, namely the house platforms (Harabasz, 2019). A majority of the deceased were buried in a flexed position, lying on the right or left side. Nevertheless, fully articulated skeletons, along with disarticulated and partially articulated skeletal elements were observed. Some skeletons had personal adornments such as beads around the neck and hands (e.g., B.122). In some cases, the deceased were bound and likely wrapped in a mat and placed in the burial pit. Furthermore, a very similar state of bone preservation and their comparable colour seems to indicate a short time interval between death and placing individuals into the burial pits.



Figure 7. Çatalhöyük. TPC Area, Burials beneath the eastern platform in Building 150 (© Çatalhöyük Research Project).



Figure 8. Çatalhöyük. ÇTPC Area, Skeleton of a man with painted forehead beneath the eastern platform of Building 150 (© Çatalhöyük Research Project).

Most of the remains of the 23 individuals interred beneath house platforms in B.150 were heavily commingled, probably because of the repeated opening of the burial pit and the displacement of the dead. The sex, age, and body position of these individuals were different. Nonetheless, among the disarticulated human remains, two individuals were placed in anatomical position (Figure 7). The first was a female who died in childbirth between the ages of 25 and 35 years and was buried with a 40-week-old foetus. Her skeleton showed signs of a healed rib fracture, osteoporosis, and surgical immobilization of the spine. The second deceased was a male who died between 35 and 50 years of age, whose frontal bone and right shoulder were covered with red cinnabar (Figure 8). This pigment was applied sometime after the man died and after significant decomposition of his soft tissues. Unlike most of the dead, the man was lying supine with his head facing west. It is worth adding that he was buried with the remains of food, as indicated by animal bones found at the level of his cervical and lumbar vertebrae.

Two figurines were discovered on the surface of the eastern platform of B.150 (Figure 9). They were probably placed during the intentional final closure of the burial pit that contained the female who died in childbirth. The platform then was covered with a limestone layer, which also covered both figurines. The smaller figure of a standing woman was about 7 cm in height, weighed 55 g, and was made of yellow limestone. This figure was made with the precise elaboration of anatomical details. The larger figurine of a standing woman was more corpulent and less precise and was about 17 cm tall weighing around 1 kg.

Getting back to Çatalhöyük – the Hellenistic settlement

Because the tell is a distinct and highly visible place in a rather flat area of the Konya Plain, it was chosen for habitation many centuries after the Neolithic. After Alexander the Great's conquest of the Persian Empire in 333 BC, the region of Anatolia was divided into several Hellenistic kingdoms. Their rulers were careful about establishing new settlements in their domains. One such settlement was set up at Çatalhöyük, most likely in the first years after the conquest (Hordecki, 2020). The new settlers replaced the previous inhabitants, most likely the Phrygians. The remains of their village were recognized in the TP Area, in close vicinity to the TPC Area.

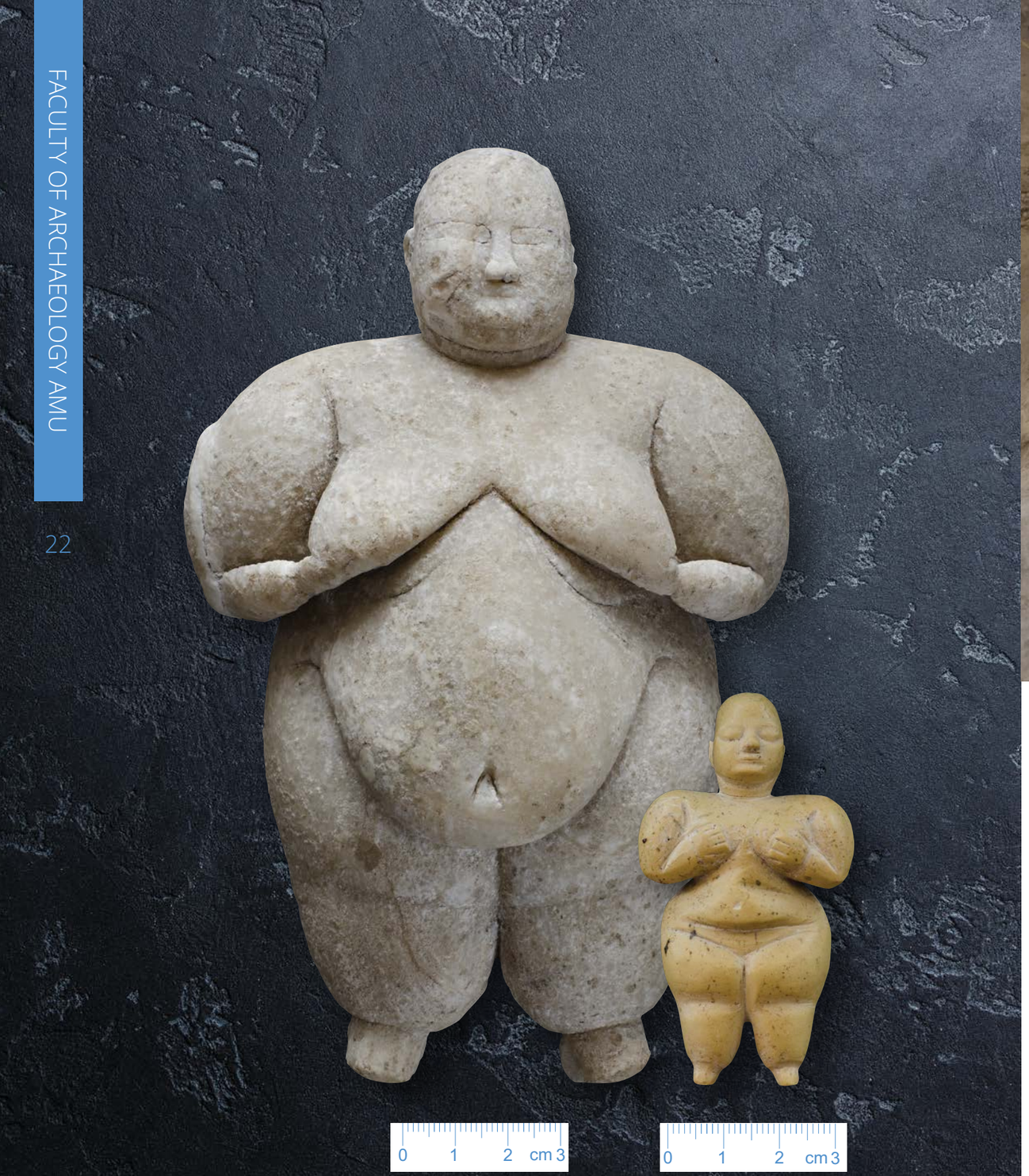


Figure 9. Çatalhöyük. TPC Area, Two female figurines from the eastern platform in Building 150 (© Çatalhöyük Research Project).



Figure 10. Çatalhöyük. TPC Area, A dog burial (© Çatalhöyük Research Project).

The newcomers appeared to inhabit the Çatalhöyük tell from the beginning of the fourth century BC onward. They settled on the top of the mound. The first manifestation of their presence is two separate dog burials (Figure 10). Although not fully confirmed, these burials might represent some kind of ritual sacrifice to the gods of the crossroads. That corresponds very well to the placement of the settlement in close proximity to the road running from the east to the west. In the following phase, it grew into a large settlement made of a number of distinct parts. The TPC Area served some kind of storage purpose. This is manifested by numerous pits, some of which have distinctively bell-shaped profiles (Figure 11).

Numerous pieces of pottery (Figure 12) and animal bone were found in these pits. In the following phase in the 3rd century BC, a distinct rectangular building (B.120) was constructed in the southern part of the TPC Area (Figure 13). It measured 16.8 m^2 within the perimeter of the trench. It had three built-in features made of clay, most likely bins used for grain storage. The final phase in this part of settlement was used as a dumping area for daily consumption waste. The occupation of the settlement came to an end around the mid-2nd century BC.



Figure 11. Çatalhöyük. TPC Area, A 3D model of the Hellenistic bell-shaped pit (© Çatalhöyük Research Project).



Figure 12. Çatalhöyük. TPC Area, Hellenistic ceramic vessels (© Çatalhöyük Research Project).



Figure 13. Çatalhöyük. TPC Area, A 3D model of the Hellenistic Building 120 (© Çatalhöyük Research Project).

The Hellenistic settlement at Çatalhöyük was one of many sites that emerged in this period and comprised an integral element of the newly emerged settlement pattern. The presence of vessels from the eastern part of the Hellenistic world with a lack of some vessels typical for the western part of Anatolia implies a closer connection with the east zone of the Hellenistic empire. The relations of this site with the Hellenistic settlement at the neighbouring Gordion are also well attested.

The last episode – the Ottoman burial ground

The last episode in the history of occupation of the tell at Çatalhöyük was an inhumation burial ground from the Ottoman period. It is dated to between the sixteenth and eighteenth centuries AD. The burials from the TPC Area comprise the margin zone of the cemetery with its central part placed directly northeast on the top of the southern eminence of the mound.

Altogether, 16 burials were unearthed in the TPC Area. They had two distinct forms: (i) chronologically earlier simple graves, and (ii) later graves with the niche. In the latter case, the body of the deceased was placed in a deliberately prepared niche in the southern corner of

the grave. The niche was later covered with mudbricks and the remainder of the upper burial pit was covered with sand.

Most of the burials represent adult individuals, lying in the extended supine position as primary disturbed or undisturbed inhumations, oriented east-west with head to the west. No grave goods were found in association with these burials.

Concluding remarks

The long-lasting research project conducted by a team of archaeologists from Adam Mickiewicz in Poznań at the Neolithic settlement at Çatalhöyük has brought about outstanding results and significantly contributed to better understanding of Neolithic lifeways in the Near East. The excavations in the TPC Area, as well as previous work in the TP Area, have revealed one-third of the millennium-long history of occupation of this important site. The team unearthed a unique sequence of the last four centuries of its inhabitation that was not previously known to date. The achieved results challenged the well-established picture of this world-renowned settlement and uncovered significant changes in the Late Neolithic phase of its existence including architecture, burial practices, pottery and lithics technology, a wide range of material culture including anthropomorphic figurines, stamp seals, and bone implements, as well as farming and husbandry practices, raw material procurement strategies, and the exploitation of the local environment. By recognizing the final period of the settlement occupation in the TPC Area, the work of the team has significantly contributed to the constriction of the new relative and absolute chronology of the settlement's occupation from its foundations to its ultimate abandonment. The contribution of the work of archaeologists from Adam Mickiewicz University in Poznań is also unearthing important episodes of the Neolithic mound use in the Iron Age and in early historic times.

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Treasures of Time:

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Heritage regained: results of rescue excavations in the Land of Cracow

Danuta Minta-Tworzowska

Abstract

This article provides a broader picture of the archaeological heritage of the Cracow (Kraków) Land that has been discovered through archaeological research as part of the project 'Archaeological excavations conducted during the construction of the S-7 expressway, section Moczydło–Szczepanowice–Widoma–Zastów–Cracow (sections B and D)'. This research has been carried out since 2015 by a consortium consisting of: the University of Wrocław, the Adam Mickiewicz University in Poznań, and the 'Archeologia Silesiae' Science Foundation. This paper examines settlement processes at Mogiła 56, an important site for this region previously investigated in the 1960s. The recent research conducted in the Land of Cracow has yielded many traces of settlement represented by features and numerous artefacts in complex contexts. This new evidence contributes to a better understanding of the relationship between changes in the landscape and settlement processes in the prehistory of the Land of Cracow.

Keywords: archaeology of the Land of Cracow, archaeological heritage, settlement processes, Mogiła, site 56.

Heritage regained

The motto 'heritage regained' has become a hallmark of the recent publications of the Adam Mickiewicz University in Poznań as the outcome of rescue excavations carried out ahead of the construction of national roads and motorways since 2009. Two monographs were published summarising the results of the research conducted in the Gniezno and Rawicz Lands (Minta-Tworzowska, 2013; Minta-Tworzowska & Chrapek-Wawrzyniak, 2018). In addition, a several-volume publication appeared as a result of research carried out within the dry detention basin in Racibórz Dolny as part of a separate series established by the Academic Publishing House of the Polish Academy of Sciences, the University of Wrocław, and AMU (Bobrowski, Gediga, Minta-Tworzowska & Piekalski, 2014a, 2014b, 2014c, 2014d). AMU participated in each of these projects and research was coordinated by Danuta Minta-Tworzowska.

Why heritage? In Jan Pruszyński's (2001, p. 50) words (summing up the spirit of various legal acts), heritage is 'a collection of immovable and movable objects together with the related spiritual values, historical and moral phenomena considered worthy of legal protection for the benefit of society and its development and transmission to future generations, for their intelligible and accepted historical, patriotic, religious, scientific and artistic values, which are important for the identity and continuity of political, social and cultural development, proving the truths and commemorating historical events, cultivating a sense of beauty and civilisational unity'.

Heritage understood in this way also includes the specific type, archaeological heritage. This terminology clearly refers to the Polish Act of 1962 on the Protection of Cultural Property and on Museums, in which the term 'cultural property' was introduced; to the Act of 2003 (as amended) on the Protection and Care of Monuments; and, in particular, to the European Convention for the Protection of the Archaeological Heritage (London, 1969; then revised at La Valletta in 1992). The term 'heritage' carries not only material, but also spiritual content and therefore its meaning in academic discourse and in public perception is far clearer than that of the term 'monument'.

This article only gives an overview of the aforementioned heritage of the Cracow region and includes only some of the remains unearthed during the archaeological excavations performed as part of the ongoing project 'Archaeological excavations conducted during the construction of the S-7 expressway, section Moczydło–Szczepanowice–Widoma–Zastów–Cracow (sections B and D)'.

Both the ongoing and earlier researches conducted under the auspices of the Adam Mickiewicz University (AMU) are part of a twenty-year government programme of rescue excavations along expressways and motorways funded by the State Treasury represented by the General Directorate for National Roads and Motorways – in this case the Cracow Branch.

This research is conducted by a consortium consisting of: the University of Wrocław (Leader), the Adam Mickiewicz University in Poznań (Partner), *'Archeologia Silesiae'* Science Foundation (Partner), and the Institute of Archaeology and Ethnology of the Polish Academy of Sciences (Subcontractor). The University of Wrocław is represented by Jerzy Piekalski and Mirosław Masojć, and the AMU by Danuta Minta-Tworzowska and Igor Kołoszuk (in his stead, Iga Fabiszak from June 1, 2020 to April 13, 2021). The contract for conducting excavation works was signed on December 15, 2015 and, from that moment on, AMU has been implementing excavation works within two parts of the planned construction of the S-7 expressway: No. 2 – Section B and No. 4 – Section D.

Due to the variety of results of the archaeological research, the large amount of material related to various archaeological taxonomic units (i.e. archaeological cultures), and the huge area of the investigated sites, the author of this work has decided to present one site in a more detailed way and just mention the others. Had this publication been compiled at a later date, taken place at the end of the year, the author could have referred in more detail and more fully to some spectacular discoveries made at other archaeological sites explored over an even larger area than the one selected for presentation in this work. Although the research itself has resulted in many valuable and unique discoveries, from an archaeological point of view it is more important to examine the daily lives of the prehistoric humans. All in all, this project has revealed the specificity of the prehistory of the Cracow Land and its richness compared to neighbouring regions.

The fundamental research questions asked by an archaeologist, whether for academic or rescue excavations, concern (1) the chronology of stratigraphic systems and sites, (2) the structure of buildings or the arrangement of graves, and (3) the belonging of artefacts to archaeological units. The extent of large-area studies also provides a good starting point for research into both settlement and the prehistoric and early medieval landscape of the study region.

The Consortium conducts research within two of the sections of the road construction project: D and B. In section D (part 4), the work carried out by the AMU uncovered the following archaeological sites: Krzesławice 39, Krzesławice 41, and Zesławice 63. Thorough archaeological investigation and analysis at an additional two sites from this section – Kraków Nowa Huta-Mogiła 56 (Minta-Tworzowska, 2019), and a small area associated with the site Krzesławice 42 (Kołoszuk, Rosińska & Skolasiński, 2017) – has been completed. Of these two, the author has selected one to discuss in more detail: Kraków Nowa Huta-Mogiła 56 (Minta-Tworzowska, 2019). In section B, AMU research focused on the archaeological sites of Szczepanowice 16, Wielki Dół 3, Zagaje Smrokowskie 10, and Smroków 4.

Studies on settlement in the region of Kraków Nowa Huta-Mogiła, site 56 (AZP 102-57/25)

The site Kraków Nowa Huta-Mogiła 56 is located on the top and slope of the floodplain terrace on the left bank of the Dłubnia River, between the riverbed and Wanda Mound. This area lies on the border of two mesoregions: the Proszowice Plateau and the Vistula Lowlands (Solon et al., 2018). Its parent material is loess mixed with slightly sandy fractions arranged horizontally (Figure 1).

The geomorphological features of the site were specified thanks to the preparation of a morphological soil profile for the nearby area. It contained formations showing connections with the Odranian and the Wartanian stages of the Middle Polish Glaciations and the period of the Baltic glaciation, as a result of which fertile brown soils were formed (Godłowska, 1976, p. 81). This site is a fragment of and at the periphery of a larger settlement complex located near the base of Wanda Mound consisting additionally of sites 54, 55, 55A. These latter sites were first studied in the 1950s and 1960s. Site 56 itself (not counting an episode with a gas pipeline), was analysed in the years between 2010 and 2015 (PAK Jaszewska). As these sites together form a single settlement complex, it is necessary and vital to discuss them as a single whole.



Figure 1. Location of Kraków Nowa Huta-Mogiła 56 on a geomorphological map (after: Solon et al., 2018).

Importantly – the highest part of the site was seriously damaged during construction works carried out at Ujastek Mogilski Street in the 1960s. Variations in absolute elevation recorded in this place amounted to 10.5 m. The investigations of Nowa Huta-Mogiła 56 were limited to the south and south-east by the range of the investment project, and to the east and north-east by a gas pipeline running along an NW-SE axis, beyond which were the areas partially explored during an earlier stage of construction of the S-7 expressway (site Mogiła 55; surveyed by A. Leciejewska and P. Wolanin), as well as a belt of tall trees (within plot 35/3). The latter temporarily precluded the possibility of exploration of the northern part of the site (Minta-Tworzowska, 2019, p. 5). The periphery of the settlement together with other sites were investigated within the framework of rescue excavations connected with the Nowa Huta 'integrated works' and its housing estates.

Despite the difficulties in observation and methodology related to the expansion of the city and its infrastructure, stratigraphic disturbances, and other factors, 104 archaeological features assigned to 9 chronological horizons were discovered and examined during the research (Table 1).

Phase	Pit	Inhumation grave	Pit / Inhumation grave	Ditch / Lynchet	Residential building	Hearth	Clay pit	Unspecified	Total
Linear Pottery culture	1	-	-	-	-	-	-	-	1
Lengyel culture (Samborzec-Opatów group)	4	1	-	-	-	1	-	-	6
Malice culture	10	-	-	-	1	-	1	-	12
Baden culture	10	-	-	-	-	-	-	-	10
Trzciniec culture	24	-	2	-	-	-	-	-	26
Trzciniec / Lusatian culture	2	-	-	-	-	-	-	2	4
Lusatian culture	10	-	-	1	-	-	-	-	11
Bronze Age	8	-	-	-	-	-	-	3	11
Early Modern period	6	-	-	6	-	-	-	-	11
Unspecified	8		-	-	-	-	-	2	10
Total	85	1	2	6	1	1	1	7	104

Table 1. Kraków Nowa Huta-Mogiła, site 56. Archaeological feature.

The part of the site investigated in 2016-2018 was as is presented by Figure 2. In other words, the research conducted at the site Mogiła 56 resulted in the discovery of the periphery of a village and features were uncovered representing all phases of its development. The spatial forms which deserve attention include numerous ditches, one of which has already been referred to as delineating the Early Bronze Age settlement. It seems likely that the said ditches mark, so to speak, the natural 'border' of the settlement.

History of research

The earliest records of Mogiła village (nowadays being a part of Nowa Huta district of Kraków) date back to the 13th century, when it was a village associated with a Cistercian monastery founded in 1218. In 1222, the Bishop of Cracow – Iwo Odrowąż, presented the Cistercians with the village and founded the monastery already being in existence. The first mention of the name of the village was discovered in a document from 1291, *'Clara tumba, quod vulgariter Mogyla appelatur'* (after Sulimierski et al., 1885, p. 586), whereas, the village exact description comes from *'The Geographical Dictionary of the Kingdom of Poland and other Slavic Countries'* (Sulimierski et al., 1885, p. 586). Over the centuries, the village was devastated by frequent invasions – first by the Mongols in 1241 and 1287, and then by the Swedes in 1656. In 1769 and 1772, the Russian army made them pay tribute, threatening to otherwise destroy the monastery lands, and during the partitions part of the Cistercian property was confiscated (Banaszak & Wawrzyniak, 2018). Although the character of Mogiła was strongly associated with the monastery, it was not very different from other villages otherwise, i.e. it had fields, mills, and ponds. The village changed only in 1949, with the start of construction of the Nowa Huta integrated works and the estates for the builders and then the workers of the Nowa Huta steel plant (Banaszak & Wawrzyniak, 2018).

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Historical sources also contain the information that, as early the 17th century, the area around Wanda Mound was called *'Pod Mogiłcze'* and was part of the Mogiła rural municipality (Lempart, 2012; Dzieszyński & Franczyk, 2006). The main trade route from Cracow to Lublin ran through the presented site and the now non-existent fragment of Bardosa Street (Figure 3).



Figure 2. The part of Kraków Nowa Huta-Mogiła 56 explored in the years 2016-2018. Scale 1:10,000.



Figure 3. Kraków Nowa Huta-Mogiła 56, fragment of the map showing the vicinity of Wanda Mound in 1833 (after: www.nhmz.pl).

The first traces of settlement located in the vicinity of Wanda Mound were recorded in 1908 by M. Wawrzeniecki and W. Demetrykiewicz. However, later in 1912, during repairs of the foundations of the tumulus structure, the same individuals did not find any archaeological material. Only a year later, in the course of the reconstruction works of the infrastructure of the Austrian fortifications located in that place, M. Drewko and L. Kozłowski discovered and investigated 16 Neolithic pits (Godłowska, 1976, p. 81; Rachwaniec, 1985, p. 89). Further rescue excavations in the area of the mound were undertaken in connection with the construction of a tramway line and metallurgical integrated works in 1962. Unfortunately, no material and only some modest descriptive documentation has been preserved from that last mentioned excavations. Richer sources were provided by the far larger-scale excavations carried out in 1963-1966 by A. Kogus, R. Zając, and R. Hachulska-Ledwos on behalf of the Nowa Huta branch of the Archaeological Museum in Cracow. The excavations covered an area of 460 ares (1 are = 10 m x 10 m unit), during which the area east of Wanda Mound and in its closest vicinity was designated as Mogiła 55 (for technical reasons, it was additionally divided into sections: 55, 55A, 55B and 55C) and the surrounding zone, investigated only within the control trenches, was numbered 53 (Figure 2, 4, 5, 6, 7; Rachwaniec, 1985, pp. 89-90; Bober, 1993, pp. 7-8).

The excavations yielded remains of settlements of Linear Pottery, Lengyel (Wyciąże–Złotniki and Samborzec–Opatów groups), Malice, Baden (formerly known as the Radial Decorated Pottery culture), Trzciniec, and Lusatian cultures, as well as some remnants related to the Corded Ware, Przeworsk, and Early Medieval cultures (Bober, 1993, p. 7; Godłowska, 1976, p. 81; Rachwaniec, 1985, p. 89). Unfortunately, although the material has been the subject of numerous publications and analyses (i.a. Hachulska-Ledwos, 1967; Rachwaniec, 1985; Kaczanowska, 1996; Bober, 1993, 1994; Górski, 1993, 1994), it has never been presented in a monograph.

In 2008, E. Dworaczyński carried out a surface survey at the site Mogiła 56 as part of the work preceding the currently implemented investment project, but no material was recorded then. It is worth noting, however, that the eastern part of Mogiła 56 coincided not only with the range of the research carried out at site 55 in 2011, but also with that carried out within the site in the 1960s.

The area was again covered by archaeological rescue excavations in 2010-2011 before the construction of the S-7 expressway junction Rybitwy – Ptaszyckiego / Igołomska. The archaeologists working on behalf of the Archaeological and Conservation Laboratory of Alina Jaszewska, MA, Zielona Góra, carried out further excavations at Mogiła 55 and examined a large area of the adjacent site 54. They recorded a number of relics related to the Neolithic (Malice and Baden cultures), Bronze Age (Trzciniec and Lusatian cultures), Roman, Early Medieval, and Early Modern periods (Leciejewska & Wolanin, 2011). In the course of work at site 55, a total of 31.46 ha were excavated. In addition, a fragment of site Mogiła 56 (4 ares of Kraków-Mogiła 54 located within Bardosa Streeet) was excavated. Mogiła 56 was delineated as a separate site in 1957 by S. Buratyński during the construction of the gas pipeline now

Figure 4. Kraków Nowa Huta-Mogiła 56, excavation works at the foot of Wanda Mound in 1963 (Photo: Archives of MAK).

Figure 5. Kraków Nowa Huta-Mogiła 56, excavation works at the foot of Wanda Mound in 1963 (Photo: Archives of MAK).

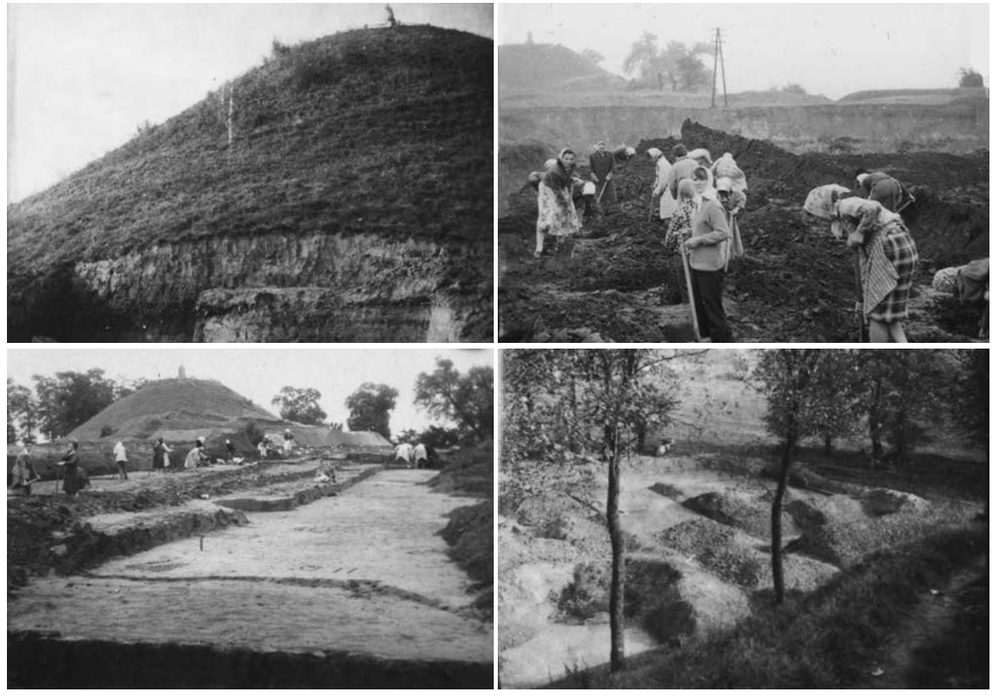


Figure 6. Kraków Nowa Huta-Mogiła 56, excavation works at the foot of Wanda Mound in 1963 (Photo: Archives of MAK).

Figure 7. Kraków Nowa Huta-Mogiła 56, excavation works at the foot of Wanda Mound 1963 (Photo: Archives of MAK).

running parallel to Ujastek Mogilski street based on fragments of medieval pottery discovered within the cut line (Buratyński, 1970, p. 253). As part of the research conducted by the Archaeological Conservation Laboratory PAK, run by Alina Jaszewska, MA, the work also covered a fragment of site Mogiła 56 i.e. a total of 4 ares of Kraków-Mogiła 54 located within Bardosa Street (Jaszewska, 2018). At Kraków-Mogiła 54, among 681 recorded features, 45 belonged to the Neolithic period, including 41 dated with archaeological sources. 5 features represented the Linear Pottery culture, 6 features represented the Lengyel culture, 20 features (including 5 without archaeological finds) represented the Samborzec–Opatów group of the Lengyel culture, 4 features represented the Pleszów–Modlnica group of the Lengyel culture, 4 features represented the Malice culture, and 6 features represented the Baden culture (the Radial Decorated Pottery culture). 20 features were ascribed to the settlement of the Trzciniec culture in the Early Bronze Age, 43 features to the settlement of the Lusatian culture (including 3 without archaeological sources), 5 features to the Przeworsk culture, 3 features to the early medieval settlement, 12 features to the late medieval settlements, and 205 features to the early modern period, including 10 without archaeological sources. In total, an area of 216.13 ares were excavated, including 4 ares on the north side of Bardosa Street i.e. where site Mogiła 56 is located. With regards to Mogiła 56, features associated with the Lengyel and Trzciniec cultures were documented (Jaszewska, 2018).

In 2014 and 2015 in the area of the sites Nowa Huta-Mogiła 51, 53, 55, 62, 62A, and 62B, full-scale, rescue excavations were carried out in connection with the construction project *'Sieć cieplna 2xDn 600'*. The work was carried out by a team of archaeologists associated with the Archaeological Museum in Cracow (pers. comm. Ms. Justyna Rodak[1]). The study area of Mogiła 53 and 55 covered 23.43 ares and 149 features dug in the ground were recorded during the excavation works. Two features were classified as Neolithic, three as belonging to the Malice culture, and five related to the Baden culture. The Bronze Age was represented by three features – one was ascribed to the Trzciniec culture, and fifteen features represented the Lusatian culture. One feature was classified as a La Tène Pit, five as prehistoric features, and thirteen were related to the Early Modern period. The research showed an increase in the range of the site towards the west.

Other prehistoric features were discovered at Mogiła 51, 62, 62A and 62B within an area of 5.24 ares. These included three features from the times of the Malice culture, two features classified as Neolithic, one identified as a general prehistoric feature, and two features belonging to the Lusatian culture.

In summary, previous excavation work conducted in the vicinity of Wanda Mound had already revealed the existence of unusually intensive settlement, lasting at least from the Neolithic up to the present day, in all sites belonging to *"Kraków Nowa Huta Mogiła"* (53, 54, 55 and 56) before the rescue operations described in this paper commenced (Figure 8).

[1] The author would like to warmly thank Ms. Rodak for her generous sharing of information.

Analyses of archaeological materials: transformations of settlements

In terms of chronology, the rescue excavations at Mogiła 56 site provided very rich material, especially from the Neolithic period as well as from the Bronze Age and, in some part, from the early modern period (Figure 9).

The oldest manifestations of the presence of human groups at Mogiła 56 revealed by the research are from the Neolithic period. 29 Neolithic features were recorded, of which one feature was associated with the people of the Linear Pottery culture, six were classified as belonging to the Samborzec–Opatów group of the Lengyel culture, twelve were assigned to the Malice culture, and ten to the Baden culture. All remains from these features were catalogued (Fabiszak & Krueger, 2019). The following fragments of pottery were ascribed to these units: Linear Pottery culture – six small fragments, Samborzec–Opatów group of the Lengyel culture – 369 fragments (101 fragments remained after vessel refitting, with the remainder of the fragments forming seven almost completely preserved vessels), and Malice culture – 602 fragments (406 fragments of pottery remained after the conservation of the material).

All sherds were analysed, regardless of their state of preservation. After vessel refitting, the types of vessels represented in the Samborzec–Opatów group and Malice assemblages were determined. The settlement situation may be outlined as follows: the existence of the Samborzec–Opatów group (Fabiszak, 2019) manifested itself in the finds of single features

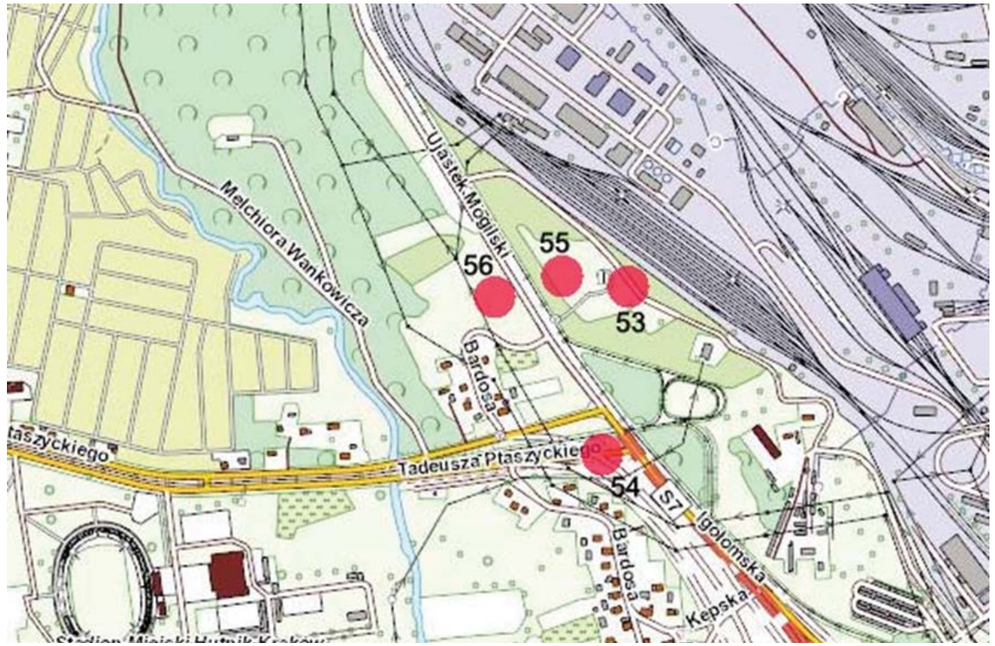


Figure 8. Kraków Nowa Huta-Mogiła 56, approximate location of sites 53, 54, 55, and 56.

of an economic character, as well as a hearth and (probably) a grave. Unfortunately, not even fragments of human remains were preserved in the lattermost feature, which can be related to its shallowness and the high level of destruction of its upper levels as a result of post-depositional processes. However, a typical set of grave goods was preserved, containing whole vessels including hollow-pedestal beakers, a bowl, and a cup.

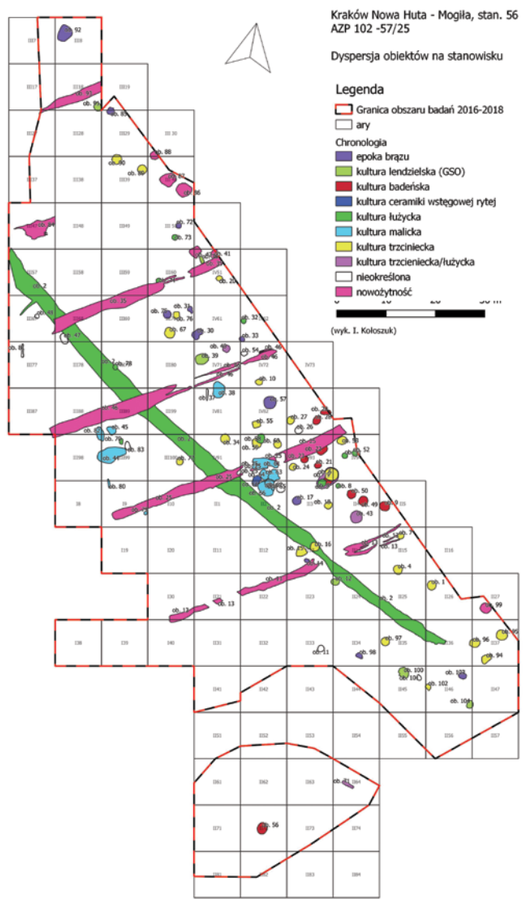


Figure 9. The part of Kraków Nowa Huta-Mogiła 56
Distribution of artefacts within the area excavated in the years 2016-2018.

During the following Malice culture population occupation of Mogiła 56, the intensity of settlement increased (Fabiszak, 2019). This phase was represented by a compact cluster of features of an economic character, one residential building (no. 66), and a clay pit. In addition to pottery, stone tools were also recovered from features belonging to this period. The settlement of this culture preferentially developed on loess soils. The pottery bears features very similar to that made by the Samborzec–Opatów group, and the only special form recorded during the archaeological investigations was a goblet-shaped vessel.

Other traces of settlement from the Neolithic are connected with the population of the Baden culture or the Radial Decorated Pottery culture (Figure 10; Krueger, 2019). Manifestations of the Baden culture in Lesser Poland have been quite well investigated, especially in its western part. Lesser Poland is considered to be the northernmost zone of the Baden settlements from its centre in the Carpathians. The influences of the Transcarpathian patterns are visible in the processes of adaptation and acculturation, referred to as ‘Badenisation’ of other culture groups. The heyday of settlement is associated with the Classic and Late Classic phases and includes sites located on the left bank of the Vistula River. Baden settlements were primarily located on chernozem and brown soils formed on loess. The latest period of the Baden culture, referred to as the Epibaden horizon, is represented by Bošáca-type materials, known predominantly from cave sites. Signs of activity left by populations using Baden material were recorded at Mogiła 56. 10 features, including 8 homogeneous features, were recorded. All of the pits were characterised by a circular shape, multi-layered fill, and relatively abundant archaeological material. The objects showed stratigraphic coherence. The analysis of the pottery was multidimensional and included: morphology, technology, stylistics, and function in conjunction with chronological determinations. An interesting observation was made that thin-walled pottery prevailed over thick-walled pottery and it was determined that the assemblage of pottery from Mogiła 56 was associated with the late phase of the Baden culture.



Figure 10. The part of Kraków Nowa Huta-Mogiła 56
Hollow-pedestal beakers of the Samborzec-Opatów group from feature 36 (Photo: M. Gembicki).

The spatial analyses that have been carried out are very important for understanding the development of the site as a whole. They make it possible to capture transformations in the organization of space, construction of the houses, and the location of economic features in that space. The following relationships were noted during the spatial analysis of Mogiła 56: the features related to the settlement of the Samborzec-Opatów group were recorded in various zones of the site. Compact remnants of the population of the Malice Culture were recorded only in the central part of the site. A separate, compact spatial cluster was formed by features attributed to the Baden culture (Bober, 1993, 1994) (excluding Ft. 56).

The analysed materials from the site Kraków-Nowa Huta-Mogiła 56 fit into the already investigated issues of the Neolithic in Lesser Poland as presented in literature. In particular, the settlement features of the Samborzec-Opatów group and the burial site of the population of the Samborzec–Opatów group seem to be compelling. Five of them were the settlement features and one was. The latter included the most interesting assemblage of pottery with two hollow-pedestal beakers – Figure11. They were standard grave goods of that time, deposited in the typical manner (Kaczanowska & Kozłowski, 2006, p. 32).

In general, the Neolithic material from Mogiła 56 shows great similarities to the inventories from Pleszów 17 and Kraków Nowa Huta-Mogiła 54 and 59. There is a high probability that, in a broader context, the materials from the site discussed herein coincide chronologically with corresponding materials from the neighbouring sites and may prove the existence of a large, long occupation in this area, first used by the population of the Linear Pottery culture, then by the Samborzec–Opatów group, and finally by the community of the Malice culture (cf. Grabowska & Zastawny, 2014).

The materials obtained from Nowa Huta-Mogiła 56 contribute to the issue of the connections and genesis of the Samborzec–Opatów group and the Malice Culture. There are interesting stylistic connections between the pottery assemblages from Pleszów and Mogiła 54 and 56. The syncretic nature of this group, reflected in the pottery inventories, has long posed many interpretative difficulties. Frequent cases of similarities noted in the ‘Samborzec’ and ‘Malice’ materials are also visible at Mogiła 56. On the other hand, more and more frequent finds which contradict the validity of the hitherto existing pottery determinations resulted in the emergence of a hypothesis that the Samborzec–Opatów group was the earliest phase of the Malice Culture (Ścibor–Michalak, 1996, p. 46).

After the Neolithic, there were significant transformations in the spatial organisation of settlements and the abandonment of the earlier behaviours connected with the funerary rites. At Mogiła 56 a new epoch – the Bronze Age – started with the settlement of the population of the Trzciniec culture and mainly, the settlement of the population of the Lusatian culture (Górski, 2019). These Bronze Age occupations can be broken into three (Trzciniec: Early-Classic, Post-Classic, Late) and two (Lusatian: early I and early II) phases, respectively.

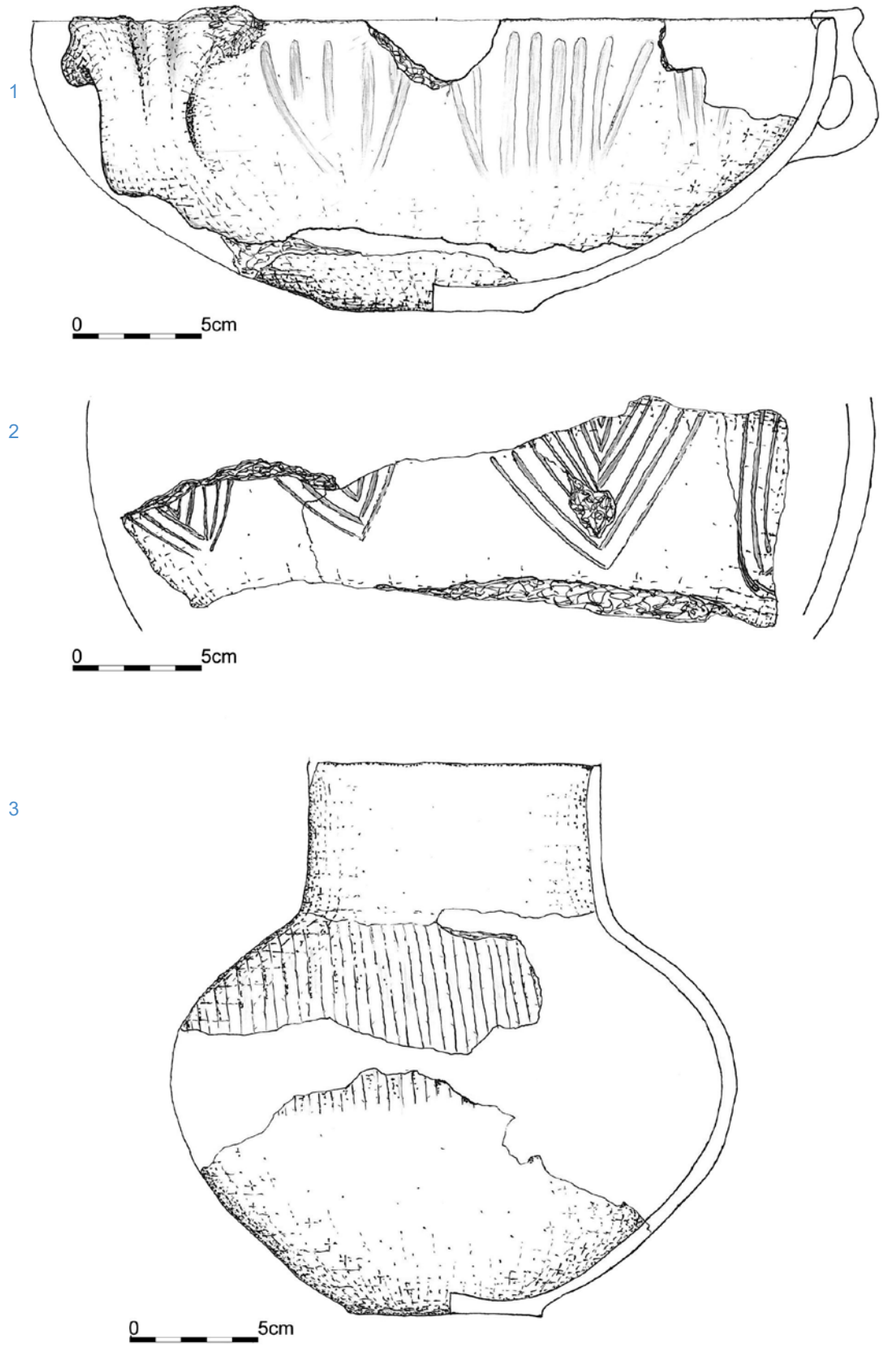


Figure 11. The part of Kraków Nowa Huta-Mogiła 56
Selected pottery: the Baden culture, Ft. 56 (1, 3), Ft. 22 (2) (Drawing by I. Fabiszak).

From the perspective provided by the remains dated to the Bronze Age, Mogiła 56 was a continuation of the site marked as 55 that was the periphery of the multiphase settlement from that period. Site 55 was studied extensively in the years 1963-1966 by a team from the Nowa Huta branch of the Archaeological Museum in Cracow (Buratyński, 1970). Although the materials from the Bronze Age were published (Rachwaniec, 1985; Górski, 1993, 1994), it was concluded that the catalogue required verification. As a result, it was re-published in the mid-1980s (Cf. Górski, 1993, pp. 55-56).

The majority of the material recorded at the site Mogiła 56 represented the Trzciniec culture (TC) and the early stage of the Lusatian culture (LC). The continuation of the occupation between the TC and LC and the change in the system of settlement organization and material culture were thus confirmed (Górski, 1992, 1997, 2002). According to J. Górski, the change was a result of the influence of groups representing the Urnfield type of culture, which settled down in the area near Cracow at the beginning of the Middle Bronze Age (Gedl, 1967, 1982; Rydzewski, 1991). Eight construction phases relating to the end of the Early through the Middle Bronze Age were identified at Mogiła 56 (Górski, 1994, pp. 92-102). Only a few small fragments of vessels were assigned to the younger development phases of the LC (Górski, 1994, pp. 92-102). Features were ascribed to the Bronze Age based on the pottery found in their fill: 26 to TC, eleven to LC, and four to either the TC or LC. In most cases, the features were settlement pits. However, one interesting feature was a ditch (Ft. 2) of considerable length, over one hundred meters, ascribed to LC. The chronological data of the objects was established on the basis of the pottery found in the fills. In four cases, its poor state of preservation did not allow for assigning the pits to any of the distinguished cultures.

A preliminary analysis of the artefacts obtained from site Mogiła 56, which had the Trzciniec and Lusatian features, shows that they did not differ from those discovered during the excavations carried out at the neighbouring sites (cf. Rachwaniec, 1985; Górski, 1993, 1994). That is why the previously developed typology of the vessels and the system of their technological description common for the TC and the LC were used.

Materials related to the TC were discovered in 26 features. The 26 TC settlement pits were classified as economic activity type. As in the case of the neighbouring site, Mogiła 55, no post-holes or other structures which might have fulfilled a residential function were recorded. An analysis of the fragments of daub found at sites 51 and 52 leads to the conclusion that pits served a storage function with walls reinforced using wattle daubed with clay. These storage facilities / 'cellars' were likely indispensable elements of houses and their surroundings. In addition, three pits contained human remains, including one with full skeletons of two adult individuals (Ft. 34). Both were articulated burials. Similar discoveries made within the settlement context were known from the neighbouring site 55 and – especially – from the area of Western Lesser Poland. The second pit contained only a fragment of human bone and a complete skeleton of horse (Ft. 95). The third pit (Ft.1) yielded a fragment of human femoral bone and a part of the occiput. In the area of Nowa Huta, two more settlements with graves were discovered. A single TC burial may be associated with a small village located in the area of Nowa Huta-Pleszów (Site 17) (Górski, 1995) and one collective burial was recorded at Cło, site 65 (Górski & Wróbel, 2000). The spatial analysis made it possible to distinguish the following time intervals for the Trzciniec phases: the Early Classic phase (two independent farms), the Post-Classic phase (large distances between the buildings), and the Late phase[2].

The LC settlement was represented by 11 features, 10 of which were classified as economic pits. The pits were located in the most elevated spots of the settlement. The final feature was a long ditch (Ft. 2). This north-west and south-east aligned feature was, unfortunately, not fully exposed – its northern end was located outside the area covered by the construction project. Worse still, the last section of the ditch was destroyed during the construction of the integrated works. At the exposure level, generally, the feature had a clear outline and an irregular, elongated shape, and its fill revealed some indeterminate, bronze objects. Within the 125 m surveyed length, its width ranged from 1.16 m to 4.26 m. Ditches are an inseparable element of settlements characteristic of the LC, particularly in western Lesser Poland. One ditch of unspecified purpose, associated with the oldest phase of settlement, was found in Wieliczka (Fraś & Reguła, 2001). A similarly dated ditch, separating a settlement from a cemetery, was discovered in Targowisko, Wieliczka district (Konieczny, 2014, p. 113). A palisade, built on a circular plan, which was discovered in Kraków-Bieżanów, should be associated with the Early Iron Age (Przybyła, 2017, p. 382). The youngest phase of the defensive complexes of the LC in western Lesser Poland is marked by fortified settlements in Kraków-Tyniec and in Biskupice, Wieliczka district, which were dated to the turn of the Hallstatt and the La Tene periods (Gedl, 1982, pp. 27-29). The fortified settlement, existing at least from the end of the Bronze Age into the Hallstatt period in Witów, Proszowice district, seems truly unique (Gawlik & Godlewski, 2010, p. 333). The spatial analysis for the LC showed two main phases: phase I and phase II.

A specific feature of the TC and LC settlements within the area of Nowa Huta is that both units form mixed cultural assemblages. They are known primarily from the settlement at site 55, but also from Pleszów 49 (Górski, 1997, pp. 29-31). A second ditch in the same settlement cluster, stretching along the bend of the floodplain, belonging to LC was identified at Mogiła 55. It separates the residential zone of sites 56 and 55 from the floodplain valley. At this point, the reader's attention should be drawn to the lack of objects of the LC within a several-metre-wide strip stretching along the ditch on its eastern side. This may be due to the fact that the soil obtained from the fill of the ditch was probably used to build a rampart as additional reinforcement. As in the case of the TC village, also in the times of the LC, the investigated zone is peripheral to the main village at site 55. Presumably, the other recorded features represented a single homestead, which was similar to the structures recorded at site 55. The ditch, which is probably a relic of unspecified settlement fortifications of the early stage of the LC, was a truly compelling discovery.

The site also yielded traces of settlement from the early modern Period (Kołoszuk & Fabiszak, 2019). The analysed archaeological objects and historical materials were classified during fieldwork as modern. Twelve features were identified, which can be grouped into two basic categories. Features 13, 93, 84, 35, 46, and 25 are shallow, irregular ditches, which are most probably the remains of ridges (lynchets) between smaller fields. Features 41, 42, 86, 87, 88, and 99, on the other hand, are pits with quite specific characteristics. These modern remains were fills from archaeological works carried out between 1963 and 1966. The methodological novelty in the case of the presented settlement was the use of GIS methods on modern

[2] The relative dating of the TC materials from Nowa Huta-Mogiła, site 56, was based on their comparison with the chronological system developed for the settlement at the neighbouring site 55 (Górski, 1993, 1994).

features. Two types of excavation plans were correlated in the GIS environment: the ones from 1963-1966 with the plans of the currently conducted research. It should be noted, however, that the field documentation standards operative in the early 1960s did not assume that any research would be carried out based on the National Geographic Coordinate System. Instead, they were based on the available, hypsometric maps. In order to correlate the two plans, an altimetric map of the area of Nowa Huta from the period before the construction of the Nowa Huta integrated works was acquired from the National Archives in Cracow. Using the section presenting Wanda Mound and the adjacent areas, the plan was correlated with the map of the distribution of archaeological sites discovered in the 1960s using characteristic topographic points.

In the next stage, the plan was georeferenced with the contemporary orthophotomap using QGIS tools. A contemporary plan of the location of the features at Mogiła 56 was plotted on this basemap. The resultant summary indicated some cases of re-exposure of the previously excavated features, confirming the hypothesis that features 86, 87, and 88 were backfills or negatives of the previously excavated pits; most probably, they correspond to several features explored in the 1960s. However, operating within the convention of requirements related to the scientific elaboration of the research results, a decision was made to systematically describe the characteristics of the explored archaeological features and the materials deposited in them. The nature of the features made it possible to introduce an idea of a specific form of research work in this part of the site. In addition, the use of GIS helped to match the layout of parallel lines with the lynchets separating individual fields, presented on a 19th century map.

All of the aforementioned conclusions were possible thanks to the use of GIS, suggesting the importance of incorporating this spatial analysis on a wider scale in archaeological research, especially when it is necessary to refer to the archival results of works conducted in the directly adjacent areas. They are a source of reflection on what remains of the archaeologist's fieldwork and how the methodological requirements change the view on these issues.

The following specialised analyses were carried out for site Mogiła 56:

a) an analysis of human skeletal remains (Rychtarska, 2019). Two human skeletons were recorded in feature 34. One of the buried individuals had a microlithic flint arrowhead stuck in the left elbow joint, which probably caused the left forearm to be shorter than the right. However, the poor state of preservation of the bone material precluded the possibility to perform more detailed analyses. In addition, the site also yielded single human bones, unearthed in features 95 and 1.

b) an analysis of flint and obsidian materials (Grużdź & Pyżewicz, 2019). This analysis was carried out in terms of raw materials and typo-technology. The main focus was put on the analysis of the materials from the individual features representing the Malice, Baden, Trzciniec, and Lusatian cultures. The occurrence of stone tools in the settlement area is noteworthy (Figure 12). The analysed flint materials were largely associated with the Neolithic communities. Fragments of obsidian, the traces of use of the punch technique, and characteristic endscrapers can be connected with the Danubian groups identified with the Linear Pottery culture or the Malice culture. In addition, some polished tools (flakes) suggest that some of the structures may have been in use during the middle stages of Neolithisation or the Early Bronze Age. A double-sided sickle and semi-finished biface may be included in the latter period. Several massive burins indicate a previously unrecognized probable episodic settlement of Late Palaeolithic groups at the site.

c) an analysis of animal bone remains (Moszycka, 2019). A wealth of faunal material was obtained during the research conducted at Mogiła 56 from the features associated with the settlement of the Lengyel, Malice, Baden, Lusatian, and Trzciniec cultures, as well as from the cultural layers. A total of 1,129 animal bone fragments were analysed. Anatomical, species, and taphonomic assessments were made. The discovery of a complete horse skeleton is noteworthy (Ft. 95, Figure 13). The rest of the bones belong to cattle and small ruminants.



Figure 12. The part of Kraków Nowa Huta-Mogiła 56
Selected stone artefacts of the Trzciniec culture from features 1 (1), 59 (2), 7 (3), and 16 (4).

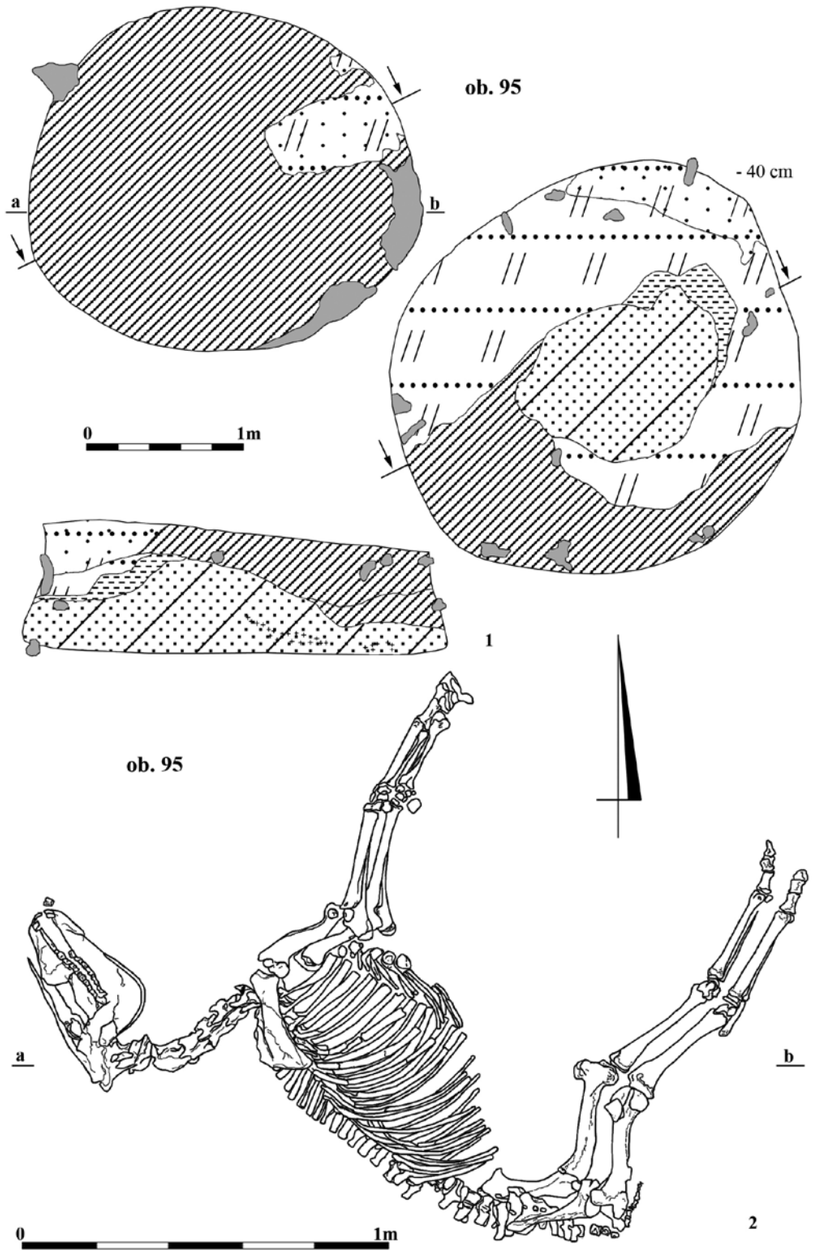


Figure 13. The part of Kraków Nowa Huta-Mogiła 56
Preserved skeleton of horse, Ft. 95.

d) In addition, an analysis of stone monuments (Krueger, 2019) and daub (Kołoszuk, 2019) were carried out. They provided information about the selection of stone raw materials and the methods of preparation of daub masses used for construction purposes. The analysis of the daub helped to detect significant differences in the composition of the daub from the Neolithic and the Bronze Age, as well as to identify the features which functioned as storage pits with plastered walls.

Concluding Remarks on Mogiła 56

The results of the research at Mogiła 56 in the area covered by the construction project provided new information on prehistoric and modern settlements. An undeniable value of this study is the spatial correlation of the results of the archaeological excavations at sites 55 and 55a conducted in the 1960s and the present-day excavations at site 56. Using the available spatial information, the older plans were georeferenced, resulting in a composite plan of the sites showing a multiphase, extensive settlement. It served as the basis for further analyses, allowing the development of a broader picture of the immediate vicinity of the study settlement. As a result, it was argued that Mogiła 56 is only a periphery of an extensive multicultural site. Moreover, this case shows that an investigation of a settlement which is limited to such a small section and performed in isolation from the wider context, could lead to drawing only partial or even erroneous conclusions. The materials obtained from Mogiła 56, as well as from the much better explored sites and investigated by the authors of the present study, could be used for broader settlement or landscape studies. Importantly though, the latter require using more advanced technologies, which is not the current focus of the rescue excavations.

Investigations carried out at the other sites

Site	Investigated area
Szczepanowice 16 (AZP 97-57/112)	10.14 ares
Krzesławice 42 (AZP 102-57/17)	33.34 ares
Krzesławice 41	
Wielki Dół 3 AZP (97-57/174)	11.75 ares
Zagaje Smrokowskie 10 (AZP 98-57/70)	247.23 ares
Smroków 4 AZP (97-57/145)	The total area of the site in the area which overlaps the planned S-7 expressway was initially estimated at 4.6 hectares. However, in total, the excavations covered a large area of 1020.8 ares.

Table 2. Investigations carried out at the other sites.



Figure 14. Zesławice 63.
Grave with preserved sword (Ft. A33).

The sites which are currently under investigation include Krzesławice 39 and Zesławice 63. In the scope of part 2 – Section B, archaeological works have been completed at Szczepanowice 16, Wielki Dół 3, Smroków 4, and Zagaje Smrokowskie 10 (Table 2). The materials obtained from the last two sites (the largest in both sections) are currently at the stage of study and specialist analyses, therefore they are only mentioned. The research in Smroków and Zagaje Smrokowskie has already yielded extremely rich and numerous material (being currently under study), the importance of which cannot be overestimated. The ongoing excavation works include sites Krzesławice 39 and Zesławice 63. In the course of excavations at Zesławice 63, conducted by Iga Faliszak, a grave was discovered in which an early medieval sword was found. This artefact has already undergone conservation procedures. This find is extremely rare in funerary contexts in southern Poland (Figures 14 and 15). This discovery, like many others, requires a separate study and, therefore, this thread is abandoned in this point.



Figure 15. Zesławice 63.
Sword from grave A33 after conservation procedures.

Selected artefacts discovered at the aforementioned sites:

1) Szczepanowice 16. Only one artefact was discovered at this site classified as belonging to group VI (after: O. Almgren) (Figure 16). The fibula was analysed using a Bruker Tracer III SD handheld X-ray fluorescence spectrometer. The results indicate that the artefact was made of a silver and copper alloy (Krueger, 2017). A fragment of a WWII trench was another, significant discovery made at the site.



Figure 16. Szczepanowice 16.
Fibula made of a silver and copper alloy, classified as group VI (after: O. Almgren)

2) Krzesławice 42 – from the material recorded at the site, only some specimens were selected (Figure 17).

3) Krzesławice 41. At this site, rich with archaeological material, the following *(inter allia)* were discovered: hatchets made of serpentine – Fts. 311, 293 and 206; some amount of rare, raw material – obsidian (Ft. 230), a fragment of amber (Ft. 200), a clay spindle whorl (Ft. 208), and a clay spool (Ft. 206; Figure 18). Other finds included serpentinite axes (Fts. 311; 293 and 206; Figure 19). On the other hand, the Bronze Age settlement was represented by an economic activity pit with two fragments of a bronze wire which, presumably, belonged to a spiral bracelet. Both fragments were subjected to metallurgical analysis using the Bruker Tracer III SD handheld X-ray fluorescence spectrometer. The analysed samples were composed of 54% copper and about 38% tin, as well as a trace amount of zinc, iron, and arsenic (Koloszuk 2017, p. 23). Simple ornaments made of wire of this type were typical from the beginning of the Bronze Age. However, their highest accumulation is associated with the settlement of the Lusatian culture (Blajer, 1990, p. 23).



Figure 17. Krzesławice 42.
Selected monuments.



Figure 18. Krzesławice 41. 1. obsidian from Ft. 230; 2. clay spool from Ft. 206; 3. amber from Ft. 200; 4. spindle whorl from Ft. 208; 5. clay spindle whorl (?) from Ft. 196; 6. whetstone from Ft. 170; 7. flint denticulate tool from Ft. 251; 8. pottery with decoration from Ft. 178.



Figure 19. Krzesławice 41. 1. hatchet made of serpentinite from Ft. 311; 2. hatchet prob. made of serpentinite from Ft. 293; 3. hatchet made of serpentinite from Ft. 206.

4) Zagaje Smrokowskie 10. They constitute a significant and quite thoroughly investigated archaeological site. In terms of chronology, the oldest traces of habitation should be associated with a Neolithic settlement and, in particular, with the Lengyel culture (over 200 features). The other datable archaeological objects are related to the Malice culture, the Funnel Beaker culture, the Mierzanowice culture, the Lusatian culture, and the early modern period. Among the features the following were recorded: pits, post holes, ditches, and residential buildings (Figure 20). Another find included two inhumation burials. The excavations yielded 11,486 fragments of pottery; 2,982 flint artefacts; 1,191 fragments of daub; 2,917 fragments of animal bones; 190 stone artefacts (an axe, polishing stones, grinding stones, and fragments of querns); everyday objects made of clay, e.g. fragments of spindle whorls or loom weights; and metal objects (e.g. a copper twist). Also, over a dozen shell fragments were recorded, four of which were elements of pendants (Figure 21).

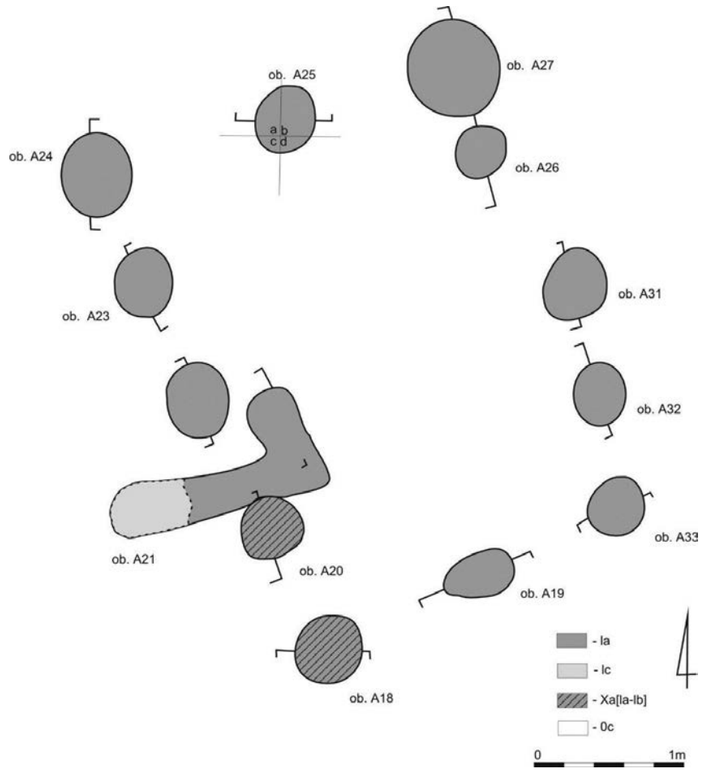


Figure 20. Zagaje Smrokowskie 10.
Exemplary system of post holes (residential building).



Figure 21. Zagaje Smrokowskie 10. 1- shell ornament from (Ft. A170);
Smroków 4: 2-5 clay whorls (Fts R1 and H50); and fragment of shell ornament (Ft. R1).



Figure 22. Smroków 4. Pottery from a grave representing the CW culture in the moment of excavation (Photo: I. Fabiszak).

5) Smroków 4 is one of the most complex and also spectacular sites investigated by the AMU Team. 611 features were studied at the site. In total, 81 features were classified as representations of the Neolithic period (Lengyel, Malice, Funnel Beaker, and Corded Ware cultures). Among the objects from the Early Neolithic, five features of the Funnel Beaker Culture and eleven features related to the people of the Corded Ware culture. Seven features were dated to the Early Bronze Age. Nine features were classified as of the Mierzanowice culture, the same number relate to the Lusatian culture, and seventeen features were identified as belonging to the Trzciniec culture. The next traces of settlement (28 features) were related to the Early Middle Ages, and the same number of features were attributed to Early Modern times. Also, 26 structures were associated with the World War II and the construction of military fortifications – trenches.

The site is complex not only because of the occurrence of features typical of settlement (houses – 24, pits – 357, post holes – 11, and ditches – 26), but also because of graves. Among the discovered burials are inhumation graves (47), one grave without human remains, and cremation burials (21). For example, eleven graves of the Corded Ware culture population were recorded, located in different clusters. They included single burials equipped with one vessel only, and very richly furnished ones with the deceased placed in niche pits in pairs. Sets of well-preserved pottery with fragments of animal bones inside some of them were found in this place (Figure 22).

The finds related to this culture also include beads made of bone, tools made of bone and stone, and, in particular, bronze ornaments (Figure 23). Other finds included clay spindle whorls (Ft. R1 and H50) and shell ornaments from Ft. S10 (c.f. Figure 21 and Figure 24).

It is also important to note that the analysed site yielded some artefacts from the Early Middle Ages – they were material from the cemetery located on a flat hill in the central part of the site. It can be strongly assumed that it represented the Alt Käbelich type, which is a truly unique find, especially for the areas of southern Poland. The high importance of the site makes it deserve a separate article or even a monograph.

Conclusions

In two parts of the planned construction of the S-7 expressway, No. 2 – section B and No. 4 – section D, a total of 1,409.19 ares were excavated (section D – 119.27 ares; section B – 1,289.92 ares), and the investigation is still in progress (one of the sites – Zesławice 63, is likely to be excavated on a further area of about 1 ha). Numerous traces of settlements represented by features and artefacts made by prehistoric people and attributed to many archaeological cultures, as well as numerous materials were recorded during the research. Undoubtedly, the large-area type of investigations will allow for a multidimensional analysis of the features and a description of their mutual relations in the coming years. The obtained sources will contribute to a better recognition of settlement processes and landscape changes as well as a better, archaeology-based understanding of life and death in the prehistory in the Cracow area.



Figure 23. Smroków 4. Bronze ornaments of the population representing the Mierzanowice culture after conservation procedures.

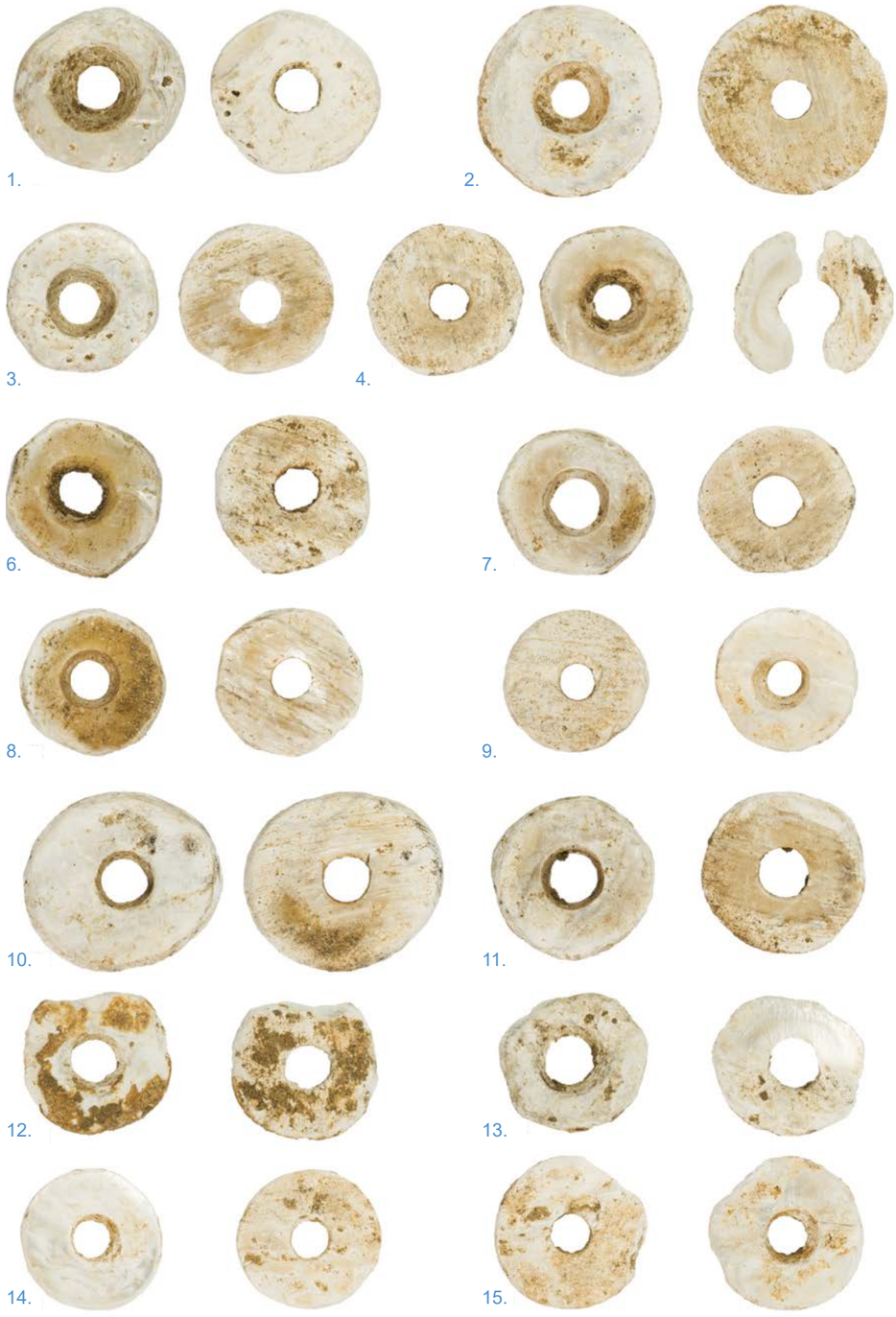


Figure 24. Smroków 4. Shell ornaments (Ft. S10).

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Lost and found: The Funnel Beaker culture's 'megalithic tombs' in the cultural and natural landscape of Greater Poland

Danuta Żurkiewicz

Abstract

Non-megalithic long barrows were the earliest type of monumental tombs that occurred in Europe. The oldest structures of this type, dating to 4800-4300 BC, are known from north-western France. Then, at the beginning of the 4th millennium BC, unchambered structures occurred in southern and central England, northern and central Germany, Denmark, and Poland. In Poland, tombs representing the Funnel Beaker culture (TRB) are found in several distinct concentrations which do not correspond to the entire range of the settlement oecumene of this community. They are also quite diverse in terms of construction and size. Interestingly, their origin and purpose still remain a mystery. It seems likely, though, that for their creators they had much higher significance than just a place to bury some selected members of the community. Most probably, they were a kind of symbolic marker of a given area, testifying to the unity and power of the communities living in such a region. Some researchers associate their origin with the influence of hunter-gatherer communities on agricultural communities. Other approaches to this topic point to the importance of borrowing the house model of early Neolithic communities, which was symbolically transformed into a 'house for the dead', i.e. a tomb. In most regions of Poland, megaliths were only 'rediscovered' in the 19th century by archaeologists, some of whom were amateurs. Unfortunately, this was not the case in Greater Poland. The megalithic tombs of the TRB remained unrecognized there until the second decade of the 21st century! What largely contributed to their discovery was technological progress, mainly the use of LiDAR (Light Detection and Ranging). Ongoing research aims to locate and verify occurrences of other cemeteries and to 'embed' them in the cultural and natural landscape of this region.

Keywords: Greater Poland, Funnel Beaker culture, TRB, Non-megalithic long barrows, paleoenvironment

Introduction

The area of the Middle Warta Basin is a place of significant accumulation of settlement remnants of the Funnel Beaker culture (TRB), reflecting an approximately 1500-year-long period of development in the region. It also contains the initial markers of significant socio-cultural transformations influencing the whole group of the eastern TRB. Such processes are certainly exemplified by the emergence of the Wiórek and Luboń styles, which illustrate two civilisation 'breakthroughs' within the presented community, and are considered one of the basic components of the TRB 'package'

Another such determinant that binds together the significantly differentiated groups of the TRB is the funeral rite associated with building monumental unchambered tombs. Until recently, the state of knowledge of the Greater Poland region did not allow for its inclusion in considerations on 'Megalithism' in the TRB culture. This created a puzzling picture of a vast settlement *oecumene* in the central Warta basin, located in the zone of crossing influences from neighbouring agglomerations, and testified by at least 3,000 known sites of this community, but almost completely devoid of any funerary sources. Confronting this state of knowledge with the current recognition of megalithic structures in the surrounding regions of Central Germany, Pomerania, Kuyavia, Lower Silesia, and Lesser Poland, makes interpretations of a central area "barren" of megaliths difficult.

The recent discovery of a megalithic cemetery in the village of Sobota, district of Poznań, significantly changes this perspective (Żurkiewicz, Niebieszczański & Bahyrycz, 2020), and the already conducted preliminary research indicates that megalithic phenomena in Greater Poland remain greatly underestimated.

Unchambered tombs in the European and Polish perspectives

The only passage-grave construction related to the TRB discovered in Poland is the tomb from Borków in Western Pomerania (Kleist, 1964; Skrzypek, 2002). The other tombs of this community recorded in Poland can be classified as unchambered structures, which in the English literature are referred to as: unchambered long barrows, earthen long barrows, and non-megalithic (earthen) long barrows (see i.a. Piggott, 1967; Midgley, 1985; Müller, 2011). These unchambered tombs are the oldest form of monumental funerary structures yet recognized in Europe, first occurring c. 4800-4300 BC in NW France in the Paris Basin in the context of the Cerny culture (Midgley, 2005, p. 89; Rzepecki, 2011a, p. 124, 2011b, p. 158). Next, within almost the same time horizon, early in the 4th millennium BC, unchambered structures appeared in southern and central England, northern and central Germany, Denmark, and Poland (Wunderlich, Müller & Hinz, 2019) (Figure 1). Throughout all these areas, apart from Poland and the oldest site in France, they then evolved into younger '*megalithic*' forms, i.e. having a built-in burial chamber, in the form of dolmens or passage-graves (Midgley, 1992, p. 418; cf. Müller, 2011, p. 33). The short time horizon connected with the occurrence of the analysed tombs in vast areas of Europe was initially identified by researchers with the spread of a kind of idea – religion, or even an invasion of builders of the megalithic structures (Childe, 1949).

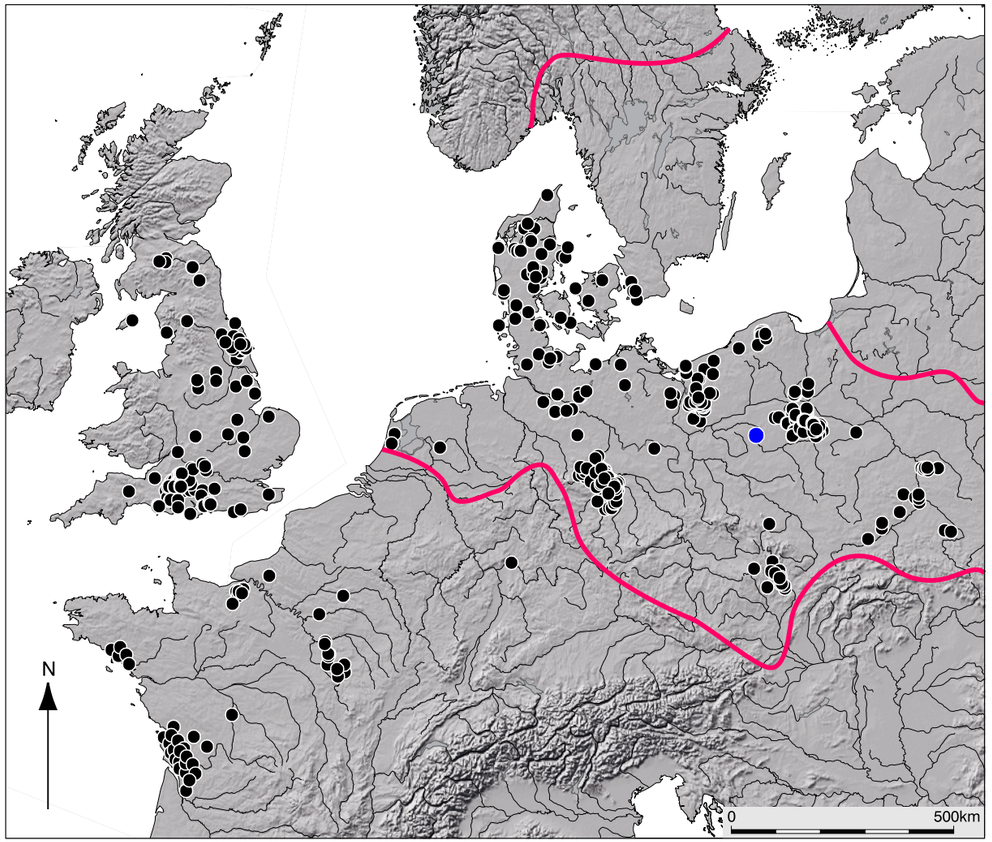


Figure 1. Non-megalithic long mounds in Europe. The blue point indicates the first TRB cemetery in the Greater Poland region, in Sobota locality, site 52, Greater Poland voivodeship. Pink colour indicates the range of the Funnel Beaker culture (after: Müller, Dibbern & Hage, 2014; Nobles, 2019; Rzepecki, 2011a; Żurkiewicz et al., 2020).

Therefore, formally, no TRB tombs built east of the Oder River should be counted as megalithic forms due to the lack of a burial chamber built of stone. However, the research tradition is different on the territory of Poland and many researchers use this 'unauthorised' term (Kruk, 2006, p. 10; Matuszewska & Szydłowski, 2012). This is probably due to the reference to the aforementioned research tradition (Kozłowski, 1921) or represents a clear intention to return to the etymology of the term itself (Greek: *mega* – great, *lithos* – stone). In addition, a more detailed analysis of data from excavations suggests that in the case of some of the tombs east of the Oder River, accessibility to the immediate burial place was provided through a chamber built of wood (e.g. Wietrzychowice tomb 5, Jadczykowa, 1970).

In Poland, the tombs of the TRB occur in several distinct concentrations that do not correspond to the entire range of the settlement *oecumene* of that community. Their main concentrations are in the areas of: Kuyavia, the Chełmno Land and the adjacent areas in the west i.e. western and central Pomerania, and Lesser Poland (Figure 1) (Chmielewski, 1952; Kośko, 2007; Jankowska, 1980; Wierzbicki, 1991; Król, 2015). There are significant concentrations of TRB settlements within this range, e.g. in Silesia or Masovia, with which larger concentrations of tombs cannot be directly linked. It is difficult to state, however, if this lack indicates that those local communities, in terms of their burial rituals, did not build such tombs, or whether their absence is a result of the current state of research. Probably, the latter factor was the case regarding the large settlement cluster from Greater Poland, and the discovery of the cemetery in the village of Sobota, Rokietnica commune provides the opportunity for a new interpretation of the identity of those communities.

Formal differentiation of unchambered tombs from the area of Poland

The unchambered structures discovered throughout the TRB area show a wide range of construction differences, which promptedidentification of new types (Figure 2) (Jankowska, 1981, p. 121; Rzepecki, 2004, p. 124; Kośko, 2006, p. 24, 2007, p. 49; see also: Müller, Dibbern & Hage, 2014; Król, 2015). If the main criterion for their classification is their building material, it is worth noting that the dominant forms in the area of Poland are those with a large stone kerb, built on a trapezoidal plan (type A). They occur in all of the aforementioned regions where tombs have been found in Poland. In the less explored regions and in those for which the prevalence of the megalithic structures was not so obvious (Silesia, Greater Poland), it was the only recorded type.

In the area of Lesser Poland, type A is slightly overtaken by structures whose kerbs were made of wood (type B). These structures, in addition to having trapezoidal outlines, were also built on rectangular, circular or ovular plans. Small-stone structures (type C), identified only in Kuyavia and Lesser Poland, had similar forms. Far less numerous are type D structures with mixed, stone-wooden kerbs, which were built on trapezoidal or rectangular bases. The last structure type (E), which consisted of an earth embankment and did not contain any traces of wooden or stone structures, is specific and characteristic only of Lesser Poland (Kowalewska-Marszałek, Duday & Pyżuk, 2006, pp. 341-360; Tunia & Włodarczak, 2011, pp. 203-219). The occurrence of particular types of tombs in the region is presented in Figure 3.

It should be noted, however, that the most important, common feature of these structures was the external earth embankment, which potentially eliminated internal construction differences from sight (Nowak, 2009, p. 474). Hence, it is difficult to decide whether it seems justified to place so much emphasis on the applied construction solutions.

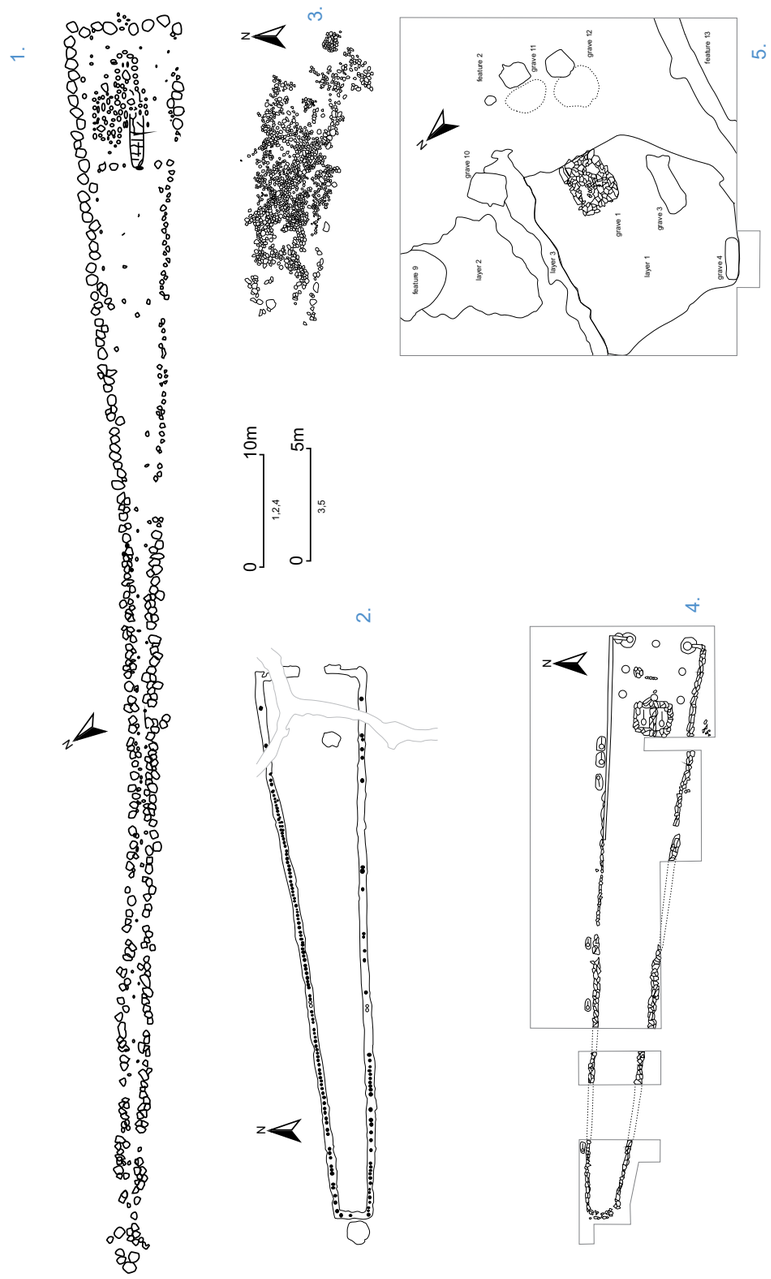


Figure 2. Examples of major tomb types: 1 – Wietrzychowice 1, tomb 3, Włocławek district. Unchambered tomb type A; 2 – Niedźwiedź 1, Kraków district. Unchambered tomb type B; 3 – Klementowice 6, Puławy district. Tomb type C; 4 – Pawłów 3, Sandomierz district. Tomb type D; 5 – Malżyce 30, Kazimierza Wielka district. Unchambered tomb type E (after: Chmielewski, 1952; Burchard, 1973; Uzarowiczowa, 1968; Bargieł & Florek, 2006; Jarosz et al., 2009).

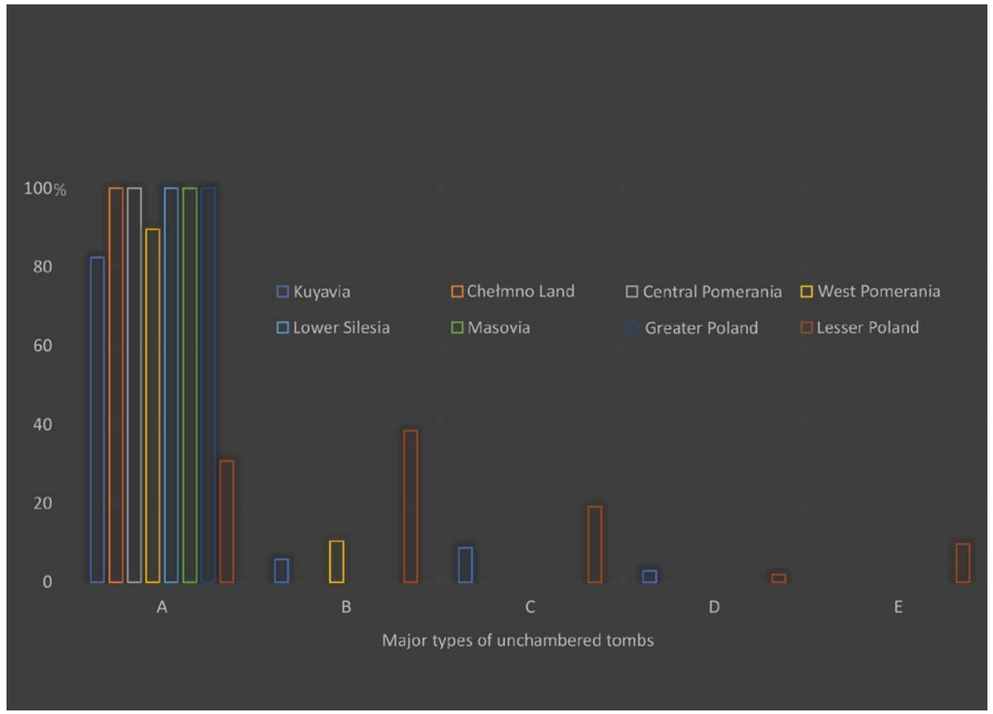


Figure 3. An occurrence of major types of unchambered tombs in particular regions of Poland (after: Król 2015).

Most of the study tombs in Poland date from c. the first half of the 4th millennium BC and are associated with the Sarnowo and Wiórek phases of TRB. Fully megalithic types, i.e. those having a narrow access passage made of large stones or a chamber, are known in Poland only from the Globular Amphora Cultures (GAC) and are dated to the last centuries of the 4th millennium BC at the earliest.

The monumentality of the structures is evidenced by their size. The longest structures, reaching up to 170 m, were discovered in Kuyavia. The average length of the tombs found there, calculated for all types of discoveries, is 74.5 m. Similar estimates can be quoted for the Chełmno Land (the average length of the tombs was 64.3 m; the longest of the discovered ones measured 68 m). The tombs from Western Pomerania come next, with a maximum length of 70 m and an average of 42.3 m. The shortest mean length values were calculated for tombs built in Central Pomerania (maximum 56 m, mean 25.9 m), Lower Silesia (up to 36 m, mean length 27.5 m), and Lesser Poland (length up to 120 m, but the mean value is only 29.2 m) (Figure 4).

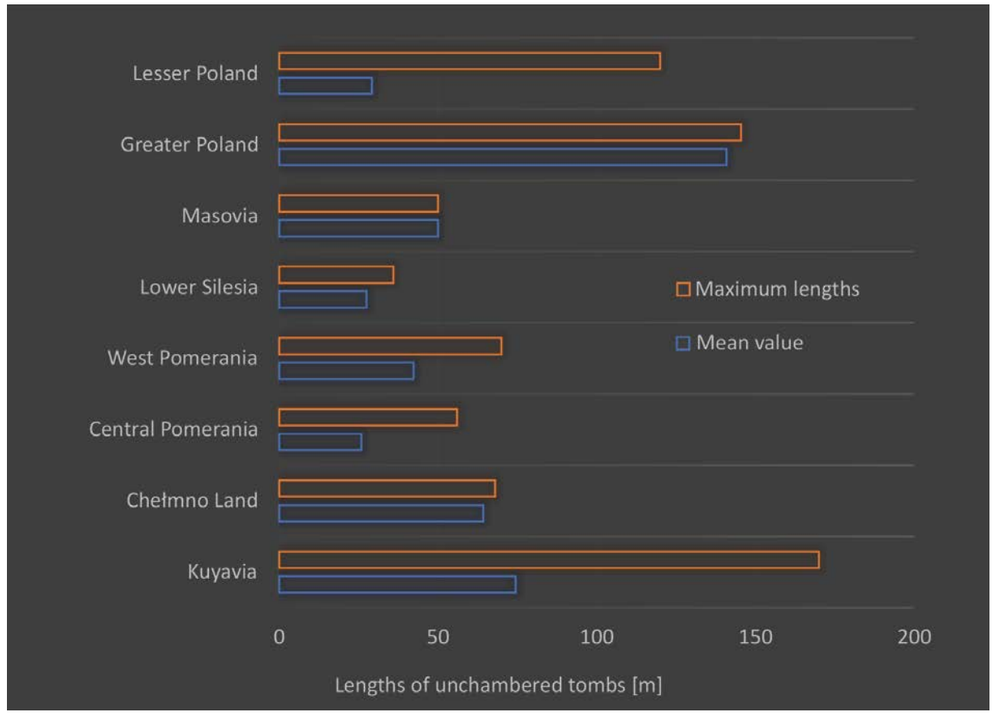
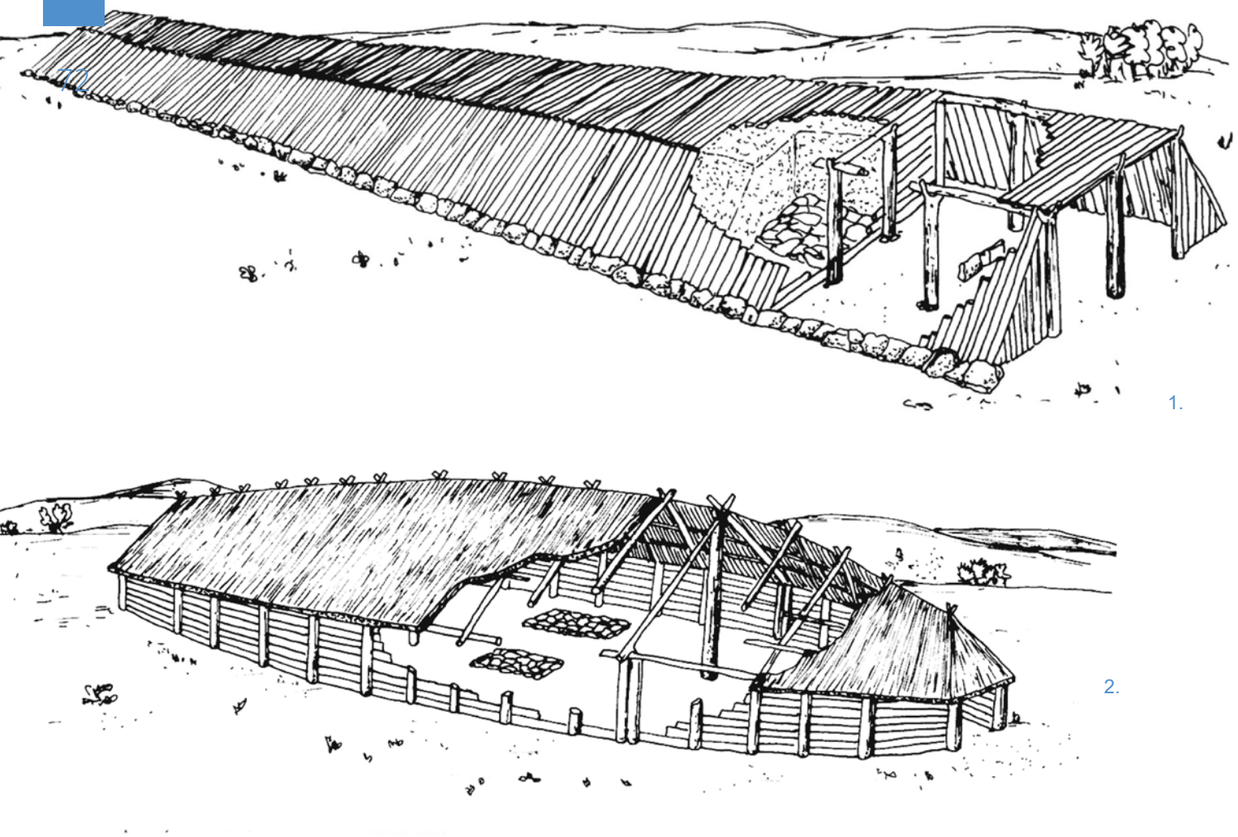


Figure 4. Mean value and maximum lengths of unchambered tombs within the main regions of their occurrence (after: Król, 2015).

Not only graves. The function of monuments

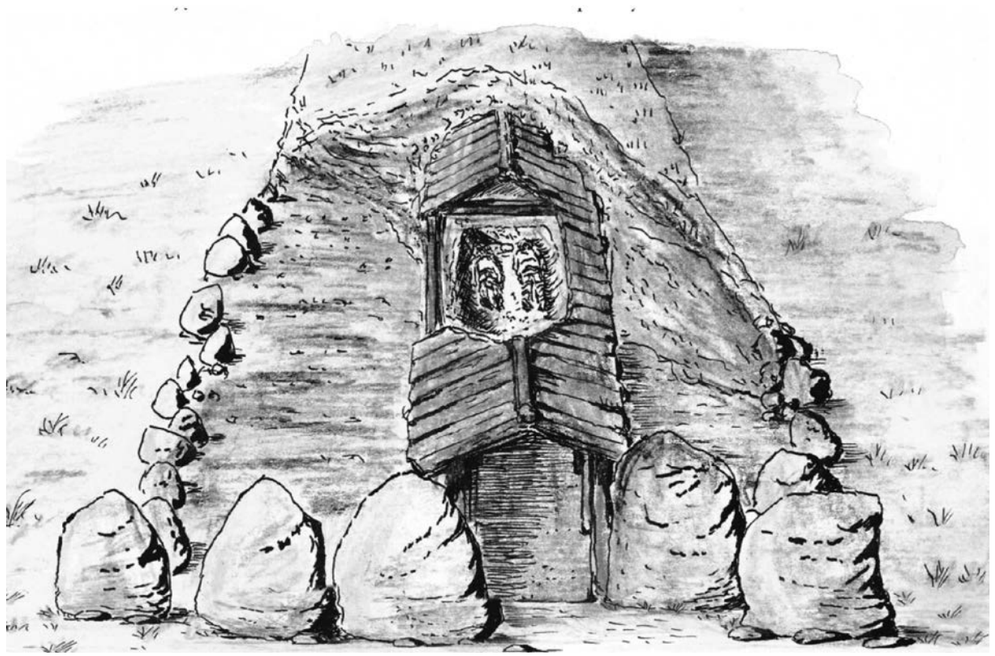
Regardless of the external parameters and the internal structures, it can certainly be assumed that the erection of those tombs was connected with a common ideology, philosophical-religious views, or economy (based on pastoralism) (Chmielewski, 1952, p. 32). Probably these were not only burial places accessible to a selected, small part of the population, but, being permanent elements of the landscape, also opened up the possibility of cultivating ancestor worship. This latter use is manifested by various features houses of the dead, traces of burning fires, layers of peat, or layers of lime dust (Socha, 2015). Their social aspect could also be important – the artificial structures, standing out in the landscape, may have been burial places for people who were highly privileged in a given society (due to prestige, high social

rank, age, or some diseases) (Kruk, 2006). The very act of erecting them is a manifestation of a high level of community organisation, capable of meeting such a challenge (Figure 5). The topic of their active role in the cultural and natural landscape is also present in theories which locate megalithic tombs in the centre of a given region and community, or treat them as points marking the boundaries of such space and conditioning the rights of a given community to the used territory-land (Wierzbicki, 2006, pp. 92-94; Gorczyca, 2005, pp. 120-123).



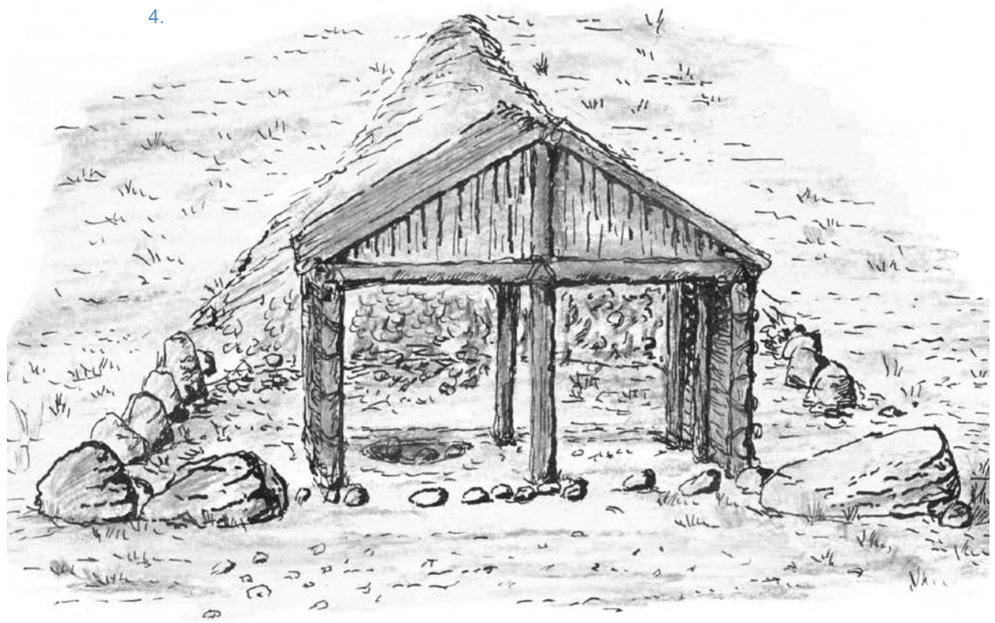
1. 2.

Figure 5. Reconstruction drawings of operational tombs. 1 – Pawłów 3, tomb 1, 2 – Pawłów 3, tomb 2, 3 – Wietrzychowice 1, tomb 5, 4 – Gaj 1, tomb 1 (after: Florek, 2020; Sukniewicz & Myrta, 2008).



3.

4.



The origin of unchambered tombs in the European Lowland

In all descriptions of the functions of the TRB tombs presented so far in this text, durability and stability of the structures are highly emphasised as the features particularly desired by Neolithic communities. In the earlier stages of the Neolithic, settlements, their building type, and the settlement regions were stable and permanent. The TRB was different in this respect as it did not form stable multi-phase settlements and it did not have (as opposed to the earlier Neolithic communities) monumental residential structures such as homesteads or roundels. Instead, it occupied vast territories, far larger than those used by the Danube communities. What is more, the TRB interacted with local 'autochthonous' gatherer-hunter communities who, as a result of these contacts, seemed to appreciate the advantages of the new 'husbandry' and, succumbed to the magic of Neolithisation, becoming *de facto* the core population of the TRB. The role of tombs in this process translates to 'stabilising points', defining the newly emerging community in an era of their material and mental transformation (e.g. Midgley, 2005, pp. 12, 79-81). Thus, the discussion of the functions of TRB tombs develops naturally into a discussion of the origins of the culture.

The concept of the TRB genesis, based on the Neolithisation of hunter-gatherer groups, gains a high degree of probability particularly in connection with the northern TRB group. The northern TRB is where the reach of small groups of migrants from the agricultural south (probably from the Michelsberg culture) (Czerniak, 2018) presumably initiated the process of Neolithisation of the North of Europe (Sørensen, 2014). Ergo, it was where the first stage of spreading the Neolithic achievements took place (Childe, 1949). The areas corresponding to the settlement of the Eastern TRB group, at the time of the formation of the new community, had already 'witnessed' at least 1,300 years of Neolithic transformations. The TRB pattern here was to emerge through an interaction with the North (Jażdżewski, 1936; Wiślański, 1979) and, according to various concepts, the megalithic idea was spread from the west or the north (Rzepecki, 2004, 2011a,b).

Today, we know that in the context of its whole range from the Lower Rhine in the west to the Upper Dniester in the east and from southern Sweden to the middle Danube, it is very difficult to speak of the TRB as a community being aware of, for example, its common origin and speaking the same language. These conclusions are evidenced by the numerous stylistic and technological differences already present in the oldest TRB, or by the flint industries – signs of presence of the local predecessors (Kozłowski & Nowak, 2019). Unfortunately, at present we are still unable to identify a single site with the oldest TRB tombs. It can therefore be assumed that their development, as in the case of the whole history of the TRB, was a result of the influence and transformation of the older local Neolithic communities.

As mentioned before, all previous Central European Neolithic communities realised the need for monumentalism by erecting structures that can be attributed in part to the aforementioned functions related to the megalithic tombs (Czerniak, 2018; Czerniak & Pyzel, 2016). In the case of the earliest farmers representing the Linear Pottery culture (LBK), these structures were clusters of post frame houses that were in turn part of extensive settlements, which enhanced their majesty. Following this thread, for the LBK's direct successors representing the Stroke Ornamented Pottery culture, the idea of monumentalism was

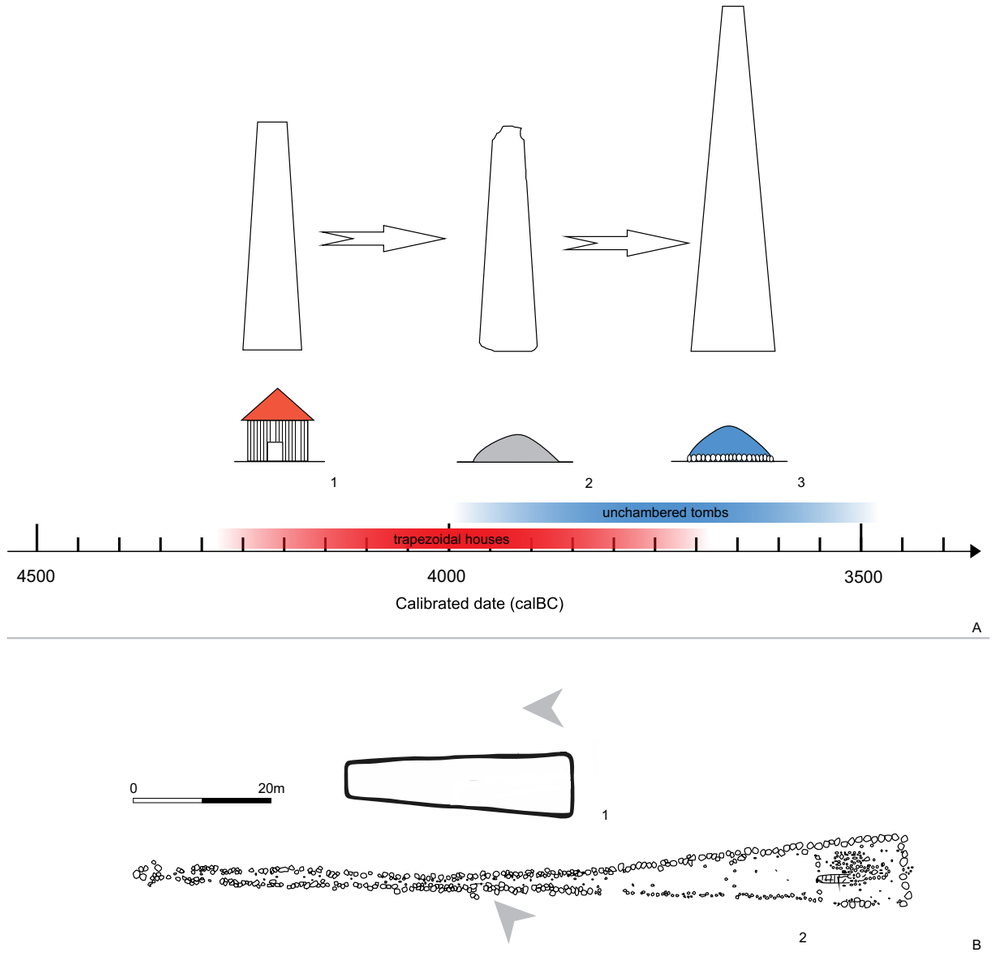


Figure 6. Long trapezoidal houses of the Brześć Kujawski culture (BKC) and unchambered tombs of the Funnel Beaker culture. A – perspective of their "evolution"; B – plans of the long trapezoidal houses and tomb, Osłonki 1, house 5, 2 - Wietrzychowice 1, tomb 3 (after: Grygiel, 2008, Fig. 404; Chmielewski, 1951, p. 94).

implemented by mysterious centres, i.e. wood and earth structures forming roundels. At the stage immediately preceding an emergence of the TRB throughout the vast areas of the European Lowland, communities of the Brześć Kujawski Culture (BKC) constructed trapezoidal houses with walls built of continuous rows of posts placed in foundation trenches (Figure 6). The concept that the TRB tombs derived from those BKC houses is a 'counter-offer' to their possible genesis (Child, 1949, p. 135; Wislański, 1979, p. 258; Hodder, 1990; Midgley, 1985, p. 207). Naturally, there is also much uncertainty among researchers about this thesis (Nowak, 2009, pp. 485-489; Jankowska, 2005, p. 139); thus, it might be worth discussing.

The first question concerns the difference in the primary function of the house and the tomb. It is worth noting here that the BKC communities often located burials within residential structures. Sometimes these burials were already taking place at the stage of house construction. But, probably just as often, burials were located in older, disused, and long-abandoned homesteads. This situation is particularly well documented at the BKC settlement in Racot, Grater Poland. A grave of a female was located here in a homestead which had already been abandoned for c. 200 years old (Czerniak et al., 2016). It can be assumed that this structure was still visible on the surface at the time the burial was placed there; perhaps it was an elongated mound formed from layers of earth and decomposed timber. The theory of such a manifestation of the remains of the BKC settlements to the TRB community was earlier considered in detail (Midgley, 2005, pp. 130-131, Figure 38). Furthermore, the link between the settlement zone and its later funerary use is particularly clear in the case of the earliest TRB tombs. Many of them were built at the Sarnowo phase on the earlier settlement remains of TRB community. This is confirmed by stratigraphic relationships from, for example, Sarnowo, Łąck, Leśniczówka and Zberzynek (Chmielewski, 1952; Rybicka, 2006, p. 67). However, as in the case of the settlement in Redecz, it was not necessarily a trace of an ephemeral and shortly-occupied settlement (Papiernik & Brzejszczak, 2018).

A wide range of arguments in favour of a significant closeness of the Danubian and TRB communities can be presented at this point, regarding not only their material culture but also, in the case of the Lowland, a significant biological similarity visible at the DNA level (Chyleński et al., 2017; Lorkiewicz et al., 2015). Focusing only on the scope limited to the reference to the BKC house by the unchambered tomb, it is also worth tracing that possible proximity not only in space but also in time.

Trapezoidal houses of the BKC in the Lowland were probably beginning built c. 4350-4300 BC and their construction horizon was fairly long (Czerniak et al., 2016). The youngest presently documented homesteads of this community were probably built on the outskirts of the then settling regions, after a deep crisis that affected their centres (Grygiel, 2008). This is indicated, *inter alia*, by the dates obtained for animal bones found in clay pits which were located in the vicinity of the trapezoidal houses: at site 18 in Olszewice, determined within the time range 3760-3640 BC (with a probability of 68 %) (3937-3540 95,%) (Żurkiewicz, 2011). In principle, the given chronological ranges do not raise any major objections in the context of locating them within the beginnings of the TRB in the Polish Lowlands (Nowak, 2017). It was at the border of the black earth *oecumene* of the BKC that the earliest TRB communities most probably emerged in Kuyavia (Czerniak & Kośko, 1993).

The topic of potential derivation of some tomb forms from the BKC longhouses were also open to doubt due to the details of the funerary rituals, being significantly different in the two communities. The strongly flexed position of skeletons laid on their sides and the characteristic elements of easily identifiable BKC burial goods, contrasted with the classical extended skeleton lying on its back and the modest burial goods found in the TRB tombs, create a significant gap in this hypothesis (Jankowska, 2005, p. 140). The extended position of the skeletons of the TRB individuals prompted the search for patterns of such an arrangement in the burials of hunter-gatherers – for which records from the Polish Lowlands were practically unknown, and only some distant, northern references were available (e.g. Larsson, 1989; Nilsson-Strutz, Larsson & Zagorska, 2013). A detailed analysis of the BKC sedimentary sources obtained from open area excavations in the Brześć Kujawski and Osłonki regions, revealed dynamic changes taking place in the late phase of this community development, including the funerary ritual (Grygiel, 2008, pp. 1914-1916). In this phase, extended, supine burials, almost void of any burial goods occurred, commonly located within the settlement of farm buildings, including within the houses themselves (cellars). The noticed traces of manipulation on the corpses, i.e. their fragmentation and displacement, may indicate an introduction of new rituals related to Ancestor worship. The author of this study believes that it illustrates a gradual transformation leading to the emergence of the GAC, however, it should be mentioned that – according to many researchers – the disappearance of the Danube communities was the result of the emergence of the eastern TRB group alongside the GAC (Czerniak, 1980; Czerniak & Kośko, 1993). The supine arrangements of human remains are also known from outside of the Kuyavian region of the Danubian cultures (e.g. Haüsler, 1994).

Nearly no aspect of genesis of the TRB can be assessed on the general, global scale of its range, and only local observations, such as those made in Kuyavia, gain significance. Both northern and western influences, extremely important for the development of that community, most likely reached in Kuyavia via Greater Poland – a region particularly poorly investigated in the time frames the author of this study is interested in.

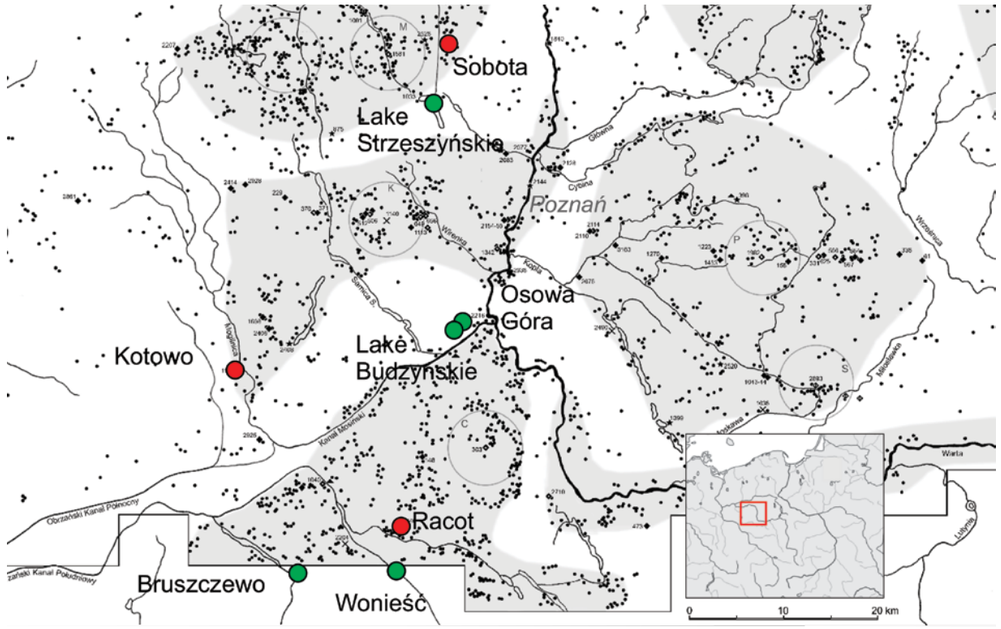
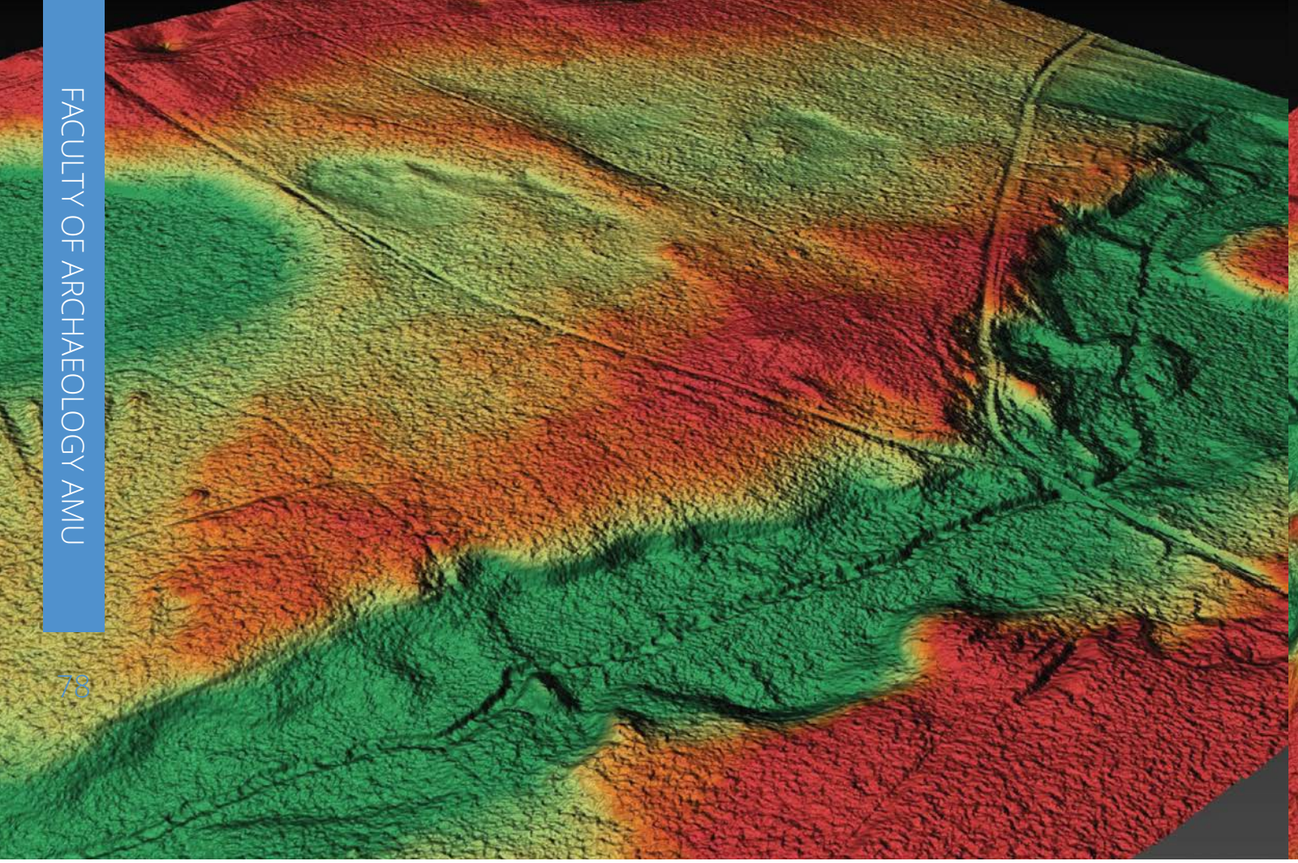


Figure 7. TRB Settlement *oecumene* in the basin of the middle Warta River. Red points indicate the important archaeological sites mentioned in the text; Green points indicate the archival sites where palaeoenvironmental studies were conducted (after: Wierzbicki, 2013, revised).



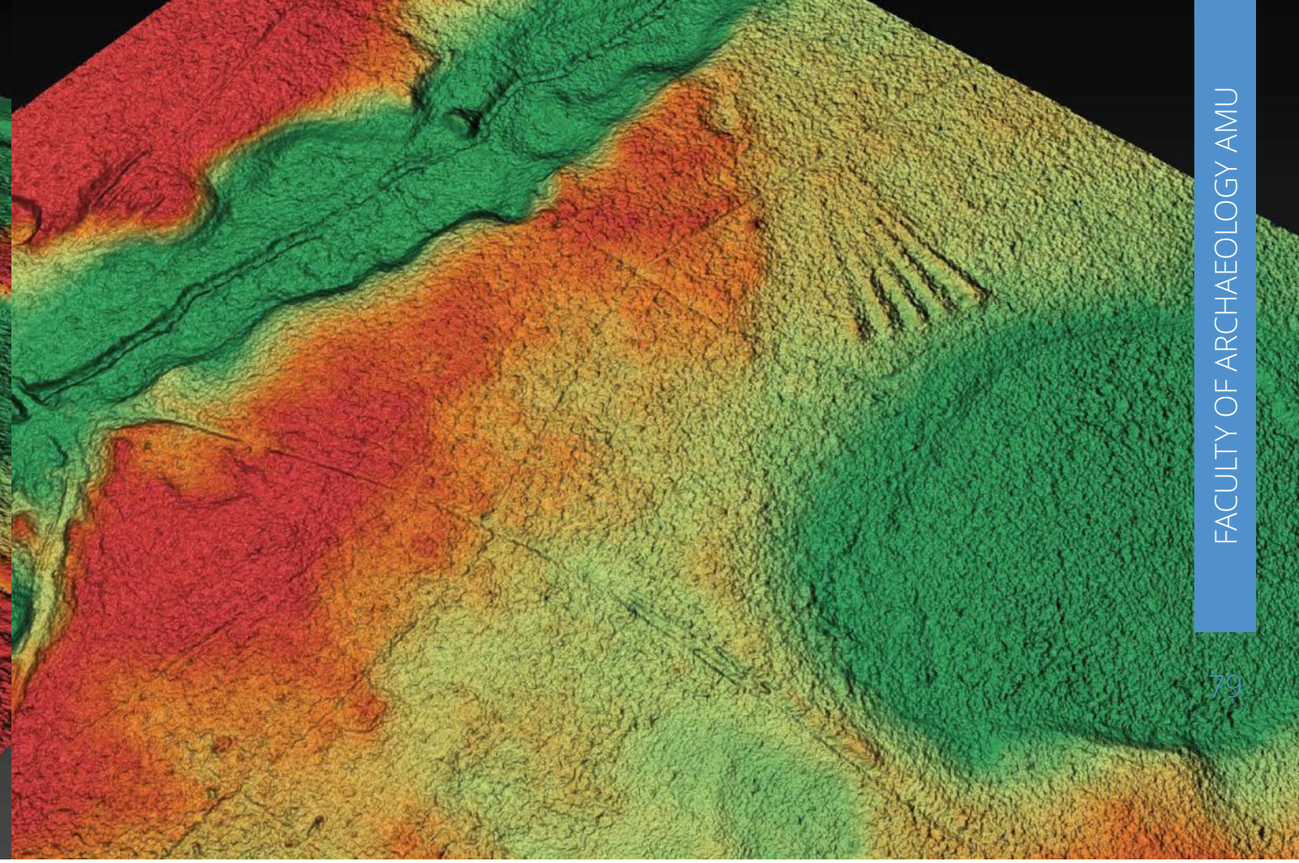


Figure 8. Visualisation of tombs from Sobota 52, Rokietnica commune, Greater Poland voivodeship (By T. Wiktorzak).

Greater Poland in the first half of the 4th millennium – prospects of new discoveries

The author's attention is here focused on the left-bank catchment area of the middle Warta River, formally assigned to Poznań Lakeland and the Poznań Warta Gorge (Kondracki, 1994, Figure 9).

Probably at the beginning of the 4th millennium, the settlements BKC – quite poorly marked in the middle Warta basin BKC, disappeared. The main materials of these communities in Greater Poland consist of 36 sites clearly concentrated in two clusters over the middle Obra and the lower Barycz rivers (Jankowska, 1999). Among them, a better explored settlement is located in the Barycz valley, in Racot – sites 18 and 25. During the excavation work, the outlines of at least 14 long trapezoidal houses were unearthed there. Within one of them, a woman was buried (as was already mentioned) 200 years after it was abandoned by the inhabitants. Unfortunately most of the archaeological material from this discovery remains unpublished. The available ^{14}C date series under Bayesian chronological modelling indicates that this settlement was abandoned by its inhabitants c. 3965-3915 BC (with a probability of 68%) (Czerniak et al., 2016).

The oldest dated TRB site known in Greater Poland is located within the section of the area of interest of the author of the study i.e. at a relatively short distance of 25 km from the aforementioned settlement in Racot (Figure 7). Materials from Kotowo, for which 3 AMS dates were obtained, indicate an existence of a TRB settlement there within the range of 3915-3715 BC (with a probability of 68%) (Żurkiewicz, 2020). This gives an interesting perspective of the existence of those two communities as being close both spatially and temporally.

As was emphasized in the introduction, until recently, the area of large TRB settlement concentration from central Greater Poland had not been not associated with any particular monumental tombs (Figure 7) (Wierzbicki, 2013). The breakthrough came only with an attempt of archaeological interpretation of the LIDAR images created for the purposes of the IT System for Country Protection against Extreme Hazards (Polish acronym: *ISOK*). Thanks to these sources, it was possible to single out the first cemetery consisting of as many as 5 long barrows. The system of radiating mounds with a length of 132-145 m and with preserved mound heights of up to 1.5 m, was subjected to preliminary archaeological reconnaissance survey (Figure 8). The construction features of these tombs enable the researchers to classify them as classical 'Kuyavian' tombs (see above: type A), and their parameters place this discovery among the longest preserved structures of this type (Figure 4).

There are many indications that further analyses currently being carried out in the middle Warta basin region will make it possible to identify similar structures of this type, which may provide the possibility of creating a new interpretation of the origin of the local TRB communities. So far, the total lack of unchambered tombs in the Greater Poland region had been associated with their (aforementioned) function of constituting rights to use the land (Wierzbicki, 2006, 2013). What is more, their absence was supposed to prove the local origin of the TRB from the hunter-gatherer communities to which this land was always supposed to belong: no additional, symbolic marking of this fact was necessary.

Further research will certainly bring more information about the identity of the investigated community from the first half of the 4th millennium, but some questions will still remain open about the scale and dynamics of cultural transformations taking place at the time in the central Greater Poland region. It would be particularly important to indicate continuity or its lack in the scope of settlement processes in the time of the disappearance of the BKC and the emergence of the earliest TRB communities. An attempt should also be made to estimate the intensity of the ongoing settlement processes related to the Sarnowo and Wiórek TRB phases.

In light of the current state of the research, the whole chronological range of this community in the central Greater Poland is about 1500 years, with which over 3,000 archaeological sites are connected, but only in a small percentage associated with a specific phase of development. In view of the stagnation observed for many decades in the development of archaeological research on the Neolithic of Greater Poland, the lack of detailed regional studies on the subject, or even basic publications of significant source materials covering the region (Wierzbicki, 2008), the possibilities offered by palaeoenvironmental studies must be appreciated.

As far as the Central Greater Poland River Basin is concerned, several attempts to identify the environment in the time period of interest can be indicated (Figure 7). The materials obtained from the pollen analysis of the peat bogs and the lake sediments from the Obra river basin in Osowa Góra and Budzyńskie Lake seem to be of particular significance (Ołtuszewski, 1957; Szafrański, 1968, 1973). The more recent palaeoenvironmental studies conducted mainly for the Early Bronze Age settlement in Bruszczewo remain cognitively valuable (Haas & Wahlmüller, 2010) as well as pollen diagrams obtained from the lacustrine sediments taken from Wonieść Lake (Dörfler, 2011) and Strzeszyńskie Lake (Pleskot, Tjallingii, Makohonienko, Nowaczyk & Szczuciński, 2017). However, the data presented above do not relate directly to the settlement *oecumene* of the central Greater Poland TRB. Hence, obtaining such data correlated with the possibilities of evaluating the level of anthropopressure (with a possibly high temporal resolution) could significantly affect the aforementioned research problems (Figure 9). Additional inspiration is also provided by treating the mounds of the unchambered tombs themselves as an archive of palaeoenvironmental records that can be source of rich information about the world in which the builders of those structures lived.



Figure 9. Exploration of sites for palaeoenvironmental studies (Photo: D. Żurkiewicz).

Conclusions

The emergence of unchambered tombs in large areas of central Europe may indicate the existence of one coherent idea uniting their builders and users. From today's perspective, it is extremely difficult to even think of the right questions that could bring modern people closer to understanding the world of the people of the first half of the 4th millennium. It seems that maintaining a high level of detail in the regional research of this issue, using both the classical methods of archaeology and those offered by the disciplines supporting this science, gives a unique chance to grasp at least some remnants of the past reality of those communities. A description of the cultural as well as natural background of the transformations taking place within the middle Warta river basin would provide the possibility to relate it to broader spatial and temporal contexts of Central Europe. Also, it would allow for a proper assessment of the role of Greater Poland in the transmission of cultural patterns of the time.

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Excavations in Kamenets-Podolskiy, Tatarysky: Small-scale insight on large-scale questions

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Abstract

This paper presents the results of field work carried out in terms of a collaborative Polish-Ukrainian project. The main aim of this project is to investigate the transformations and modifications of culture in prehistory as reflected in the archaeological record, focusing on the issues of cultural expansion, unification, and internal diversity. The excavations of Western Tripolye culture settlement of Kamenets-Podolskiy (Tatarysky) were conducted to provide an empirical base for this work. During first season of excavations remains of a burnt house (ploschadka) and pottery kilns were excavated.

Keywords: Middle Dniester, Tripolye culture, *ploshchadka*, pottery kilns, daub

Since 2019 the collaborative Polish-Ukrainian project *The dynamic prehistoric culture. Comprehensive analysis of archaeological data from Central and Southeastern Europe*, financed by the National Science Centre (Poland) has been carried out. This project aims to investigate the transformations and modifications of culture in prehistory as reflected in the archaeological record, focusing on the issues of cultural expansion, unification and internal diversity. These issues shape the formation, development and decline of archaeological cultures and lay at the core of the way of thinking in the archaeology of continental Europe, framing the interpretations of ethnic processes, subsistence strategies, social organization of ancient populations and their culture in its wider sense.

The outcome of this project will significantly complement archaeological method and theory, reframing one of its basic concepts, ‘archaeological culture’, and, therefore, understandings of culture in its wider sense within the interdisciplinary framework of the complex dynamic systems. Newly developed methods will contribute to the analytical tools of prehistoric archaeology.



Figure 1. Kamenets-Podolskiy, Tatarysky.
View of the site (Photo: I. Pustynnikova).

The aims of the project frame its three main components: 1) the development of method and theory; 2) investigation of the process of archaeologisation (transformation of material remains of the remote past into archaeological records – Schiffer, 1987); and 3) the analysis of empirical data. To provide an empirical base for these research objectives, a study of key museal collections and excavations was conducted. Excavations were carried out at the Middle Tripolye site in Kamenets-Podolskiy (Tatarysky), located in the Middle Dniester region and dated to 3950-3900 BC (Figure 1). To consider the issue of an 'archaeological culture' as a complex dynamic system, which includes the study of archaeologisation (i.e., the behaviours leading to the specific deposition of archaeological data in objects of different types and post-depositional processes (Schiffer, 1987, 2010), we arranged to excavate features of different types.

The site has been known since 1926. Collections from surface surveys are kept by the State Historical Museum-Preservation of Kamenets-Podolskiy and the Archaeological Laboratory of the Ivan Ohienko National University of Kamenets-Podolskiy (Levinzon, 2018, 2019). Excavations were preceded by geophysical surveys, which identified the settlement structure composed of elliptical circuits of dwellings (Niebieszczański et al., unpublished data).

During our first field season, we excavated house remains (Diachenko et al., 2021) and pottery kilns (Diachenko & Sobkowiak-Tabaka, 2020).

The remains of wattle-and-daub dwellings at Middle Tripolye sites are described using the term "ploshchadki". Its original meaning in Russian reflects the 'ordinary' form of such building remains – rectangular-shaped layers of burnt daub, ceramics, animal bones, and tools made of flint, stone, bone, and antler; the thickness of the Middle Tripolye ploshchadka reach 30 cm or more (Kruts, 2003). Such objects perfectly fit the related research objective of the proposed project because the abandonment of a house followed a ritual conducted in several stages. In numerous cases the hearth – or 'heart' – of a house was broken, vessels were placed in a specific manner, and then a dwelling was burnt in a ritual fire (Kruts, 2003). Therefore, these remains reflect cultural behaviour, specific initial deposition of artefacts, archaeologisation of an object resulting from its collapse during the fire, and post-depositional processes due to natural factors and human activities at this place in later times.

Ploshchadka 1 belongs to a cluster composed of four houses located in the outer construction circuit of the settlement. This feature was nearly rectangular in shape reaching a size of c. 11.6 x 4 m and was oriented along a east-west axis with a small northwest-southeast deviation. The cultural layer within its perimeter was intensively filled with pottery shreds and bones (Figure 2A and 2B). As usually, postholes were not identified below the ploshchadka. Three stones, including a used grinding stone, were likely used to strength the



Figure 2A. Kamenets-Podolskiy, Tatarysky, Ploshchadka 1 (Photo: I. Pustynnikova).

construction, probably marking the northeastern, northwestern, and southwestern corners of the dwelling (Figure 2A and 2B). A layer of burnt daub represents the floor of the upper story of the house. Imprints on the bottom of the daub fragments make it possible to identify the construction techniques used to create the wooden body of the floor. The latter was composed of relatively thick beams (exceeding 8-10 cm in thickness and width) with a nearly square or semi-rounded profiles, which were placed at a distance of c. 1 m one from one another (Figure 3A). These beams supported a floor with a thickness exceeding 2-3 cm, the edges of which were placed one on top of the other in the form of a tortoise shell (Figure 3B).

The wooden construction was covered by two layers of daub. The first layer was 10-11 cm thick (from bottom to top) and was made of clay with organic admixture. The upper storey of the house was subdivided into two rooms: a residential area with a length of c. 7.4 m and an entrance room with a length of c. 4.2 m. Interior details were detected only in residential area (Figure 2A and 2B). These were the oven and interior element, the shape and size of which is impossible to reconstruct. The oven was c. 1.6 x 1.4 m in size and was located to the right of the entrance to residential area (Figure 4). Its base was shaped as a thick layer (exceeding 15 cm) of daub without organic admixture placed on the wooden construction of the floor of the upper storey. The lower storey was not subdivided into rooms. Its interior details are represented by a shallow pit and two installations. The first installation was relatively thin, up to 2-3 cm. It was placed next to a shallow pit located near the short wall of the house. Fragments of two bowls were excavated from this installation (Figure 2A, north-western part of the house). Considering the shape of Ploshchadka 1, we may assume that different sections of the floor

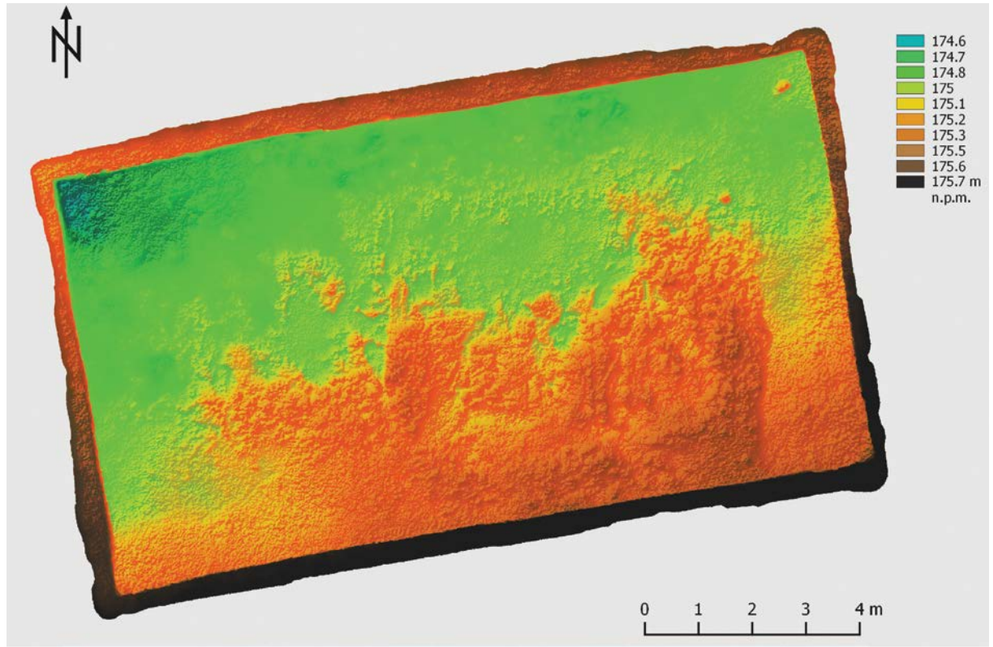


Figure 2B. Kamenets-Podolskiy, Tatarysky. Elevation model (by M. Stróżyk).



Figure 3A. Kamenets-Podolskiy, Tatarysky, Ploshchadka 1. Wooden construction of the floor of the upper storey: Excavated imprints of wood on the underside of daub fragment (Photo: A. Diachenko).

of the upper store collapsed when the walls of this house were still standing. The lack of daub in the central part of the residential area may suggest that this part of the floor, measuring c. 3 x 1 m, collapsed first (see the Nebelivka experiment for an analogy: Johnston et al., 2018).

It is important to admit that similar construction techniques and interior details are notable in synchronous houses far to the east of the Dniester region, in the Southern Bug and Dnieper interfluve (studies of D. Chernovol). Demographic estimations suggest the migration of some population groups from Dniester to the east (e.g., Diachenko, 2016). In this respect it is very important to admit similarities between the ceramics and construction and organization of space in the houses of these two regions. These similarities represent how migrants brought their traditions to new lands.

The next features unearthed during our excavations were two pottery kilns. These features were sunken into the sterile earth, represented by limestone, which preserved them from later destruction by intensive erosion processes. The kilns were placed 2 m apart from each other on the edge of the plateau, away from the houses (Figure 5). Such placement decreased the risk of fire and supported additional circulation of air in the kilns (Sîrbu, 2015).

Figure 3B. Kamenets-Podolskiy, Tatarysky, Ploshchadka 1. Wooden construction of the floor of the upper storey: Excavated imprints of daub in the ground (Photo: A. Diachenko).

Figure 4. Kamenets-Podolskiy, Tatarysky, Ploshchadka 1. View of the oven from the north (Photo: A. Diachenko).

Investigation of pottery kilns in Kamenets-Podolskiy, Tatarysky significantly improved our understanding of the evolution of ceramic production in Neolithic and Eneolithic Southeastern Europe. Kilns from Kamenets-Podolskiy represent a kind of a “missing link” (or “one of the missing links” considering multilinear evolution) between earlier and simpler features known at sites in the Balkans and more complex kilns known from Late Tripolye settlements.

Our contribution to a “search for missing links” was preceded by investigations in the Tripolye settlement of Trostyanchyk in the Southern Bug region, where a number of clay units of unknown function were found in a pit (Rud et al., 2019). Vitalii Rud, who conducted the excavations in Trostyanchyk, assumed that these might have been used as structural units for heating structures (Rud, 2016). “Archaeological luck” smiled to our team when we found identical units in the context of an abandoned pottery kiln.

Pottery Kiln 1 was nearly square with rounded corners. The size reached c. 2.2 m along the east-west axis and 2.1 m along the north-south axis. The entrance to the kiln was turned to the east. A shallow pit 8-15 cm deep was ‘dug out’ in front of the entrance by removing small blocks of limestone. The surface, initially prepared by removing the sterile soil (the difference in elevation reaches 0.4 m along the east-west axis), was covered by a thin, 2-2.5 cm layer

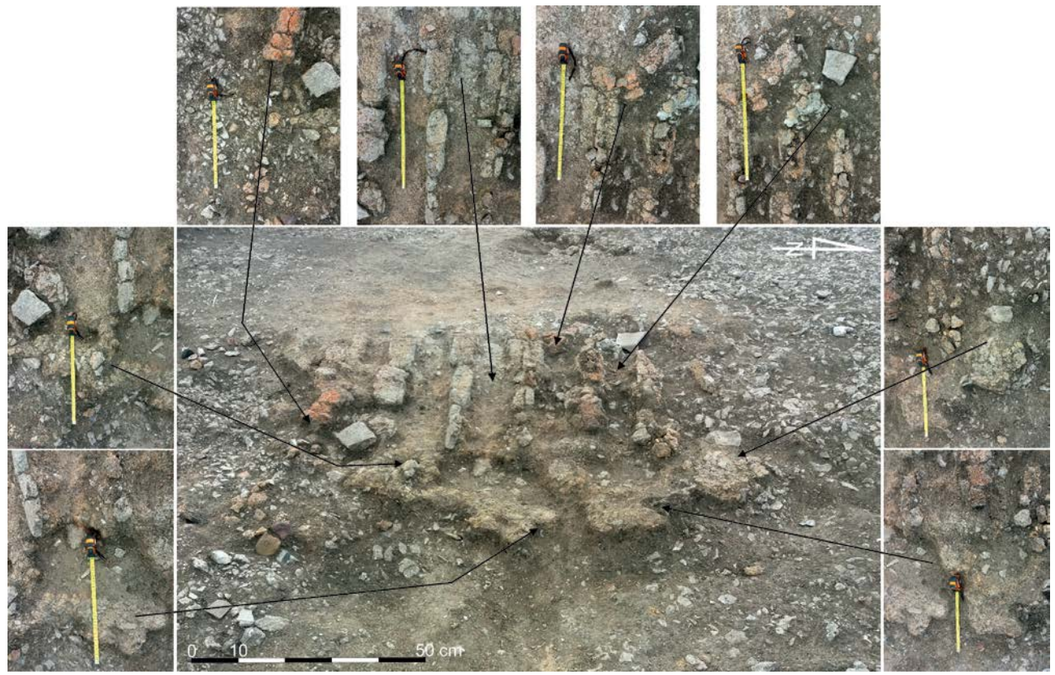


Figure 5. Kamenets-Podolskiy, Tatarysky. Excavation of Pottery Kiln 1 (Photo: I. Sobkowiak-Tabaka).

of clay. It was only partly preserved – probably in the places where the most hot air passed through the channels formed by supports (also known as 'козлы' in Russian or 'goats' in articles on Tripolye pottery kilns – e.g. Korvin-Piotrovskiy et al., 2016). The kiln contained six supports, which were covered by round discs made of clay with an admixture of sand and relatively rare inclusions of organics (Figure 6). Vessels were placed on the platform composed of discs. During excavation of this feature, a fragment of a clay female figurine was found (Figure 7).

The function of Pottery Kiln 2, which was smaller in size compared to Kiln 1, became a real conundrum. This feature also had a rectangular shape with rounded corners, and was placed into a surface preliminary prepared by removal of the sterile earth (difference in elevations reaches 0.17 m along the east-west axis; Figure 8). The size of this feature is estimated to be 1.4 m along the north-south axis and c. 0.7 m along the east-west axis. Two channels of c. 0.7 m long were 'dug out' by removing small limestone blocks in the northern part of the structure. A small firing chamber of c. 0.7 by 0.65 m in Kiln 2 was somewhat sunken into the sterile soil. Vertical fragments of burnt daub (up to 6 cm thick) with substantial organic admixture were recovered near the southern and western walls of the chamber. This may suggest a relatively high temperature inside the kiln. Fragments of a clay disc were found in the fill of the firing chamber of Kiln 2. The fragments are analogous to the ones found in Kiln 1.



Figure 6. Kamenets-Podolskiy, Tatarysky. Clay discs from Pottery Kiln 1 (Photo: I. Sobkowiak-Tabaka).

Figure 7: Fragments of female figurine found within Pottery Kiln 1
(Photo: A. Diachenko).



Figure 8. Kamenets-Podolskiy, Tatarysky. Excavation of Pottery Kiln 2
(Photo: I. Sobkowiak-Tabaka).

Why did the inhabitants of Kamenets-Podolskiy, Tatarysky need to construct such a small pottery kiln near the larger one? An elegant solution to this issue was suggested to us by the well-known Tripolye expert Sergej Ryzhov. According to him, usage of this structure could be related to the firing of pottery with bichromic painting (i.e., black and white or red and white), which is seen in Western Tripolye Culture sites of this time period at low frequencies. Black and red paint was made of ochre and required a higher temperature of firing, as compared to white paint made of chalk (the composition of paint and the temperature of firing are discussed in Ryzhov, 2001). Therefore, the larger kiln was used for firing vessels, and smaller one decreased the efforts needed to fire pottery with different coloured slips.

We are waiting for next archaeological seasons and new data which we will use to test the models of socio-economic and cultural evolution…

Acknowledgements

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Late Neolithic Hilltop Communities in Central Kujawy

Aleksander Kośko, Marzena Szmyt

Abstract

The article presents the history and the most important results of archaeological research on the so-called Prokopiak's Mount at Opatowice in the Kujawy region. Archaeologists from the Adam Mickiewicz University conducted surveys and excavations there for several years - from 1983 to 1998. Remains of settlements and graves discovered on the hill come mainly from the 4th and 3rd mill. BC and represent several units of the archaeological taxonomy: the Funnel Beaker culture, the Globular Amphora culture, the Corded Ware culture, the Neman culture, and the Proto-Bronze group. Since 2006, a special series of monographs of individual sites has been published. To date, five volumes have been published, and more are being prepared. Thanks to meticulous investigations as well as comprehensive and multifaceted scientific analyzes, the Prokopiak's Mount at Opatowice is one of the best-recognized micro-regions of Late Neolithic settlement in Kujawy and is a reference point for extensive comparative research. This applies, for example, to the local scale of absolute chronology, various components of material culture, forms of settlements and camps, ceremonial and funeral practices, as well as economic activities.

Keywords: Late Neolithic, Kujawy region, 4th and 3rd millennium BC, settlement practices, funeral practices

Introduction

Climbing a vast elevation, rising from the surrounding plain 3 km southeast of Radziejów in 1983, we were aware that we followed in the footsteps of the late Dr. Lidia Gabałówna. It is to her that archaeological literature owes the introduction of the names of Radziejów – a quaint little town cresting the highest hill of the Radziejów Hills – and Opatowice – a village of over a dozen farms and a single shop. Actually, in the latter case, her interest

was attracted by an elevation covered by fields and sand pits belonging mostly to the Prokopiak family (cf. Gabałówna, 1962). One of us (A. K.) participated in rescue excavations in 1969 in which a team headed by Gabałówna explored a grain pit, published after ten years (Grygiel, 1979). Our wandering across the fields in 1983 was part of the work on the Archaeological Record of Poland. With early-spring crops rising at that time, one could easily notice rich clusters of archaeological material, mostly Neolithic, on the ground surface. In many smaller and larger pits left by sand excavation we found pottery while in some and in the walls of a huge, industrially exploited borrow pit, archaeological features could be noticed. We realized that it was the last moment for rescue investigations. As it turned out, in terms of field work, they lasted 16 years – from 1983 to 1998. It took several more years to prepare materials for processing, and finally 2006 saw the publication of the first volume in a series dedicated to sources from Prokopiak's Mount in Opatowice. So far, in the series, monographs of five sites have appeared (Kośko & Szmyt, 2006, 2007a, 2007b, 2014, 2015), while several more are being prepared. It is possible now to share several conclusions made when summing up a stage in the investigations and concerning the natural and cultural peculiarity of the Mount, a general description of results obtained, and their evaluation against the background of the current archaeological research in Poland[1].

1. Natural and cultural processes of archaeological record formation on Prokopiak's Mount

The name of 'Radziejów Hills' designates a chain of moraine elevations rising from the NW to the SE above a monotonously flat plain in the central part of the Kujawy Plateau in the vicinity of the town of Radziejów. The highest absolute altitude (127.3 m a.s.l.) is found on a centrally situated Radziejów Hill, the second highest section is located on the west fringe (in the village of Chełmce), while the third (117 m a.s.l.) is found in Opatowice (Figure 1).

The Radziejów Hills are an end moraine built by the oscillating ice-cap margin ca. 18.200 BP (Nowaczyk, 2006). They were formed of sands, gravels and the boulder clay that has turned into sand, with the sediments showing glacitectonic deformations. The surface of Prokopiak's Mount that was studied in detail, was repeatedly re-modelled by wind that caused eolian cover sands to develop and take the form of a terrain folding of a relative height of up to 2 metres. The processes were interrupted after vegetation spread over the area, triggering the onset of soil formation. Later, from the second half of the 6th mill. BC the terrain owed its shape chiefly to human activity. The advance of man brought about the destruction of vegetation by fire, which is evidenced by charcoals in the fossil humus. Then sand was moved by wind in the west of the Mount and eolian cover sands were accumulated in its north and east parts. Discovered on the Mount, successive fossil soil layers show that this process repeated itself many times over. As a result, there was preserved a sequence of alternating levels of fossil humus and eolian cover sands on the Mount (Figure 2). The rise of the strata of the latter kind was brought about, in principle, by anthropogenic deforestation.

[1] This article is a shortened and revised version of our previous publication (Kośko, Szmyt, 2018).

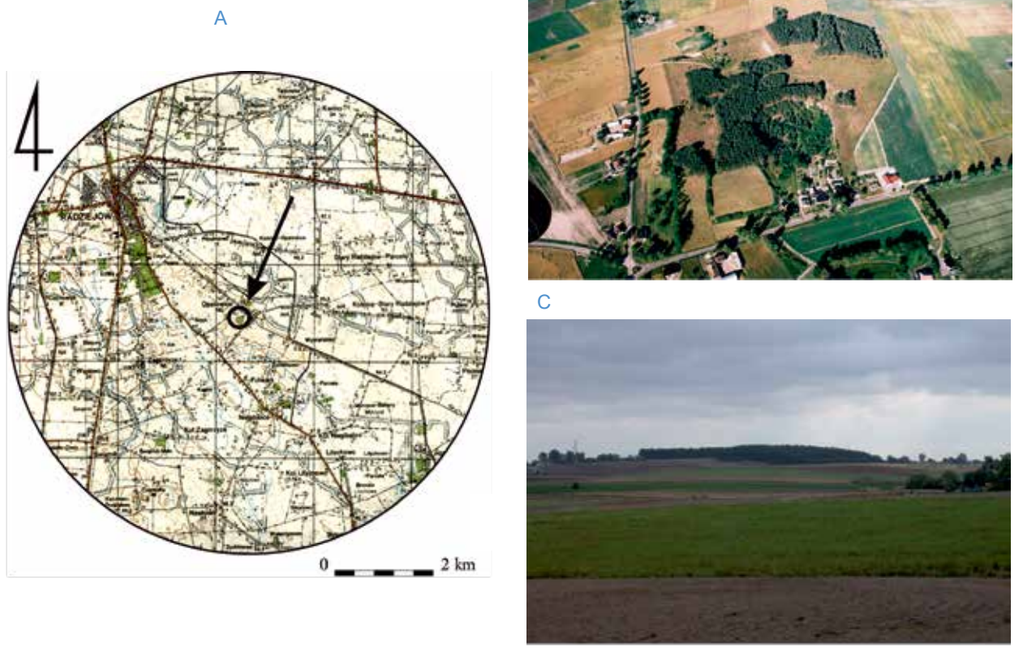


Figure 1. Opatowice – Prokopiak's Mount, Kujawy-Pomerania voivodeship. A – location B – aerial photo 2004 (Photo: W. Rączkowski); C – view from the west (Photo: M. Szmyt).

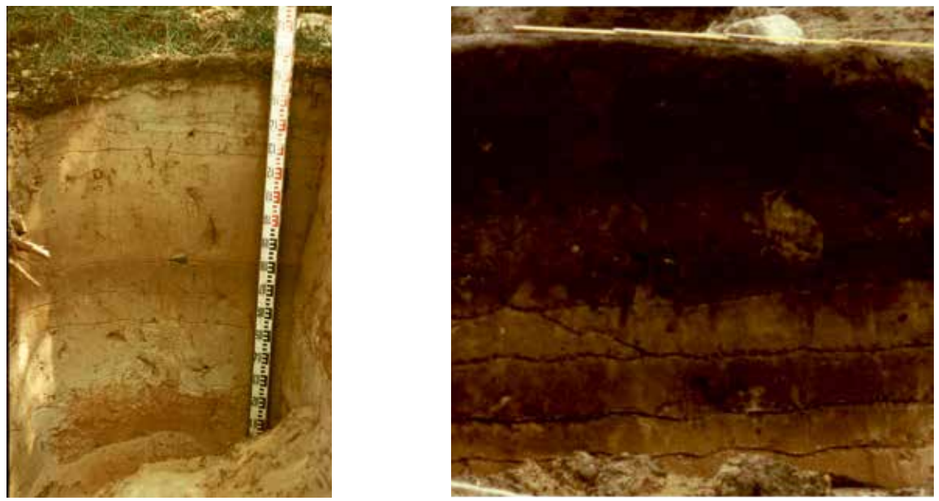


Figure 2. Opatowice – Prokopiak's Mount, Kujawy-Pomerania province. Examples of local stratigraphy (Photo: M. Szmyt).

These basic characteristics of the abiotic environment to a large extent predetermined its primeval vegetation. And so, poor sandy habitats on the Mount top, with a low groundwater level, must have been occupied by pine coniferous forests or possibly – which is less likely – pine-oak mixed forests. In turn, richer habitats, located on the plain directly surrounding the Mount, were covered by deciduous forests, having several forms (Makohonienko et al., 2006, pp. 81-83). Dominating in the landscape of the plain, fertile Kujawy black soils were probably overgrown by thinned forests resembling today's ash-elm carrs, but with a lesser share of the ash and elm and a substantial portion of the oak and herbaceous plants (Makohonienko, 2008, p. 367). More humid habitats were occupied by alder or alder-ash carrs.

These natural environment characteristics clearly set apart Prokopiak's Mount from its surroundings and made it a peculiar ecological isolate. For in the heart of a flat plain, covered with heavy clayey and very fertile soils, there rose a sandy elevation overgrown with completely different vegetation, with its peak reaching 20 m above the neighbouring lands. It is no surprise that it attracted the attention of humans, who appeared there beginning with the 6th mill. BC. Even if they put up their settlements some distance away from the Mount, they came to it, leaving behind many traces and frequently causing fires. These, in turn, triggered eolian processes. The same consequences were brought about by the damage to vegetation caused by those groups of humans who lived on the Mount for longer or shorter periods. The traces of such activities have survived on the Mount thanks to the accumulation of successive eolian layers and humus levels. Hence, the stratigraphy of Prokopiak's Mount records biocultural series and could serve as an archive with respect to local human activities (Kośko & Szmyt, 2006, p. 25; Szmyt, 2013, p. 127).

2. Opatowice Mount as a subject of long-lasting and comprehensive investigation

The long-term project of investigation of Prokopiak's Mount in Opatowice was part of the Kujawy Research Programme implemented from the late 1960s (Szmyt, 2013, pp. 24-26). In short, the programme involved the study of several spatial units that were chosen as representative test areas for wider parts of the Kujawy region. The test areas were then subjected to detailed, comprehensive and multi-disciplinary investigations (Cofta-Broniewska, 1989, pp. 14-15).

Prokopiak's Mount has become one of the most important test areas in Kujawy. While defining its cognitive value (Kośko & Szmyt, 1993, 2018), some assumptions have been made: first of all, the Mount (together with the hill in Radziejów) was unique when considered in the regional ecological and cultural contexts; second, it could have had a high cultural value for the Late Neolithic human groups. The third assumption holds that Mount stratigraphy could serve as a 'calendar' of human activities in this part of the region.

The first assumption had its roots in the location of the Opatowice elevation in the regional ecological and cultural context of the Kujawy Plateau. Beginning with the 6th mill. BC, i.e. from the emergence of the first agrarians, the Plateau witnessed exceptionally numerous and rich settlement phases and episodes at various times. It can be said that the Mount stood at the centre of functionally diverse processes of settling fertile soils. So, potentially, it could have preserved the traces of successive stages of Kujawy Plateau settlement.

The second assumption resulted from the statement that the Mount stood out against the regional natural landscape. One of its consequences could be the special position of the Mount which could have acquired a high cultural value during the Neolithic. Taking a broader view, it was assumed that at least in the Late Neolithic, Prokopiak's Mount could have been one of the contact centres within Kujawy – a place where inter-group meetings were held from time to time during which functionally complex rites were performed. This assumption would be supported by an accumulation of ritual features on the Mount.

The third assumption took into consideration the special character of stratigraphy of the Mount which led to the preservation of a sequence of alternating levels of fossil humus and eolian cover sands. Together with related radiocarbon chronology, it could serve as a calendar of sorts in respect to local settlement processes.

Relying on these assumptions, it was decided to make Prokopiak's Mount a test area for the investigation of the Late Neolithic in Kujawy. Since then, owing to its uniqueness, the Mount had been treated as an exceptional natural and cultural complex, which became important for the study of the early agrarian settlement on the Kujawy Plateau, chiefly for the 4th and 3rd mill. BC. If one takes into account the significance of this central part of Kujawy for the study of these times in a supra-regional dimension, the position of Prokopiak's Mount makes it one of the most important site complexes in terms of information potential on the Central European Plain.

Because of the above assessment, the major objective of the comprehensive research programme was to present all the prehistoric bio-cultural information, recorded on the whole Mount, in a systemic way. In this way, it was planned, it would be possible to explore the local (micro-spatial) sequence of natural and cultural changes in their entirety. As a consequence, field research was concerned with excavating most of the sites. The schedule of field work covered about ten years and allowed for the varied gravity of threat to sites and their informative value, which was assessed pursuant to detailed repeated surface surveys.

The programme was implemented between 1985 and 1998 (Figure 3). Different exploration forms covered 24 sites (Figure 4) and yielded an extremely rich set of archaeological and natural sources, for the most part referring to the Late Neolithic and the beginnings of the Bronze Age. A special accumulation of data concerns the 4th and 3rd mill. BC. After some years thanks to scientific grants funding by Polish science agencies (Committee for Scientific Research and National Science Centre) the artefacts and ecofacts, collected in the course of the excavation, have been systematically analyzed. A series of multi-aspect analyses of biocultural sources was completed. Studies in the areas of geomorphology, palaeopedology, archaezoology, palaeobotany, palynology, petrography, archaeometry and others have been either carried out or made up for and prepared for publication. So far, five volumes have been published devoted to Prokopiak's Mount in Opatowice which bring detailed studies of sources from sites Opatowice 1, 3, 33, 36 and 42 (Kośko & Szmyt, 2006, 2007a, 2007b, 2014, 2015), Separately, a broader discussion of issues related to the Late Neolithic in Kujawy and on Prokopiak's Mount was published (Szmyt, 2013).



Figure 3. Opatowice – Prokopiak's Mount, Kujawy-Pomerania province. A, B – excavation in destructed parts of the Mount; C, D – selected features from sites Opatowice 36 and Opatowice 35 (Photo: M. Szmyt).

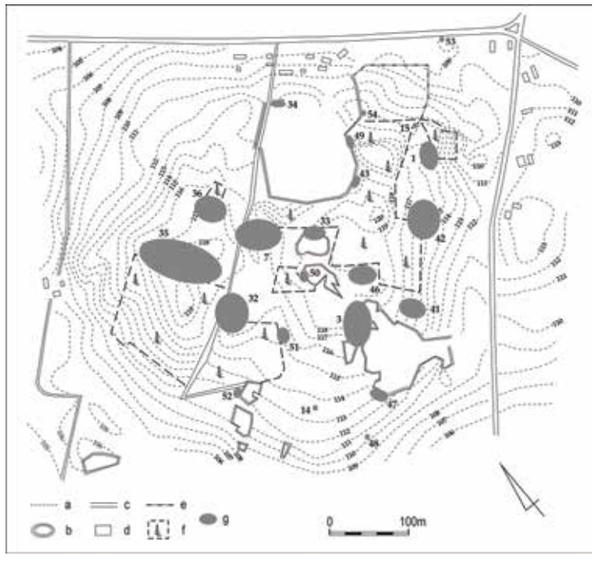


Figure 4. Opatowice – Prokopiak's Mount, Kujawy-Pomerania province. Location of archaeological sites. Key: a – contour lines; b – modern borrow pits; c – roads; d – buildings; e – fences; f – woods; g – archaeological sites

3. Brief presentation of most important results

The main idea of the programme was to make Prokopiak's Mount a place where the methods of archaeology and natural sciences would fuse. Three areas of collaboration can be considered the most significant: (1) construction of a local radiocarbon scale that would serve as one of the reference line of a regional (Kujawy) absolute chronology of the Neolithic and Bronze Age, (2) determination of the state of the natural environment and the extent of anthropogenic transformations of the primeval landscape in the investigated part of Kujawy, and (3) identification of the aspects of everyday life and rituals of Opatowice settlers as shown by artefacts and ecofacts.

3.1. Local radiocarbon scale: towards micro-history

The Opatowice programme has produced until now 100 radiocarbon measurements so far. Samples sent to laboratories contained charcoal, bones, wood tar, organic residues from pottery surface as well as organic components of the ceramic body.

Out of the 100 measurements that we have now, a vast majority falls on the 4th and 3rd mill. BC, or to be more precise, fit into the period of 3700-2300 BC, while the other measurements are older and coincide with the period of 5300-3700 BC. Most of the measurements can be logically related to the settlement of the Mount or adjacent areas. Only two measurements cannot be accepted and explained, relying on currently available archaeological knowledge (e.g. Goslar et al., 2013).

Currently, 59 measurements concern five fully processed sites, have well described cultural contexts and have been subjected to a critical analysis (Table 1). Most (41 dates) provide evidence for the multiple exploitation of the Mount by the Late Neolithic communities of the Funnel Beaker culture related to phases IIIB, IIIB-C, IIIC, IVB, VB and VC according to the Kujawy periodization (Kośko, 1981). The second largest group of dates is comprised of 13 measurements, coming from contexts left by the communities of the Globular Amphora culture of phases IIb and IIIa (Szmyt, 1996, 2013). Five measurements refer to the Middle Neolithic. A shortcoming, no doubt, is the absence of any dates corresponding to other stages of Mount exploitation, recorded as the remains of the Corded Ware culture and the Proto-Bronze Age, which have been discovered, for instance, at Opatowice 1 and 33 (Kośko & Szmyt, 2006, p. 288; Czebreszuk & Szmyt, 2007).

Neolithic Stages	Cultural qualification	Opatowice 1	Opatowice 3	Opatowice 33	Opatowice 36	Opatowice 42	Total
Early Neolithic	Linear Pottery culture?	-	-	1	-	-	1
Middle Neolithic	Late Band Pottery culture?	-	1	1	1	-	3
	Funnel Beaker culture?	-	-	-	-	1	1
Late Neolithic	Funnel Beaker culture	13	9	7	3	9	41
	Globular Amphora culture	2	4	1	6	-	13
Total		15	14	10	10	10	59

Table 1. Opatowice, sites 1, 3, 33, 36 and 42. Contexts of radiocarbon datings. Foll. Kośko & Szmyt, 2018.

In conclusion, we believe that a major merit of the radiocarbon dates from Opatowice is their credibility based on the systematic enlargement of the set and its continuous verification by referring them to the ever more detailed deposition contexts of bio-archaeological sources (Figure 5).

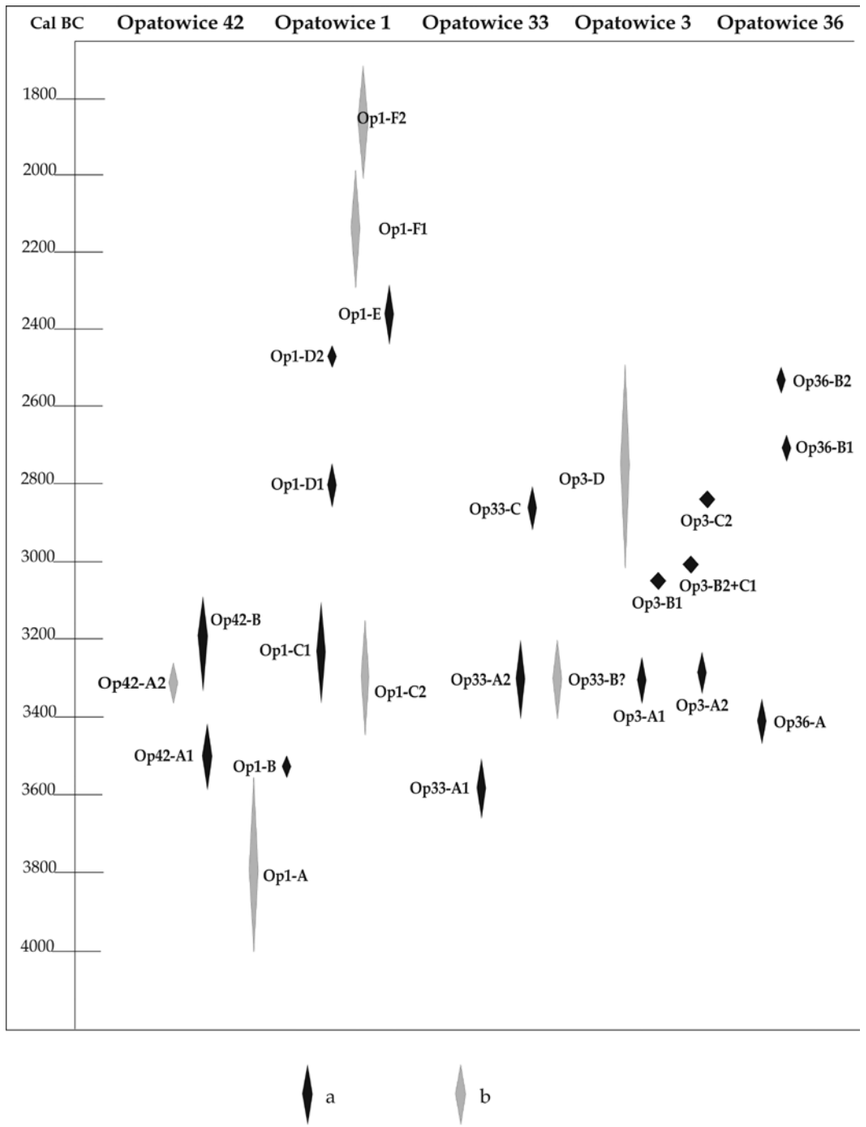


Figure 5. Opatowice – Prokopiak's Mount, Kujawy-Pomerania province.
Absolute chronology of settlement phases in five published sites. Foll. Kośko & Szmyt, 2015.
Key: a – detailed chronology based on the radiocarbon determinations;
b – general chronology established for the Kujawy region

3.2. Natural landscape and stages of its transformation

Kujawy is an exceptionally difficult region for the study of the dynamics and extent of primeval landscape changes (cf. Wiśniewski, 1983, pp. 434-435). For a number of reasons, even very large research projects undertaken in respect of this region do not produce fully satisfactory results. In spite of this fact, the Opatowice programme devoted much effort to the study of both abiotic determinants of the local environment and its biological characteristics.

As far as the first of the above-named aspects is concerned, most effort was devoted to the exploration of the lithology and stratification of Prokopiak's Mount (Nowaczyk, 2006; Hildebrandt-Radke, 2014).

In turn, the study of biological characteristics initially concentrated on the search for places that could supply palynological data, reflecting vegetation cover changes in this Kujawy fragment where Prokopiak's Mount stands. After many attempts, promising results were brought by investigations on palynological site Nasiłowo II, located about 4 km south of Prokopiak's Mount (Makohonienko et al., 2006, pp. 83-84). A core was extracted there the detailed examinations of which have continued to this day, although preliminary results were presented a few years ago (Makohonienko, 2008).

In the palynological sequence of Nasiłowo, five local pollen levels were identified: the oldest (*Pinus-Betula*) corresponds to the early Holocene, the second (*Quercus-Ulmus*) is dated to 5000-4200 BC, the third (*Artemisia*) to 4200-3400 BC, the fourth (*Plantago*) to 3400-1500 BC and the last (*Carpinus*) began ca. 1500 BC. The pollen levels testify to gradual changes in the vegetation and the transformation of the primeval landscape caused by natural factors and a human impact, exceptionally strong in the third and fourth levels.

Several phases of anthropopressure were distinguished (Makohonienko, 2008, pp. 360-366). The oldest phase A (5000-4400 BC), witnessed the opening of the landscape and the appearance of the first cereal grains. At the end, in the period of 4400-4200 BC, forests regenerated and the share of human activity indicators fell. In the next phase (B), dated to 4200-3850 BC, the share of synanthropic plants rises to reach 5.3 per cent, whereas the share of tree pollen falls. This phase encompasses fire traces and ends with the first elm-pollen drop. The third phase (C) with two sub-phases (C1 and C2) was put at 3850-2900 BC and was found to have witnessed a high share of human activity indicators, especially synanthropic plants, as well as cereals (*Cerealia*). Herbaceous plant pollen makes up 38.8-40.5 per cent, while the share of trees falls sharply. The highest degree of a human impact is observed in the period of 3400-2900 BC (sub-phase C2). Around 3150 BC, the second elm drop is noticeable. The next phase (D) can be dated to 2900-1450 BC. The human activity indicators (mainly synanthropic components) continue to have a high share but it is clearly lower than in phase C. In the successive phases – E (1450-850 BC) and F (after 850 BC), the share of anthropopressure indicators is lower.

In conclusion, the palynological evidence of human activity corresponds in principle to the results of settlement investigations on Prokopiak's Mount. However, further investigations are focused on making the relationship between both forms of recording human activity on a local scale far more precise.

3.3. Daily and ritual life on the Mount

By no means is it possible in a short article to present the detailed results of investigations and analyses included in the five volumes published so far. Moreover, it must be kept in mind that at most only a half of the sources, coming from the sites on Prokopiak's Mount, have been fully processed (Table 2).

Site	Number of finds						Other finds
	Pottery	Flint	Stone	Daub	Animal bones	Charcoal samples	
Opatowice 1	7 939	381	205	951	527	36	amber, clay and bone artefacts soil and stone samples plant impressions pottery dyes remains animal deposit
Opatowice 3	22 325	576	209	3 871	1495	42	clay and bone artefacts soil and stone samples plant impressions wood tar remains remains of pottery dyes copper lump animal deposits
Opatowice 33	5 308	277	111	33	37	39	clay artefact soil and stone samples plant impressions wood tar remains remains of pottery dyes
Opatowice 36	30 273	1 431	31	2 655	400	132	clay artefacts soil and stone samples plant impressions animal deposits
Opatowice 42	34 632	473	389	208	117	30	clay artefacts soil and stone samples plant impressions wood tar remains remains of pottery dyes animal deposits
Total	100 477	3 138	945	7 718	2 576	279	

Table 2. Opatowice, sites 1, 3, 33, 36 and 42. Basic quantitative data.
Foll. Kośko & Szmyt, 2018

In a concise summary, we wish to draw attention to several selected questions, concerning some aspects of daily and ritual life of Opatowice settlers as illustrated by archaeological and bio-archaeological sources.

In the first place, field investigations on the Mount and ensuing detailed analyses of all categories of sources, including typological, taxonomic, spatial, stratigraphic, chronometric and functional, exposed a complex and multiphase history of the sites. On each of them, a number of traces of use in the form of functionally varied either settlement phases or episodes were identified (Table 3). By a settlement phase, we mean such a use of space which involved the introduction of infrastructure in the form of any over- or underground structures into the landscape. A settlement episode, in turn, is a penetration of space, i.e. a transient presence of people evidenced solely by smaller or larger clusters of movable finds (usually pottery or flints) that cannot be related to any elements of settlement infrastructure. On the five sites processed so far, from 5 to 11 episodes (designated by lowercase letters following the site call number, e.g. Op1-a) and from 3 to 9 settlement phases (designated by uppercase letters following the site call number, e.g. Op1-A) were identified. Interestingly enough, all the settlement phases fall on the Late Neolithic and fit between 3700 BC and 2400 BC, while the chronology of settlement episodes is much broader, covering the period from the 6th mill. BC to the modern times. The rich history of space use resulted in a highly dynamic deposition and post-deposition processes which in turn modified (or even obliterated) the natural stratification of the Mount described above. This makes the spatial and functional identification of particular settlement phases much more difficult. If one considers, too, the degree of Mount destruction (Kośko et al., 2006), it is obvious why some of the questions posed cannot be answered for the time being.

Site	Excavated area (sq. m)	Number of features	Number of ^{14}C dates	Number and acronyms of identified settlement phases and episodes	
				phases	episodes
Opatowice 1	302,50	59	15	9 (Op1-A – Op1-F2)	5 (Op1-a – Op1-e)
Opatowice 3	445,00	113	14	6 (Op3-A – Op3-D)	8 (Op3-a – Op3-h)
Opatowice 33	285,50	85	10	6 (Op33-A – Op33-F)	7 (Op33-a – Op33-g)
Opatowice 36	730,75	205	10	3 (Op36-A – Op36-C)	10 (Op36-a – Op36-j)
Opatowice 42	570,50	103	10	3 (Op42-A – Op42-B2)	11 (Op42-a – Op42-k)
Total	2334,25	565	59		

Table 3. Opatowice, sites 1, 3, 33, 36 and 42. Basic quantitative results.
Foll. Kośko & Szmyt, 2018

In the course of individual settlement phases, the Mount saw settlements and camps as well as places of rituals, including cemeteries. The settlements were either seasonal or periodic. As a rule, they were small, consisting most of the time of a single farm-homestead. It comprised a dwelling structure (house, hut) and functionally related economic and, sometimes, ritual features. In each case, detailed exploration concerned various aspects of the production, distribution and consumption of a number of goods (such as food, containers, tools, weapons, textiles) and manners of waste disposal as well as connections to the outside world. These were traced by the presence of raw materials or products of a foreign (i.e. extra-Kujawy) provenance. Below, short descriptions of three settlements and a funeral place are given by way of example.

Opatowice site 42, settlement Op42-B (foll. Kośko & Szmyt, 2007b). It was erected in 3350-3100 BC in the form of a single-house settlement of people linked to the Funnel Beaker culture, phase IVB/VB (Figure 6). In the time it was used, continuing the same spatial formula, the construction of the house changed (it was re-modelled), which justifies distinguishing two construction phases: an older one (Op42-B1), for which a diagnostic role is played by a dwelling structure of about 35 sq. m, and a younger one (Op42-B2), which is identified by a dwelling structure of about 90 sq. m. As seen in the pottery scatter, in both construction phases the settlement range covered at least 900-1000 sq. m. The ground plan of the building in phase Op42-B1 was polygonal and its longer axis ran from the south-east to north-west. To the house, several cellars were connected. The younger building (Op42-B2) was located in part

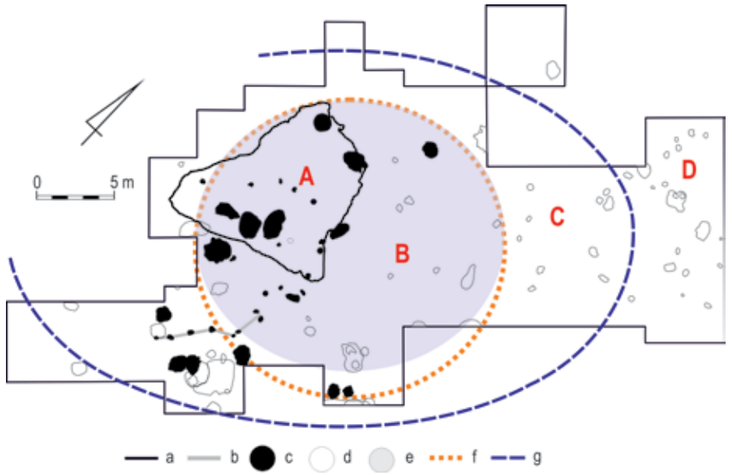


Figure 6. Opatowice, site 42, Kujawy-Pomerania province. Main settlement phase Op42-B (Funnel Beaker culture). Foll. Kośko, Szmyt 2007a, simplified.

in the place of the older building. Its ground plan was trapezoid and covered about 90 sq. m. Inside the younger structure, there was a great number of finds, mostly pottery. A vast majority of them were concentrated in the eastern half of the structure. On its useable level, there were very many potsherds, a significant portion of the spindle whorls and stone and flint products, and débitage. Integral elements of the structure were two pits, which must have served as cellars. Along the eastern wall of the younger house a courtyard stretched which can be defined as an area where household chores concentrated and, consequently, a large number of movable finds accumulated. Useless inorganic waste, resulting from accidental destruction of wares or tools, or originating from different industries (e.g. stone or flint working), was usually left in place. There are no signs of taking such materials outside the house or the courtyard. Quite the contrary, it is these zones of the settlement that were the principal dump of inorganic waste, which, as a result, was an integral component of the useable level (dirt floor) of the house and the courtyard surface. The farmyard was an area where activities less 'organizationally cumulated' were carried out. The space is characterized by a gradual thinning of finds. It is there that most of the storage pits were located.

The settlement inhabitants ate meat of domesticated animals, mainly cattle with a smaller share of sheep/goat. The use of plants is evidenced by a large series of plant impressions, charcoals and vegetable raw material processing indexes. The major crop was cereals, mainly wheat in its four varieties: einkorn (*Triticum monococcum*), emmer (*Triticum dicoccon*), spelt (*Triticum* cf. *spelta*) and bread wheat (*Triticum* cf. *aestivum*). The most popular wood raw material was pine *Pinus sp.*, used for construction and most likely burned for heat as well. Its remains account for over 95 per cent of charcoals on the site. Hardwood was only sporadically used for – in the case of oak wood – specialized manufacturing or – in the case of birch wood and bark – producing wood tar. In the pottery from settlement Op42-B, the signs of local craft can be seen in the application of 'wood-tar glaze' onto the outer surface of vessels. Exceptionally many instances of this practice were recorded on this site (on 380 shards) within the eastern part of the younger house and on the adjacent farmyard. Vessels, mostly pots, were covered with a layer of birch-wood tar about 1 mm thick. For the manufacturing of tools, local erratic flint was mostly used, while southern raw materials: chocolate, Volhynian and Jurassic flint were far less often used for this purpose. Tell-tale flakes of Jurassic flint are evidence that axes made of this material were re-utilized on the site. Fibre processing is confirmed by spindle bobs of which 30 were found in the house and its surroundings. It is not possible to determine what kind of weaving raw materials were used, but it is quite possible that sheep wool could have been utilized as the presence of this species of domesticated mammals was confirmed by the bone material from settlement Op42-B.

Opatowice site 3, settlement Op3-B2+C1 (foll. Kośko & Szmyt, 2014). Among the discussed settlement forms, a 'defensive' settlement, unique on the Lowland, stands out at site Opatowice 3 (Figure 7). It is composed of a ditch and an accompanying embankment, and

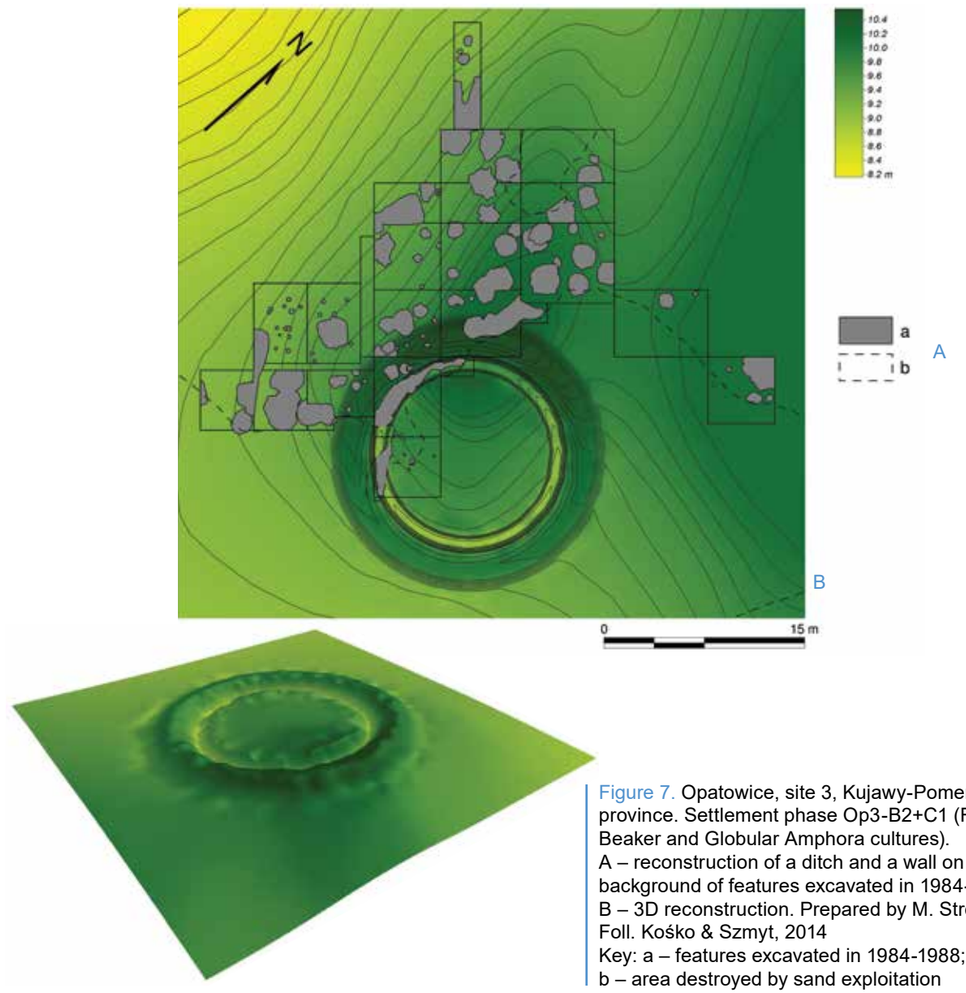


Figure 7. Opatowice, site 3, Kujawy-Pomerania province. Settlement phase Op3-B2+C1 (Funnel Beaker and Globular Amphora cultures).
A – reconstruction of a ditch and a wall on background of features excavated in 1984-1988;
B – 3D reconstruction. Prepared by M. Stróżyk.
Foll. Kośko & Szmyt, 2014
Key: a – features excavated in 1984-1988;
b – area destroyed by sand exploitation

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was located at the south-western edge of Prokopiak's Mount, in the area that has been badly devastated through the extraction of sand. The ditch was dug out to a width of 1.0 to 1.5 m and a depth of 0.7 m, delineating a circle with a hypothetical diameter of about 15 m. In the ditch fill, postholes were identified, testifying to the existence of a palisade. The remains of the embankment were documented along the external, western side of the ditch. In the ditch fill, a rich material was found, composed of sources belonging to the Funnel Beaker culture of phase VB and the Globular Amphora culture of phase IIb. A detailed planigraphic and stratigraphic analysis of the ditch fill revealed at all levels the co-occurrence of Funnel Beaker and Globular Amphora ceramic ware. Together with a chronometric analysis, this provides thus a basis for a hypothesis about the cohabitation of both communities using the 'fortifications'. The AMS radiocarbon measurements allow one to set this period to 3014-2990 BC. Due to the very poor state of preservation of the feature, it is difficult to specify its function (defensive? ritual? other?).

Opatowice site 36, settlement Op36-B (foll. Kośko & Szmyt, 2015). This single-homestead settlement of people is related to the Globular Amphora culture, phase IIIa. Its history includes two construction phases called Op36-B1 and Op36-B2 (Figure 8). The settlement was established in the 28th century BC, and a house erected on a rectangular plan (ca. 35 sq. m) was its dominant architectural feature. The building was aligned on an east-west axis and slightly sunken into the ground; its floor was made of clay. The processing of organic raw materials focused inside the house, while around it there were relics of other activities (including pits, cellars, fireplaces, and sand extraction pits). A ritual feature containing the body of a cow was located in the immediate vicinity of the house. In total, the central part of the settlement extended over an area of approximately 250 sq. m. In the described form, settlement Op36-B1 could have lasted at least 40 years (2730-2690 BC). It is possible that in terms of both spatial organization and the material culture characteristics it continued in the form of settlement Op36-B2. At the latest by the 26th century BC, the then residents partially changed the inhabited space by sacralizing the north-eastern edge by placing there two animal deposits containing parts of bovine carcasses. This was probably not a one-time event, but rather a repeated action that happened twice between 2570-2510 BC. At the same time, the house did not alter much.

The everyday life of the residents of settlement Op36-B was reconstructed in a few aspects. And so, their food economy was based on animals and plants. Cattle was used, which is reflected not only in skeletal remains, but also as traces of processed milk preserved in the form of lipids on the walls of clay vessels. Cereals and legumes were also utilized (including emmer wheat), which is confirmed by impressions identified on pottery. For manufacturing tools mainly mineral raw materials were used, predominantly flint. Locally available erratic flint was of particular importance. It was supplemented to a small extent by banded flint imported from the south, from which mostly axes were made. Tools (polishing plates, grinders, axes) were also made of erratic rocks. Clay was processed and turned into clay body for pottery manufacture by the addition of two basic tempers: chunks of igneous rocks and sand, occasionally also organic material. The firing of vessels was performed mostly at none too

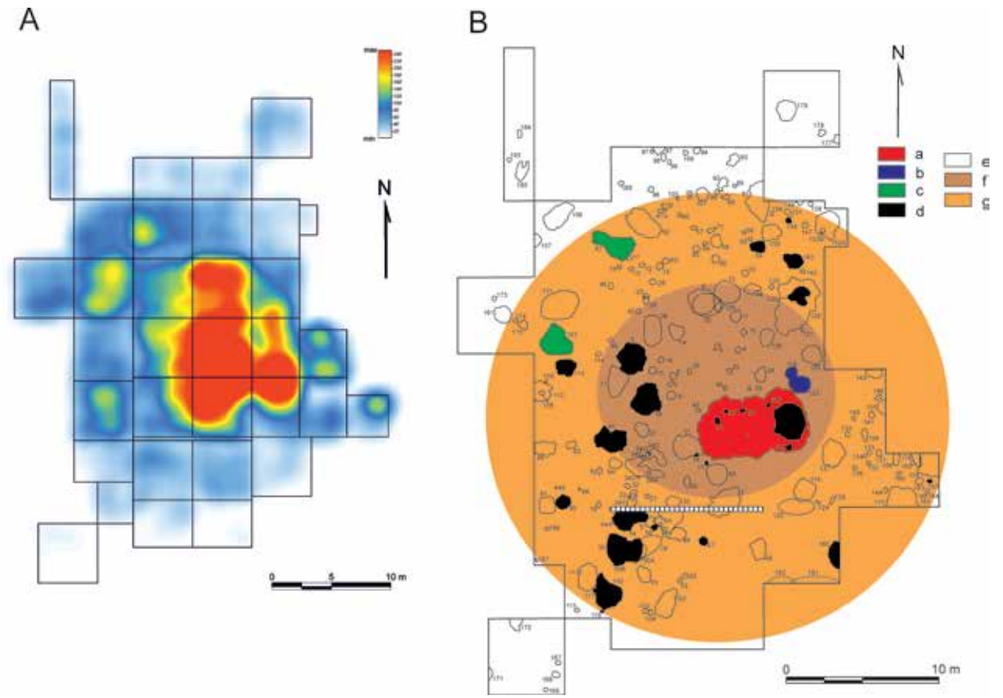


Figure 8. Op36-B Opatowice, site 36, Kujawy-Pomerania province. Main settlement phase Op36-B (Globular Amphora culture). A – results of kernel density analysis of pottery distribution; B – spatial organization. Foll. Kośko & Szmyt, 2015, modified
Key: a – house; b – cattle deposit of phase Op36-B1;
c – cattle deposits of phase Op36-B2;
d – features of phase Op36-B1 or Op36-B2;
e – other features, not connected to the Op36-B;
f – concentration of pottery;
g – range of settlement Op36-B

high temperature (approx. 700 ºC). Coniferous wood (mainly pine), most easily available on the Mount, was used as the primary building material and fuel. Deciduous wood was used only occasionally. Imprints on pottery attest that fibrous materials in the form of braided cords probably made of phloem were used. Additionally, traces of the use of plain weave were identified.

Opatowice site 1, funeral place (foll. Czebreszuk & Szmyt, 2007). At the end of the 3rd mill. BC, in the eastern part of the Mount, at the Opatowice 1 site, graves began to be placed. Three of them were discovered during excavations (Figure 9A). Unfortunately, the remains of the deceased have not survived, but the items placed next to their bodies have survived to our times in good condition. One of the graves was object no. 58: oval, 170 x 106 cm in size and

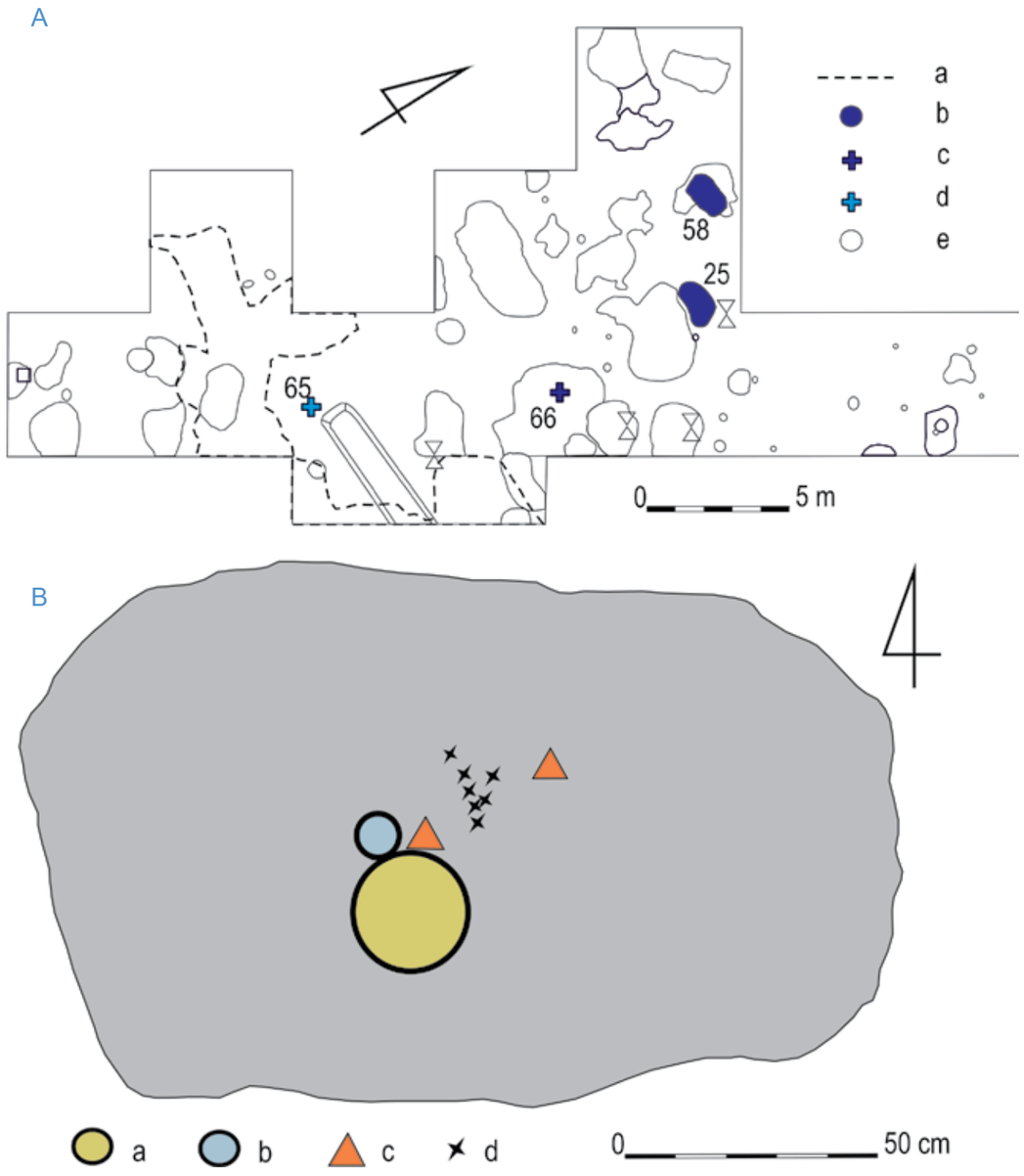


Figure 9. Opatowice, site 1, Kujawy-Pomerania province. A – location of graves dated to the Proto-Bronze Age and Early Bronze Age; B – grave 58. Foll. Czebreszuk & Szmyt, 2007, modified
Key: A. a – range of modern destruction; a – Proto-Bronze graves (features 25 and 58); c – possible Proto-Bronze grave (feature 66); d – possible Early Bronze grave (feature 65); e – other features;
B. a – a bowl with flint flakes and raw amber lumps inside; b – a pot; c – amber artefacts (a bead and a pendant); h – human (?) fine bones.

61 cm in depth (Figure 9B). In its central part there were two vessels: a bowl and a pot. The bowl contained 22 small pieces of flint, five amber lumps and a fragment of a pot placed next to it. The set of flint objects contained only flakes of the erratic Baltic raw material, including at least 4 flakes of a polished ax. Five flakes were previously used: two in the production of ceramics and the other two for scraping plants. There were also five small amber lumps in the bowl, which due to their size were not suitable for processing, although two of them had been previously processed. Two amber products were placed under the vessels: a bead and a rectangular pendant with a hole in the center. The amber pendant (Figure 10) is unique, and similar items are few and come from eastern Germany and France. These analogies are related to one of the most important European cultural traditions at the end of the 3rd mill. BC – Bell Beakers. It connected societies living in vast areas of Europe, from Portugal and Spain in the west to Poland, Slovakia and Hungary in the east, and from the British Isles and Denmark in the north to Italy in the south. They were involved in the network of far-reaching cultural ties, in which the inhabitants of Kujawy of that time also participated.



Figure 10. Opatowice, site 1, Kujawy-Pomerania province. Amber pendant from feature 58 (Photo: K. Zisopulu-Bleja).

4. Looking back years later: evaluation of the Opatowice programme against the background of the current archaeological research

The years that have passed since the end of the field part of the Opatowice programme witnessed other types of investigations, mainly broad-area and linear ones that sought to rescue relics of prehistory prior to the launching of vast rescue projects in Poland (cf. Szmyt, 2013, pp. 28-30). These investigations yielded great amounts of data on prehistoric settlement in Kujawy and elsewhere in Poland. In the context of all these new sources, thought ought to be given to whether the Opatowice programme is still topical; in particular, its objectives and assumptions should be weighed and reconsidered. A stimulus for such an assessment comes from the experience gained in the first stage of analytical work.

At first glance, all the archaeological sites on Prokopiak's Mount fit into the category of sandy sites, admittedly dominant on the Polish Lowland, but unrewarding in exploration due to the poor state of preservation of organic materials and the high comminution of pottery. Actually, this opinion is not justified, as geomorphologic data show. The stratigraphy of the Mount and the fact that the local fields had not been intensively cultivated helped preserve numerous

prehistoric sources, including organic ones. It is true, however, that the amount of the latter is considerably smaller than on sites located on clay soils.

The results of analyses made so far have vindicated the decision to chart in detail movable finds despite its costly and time-consuming consequences. The documentation that has been amassed is slowly being digitalized not only for the purpose of storage but also to subject it to the state-of-the-art methods of analysis (e.g. analyses using the kernel density algorithm – Figure 8) producing high-precision results (e.g. Stróżyk & Szmyt, 2015). This makes up, in part, for the destruction brought to some sites by sand extraction. Unfortunately, in some instances the destruction was so extensive that the interpretation of research results is made very difficult.

The verification of the informative potential of stratigraphy preserved on the Mount, both in its vertical and horizontal dimensions, has proven successful. The combination of stratigraphic findings, detailed taxonomic studies of pottery and the numerous series of radiocarbon dates helps to place a date on successive settlement phases and episodes with ever greater accuracy – their great number being yet another factor responsible for a more complicated research, a consequence of the great complexity of post-deposition processes. To disentangle this complexity, it is necessary to be very exact in one's observations and diligent in documenting field investigations, as well as highly critical in analyzing radiocarbon dates.

The time devoted to excavations and the thoroughness of exploration in Opatowice favourably set the programme apart from broad-area rescue investigations, dominating in the archaeology of Poland and Kujawy since the 1990s. Despite efforts by the academic community to maintain the appropriate level of research methodology, the standards of explorations have been declining ever more noticeably for several years under the pressure of institutions coordinating construction projects. What makes matters worse is the fact that linear construction projects (roads, motorways and pipelines) have crisscrossed the Kujawy Plateau, i.e. a key region for the whole of the Lowland (Szmyt, 2013, Figure 1.5). Sites located on clay soils (especially on Kujawy black soils) hold well-preserved organic sources, the quick exploration of which is not feasible. The time factor limits not only the methodology of research but also the accuracy of field observations. Another restriction concerns the space set aside for investigations. As a result, investigations along planned gas pipelines focus on narrow strips of land, the relationship of which to the remaining portions of sites is not known. On the other hand, the advantages of rescue investigations include the fact that they covered extensive areas and among them places that had not attracted earlier any special interest of archaeologists (e.g. Kośko (Ed.), 2000; Bednarczyk & Kośko (Eds.), 2004; Szmyt (Ed.), 2016). Moreover, it has become a standard procedure to include natural scientists in research teams. Finally, a significant portion of archaeological sources is processed and published within several years from their discovery.

All things considered, the high opinion of Prokopiak's Mount as a testing ground for the study of Late Neolithic settlement holds fast. The assumptions and objectives of the Opatowice programme continue to be topical and find many analogies in the directions in which European archaeology develops today.

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Between the East and the West of Europe: The Eneolithic and the Beginning of the Bronze Age in Light of Studies on Bio-Cultural Borderlands

Aleksander Kośko, Piotr Włodarczak, Danuta Żurkiewicz

Abstract

The barrows of the Yamnaya culture located along the middle Dniester River (southern Ukraine, Yampil region) became a matter of concern for a Polish-Ukrainian archaeological expedition. As a result of this joint effort, a series of earlier studies of the barrows were published and additional excavations were conducted. A total of seven barrows located at four archaeological sites were excavated. Consequently, a variety of new materials were obtained, which made it possible to perform extensive specialist analyses (radiocarbon, isotope, and aDNA, among others). The results of this research show a broader picture of local Yamnaya culture communities, allowing a comparison with Central European Corded Ware culture communities and contributing immensely to the discussion regarding the relations between these groups.

Keywords: Yamnaya culture, Middle Dniester area, Corded Ware culture

Introduction

The history of research on the relationship between Eastern and Western Europe at the junction of the late Eneolithic and Early Bronze Ages (3500-2000 BC) conducted by researchers from Poznań has a particularly long tradition based more or less on formal research projects. It was instigated by Professor Józef Kostrzewski, who in 1925 conducted research in the eastern borderlands of the Second Republic of Poland, in the catchment area of the middle Dniester River at the site located in Biały Potok (Kostrzewski, 1928; Kośko, 1998; Szmyt, 2016).

The post-war years and the new political reality, which also affected the city of Poznań, did not favour research interests in the bio-cultural borderland between Eastern and Western Europe. The archaeological focus on the study of the beginnings of Polish statehood, which was associated with the thousandth anniversary of the Baptism of Poland, resulted in an intensification of research predominantly within the western areas of the country. As evident in the journal *Slavia Antiqua*, research in the eastern area emerging from Poznań academic circles at that time presented the achievements of the researchers who delved into the Middle Ages rather than earlier periods.

It was only after the jubilee year of 1966 that systematic growth of research interest in earlier epochs became possible. This was particularly intense within the Kuyavia region, where the then Department of Archaeology at the Adam Mickiewicz University established the Kuyavia Expedition, later known as the Kuyavia Research Team. The programme, headed by Professor Aleksandra Cofta-Broniewska, developed dynamically in the 1970s and 1980s. In the 1980s and 1990s it resulted in a number of inspiring monographs on the Neolithic and Early Bronze Age communities in Kuyavia. Much of this work highlighted the importance of contact with Eastern Europe for the development of local communities and indicated an urgent need to study interactions between these regions.

Unfortunately, the possibility to communicate with archaeologists from Eastern Europe was adversely affected by the political barrier that existed at that time and it was only during the political transformations in Poland of the 1980s and 1990s that the barrier was brought down. The year 1992 was a symbolic date of 'opening up to' working together, when an agreement on mutual cooperation between Adam Mickiewicz University in Poznań and the Institute of Archaeology of the National Academy of Sciences of Ukraine was signed. Since 2010 (but officially beginning in 2013), researchers from the Centre for Mountain and Upland Archaeology in Cracow joined the team of researchers studying the bio-cultural borderlands of Eastern and Western Europe as a result of a scientific cooperation agreement between the Institute of Archaeology and Ethnology of the Polish Academy of Sciences and Adam Mickiewicz University. This beneficial 'merger' gave rise to numerous initiatives aimed at bringing research centres together, agreeing on joint research plans, and, finally, their implementation in the field and subsequent research activities (Kośko, 2011, 2014). This all resulted in the creation of several research teams focused on different sections of prehistory and different border zones between Eastern and Western Europe. The effects of the activities of one of these teams is the subject matter of the present text.

Yampil

The research project aiming to study the biocultural south-eastern borderlands between Eastern and Western Europe focused on the diagnostics of contact between the Corded Ware Culture (CWC) and local barrow cultures. The research area was the eastern part of the Podolian Upland, located in the catchment area of the middle course of the Dniester River (i.e., the Middle Dniester area). This was where communities of the Globular Amphora culture (GAC) emerged in the early third millennium BC, forming the eastern limit of their range, and entered into intensive relations with local communities of the late Trypillia culture (TC) and the

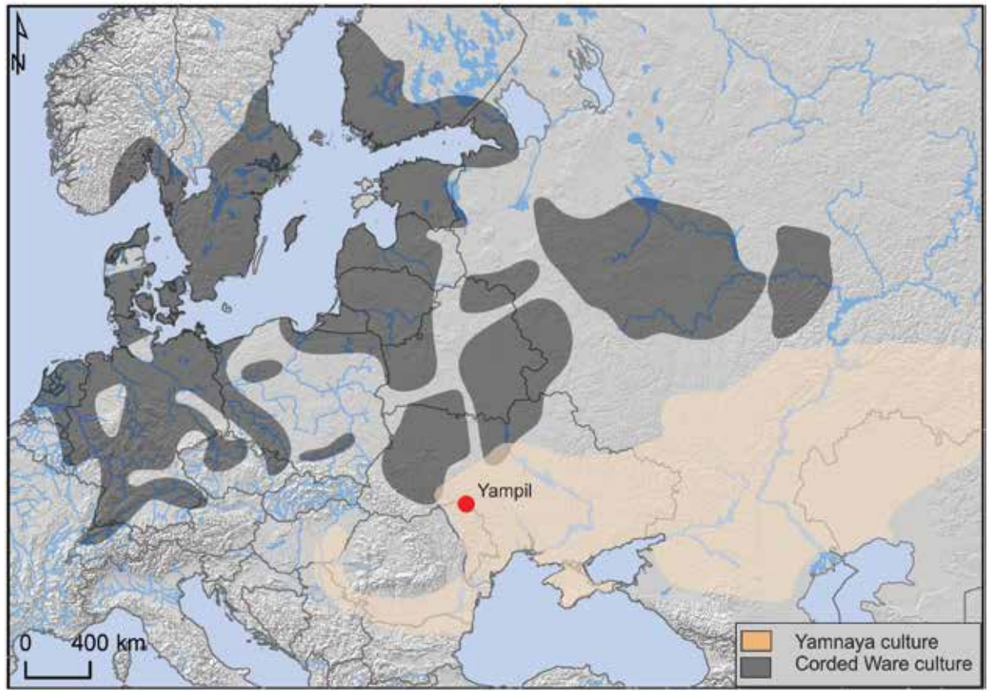


Figure 1. Map of the extent of the Corded Ware culture and the Yamnaya culture (modified from Müller et al., 2009).

Yamnaya culture (YC) (Szmyt, 1999, 2014). The next develop stage of the East-West European borderland in the area of central Transnistria was the emergence of CWC communities in this zone (Figure 1).

In the Podolia area, there was a borderland between two communities building a comparable cultural picture of 'nomadic' Europe from the Rhine Valley to the Upper Volga River region. Following the adoption of concepts, the unification of the funerary rites throughout such vast territories was caused by the westward expansion of East European steppe communities into Central Europe (Gimbutas, 1979). The interrelations present in the origins of the CWC and the YC and their subsequent interactions are the basis for an inspiring discussion on the origin of cultural and biological world-building patterns that are completely different from the existing patterns created by Indo-Europeans – the ancestors of the majority of today's inhabitants of Europe.

Sources from eastern Podolia obtained within the region of Yampil in the Vinnytsia Oblast located in southern Ukraine on the border with Moldova, are particularly important for studying the outlined issues. A museum query carried out in the 1990s by Poznań researchers helped to uncover their potential. As a result, in the Vinnytsia Regional Museum, an amphora

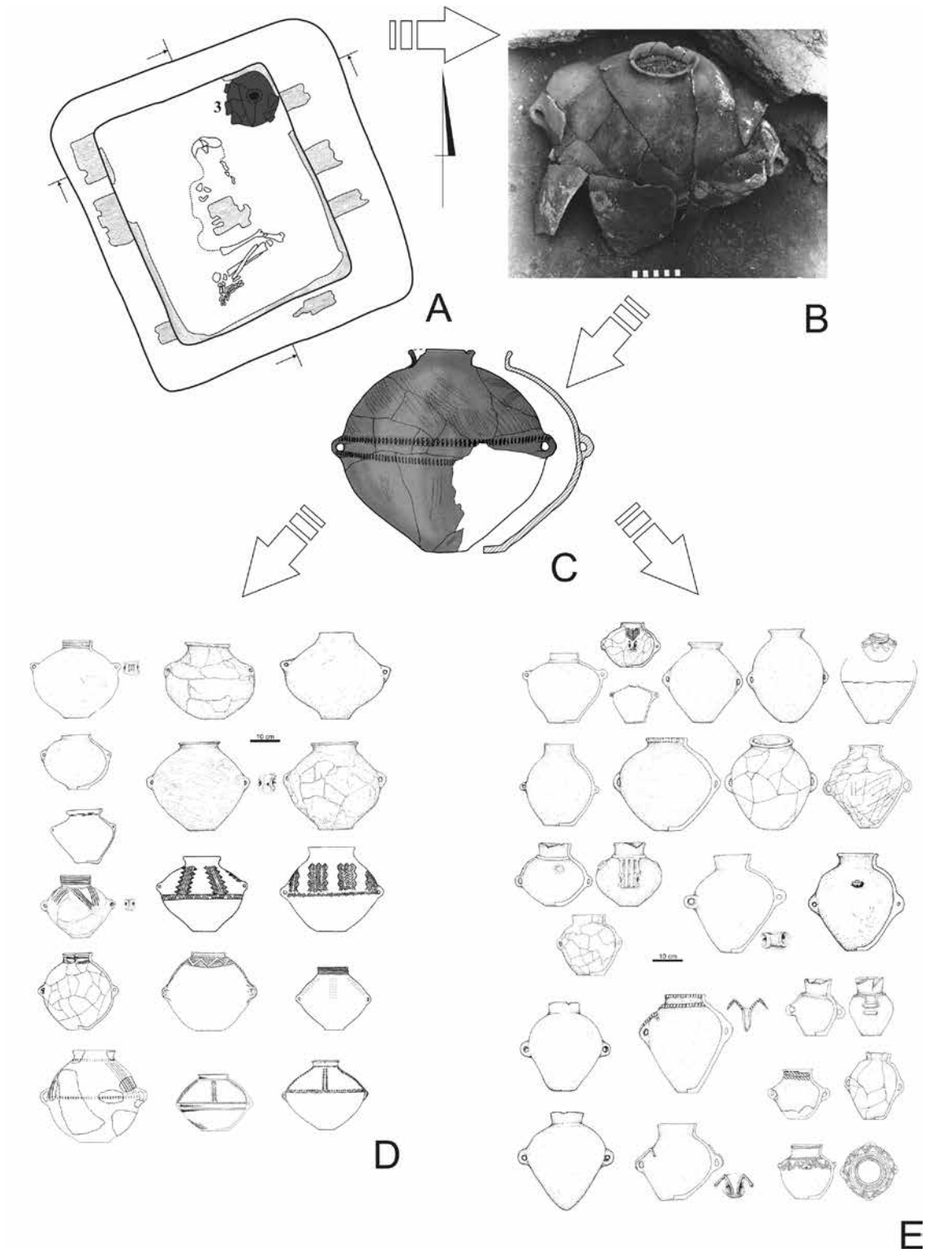


Figure 2. Porohy, Yampil Region, Barrow 2: A. Plan of Feature 6; B. Amphora in the moment of discovery; C. Drawing reconstruction of the amphora; D. Amphorae from graves of the Corded Ware culture in the zones of the Upper Dniester zone and the Lublin Upland; E. Amphorae from the graves of the Yamnaya culture in the Dniester-Danube zone.

corresponding to the stylistic characteristics of the earliest phase of the CWC in Central Europe was recorded in the YC inventory found under the barrow mounds in the village of Porohy (Yampil region) (Iwanowa et al., 2014). This discovery initiated a series of interlinked projects aimed at examining the interactions between these neighbouring communities in detail (Figure 2).

Catalogue of barrows from the Yampil region

At the start of this project, a detailed inventory of all barrows from the Yampil area was made and information on the excavations carried out to that time was collected (Harat et al., 2014). The first investigations of the YC barrows in this zone took place as early as the second half of the nineteenth century. After a long break, in the 1980s and 1990s, the Yampil mounds were the target of rescue and conservation research led by archaeologists from Vinnytsia. Also, a detailed inventory of the mounds visible in the landscape was made at that time. The collection of all available information about the barrows located in the vicinity of Yampil and resulting publications became the first stage of the project (Kośko et al., 2014). From 2010 to 2014, a Polish-Ukrainian expedition carried out excavations of seven more mounds in this region. As a result, around 156 burial mounds were recorded within an area of c. 790 km^2 (Jachimowicz & Żurkiewicz, 2017) (Figure 3). At the time the project was implemented, 16 barrows had already been excavated. Unfortunately, the obtained osteological material was not available for research as it was destroyed in an earlier fire in the repository containing the museum's collection. Based on the reports from these studies, it may be concluded that all the sites investigated in the initial phase were related to the YC, whereas the later stages can be associated with subsequent cultures up to the Middle Ages.

To verify these assessments and acquire new chronometric and biological data from the analysed community, new research was initiated – both non-invasive and excavation. Thus, from 2010 to 2014, seven barrows located at four sites were investigated: Pidlisivka, Porohy, Klembivka, and Prydnistryanske (Klochko et al., 2015a, 2015b, 2015c; Klochko et al., 2015; Przybyła et al., 2017).

Research results and discussion

The data obtained from the 2010 to 2014 excavations helped to reconstruct a new picture of the local communities that built barrows in the Yampil area. An important discovery was linking the earliest phases of building of the structures to Eneolithic communities, earlier than previously assumed, rather than directly associating them with the YC. The assumption was confirmed by an extensive series of over 60 radiocarbon dates, which was the first attempt to create an absolute chronological scale for this region (Goslar et al., 2015) (Figure 4).

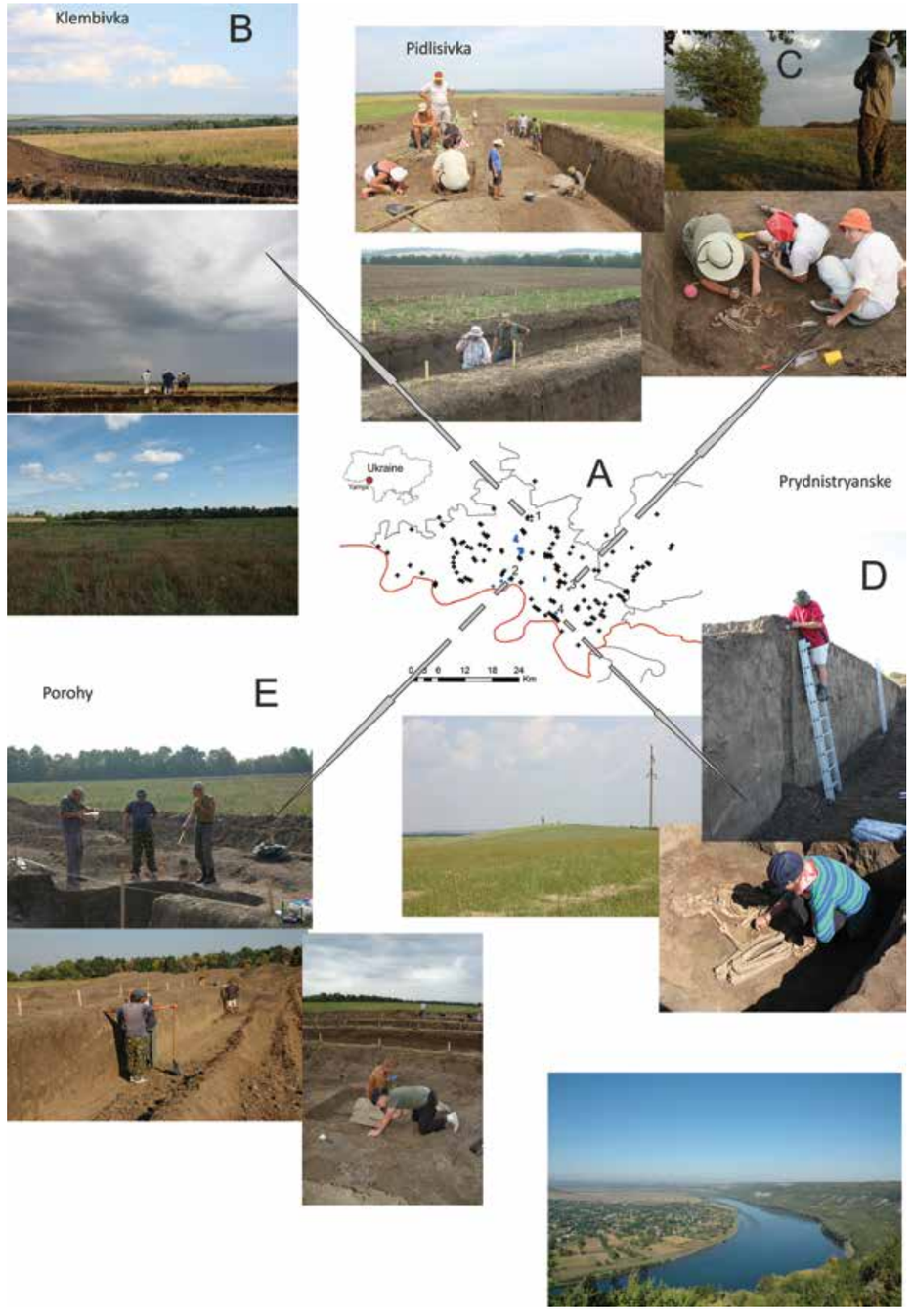


Figure 3. Barrows in the Yampil region. A. Administrative map of the Yampil area indicating the presence of barrows (marked with black crosses) and excavated barrows (marked with blue points). Sites under excavations in the years 2010-2014; B. Klembivka; C. Pidlisivka; D. Prydnistryanske; E. Porohy.

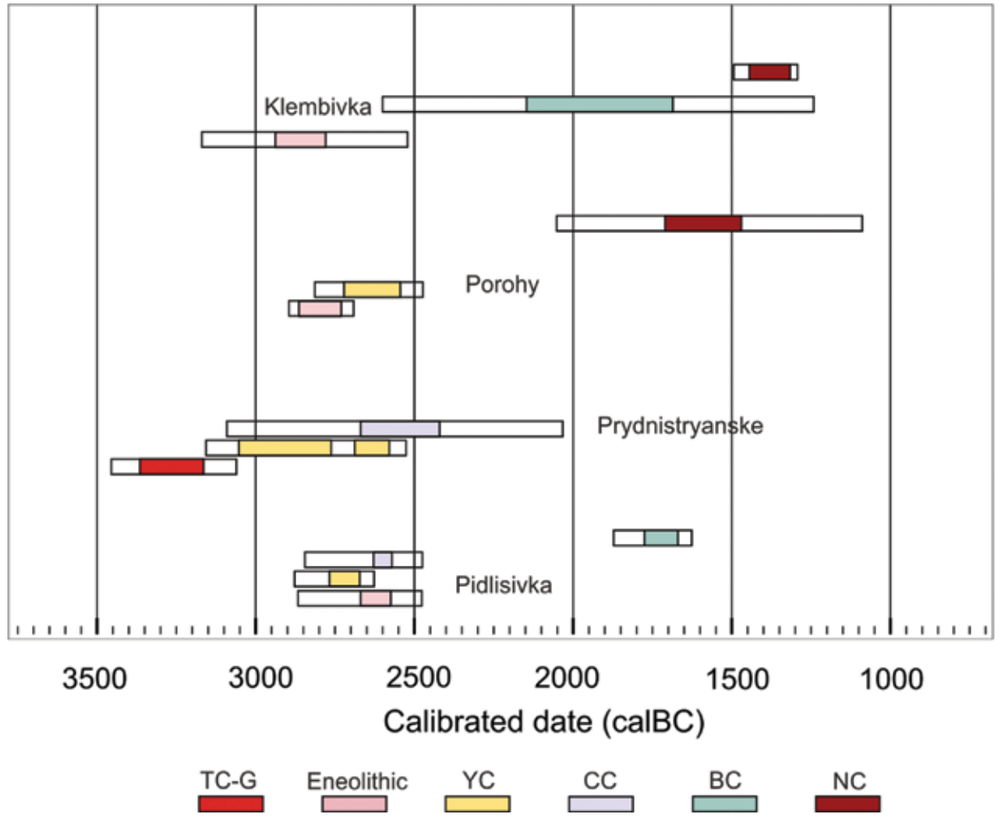


Figure 4. Chronological diagram of barrows from the Yampil area based on absolute dating (modified from Goslar et al., 2015).

The oldest sites (i.e., barrow burials), were constructed by late TC communities (Grordnineşti/Kasperovtsy group) and date to c. 3350-3200 BC. The horizon connected with the YC communities in this region is dated to c. 3100/3000-2500 BC. This period also reveals the presence of specific activities connected with the appropriation of burial sites by new groups. For example, within the Prydnistryanske cemetery, deliberate removal of late TC burials and their replacement with early YC burials is clearly evident. Throughout the entire region, a slightly different funeral ritual functioned concurrently with the early horizon of the YC, which was associated with Eneolithic communities, including Nizhnaya Mikhailovka/Černavoda I and Zhivotilovka-Volchansk traditions, which date to c. 3000-2800 BC (Figure 5). However, no traces indicating the youngest phases related to the YC were recorded in the vicinity of Yampil (Włodarczak, 2017). Only one grave from the barrow cemetery at Prydnistyanske was related to the early phase of Katakombnaya culture.

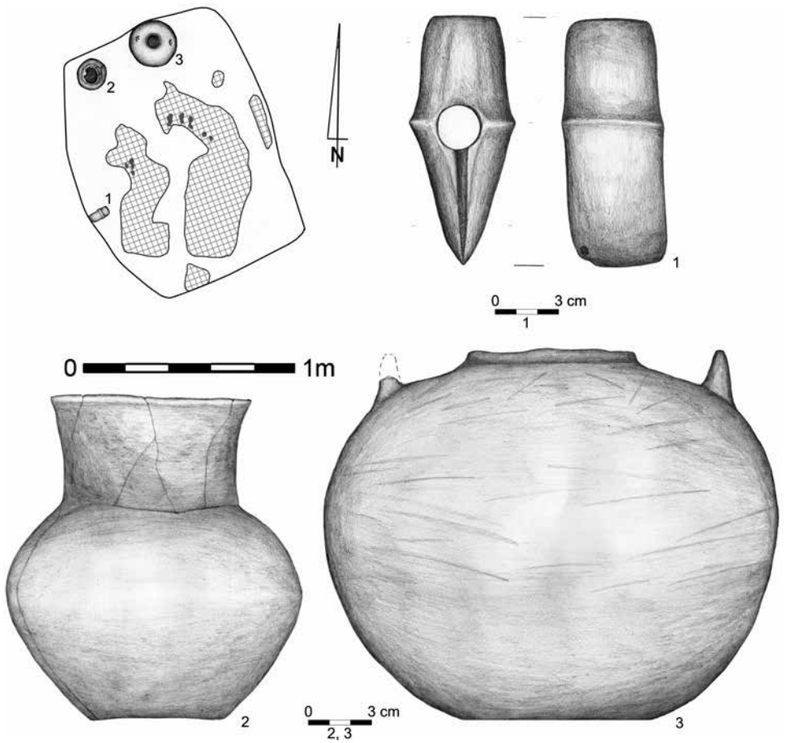


Figure 5. Prydnistryanske Yampil Region. Zhivotilovka-Volchansk grave from Barrow III (Drawing by M. Podsiadło; after: Włodarczak, 2017).

To date, 20 burials in the seven most recently excavated burial mounds in the Yampil area have been assigned to the Eneolithic horizon. The osteological data obtained from earlier studies are unverifiable/impossible to reinterpret for the reasons already described earlier in this text. However, the YC burials remain the most numerous from the Yampil area. To date, 61 graves have been documented from all excavation sites (Table 1), including 21 from the latest excavations. An analysis of these finds has provided valuable information about the funerary rituals performed by these communities.

Cultural Affiliation/Chronology	Female	Male	Adult	Child	Total
Eneolithic	0	3	5	5	13
Yamnaya culture	2	12	2	5	21
Katakombnaya culture	1	2		1	4
Babyno culture	1	2	1	0	4
Noua Culture	1	7	1	1	10
Iron Age	2	2	2	1	7
Unidentified				2	2
Total	7	28	11	15	61

Table 1. Number of individuals excavated from barrow burials in the Yampil area by sex, age, and cultural affiliation and chronology.

The Yamnaya culture in the Middle Dniester Area

A characteristic feature of the YC in the Middle Dniester area was the largescale standardisation of ritual activities (Włodarczak, 2017). Placing the central burial within a barrow signalled the time for it to come into operation. Sometimes several burials were considered central at a given stage of a barrow's use. After the body was placed (usually in the supine position with flexed legs and the head to the west) in the central feature – a rectangular pit – other graves were built in the immediate vicinity (Figure 6). In addition to the placement of another central grave during the new phase of use of such a cemetery, there was also the procedure of enlarging the mound itself. There were also probably stelae (i.e., pieces of worked, local deltoid-shaped stones) placed at the top of these artificial 'small hills'.

The rectangular burial pits occurred in various sizes – the smallest were created for burying children and juveniles. The largest, intended for adults, ranged from 1.5 to 3.7 m^2 at the bottom of the trench (Włodarczak, 2017, p. 252). A characteristic element of their construction was a narrow section, forming a kind of step placed before the burial chamber and, commonly, a wooden grave cover was located in that place.

Most of the burial pits of the YC were equipped with wooden constructions in the form of the aforementioned cover or casing of the burial pits (Stępnik et al., 2017). These structures were mostly made of oak planks laid along the longer side in the central structures and dated to the earlier phase of the YC. In the later phases and in the graves surrounding the central burial, the timbers were arranged transversely along the longer axis of the grave.

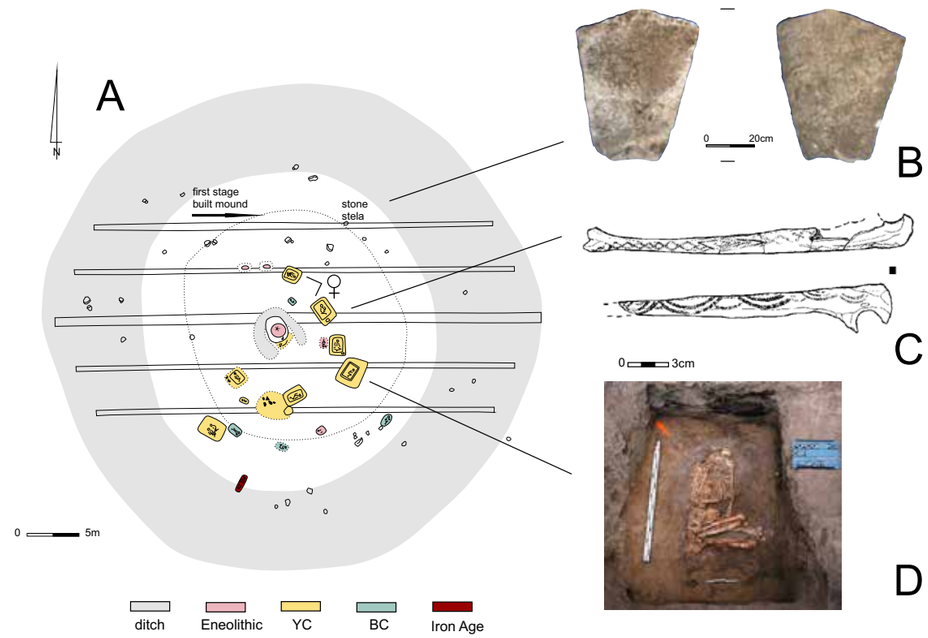


Figure 6. A. Plan of Barrow 3A from the village of Porohy with burials from different use phases; B. Stone stella; C. Bone with postmortem 'tattoo'; D. Grave from the Yamnaya culture.



Figure 7. Prydnistryanske Yampil Region. Reconstruction of stages of grave IV/3 construction (Drawing by M. Podsiadło; after: Włodarczak, 2017).

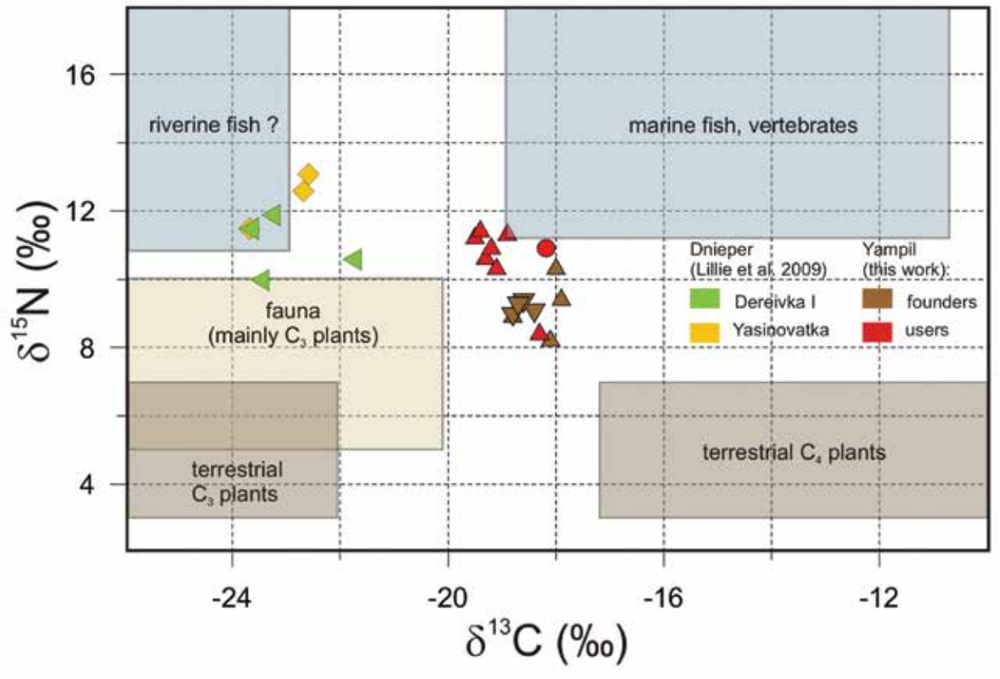


Figure 8. Reconstruction of the potential diet of the builders and users of the Yampil mounds based on the analysis of carbon and nitrogen stable isotopes from the bones of the deceased (after: Goslar et al., 2017).

Considering construction of the burial chamber, Grave 4 from Barrow IV at Prydnistryanske stood out (Klochko et al., 2015). The rectangular-shaped burial chamber was covered with four fragments of well-fitted limestone slabs, forming a cover measuring c. 2.8 x 2.0 m and covered from below and above by matting indicated by impressions and an organic layer that were highly visible (Figure 7). The interior of the grave had an additional wooden roof, supported by eight posts with a diameter of 5-6 cm, sunk below the level of the burial. The whole structure was made of ash wood. The anthropological investigation of the well-preserved skeleton found within and dated to c. 3050- 2950 BC found it belonged to a male who died between the ages of 35 and 50 years. He was very tall (c. 187 cm) and suffered from rheumatic lesions in the upper extremities and degeneration of the spine. The pathological conditions recorded prove that this adult male was extremely physically active and his body was exposed to sustained mechanical loading related to the nature of the work he performed (Litvinova et al., 2015).

An anthropological analysis of all available human remains from the Yampil region dating from the Eneolithic to the Late Bronze Age, with a predominance of representatives of the YC, indicates these communities were in a good state of health. The assessments were made on the basis of such determinants as the presence of stress and disease, including linear enamel hypoplasia (LEH), cribra orbitalia, porotic hyperostosis, as well as tooth decay. In addition, the latter determinant was characterized by a particularly low frequency of occurrence in the investigated population and may be indicative of a diet low in sugars and carbohydrates, based largely on food of animal origin (Litvinova et al., 2015).

Slightly different information about the diet of prehistoric communities from the vicinity of modern Yampil was obtained from stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope analyses of the bones of 16 humans (Figure 8). On this basis, it is possible to conclude the diet of these communities was based on plant foods with variable amounts of terrestrial animal protein at different times. High $\delta^{13}C$ values suggest the consumption of C_4 plants in the diet, possibly represented by millet. Also, the isotopic composition of the oldest burials belonging to the investigated Yampil barrows (i.e., the 'founders' of the individual barrows), were compared with the remains of people buried under their mounds during the subsequent, later stages of barrow 'use' (Goslar et al., 2017). The higher $\delta^{15}N$ values of users compared to founders may reflect an increase in the consumption of animal or freshwater fish protein. Interestingly, this increase took place at different times in particular clusters of barrows. Thus, the increase in the consumption of animal or fish protein was the result of the stabilisation of the local economy of a particular centre rather than an effect of climatic or culturally conditioned regional transformations.

As it turned out, it was particularly difficult to obtain data describing the natural environment of the third and early second millennia BC for the Yampil region, as the specific natural conditions were not conducive to the preservation of vegetal pollen, making palaeobotanical reconstructions impossible (Makohonienko & Hlildebrandt-Radke, 2014). However, it was feasible to perform some palaeoenvironmental reconstructions based on the analyses of soil from the profiles obtained from the excavated barrows (Jankowski et al., 2017) (Figure 9). Based on the results of these analyses, it was concluded that in the third millennium BC the Yampil area, formally classified as a less open forest-steppe, was covered by soils characteristic of steppe areas with rich grassy vegetation, where trees were found mainly in the river valleys.

There is not much information available about the economy of the YC in the Yampil area. The modest burial goods found with the remains of the local deceased include animal remains discovered in Eneolithic and Bronze Age burials; however, it is difficult to decide whether those animal species were of economic or, perhaps, only of symbolic importance. No more than about a quarter of all graves discovered in the Yampil region yielded animal remains (Marciniak et al., 2017). Apart from a few artefacts made of bones and teeth – such as tools and ornaments – most were elements of sacrifices made for the deceased, either intended for consumption or in the form of non-consumable parts of animals (skulls and limbs) (Figure 10). These goods were deposited at the level of the burial – either by the deceased or within the wooden grave cover. Among the identified species, the remains of cattle dominated in Eneolithic burials. In the graves of the YC, remains of goats and sheep/goats definitely predominated. No remains of cattle were recorded in the Yampil funeral contexts of the YC; however, they do occur later in the developed stage of the Bronze Age in the burials of the Babyno culture.

Ancient DNA (aDNA) studies have provided additional information that might help to depict the social structure of the Yampil community of the YC. Until recently, it was assumed that men played the main role in the wave of migration that led to the creation of the CWC and the cultural transformations identified with 'nomadisation' of vast areas of Europe. aDNA analyses of human remains buried in barrows in the Yampil area and their comparison with representatives of the neighbouring CWC communities from Lesser Poland not only confirmed their kinship, but also indicated a large share of women from the steppe in the migration wave

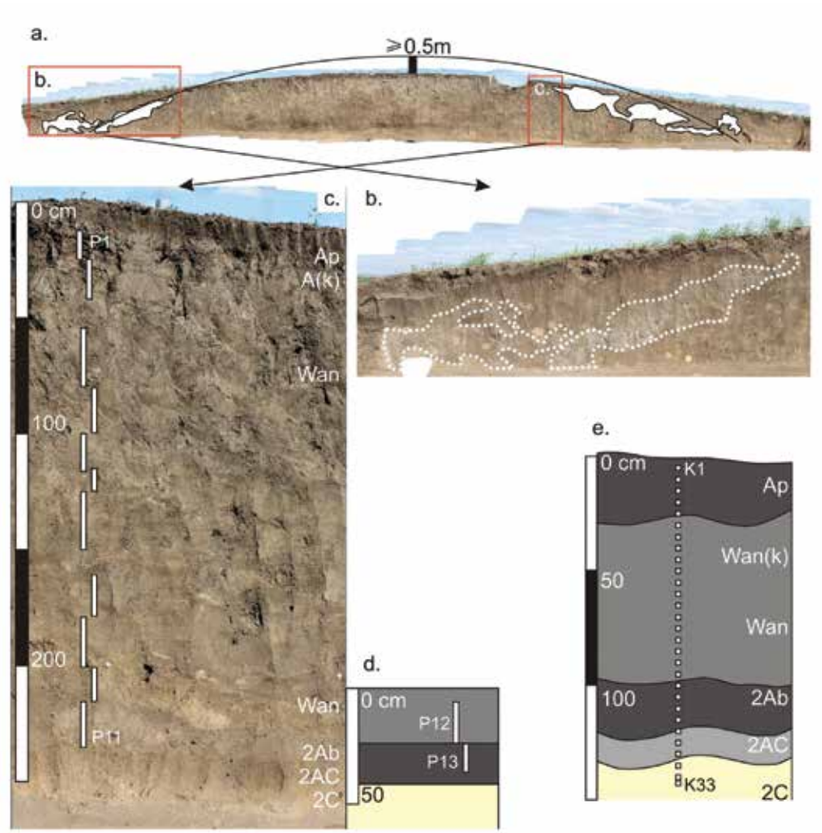


Figure 9. Morphology of barrows: Prydnistryanske 1-IV: A. Cross-section N-S, with secondary calcic horizon and probable former barrow height marked; B. Closer view of secondary calcic horizon; C. Scheme of Core 1 sample (section N-S); D. Scheme of Core 2 sample (section S-N); E. Scheme of Klembivka 1 barrow sampling (after: Jankowski et al., 2017, Figure 3).

(Juras et al., 2018). This conclusion was based on the recorded higher frequencies of mitochondrial DNA haplogroups (mtDNA) representing the maternal lines of steppe origin in the population from Lesser Poland, and a greater share of local maternal lines in the more westerly populations.

However, it was mainly male individuals who were buried in the Yampil barrows. This preponderance is evident throughout nearly all chronological phases connected with the use of these barrows. The men mostly died between the ages of 35 and 45 years and above this age range (Litvinova et al., 2015, Table 2-5) (Table 1). The only two burials of women representing the YC were found in a single cemetery under the mound of Barrow 3A in Porohy. The first woman was between the ages of 22 and 25 years at death and may have died in childbirth as she was buried with an unborn child (Figure 10). The other female's grave formally did not differ from other standard YC funerary structures. A rectangular pit dated to c. 2650-2550 BC, dug into the mound of a barrow and covered from above with oak timbers, contained the remains of a woman who at the time of death was 25 to 30 years old (Klochko et al., 2015b) (Figure 11).



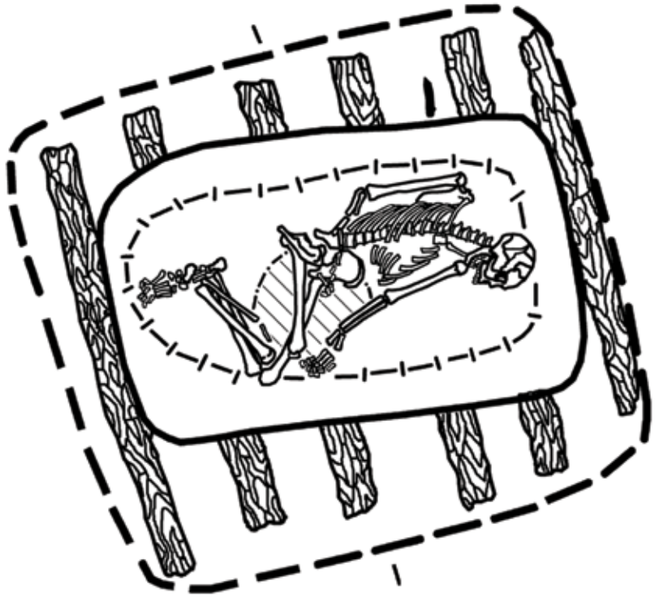


Figure 10. Porohy, Yampil Region, Barrow 3A. Plan of Feature 3A/12. Burial of a woman who died around 2550 BC, aged 22-25 years at death, along with her unborn child (Modified from Klochko et al., 2015b modified).







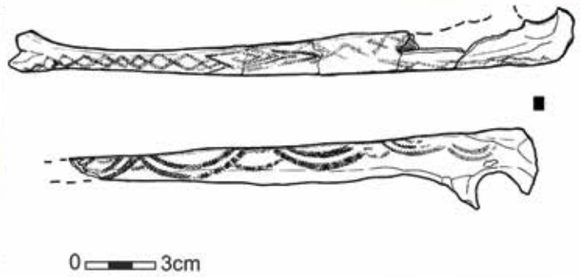








Figure 11. Porohy, Yampil Region, Barrow 3A. Plan of Feature 3A/10. Burial of a woman with postmortem “tattoos” on her forearm, who died around 2650 BC at the age of 25 to 30 years (Modified from Klochko et al., 2015b).

While collecting the field data of the second female burial (Grave 10), attention was drawn to some regular patterns discovered on the bones of both of her elbows. They were interpreted as traces of a tattoo, but could also be caused by postmortem animal or plant activity (i.e., taphonomy). Chemical, microscopic, and forensic analyses revealed that the patterns were clearly man-made and, indeed, after the woman's death. There are many indications that these are traces of painting with some black substance – probably tar. It is probable that the procedure of 'decorating' the bones was performed postmortem, after the body had decomposed. Additionally, the assumption is supported by the location of the pattern (i.e., upon the bone surface), as well as through the manner in which the pigment was applied. In the foregoing studies, similar (albeit few) discoveries like this one were interpreted as traces of a tattoo, but none have been investigated using the interdisciplinary suite of multiple specialist analyses employed here (Lorkiewicz-Muszyńska et al., 2017). The sparse grave goods buried with the deceased included a fragment of a bone tool, a lump of ochre, and fragments of sheep/goat limb bones. The bottom of the grave was covered with an organic layer interpreted as a mat on which the deceased was lain. These particular 'furnishings' were common for most YC graves from the Yampil area. The results of the specialist analyses of the remains provided additional information about these artefacts as well as about the impressions of wattle products and woven materials preserved within them (Kałużna-Czaplińska et al., 2017).

Characteristic layers were visible near the covers of the graves and under the human skeletons (Figure 12). Microscopic and chemical analyses of, *inter alia*, fatty acids and infrared spectroscopy of the samples indicate that the mats were made of raw material of plant origin. Most probably it was seagrass or some other aquatic plant (i.e., seaweed). For bactericidal purposes, the mats or bodies of the deceased were covered with beeswax. Also, chemical compounds characteristic of crocus or flax plants were detected. Among the impressions analysed microscopically, wattle 'mats-biers' (rather thick) were recorded – they were probably used for transporting the deceased and for facilitating the body placement in the grave. Also, traces of more delicate, decorative fabrics, which used to be elements of the clothes of the deceased or a kind of shroud in which the corpse was wrapped, were identified. The impressions of wattle products and woven materials testify to the great manufacturing sophistication of these communities. Furthermore, these studies point to a clear continuation of elements of funeral rituals, linking the Eneolithic and the YC communities.

New hope

Podolia, as an area where many cultural traditions from the end of the fourth and beginning of the third millennia BC met, gains particular importance for discussions of the genesis of barrow burial rites in the circles of the YC and the CWC. It is also a vast zone of cultural contacts between the East and West of Europe (Ivanova & Toschev, 2015). The significant contribution of the Eneolithic communities to the formation of specific funerary rites of the barrow cultures in this region, proven through the realisation of the framework of this project, makes it necessary to focus the next research stages on this period of prehistory (Ivanova et al., 2015; Włodarczak, 2014). The research that is currently being undertaken in the Eastern Podolia zone aims to investigate the role of the GAC in the local and also the supra-regional picture of that epoch.



Figure 12. Mats made of organic materials used in the Yampol region for lining the bottom of the grave and wrapping the dead (A) and reinforcement of the top part of the grave (B, C). A. Porogy, Yampil 3A/3 and 3A/7, Noua culture; B. Prydnistryanske IV/4, Yamnaya culture; C. Porohy 3A/17, Yamnaya culture (modified from Klochko et al., 2015b, 2015c).

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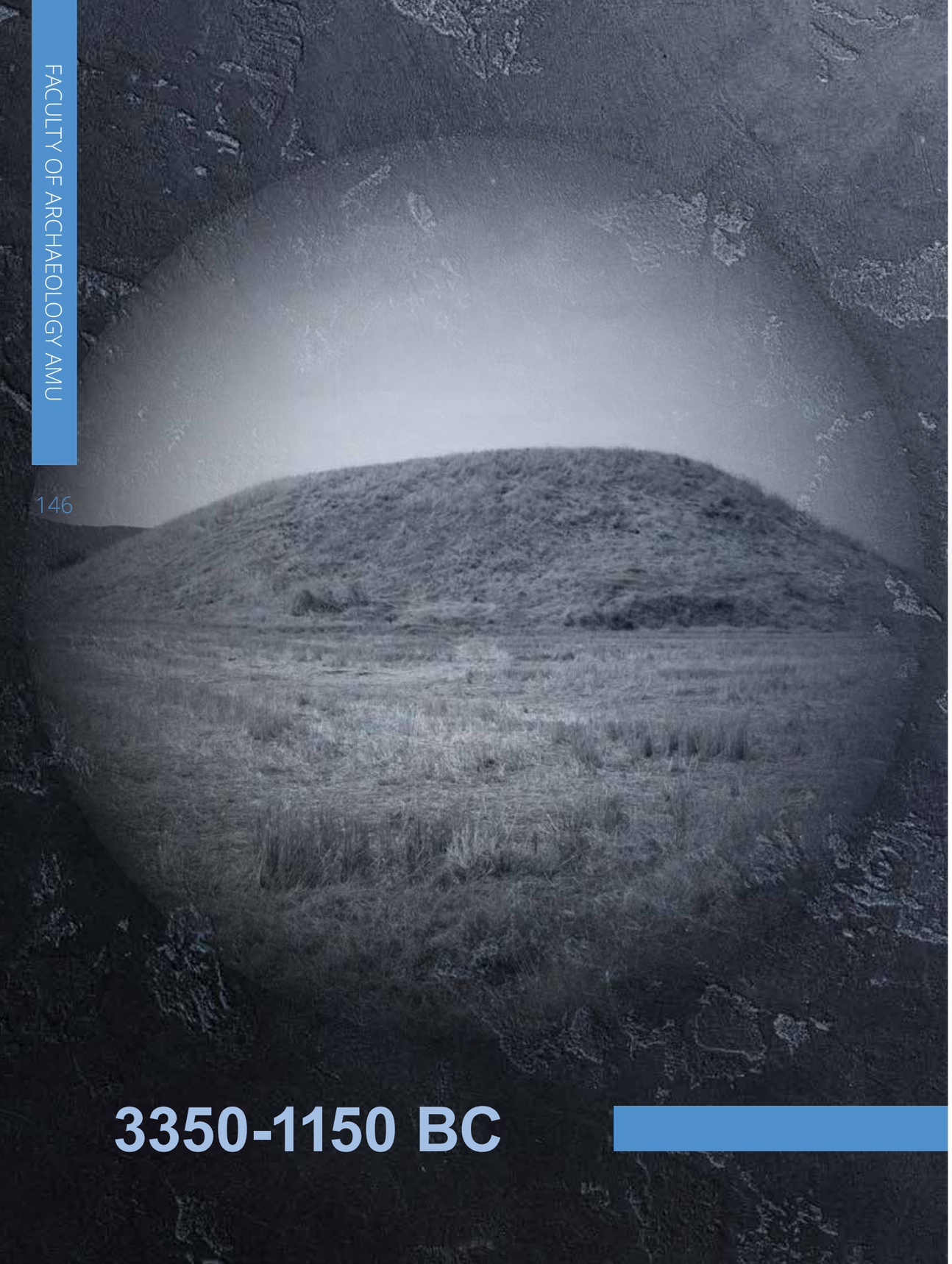
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In the Valley of Anthemous … (Northern Greece)

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Abstract

The Anthemous Valley Archaeological Project is a cooperation between Greek and Polish scientists aiming towards archaeological recognition of the northern Aegean within the alluvial Anthemous Valley. The methodology of the project consists of the multidisciplinary tools of settlement archaeology and geoarchaeology. The timeframe spans the prehistoric periods from the Neolithic to the Early Iron Age. One of the main research tasks is to reconstruct the evolution of the landscape in close reference to the cultural changes in the region. To date, all sites within the valley have been catalogued and identified through archaeological prospection and some with the use of geophysical survey. The results point to an intensive occupation in the past, especially during the Bronze Age. Geoarchaeological research was conducted in the tell of Nea Raedestos, which has shown major landscape transformations in the Holocene due to river activity. The current work focuses on the mouth of the Anthemous River to reconstruct the progradation processes and formation of the deltaic plain in relation to prehistoric human occupation of this area.

Keywords: Northern Greece, Tell, Geoarchaeology, Neolithic, Bronze Age, Early Iron Age

Introduction

An international research initiative, the Anthemous Valley Archaeological Project (AVAP), was launched in 2010 and realised in Northern Greece (Figure 1). Initially, the project was run by the Ephorate of Antiquities of the Thessaloniki Region (Dr M. Pappa) and the Aristotle University of Thessaloniki (Prof S. Andreou), with the participation of the then Institute of Archaeology of the Adam Mickiewicz University in Poznań (Prof J. Czebreszuk). Since 2020, the project has been led by the Faculty of Archaeology of the Adam Mickiewicz University under the concession obtained by the Polish Archaeological Institute at Athens. The participation of the Polish team is based mainly on funds provided by the National Science Centre (NCN). Four grants have been gained to date (2 grants from the Opus program, one from Preludium, and one from the Diamond Grant).

The following text is an expanded Polish version of a chapter that was first published in 2019 (Czebreszuk & Niebieszczański, 2019).

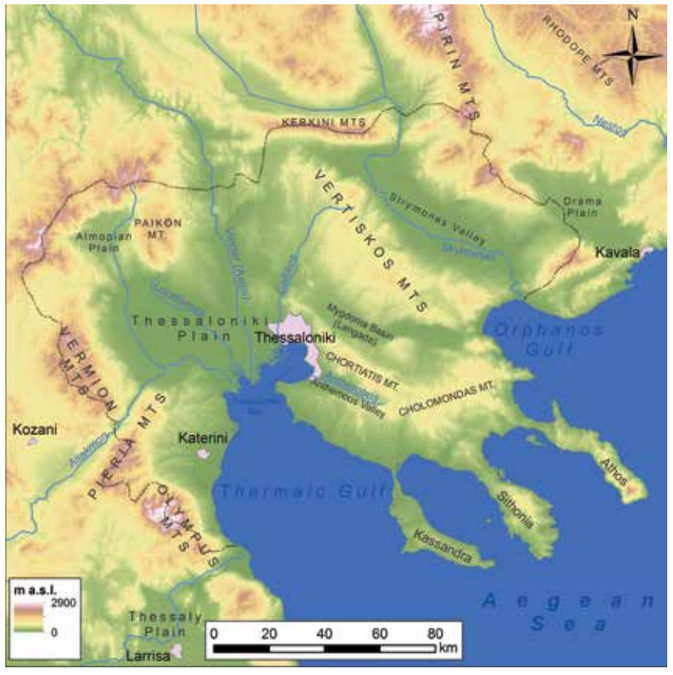


Figure 1. Anthemous Valley, Northern Greece.



Figure 2. Mount Chortiatis, the dominant terrain in the Anthemousa Valley with an altitude of 1201 m. The NATO military radar is visible at the top (Photo: AVAP).

The Anthemous Valley

The subject of the AVAP is to research the history of prehistoric settlements from the Neolithic, Bronze, and Early Iron Ages (the period from ~6500 to 700 BC), the remains of which have been recorded by archaeologists in the valley of the Anthemous River, near Thessaloniki in Northern Greece. The Anthemous is an intermittent river, in which continuous flows occur only during periods of increased rainfall, and its valley rests on the still active tectonic fault of the same name. As a result of its activity, the region is exposed to earthquakes (including one in Thessaloniki in 1978; Papazachos & Papazachou, 1997). Thanks to the geological diversity of the rocks that form the Anthemous Valley (Niebieszczański, 2016), the settlements in the past benefited from rich deposits such as chert (a ferruginous variety of flint) and serpentinite (a greenish rock used in the production of ornaments), as well as gold. These natural deposits occur on the slopes of the mountains which close the valley from the south and the north. These are part of the Chortiatis mountain massif and the highest peak in the north is 1201 m above sea level (asl) (Figure 2). At the bottom of the valley, there is a flat plain composed of flood sediments that foster the development of agriculture – therefore, it is not without reason that this area is called ‘Thessaloniki’s garden’.

The study area is located at the crossroads of the Aegean world, which stretches to the south, and the Balkan world – extending northwards. Today, traces of prehistoric settlement are recorded there (Figure 3), the most distinctive and impressive form of which are toumba (tell) sites. Contrary to the first impression, the name 'toumba' does not translate as 'tomb' (although in the 19th century, these features were interpreted in this way), but instead means the remains of settlements from the Bronze Age. They are man-made hills with a characteristic cut-off peak and some are nearly 20 m high and 200 m wide in diameter at the base. They were created by building houses 'on top of one another' in the same place, and the whole process probably lasted for several thousand years (Figure 4). During the archaeological surface survey, the AVAP team recorded 13 such forms, which indicates a very high settlement density in the Bronze Age (Andreou, Czebreszuk & Pappa, 2016). On the other hand, extensive 'flat' sites

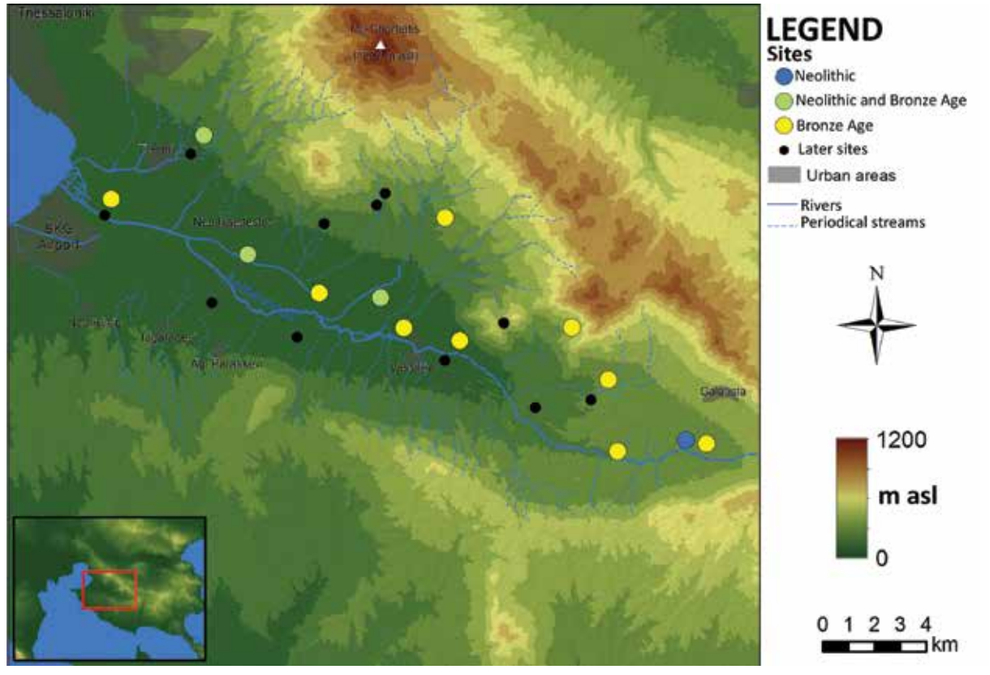


Figure 3. Archaeological sites in the Anthemous Valley.



Figure 4. Toumba Loutra Thermis - an example of an anthropogenic hill created as a result of long-term settlement in the same place over thousands of years (Photo: AVAP).

(i.e., those that can only be recognised in the field by the remains of vessel fragments on freshly ploughed ground) are associated with the earlier period (i.e., the Neolithic). To date, the largest Neolithic settlement – Vassilika – Kyparissi, with an area of 13 ha (Andreou, Czebreszuk & Pappa, 2016) has been documented in the Anthemous Valley. Excavations and comparisons between this and other sites representing the same period also located in Northern Greece show that settlements of this type were characterised by loose clusters of buildings that changed position within the site every several dozen or hundred years (Pappa, Nanoglou & Efthymiadou, 2016). Thus, archaeologists now record large-scale settlement complexes with the understanding that they were not necessarily all inhabited within a single generation (Kotsakis, 1999; Pappa, Nanoglou & Efthymiadou, 2016). In addition to the Vassilika – Kyparissi settlement, two other sites characterised by a large area have been discovered: Galatista (Andreou, Czebreszuk & Pappa, 2016) and Thermi (Pappa, Antomaras, Vliora & Nanoglou, 2011; Andreou, Czebreszuk & Pappa, 2016).



Figure 5. Surface research – a line of archaeologists identifying archaeological remains and artefacts in the field (Photo: AVAP).

Archaeological fieldwork

Archaeological recognition of the sites located in the Anthemous Valley rely mainly on surface prospection (Figure 5) (Andreou, Czebreszuk & Pappa, 2016). It is a research method that involves identifying the record of anthropogenic activity in the past from what can be observed on freshly ploughed land. Among the finds, fragments of ceramic vessels prevailed, but there were also clay figurines or artefacts made of stone (tools or ornaments). For example, a selected section of the Neolithic site of Vassilika – Kyparissi yielded over several hundred kilograms of archaeological material obtained from the surface.

In addition to the classical methods of archaeological prospection, the AVAP also used the method of magnetometry (Figure 6), which measures the magnetic field intensity of underground soil layers. This provides insight into the diversity of geological and archaeological horizons. The use of this method in the Anthemous Valley made it possible to identify, for example, fortifications in the form of a ditch dug around the Neolithic settlement in Galatista (Figure 7) (Andreou, Czebreszuk & Pappa, 2016).



Figure 6. Magnetometry research – searching sites without archaeologists interfering with the soil structure (Photo: AVAP).

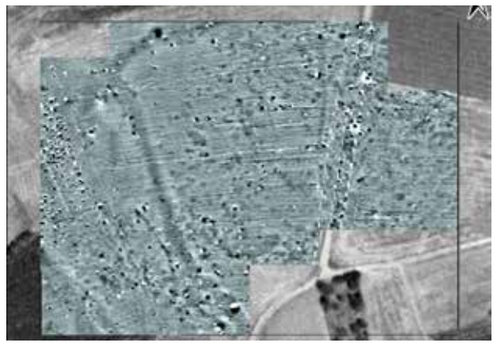


Figure 7. The results of magnetic studies at the Galatista Neolithic site. The dark area that runs from the north to the south is an anomaly for which the ditch is responsible, probably serving as a defensive element in the Neolithic period (Andreou, & Czebreszuk & Pappa, 2016).

Geoarchaeological research

In addition to studying the prehistoric settlement system, the project team also focused on a geoarchaeological study that aimed to identify records of past anthropogenic activity with the use of several methods borrowed from geology, geomorphology, and other natural sciences to study human interactions with their environment. The fluvial valleys and coastal plains of Northern Greece have undergone significant environmental transformations since the Last Glacial Maximum (van Andel & Shackleton, 1982). The Aegean Sea was affected by the Holocene transgression and fluvial deltaic processes that caused the landscape to dynamically transform over the last 18,000 years. A telling example of this is the case of the Thessaloniki Plain, located on the opposite side of the Thermaic Gulf, where in the 4th century BC there was a shallow bay on which the strategic port used by Philip II of Macedon and Alexander the Great operated in Pella. As a result of progressive delta formation processes, the site at Pella now lies about 40 km inland (Syrides et al., 2009; Ghilardi et al., 2008). Another specific feature of the fluvial valleys in that region is increased river activity since the end of the 4th millennium BC (Syrides et al., 2009). As a result of these processes, some archaeological sites can be now found many metres below the surface of the terrain – which is the case of Dikili Tash in Eastern Macedonia, for example. There, an early Neolithic settlement was discovered by drilling through an almost 10 m thick cover of flood sediments (Lespez et al., 2013).



Figure 8. Toumba Nea Raedestos, one of the largest toumbas in the valley, has been subjected to geoarchaeological research. The form visible in the photo measures 19 m in height and over 200 m in circumference at the base of the enbankment (Photo: AVAP).

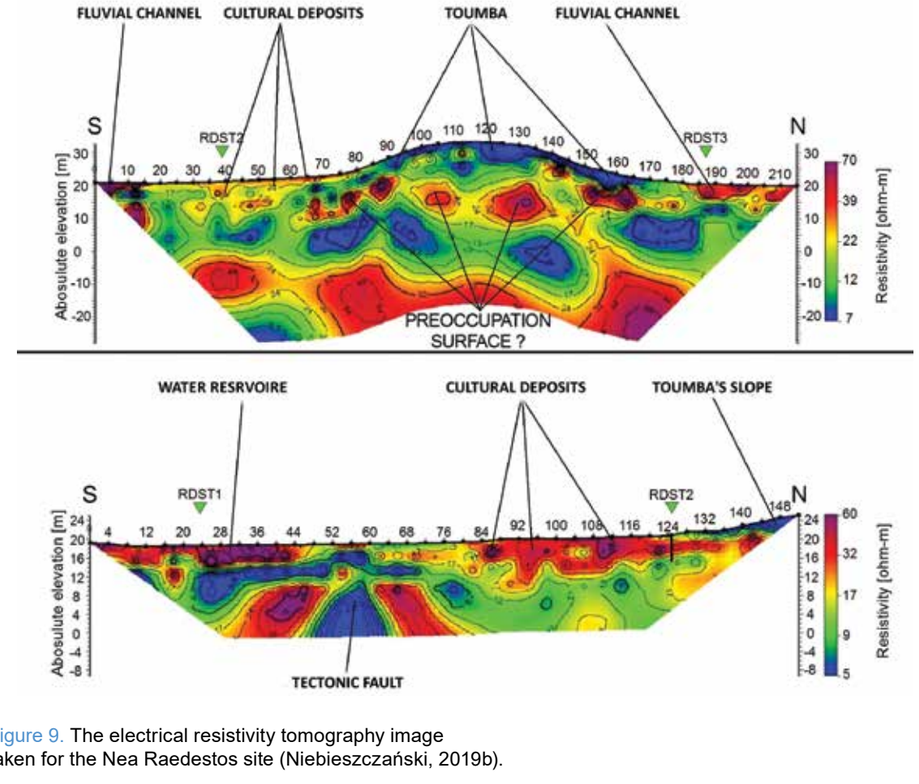


Figure 9. The electrical resistivity tomography image taken for the Nea Raedestos site (Niebieszczański, 2019b).

Similar transformations were also expected in the nearby Anthemous Valley, both in terms of fluvial activity and marine transgression (e.g., Vouvalidis, Syrides & Albanakis, 2005). Therefore, a geoarchaeological study of one of the largest toumbas in the Anthemous Valley – Nea Raedestos – was undertaken (Niebieszczański et al., 2019a; 2019b; 2020). Today, the site is located in the centre of the valley and is surrounded by the extensive flood plain of the Anthemous River, which runs approximately 1 km south of the toumba (Figure 8). The application of the electrical resistivity imaging method enabled archaeologists to identify the structure of geological formations resting underground without the need for costly and time-consuming excavations. The obtained images show how the landscape around the Nea Raedestos site developed in the past (Figure 9). The results reveal that there were two river channels in the past both north and south of the toumba, probably representing different developmental phases and the changing course of the Anthemous River, and also revealed the existence of a small tectonic fault in the vicinity of the settlement (Niebieszczański et al., 2019a). After obtaining the electrical resistivity profile, the next research step was to take geological cores of the intact sediment structure. It is a specialized method which involves driving a steel sampler with a pneumatic drill which has inside a plastic tube for collecting the obtained sediment (Canti & Meddens, 1998). With this method, it is possible to detect even the slightest changes in geological or archaeological horizons. The percussion drilling results showed that there was a shallow body of water directly south of the toumba that functioned during the Neolithic and the Early Bronze Ages (Figure 10). The lacustrine sediments were characterized by a high content of organic matter, including tree pollen and diatoms, thanks to which the vegetation cover and hydrological conditions of the reservoir were reconstructed (Niebieszczański et al., 2019a). These results indicate that the pond (or small lake) was heavily polluted and partly salinated. Probably its water was not fit for consumption due to the high proportion of coprophilous fungi (i.e., those that feed on animal excrement; Niebieszczański et al., 2019a). The vegetation around the reservoir was highly ruderal, which proves the anthropogenic influence on the environment. Nearly no tree pollen was recorded, which suggests that the landscape was most probably exposed at the time. Another outcome of the percussion drilling was encountering layers containing Neolithic pottery and many charcoal fragments at a depth of over 3 m. Radiocarbon dates confirmed that time span. During the recording of the Neolithic settlement layers, some traces of a fire incident were identified (i.e., a strongly burnt layer abundant in fragments of vessels). This indicates that the settlement was affected by fire around the time of the transition from the 4th to 3rd millennia BC. (Niebieszczański et al., 2019b). Despite this, the settlement continued into the later period, and, with the beginning of the Bronze Age, some

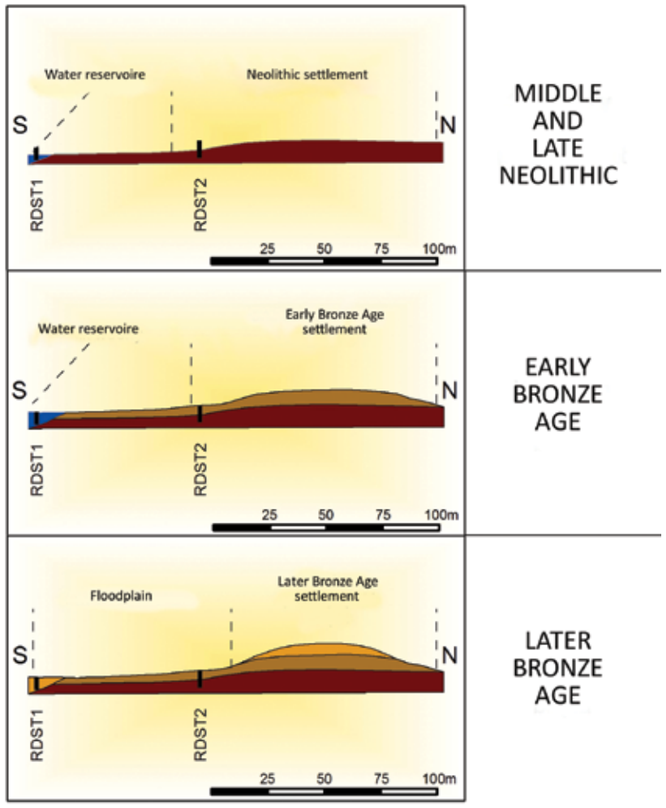


Figure 10. Diagram showing landscape changes around the Nea Raedestos site during the Neolithic and Bronze Age (Niebieszczański et al., 2019a).

toumbas began to form. One of the important achievements of this geoarchaeological research was the establishment of the beginnings of the settlement during the middle of the 6th millennium BC. In turn, its end is estimated to have occurred in the Early Iron Age (i.e., around the beginning of the 1st millennium BC). Given the fact that, nearby, there is a site representing the Classical, Roman, and Medieval periods, as well as the modern settlement of Nea Raedestos (which still exists today), it can be concluded that the area has been continuously inhabited for more than 8,000 years (Andreou, Czebreszuk & Pappa, 2016)!

Ongoing research

The ongoing archaeological and geoarchaeological research in the Anthemous Valley is aimed at exploring the delta zone of the river that flows directly into the Thermaic Gulf. To date, it has been established that the current course of the coastline was formed at the beginning of the Holocene (Vouvalidis et al., 2005). During the last glaciation, the water level in the gulf was lower by about 130 m, and the bottom of the basin was then a vast plain reaching the foot of Mount Olympus, located on the other side of the sea (van Andel & Shackleton, 1982). With the advent of the Holocene (i.e., the period in which humans also exist), as temperatures started to rise, the northern hemisphere ice sheets melted, and sea levels increased at different rates. In the Anthemous Valley, the delta zone (i.e., where the archaeological sites are now recorded) was formed during the Middle Bronze Age (i.e., in the 3rd millennium BC). Earlier, it was a shallow bay fading into saline marshes and floodplains (Vouvalidis et al., 2005). Currently, the project involves drilling in this area to recognize the dynamics of the changing shoreline as well as patterns in the progradation of the deltaic plain (Doani et al., 2021) and associated transformations in the settlement system.

Summary

To date, the archaeological research project conducted in the Anthemous Valley has revised archaeological understanding of the transition zone between the Balkan and Aegean worlds. Until now, the area of the Peloponnese, “Greece Proper” and the Greek islands were treated as the centre of civilization and culture that had a unilateral influence on the surrounding areas. The research conducted in the valley has revealed that the northern fringes of that world were not at all “deserted” places. On the contrary, they were densely settled areas that became transmitters of the civilizational progress that contributed to the emergence of European cultures known today. It is worth noting that the communities occupying the study region developed a culture with specific features and successful internal organisation. All in all, the outcome of the ongoing AVAP research promotes a better understanding of the Pleistocene and Holocene evolution of river valleys in the eastern Mediterranean. This is a crucial issue in the study and classification of the cultural processes taking place in the analysed areas.

Acknowledgments

The Anthemous Valley Archaeological Project (AVAP) started in 2010 as a cooperation between the Ephorate of Antiquities of the Thessaloniki Region and the Aristotle University of Thessaloniki. The Adam Mickiewicz University of Poznań (UAM), Poland participated from the start as the scientific partner of AUTH on the basis of a bilateral agreement between the two universities. On behalf of the three participants, the project was directed by Dr Maria Pappa, Prof. Stelios Andreou and Prof. Janusz Czebreszuk respectively. With the establishment of the Polish Archaeological Institute at Athens (PAIA) in 2019, a significant organizational change took place in the project. Through a permit which was issued by the Ministry of Culture and Sports of Greece to PAIA, UAM took over the research in the framework of AVAP since 2020. The project is still being realized in cooperation with the Ephorate of Antiquities of the Thessaloniki Region, which oversees it, and the Aristotle University of Thessaloniki.

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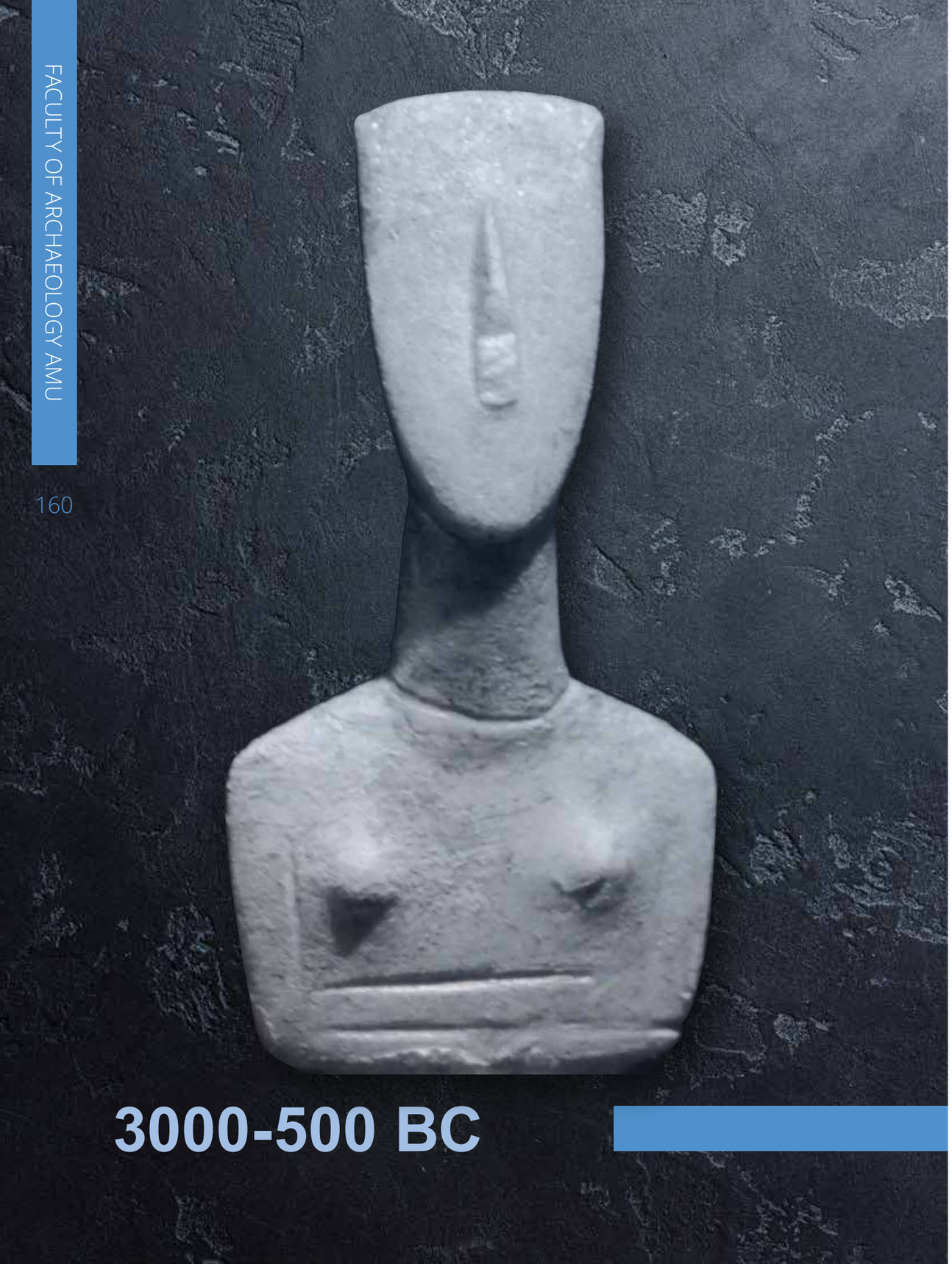
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Treasures of Time:

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Some Remarks on the Problems of Researching Art in Archaeology using the Examples of Prehistoric Figurines and Attic Geometric Pottery

Ewa Bugaj

Abstract

This article briefly presents some of the author's research on art in archaeology. Drawing on previously published works, the text reviews the general problems of art research in archaeology before focusing on investigations of prehistoric and ancient figurines, anthropomorphisation in ancient Greece, and figural motifs in Attic Geometric pottery.

Keywords: archaeology and art, prehistoric and ancient figurines, figural motifs in pottery, Attic Geometric pottery

My research combines archaeological methods with those developed in art history to highlight common areas of interest covered by both fields. Drawing on examples from already published works focused on prehistoric figurines, anthropomorphisation in Antiquity, and Attic Geometric pottery, this article highlights the possibilities afforded by this interdisciplinary approach.

At the broadest scale, over the last years I have concentrated on general considerations regarding the understanding and interpretation of art in archaeology, as well as links between approaches applied by archaeology with those employed by history of art (Bugaj, 2001, 2003, 2010a, 2012). In understanding art I have taken the stance that the conceptualisation of and the setting of limits between what is art and what is not, remain ambiguous issues left to be decided by each researcher for themselves. However, this choice should be justified by the presentation of the theoretical assumptions on which it is based. Clarity in this issue is of primary importance as it influences both the methods applied by archaeologists in interpretation of art and, as a result, also the status assigned to this knowledge.

Referring to the findings of aestheticians who have sought an element of art a priori in all periods (Morawski, 1985), I have argued that the performance of set rules during the creative act results in clear expressive-formal systems often defined for the art of prehistory which can be understood as the manifestation of fundamental artistic values. The recognition of the early presence of these values provides the impetus for interpretations suggesting historical sequence and the continuity of artistic activities through time. However, despite numerous synthesising efforts, the history of art has shown art to have a heterogeneous character and be an unobvious and variable phenomenon, not only in terms of its appearance but also in its nature and function, making the particular visual messages from the past doomed to partial intelligibility.

From among possible approaches towards art in archaeological studies I have been interested in the ones that provide opportunity for its interpretation in terms of its meaning in culture and society. I consider these aspects very important, as archaeologists often refrain from attempts to find cultural meanings of prehistoric or ancient art and, in contrast to cultural anthropologists and art historians, focus on reconstruction and explanation of how a particular object was manufactured, what its chronological and spatial distribution were, and how motifs and styles, understood as sets of formal features, varied.

A large part of my research has also been devoted to more specific issues, such as considerations of possibilities in the interpretation of prehistoric figurines (Bugaj, 2007, 2008) and especially anthropomorphisation in the context of Greek culture (Bugaj, 2010b). I have shown that the “attractiveness” of figurines as “speaking” evidence in contrast to the other, “mute” prehistoric finds, as sometimes declared by archaeologists, is deceptive because what the figurines depict, what they mean, how they were meant to be used, and what the influence of their presence was always remain a question of an interpretation. Referring to Richard G. Lesure’s considerations (2002), but also those of many other researchers (e.g. Hamilton, 1996), in a paper dealing with various methods of studying figurines (Bugaj, 2008) I presented how only integrated studies – i.e. an analysis of the iconography of figurines, their function, and a discussion of their probable impact on society, as well as their symbolism – may allow satisfactory interpretations approximating their original meanings. I concluded that the contextual approach would be the most useful in archaeology. In later papers devoted to images on Greek Geometric pottery I followed this way of thinking and emphasised that fruitful studies in archaeology are those which ask about the social operations of prehistoric and ancient art, considering the objects themselves and their material features as well as the contexts of their occurrence.

An example of this is provided by my analysis of the so-called Cycladic idols (Bugaj, 2007). Critiquing a range of existing interpretations (e.g. Fitton, 1984; Broodbank, 2000; Hoffman, 2002; Hendrix, 2003), I turned to a discussion of their possible social life by recognizing the idols as the material culture of social groups inhabiting the Cyclades in the third millennium BC and drawing on the specific contexts in which the idols have been found. Furthermore, I paid attention to the figurines themselves (Figure 1), both in terms of their forms and also their (sometimes multiple) decoration. This approach allowed not only their interpretation as objects participating in funeral rites, after which they were left behind in tombs as grave goods, but



Figure 1. Cycladic female figurine in the canonical type from the collection of the Badisches Landesmuseum in Karlsruhe (Photo: E. Bugaj).

also as objects taking part in key moments during the life of members, most likely female, of these communities (initiation, delivering children, death). Other authors have gone even further than this, suggesting that the idols might have also served other adaptive functions for these groups by participating in the transfer of knowledge or reporting of history (Hoffman, 2002; Hendrix, 2003).

A project important to me and closely related to the problems of interpretation of ancient plastic art has been a contribution to discussions on the broader issues of figuration and anthropomorphic representation in prehistory and antiquity. In the introductory chapter of a monograph concerning the subject of which I was a co-editor (Bugaj, 2010a), I characterised research perspectives applied to these issues. On the one hand, they are focused on specific artistic creations taking human physical form (figurations) produced at different times in many cultures. On the other hand, they are considered reflections of anthropomorphisation as a wider phenomenon, consisting of the attribution of human features to the inanimate world and the projection of human qualities onto the surrounding reality; this broader perspective even points to the inability of going beyond anthropomorphic “I” in recognition of reality.

To contribute to the foregoing considerations, I attempted to characterise the phenomenon of anthropomorphisation of gods in Greece (Bugaj, 2010b). I pointed out that there were various ways used to portray and envisage divinity in Greece and that recognising only one of them, the anthropomorphic image, would be a simplification. I referred to the long tradition of studies on cult images, especially the works by Jean-Pierre Vernant (Vernant, 1991; Neer, 2010; Kowalski, 2013) and his ontology of cult statue, as well as Alain Schnapp’s thoughts (Schnapp, 1988) derived from a similar tradition of historical anthropology. I took the stance that cult imag-

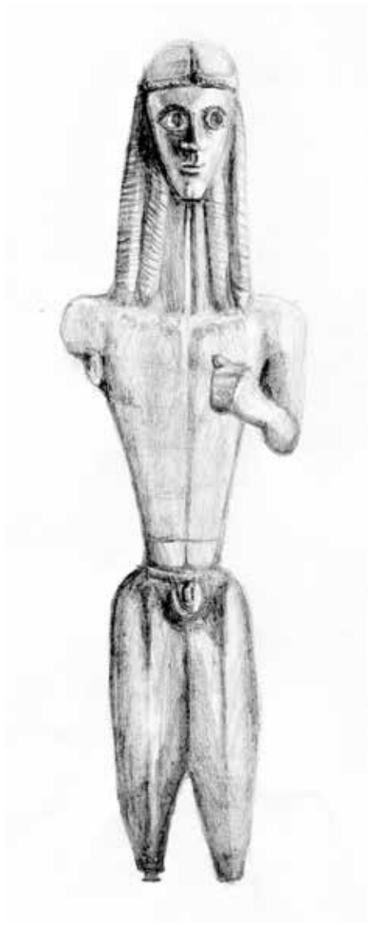


Figure 2. Mantiklos “Apollo”, c. 700-675 BC, bronze votive statuette from Thebes, Boiotia. Boston, Museum of Fine Art (Drawing by M. Święszkowska).

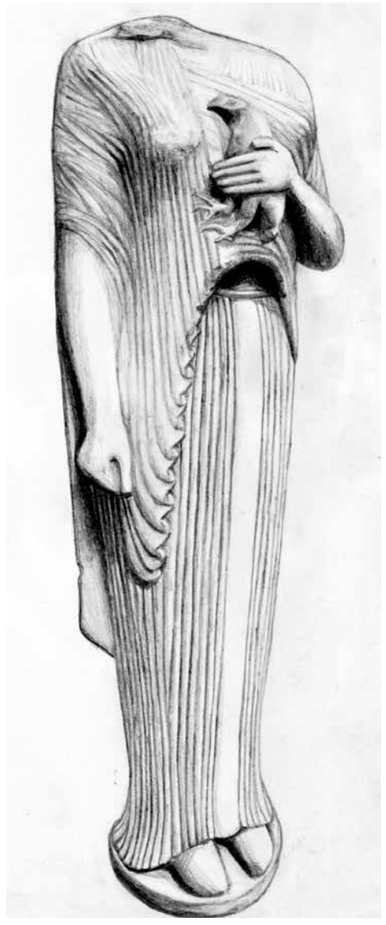


Figure 3. A statue of a kore from Miletus, c. 550 BC, marble. Berlin, Altes Museum (Drawing by M. Święszkowska).

es were not intended as reflections of some external model, as this is a typical feature only of modern understandings of depicting images. While referring to numerous fragments of ancient texts, I showed that in Greece the cult, which was the basic principle of religious life, would have been impossible without images. I believe that the Greeks producing artistic images, especially the anthropomorphic (Figure 2), tried to connect the universe of imagination with physical reality. By using a variety of anthropomorphic images they evoked a variety of phenomena, but this was art that expressed experiencing of the world rather than the visible world itself. I suggested that many researchers attributed particular effectiveness to Greek art in getting through to its beneficiaries, to its ability to speak by illusionistic human figures, and I emphasised that portraying humans and their bodies (Figure 3) was a primary form of visual expression of a Greek city-state.

This type of reflection on art, attempting to clarify the role of images in Greek culture and taking into account changes in the mentality of the Greeks, their ways of seeing, understanding and categorising the world, are quite a challenge, but also the right line of research. I think that archaeologists and historians of ancient art, despite many positive achievements, still lack much in comparison to scholars undertaking such research through writing and texts.

In focusing on interpretations of art in archaeology, the figurative images on Greek Geometric pottery, and Attic pottery in particular, were well suited for my research. In terms of chronology, like the examples cited above, this material can be treated as part of prehistoric visual imagery. However, its importance extended into protohistoric periods. Attic pottery remained a model for the Greek world in the Early Iron Age because of its diversity and well-developed production. Furthermore, it was mainly Attic pottery on which figurative and narrative art occurred in Greece after almost three centuries of absence (Figure 4). Since this re-occurrence, these artistic conventions have developed uninterrupted, although different in form, function, and effect.

I devoted one text (Bugaj, 2010c) to differences observed between the Greek Geometric Style and the ornamentation of Hallstatt vessels. After a brief characterisation of evidence from both areas in question (Coldstream, 1991; Snodgrass, 1998; Reichenberger, 2000; Huth, 2003), and after a presentation of an outline of the cultural situation in the Early Iron Age, I showed that the impact of the Greek Geometric Style on barbaric Europe was very limited, contra the previously dominant perspective (Gediga, 1970; Dobiat, 1982). I noted that a style based on simple geometric ornamentation had been present in vast areas of Europe already before, and should be regarded as a method of visual expression of basic shapes having universal characteristics. During the Hallstatt period, in some regions of Europe, this form of artistic expression was subject to intensification involving, *inter alia*, covering whole surfaces of vessels in a very regular way with geometric patterns. While figurative images did begin to appear, I pointed out that the style of these images in the Hallstatt area differed from that



Figure 4. Attic Geometric skyphos with a scene of battle around a warship, c. 850-800 BC. Eleusis, Eleusis Archaeological Museum, 741 (Drawing by M. Święszkowska).



Figure 5. Monumental Attic Geometric funerary amphora of the Dipylon group depicting a scene of *prothesis*, c. 750 BC. Athens, National Archaeological Museum, NM 804 (Drawing by M. Święszkowska).

Figure 6. Attic Geometric oinochoe from the Kerameikos with a scene of sea battle and taming horses, c. 750-720 BC. Copenhagen, National Museum, 1628 (Drawing by L. Żuk).

known in the Greek world, though it used a similar method to construct larger figures by compiling individual geometric elements. Moreover, a plastic language of figurative Hallstatt images did not develop, nor did it begin to change towards idealised forms of realistic and complex mythological narratives as happened in Greece. The art in vast areas of prehistoric Europe for centuries to come would not use such a language, since it remained at a level of primary transmission more suitable for those communities "totemic" in character. Therefore, besides formal borrowings, the essence of Hallstatt art, as compared to Greek, in my opinion, remained different.

I dealt with issues of recognising the principles governing the decoration found on Attic Geometric pottery in another text (Bugaj, 2015). This article did not directly concern the problem of interpretation of Greek Geometric art, but raised the question of the possible ability of creators of Geometric Style ornamentation to project experienced reality visually and to attempt generalisations of these experiences. Previous studies had already carried out metric analyses of ornamentation on the vessels (Benson, 1982, 1987) and, in the case of the monumental amphorae from Athens (inv. NM 804; Figure 5), even indicated a module applied in decoration (Andreae, 1979). Referring in part to these findings, in my analysis I mainly focused on showing how two clearly distinct trends – the horizontal arranging of decorative motifs and the presence of vertical panels – developed along with Attic Geometric pottery into a harmonised unity. Nevertheless, I emphasised that these measures aiming at standardisation of decorations did not yet have much to do with mathematical thinking; they should be considered evidence of attempts to move towards generalisation of knowledge concerning physical characteristics of the surrounding reality.

In an article concerning methods of pictorial narrative I presented the most detailed results of my considerations of the interpretation of Greek Geometric pottery based on selected examples of figurative paintings (Bugaj, 2013). This discussion was contextualized in the transformation of Greek society in the early Iron Age, from dispersed settlements with rulers to the polis with its civil structures and the accompanying social, political and cultural changes. While characterising the Geometric Style, I indicated its important features and I also pointed to an appearance, among dominating abstract motifs, of figurative ones, which transformed the style into narrative art (Figure 6). The recognition of this process has been discussed by researchers for over a hundred years. I concentrated on the most important stages of this discussion (e.g. Fittschen, 1969; Carter, 1972; Snodgrass 1982, 1998; Langdon, 2008), arguing that images were mostly generic, but over time some also started to speak the language of legends and myths, like eposes, although many may have mainly visualised contemporary rituals (Figure 7). In my further considerations I turned to the long-lasting tradition of research concerning pictorial narrative and communicative aspects of pieces of art and in particular to the most recent studies of practices of telling stories with pictures in Antiquity (Stansbury-O'Donnell, 1999; Giuliani, 2003). I presented the opinion that particular solutions concerning presentation of history in figurative depictions come mainly from the way the craftsmen looked at the subject or the receivers reacted to it, and not from the development of the style itself or an ability to present various forms in a sophisticated manner.

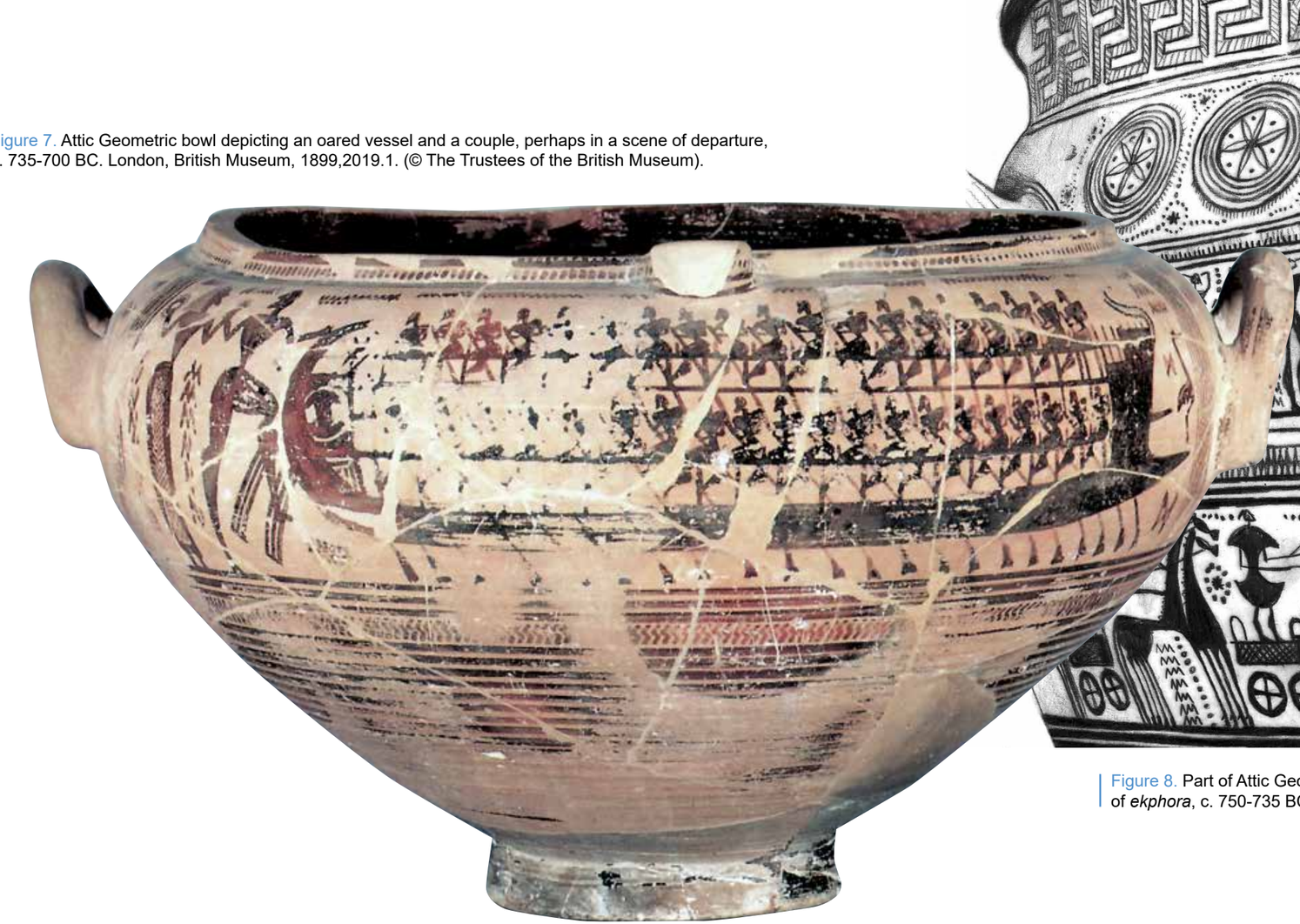


Figure 7. Attic Geometric bowl depicting an oared vessel and a couple, perhaps in a scene of departure, c. 735-700 BC. London, British Museum, 1899,2019.1. (© The Trustees of the British Museum).



Figure 8. Part of Attic Geometric monumental krater ("Hirschfeld Krater") from the Dipylon depicting a scene of *ekphora*, c. 750-735 BC. Athens, National Archaeological Museum, NM 990 (Drawing by L. Żuk).

Thereafter, I refer to Vincent Farenga (1998), who argues that some recognition of cognitive and communicative skills of communities inhabiting the Greek world in the Early Iron Age might be achieved by tracing the different ways in which time and space were imagined and also how contemporary people viewed themselves within that frame. Literary evidence from Antiquity combined with anthropological research clearly indicate that the understanding of time and space as well as people's actions within them focused on ancestors who combine the presence and the past to solve primary material and existential social dilemmas. Therefore, funeral rituals must have represented one of the most important events experienced by a whole community (Figure 8), and during them there must have existed commonly understood narratives. The narrative practices connected with this funeral realm extended the importance of burials and buried people also to the living members of the society, particularly to those with high social status. Equally important elements of social rituals at the time were various material "props", numerous remains of which are subject to archaeological excavations. One of the most important areas of exploration in this field is, again, funeral realm (Morris, 1987; Whitley, 1991), with the most numerous material relics of ritual activities, including pottery decorated with figurative motifs. I discuss, in the article, numerous examples of the latter and unique features of their decoration which are similar to pictograms or ideograms.

While summarising the results of my considerations, I assumed that majority of the friezes with figurative motifs on Geometric Pottery must have presented some action or activity, thus reflecting a story, though it might be hard to read in detail. In most cases we are able to determine the general character of such an action and recognise what it might have been preceded and followed by. The scenes presented on Geometric Pottery refer mainly to funeral rites (Figures 5, 8), land and sea battles (Figures 4, 6), hunting for and taming of animals (Figure 9), and subordinating nature as well as agon, dance, music (Figure 10), and various forms of feasting (Ahlberg, 1971a, 1971b; Rombos, 1988). All of these themes, important in contemporary social life, were illustrated and communicated via art which took part in their sanctioning, and glorification, thus locating them within a mythic past which helped to create understanding and meaning in the present.

In conclusion, the implementation of a research project related to the Attic Geometric pottery let me present a variety of techniques of research on early images and to opt for those which illustrate the social dimensions of visual communication. As a result of these studies, the images on Attic Geometric pottery might be seen as an explanation of funeral rituals. Death, a grave, and the deceased were integral elements in the process of solidifying forms of social bonds and a new organisation of the Early Iron Age communities within the Greek world, including Attica. They occurred within specific conditions of a period of transition in which, although elites emphasised their position, everything tended towards the emergence of a collegial governance culminating in the creation of the Greek city-states. The rituals associated with death, burials, and treatment of the deceased became one of the necessary elements to solidify emergent forms of relationships with the dead and negotiate the position of living members of the communities. Acting in conjunction with other factors, the use of figurative art, enabled working out of “memory regimes”, over time leading to their formalisation.



Figure 9. Attic Geometric oinochoe from Egina depicting a man with a bird on his head leading horses, c. 730 BC. Berlin, Altes Museum, SM V.I. 3374. (Drawing by L. Żuk).



Figure 10. Attic Geometric hydria depicting dancing women, c. 735-700 BC. Athens, National Archaeological Museum, NM 17470. (Drawing by L. Żuk).

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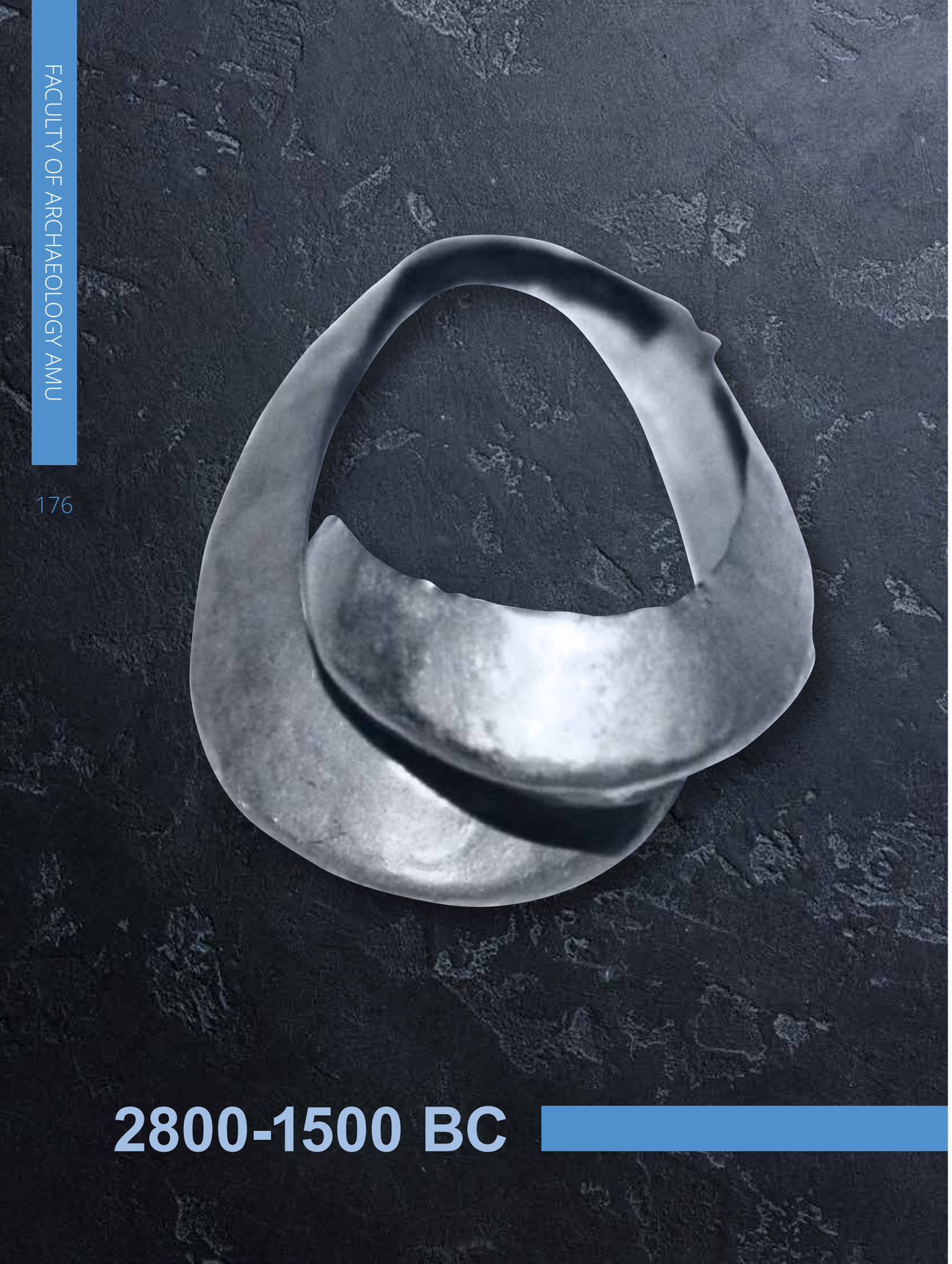
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The barrow culture of the Upper Dniester Basin in the 3rd and 2nd millennia BC: The Polish-Ukrainian research projects

Przemysław Makarowicz, Jan Romaniszyn, Vitalii Rud

Abstract

Since 2009, the international Upper Dniester Expedition has conducted field research (field-walking surveys, non-invasive and excavation) and analytical studies in the Eastern Transcarpathia. These investigations are part of a broader research programme – a study of 'The Biocultural Borderland between the East and the West of Europe'. The projects concern a comprehensive reconnaissance of barrow cemeteries dated to the 3rd and 2nd millennia BC, located in the mixed forest-steppe and forest belt in the basin of the Upper Dniester River. For almost 1500 years, this type of funeral architecture shaped the 'mortuary landscapes' of the communities successively inhabiting that area. Hence, the barrow cemeteries are an important source for understanding the mechanisms and trajectories of cultural development in this part of Europe, and consequently the subject of intensive studies within several research projects.

This article describes the aims and results of two already completed and one ongoing project in the Upper Dniester Basin. Thanks to the use of modern research methods, both in the field of archaeology and 'archaeological sciences', it has been possible to present a wide spectrum of regularities/principles concerning the 'barrow landscapes', the chronology of the creation of selected cemeteries, and the construction of regular, linear arrangements of barrows. Furthermore, the projects have and are providing large collections of archaeological (ceramic, lithic, metals, etc.), anthropological, archaeobotanical and archaeofaunal material for future analyses.

Keywords: Barrow cemeteries, Upper Dniester Basin, barrow landscapes, mortuary houses, Komarów culture

Introduction

Interest in Ukraine as a key region for field research and analytical studies by Polish archaeologists is an element of the strategy of a broader research programme – the study of 'The Biocultural Borderland between the East and the West of Europe' (Kośko et al., 2022). It has been carried out for several years by a team of scientists, PhD students, and undergraduates from the Faculty of Archaeology (formerly the Institute of Prehistory) of Adam Mickiewicz University (AMU) in Poznań, Poland. The initiative to establish the Upper Dniester Expedition within the framework of the aforementioned programme originated among the Poznań prehistorians interested in the study of the Baltic-Pontic *Intermarium* in cooperation with the English-language journal 'Baltic-Pontic Studies' and the series 'Archaeologia Bimaris', publishing mainly in the national languages (Kośko, 2001; Kośko & Szmyt, 2006; Makarowicz, 2012).

Initiated in 2009 and continuing to the present day, the mission of the international Upper Dniester Expedition includes field research and analytical studies in the Eastern Transcarpathia of western Ukraine. In particular, it is concerned with barrow necropolises from the 3rd and 2nd millennia BC, located in the mixed forest-steppe and forest belt in the Upper Dniester Basin, within the administrative borders of the provinces of Lviv, Ivano-Frankivsk and Ternopil (Figure 1; Makarowicz et al., 2016a). The research is carried out by scientists from the Faculty of Archaeology, Adam Mickiewicz University in Poznań jointly with scholars from the Institute of Archaeology of the National Academy of Sciences of Ukraine in Kiev and from the Department of Archaeology and Ethnology of the Vasyl Stefanyk Precarpathian National University in Ivano-Frankivsk, as well as museums in Ukraine. Two projects, funded by the National Centre for Science (NCN) and the National Programme for the Development of the Humanities (NPRH), have been already completed and the third one, funded by the NCN, is underway.

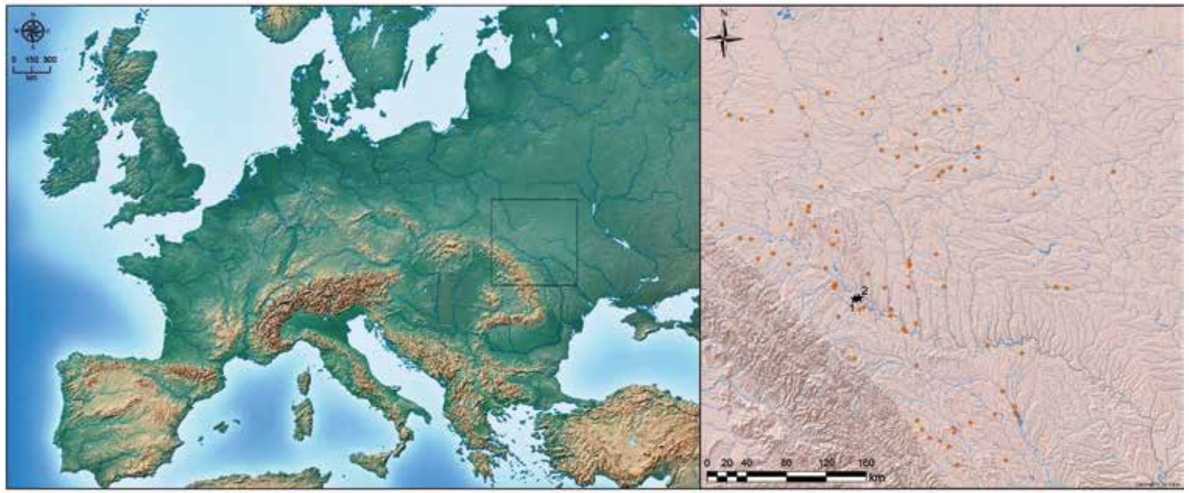


Figure 1. Spatial distribution of barrow cemeteries in the Upper Dniester Basin and the neighbouring areas (by J. Niebieszczański). An asterisk marks the necropolises under excavation: 1 – Bukivna, 2 – Milluvannya.

The barrow cemeteries on the Upper Dniester River form unique funerary landscapes. In this mixed forest-steppe and forest belt, tens of thousands of barrows were built from the beginning of the 3rd millennium BC, and at least several thousand are still preserved today, especially in the large beech and beech-hornbeam forest complexes at an altitude of 300-400 m. For almost 1500 years, this type of funerary architecture shaped the 'mortuary landscapes' of successive communities settling that area (Makarowicz et al., 2018, 2019; see Fontijn, 1996; Bourgeois, 2013). Both archival research and contemporary projects in the Upper Dniester Basin have confirmed that the mounds were built successively by the Corded Ware Culture communities (CWC), the Epi-Corded groups (both from the 3rd millennium BC), and finally the population of the Middle Bronze Age Komarów culture (first half of the 2nd millennium BC: Sulimirski, 1968; Sveshnikov, 1974; Kadrow & Machnik, 1997; Makarowicz et al., 2016a, 2018, 2019). As a result, necropolises forming extensive 'barrow landscapes' were created, which can be interpreted as *longue durée* structures. They are characterized by multidimensional symbolism and diverse functions: funerary, territorial, social and religious (Górski, 1996; Garwood, 2007; Bradley & Frazer, 2011; Bourgeois, 2013; Arnoldusen & Drenth, 2015; Makarowicz et al., 2019). The spatial arrangements of the cemeteries are similar: the barrows occur in linear or linear-group arrangements covering lengths of several hundred metres to dozens of kilometres (Makarowicz et al., 2016a).

The barrow necropolises in the Upper Dniester Basin have been the subject of intensive studies carried out for over a dozen years within the framework of several research projects.

The 'Bukivna' research project

The project 'Bukivna' aimed to provide a comprehensive bioarchaeological characterisation and a socio-cultural interpretation of a large barrow cemetery dated to the first half of the 2nd millennium BC in Bukivna (formerly Bukówna), Ukraine (Figure 2). Through field-walking surveys and the use of non-invasive techniques, more than 60 barrows were identified there. Together with the neighbouring necropolises located within a radius of 5 km, more than 150 of barrows, occurring mostly in linear and linear-group systems, were recorded (Makarowicz et al., 2019). The project addressed the following issues: the spatial organisation of the necropolis, the chronology of the documented barrow groups and selected monuments, the reconstruction of the dynamics of the cemetery's development, the method of erecting the barrows, the techno-archaeological study of the archaeological material from the excavated mounds, the analysis of the palaeoenvironmental context of the necropolis (the Dniester Valley), and the study of the botanical and faunal sources obtained during the field survey, as well as the interpretation of the social structure of the users of the cemetery.

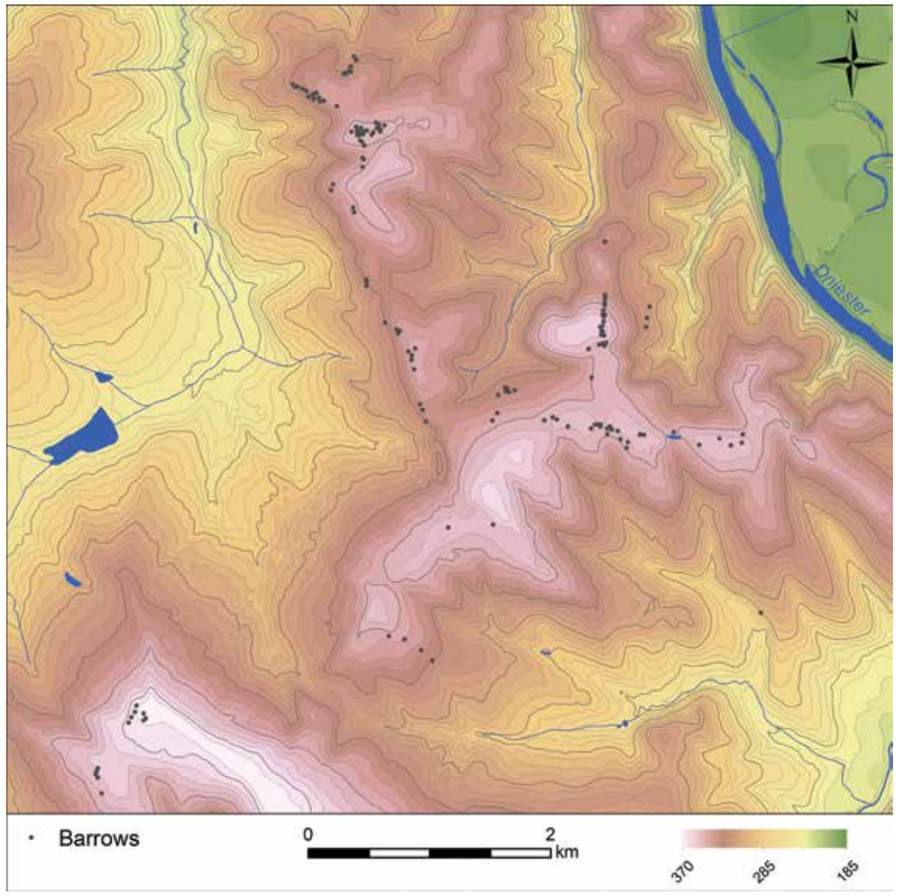


Figure 2. Bukivna and Milluvanna. The spatial arrangement of barrows in the cemeteries (after Makarowicz et al., 2016a).

The research confirmed earlier assumptions that the cemetery in Bukivna was an elite Middle Bronze Age barrow necropolis connected to the Komarów culture (Bryk, 1932; Siwkówna, 1937; Rogozińska, 1959; Swiesznikow, 1967; Sulimirski, 1968). This is evidenced both by under-mound architecture, i.e. monumental graves in the type of clay-and-wood mortuary houses (logs and planks made mainly of oak), cenotaphs built of glacial erratic boulders and wooden elements, and other structures accompanying the rites of passage like wooden platforms of various sizes built of oak planks (Figure 3) as well as prestige items recorded in a significant proportion of these burial contexts. These latter items include bronze and gold products (Figure 4) and numerous vessels found as ritual deposits under and outside the barrow mounds interpreted as a kind of 'tableware' for the dead or 'ritual space markers' (Figure 5).



Figure 3. Bukivna. A view and cross-section of barrow 1/II/2013 representing the Corded Ware culture from the 3rd millennium BC, and examples of the funeral under-mound architecture in the barrows of the Komarów culture (1800-1500 BC).



Figure 4. Bukivna. A gold adornment described as a gold earing of 'Sibin type' from barrow 3/I/2012 (Komarów culture), Middle Bronze Age.

Figure 5. Bukivna. Examples of deposits of vessels from the barrows of the Komarów culture.

In total, over 150 ceramic vessels of various types were discovered in the six investigated mounds. Earlier hypotheses about urn burials at the site, repeated in the literature after the first explorers of the cemetery in the 1930s, were verified negatively (Bryk, 1932; Siwkówna, 1937; Rogozińska, 1959; Swiesznikow, 1967; Sulimirski, 1968; Dąbrowski, 1972; see: Makarowicz, 2010). A series of publications presented the new information that *in situ* cremation was the most popular form of burial in the population of the Komarów culture from the first half of the 2nd millennium BC (Makarowicz et al., 2013a, 2013b, 2018, Makarowicz et al., in press; Lysenko et al., 2015; Romaniszyn, 2015; Makarowicz, 2019). While performing complex funeral rituals, the dead were buried in the mortuary houses individually or collectively. As the field observations and analytical studies have shown, some mortuary houses remained open for some time in order to add additional deceased. Before the erection of the mound, which was the final act of sealing the burial place, the wooden grave structures, which were usually dug into the primary humus, were burnt. Also, other funerary rituals have been discovered, such as scattering of small fragments of the cremated bones either within the above-mentioned wooden structures or at different levels of the under-mound space; urn-burning was incidental though (two cases). It seems likely that small (single) bones entered the containers during the burning process of the monumental wooden structures, during which the temperature reached 900-1000 degrees C.

The analysis of numerous AMS radiocarbon dates using Bayesian modelling and extensive multivariate statistics made it possible to establish the probable sequence of development of one of the unearthed groups of barrows. The mounds were built according to a specific spatial plan, with a new mound constructed on average every 35 years; however, they were not necessarily erected 'sequentially' in one direction (Makarowicz et al., 2018). The linear arrangements of the barrows were the final result of a long and complex process of cemetery structuring (Makarowicz et al., 2019). Specific studies (palaeopedological, lithological, geomorphological, and geochemical) confirmed the field observations about the construction of the mounds. They were made from lumps/cakes of turf cut near the barrows and placed side by side in layers with grass to the bottom (Hildebrandt-Radke et al., 2019).

These analyses, together with the palynological research and excavations, revealed that the first barrows in the cemetery were erected by the Corded Ware culture communities in the second half of the 3rd millennium BC. At this time, the area had already been significantly deforested and steppe vegetation was encroaching gradually upon it. When the subsequent mounds – after the 'Corded Ware' episode – were built by communities of the Komarów culture in the period 1800-1500 BC, the area was an open space dominated by meadow vegetation. The extensive systems of those features formed numerous linear groups stretching over several kilometres on the watersheds of the Dniester and its tributaries, in the higher parts of the landscape (Makarowicz et al., 2018, 2019; Hildebrandt-Radke et al., 2019). The investigations conducted using non-invasive techniques (digital elevation models of the cemetery in GIS, plans and profiles of individual mounds, magnetometric prospection, and drone photos) translated into a comprehensive presentation of the spatial layout of the cemetery and provided information about the characteristics of all monuments (also those not excavated), helping to determine the extent of their damage and to document the under-mound architecture. Using GIS tools, the principles and specifics of the location of the particular cemeteries and the location of barrows, both in the natural and cultural landscape, were determined. A cumulative analysis of the visibility of the barrows revealed they were highly exposed. The visibility investigation of the Bukivna mounds from the level of the Dniester Valley was impeded by its right, high bank, while the barrows were clearly visible from the valleys of its smaller tributaries. The most important, however, was the intervisibility between individual barrow groups. From each group of mounds at least one other group could be observed, which could help determine the spatial distribution of the necropolis (Makarowicz et al., 2019).

Analyses of substances found on the walls of the vessels from the barrows showed the presence of fatty acid residues, indicating the consumption of meat from terrestrial animals, nuts and seeds by the 'Komarów' communities (Kałużna-Czaplińska et al., 2017).

Currently, an English version of the monograph on the cemetery comprehensively presenting the results of several years of the non-invasive and excavation research in Bukivna, is being prepared (Makarowicz et al., in press).

Project 'Catalogue' and landscape research

A second project concerning barrow culture communities, financed from NPRH funds, was entitled: 'Catalogue of the Komarów Culture Barrow Cemeteries in the Upper Dniester Drainage Basin (former Stanisławów Voivodship)'. Its aim was to make an inventory and catalogue of barrow necropolises known from the literature that were built in the 2nd millennium BC by the communities of the Komarów culture – the south-eastern fraction of the Trzciniec Cultural Circle – in the Upper Dniester drainage basin, within the boundaries of the former Stanisławów Voivodeship (currently mainly the Ivano-Frankivsk oblast in Ukraine). Thanks to a review of literature and documentation from the previous excavations of 'Komarów' barrow cemeteries in the Upper Dniester basin, field-walking studies conducted using modern geodetic tools and instruments (RTK, GPS), non-invasive prospection with the use of drone (photogrammetry) and magnetometer, and an analysis of old topographic maps (including the Friedrich von Mieg Maps from the 18th century, maps of the Military Geographical Institute from the interwar period, and Soviet ordnance maps) and modern satellite images, almost one thousand Bronze Age barrows were documented in cemeteries located within the administrative boundaries of 17 towns. Digital elevation models of the discovered necropolises were made using a laser total station (Leica TCR). In addition, geophysical surveys were used to investigate the under-mound architecture of a selected subset of barrows. Materials and documentation derived from excavations carried out by various archaeological institutions from the second half of the 19th century until the interwar period were comprehensively compiled and compared with information provided by literature. The dramatic events of World War II and the post-Yalta order in Europe resulted in many collections being dispersed and deposited in various museums in Poland, Ukraine, and Austria.

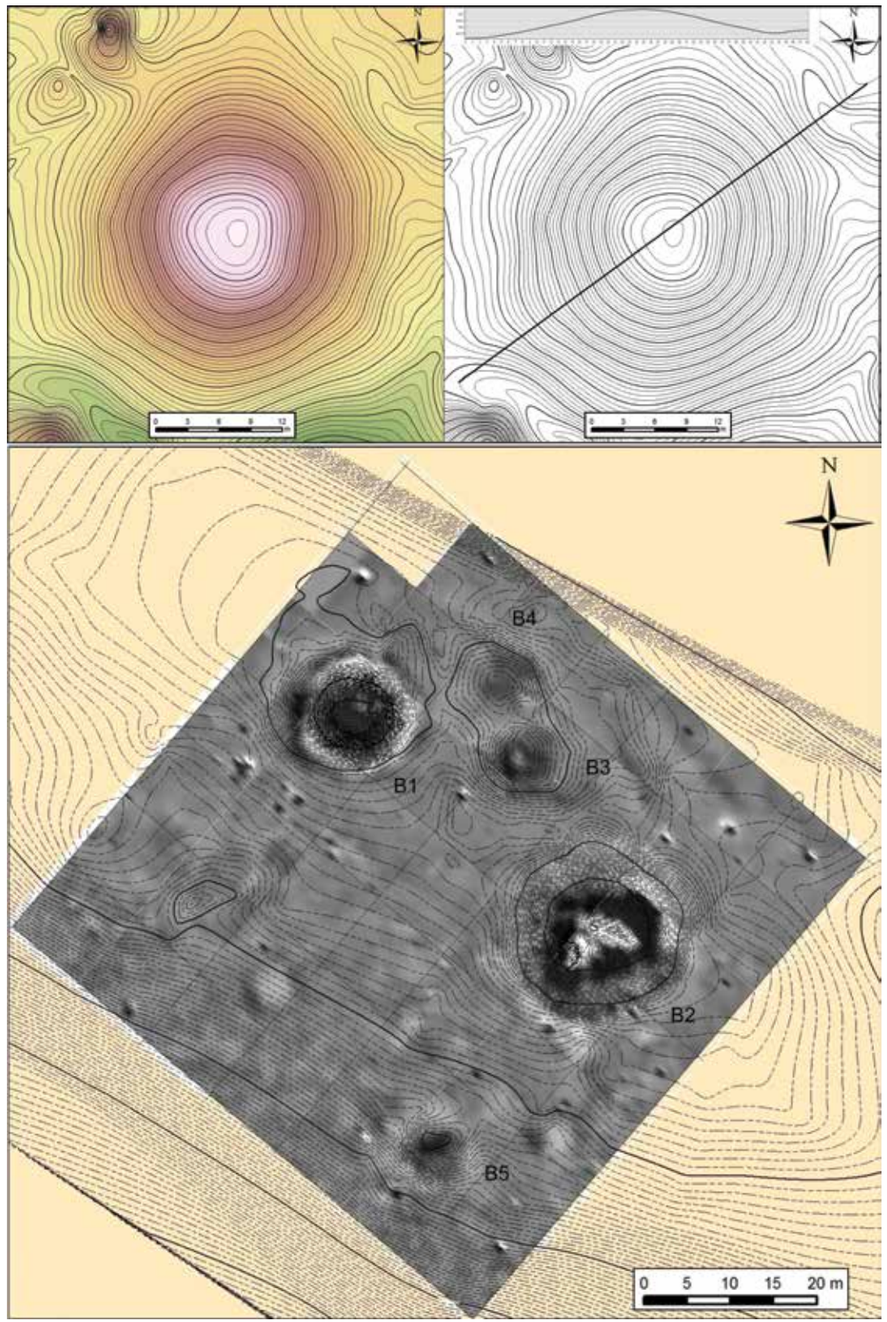


Figure 6. Examples of plans and cross-sections of barrows and their magnetometric images (after: Makarowicz et al., 2019).

The project resulted in the publication of the 'Catalogue of the Komarów Culture Barrow Cemeteries in the Upper Dniester Drainage Basin (former Stanisławów Voivodship)' in three language versions – English, Ukrainian and Polish (Makarowicz et al., 2016a, 2016b, 2016c). The catalogue contains the archival information and the results of the non-invasiven field prospections including digital elevation models (DEM) of barrow cemeteries (scale 1: 10,000) and their groups, the situation-height plans and the cross-sections of single unexplored barrows, the standardised descriptions of the parameters of the mounds, the evaluation of the degree of their destruction, and the photographs and drawings of archival artefacts from the excavated monuments. For each barrow in the necropolises identified by field-walking, GPS coordinates, location on a satellite map, and photographs from different seasons as well as graphic representations of its current external appearance were provided. Also, the under-mound funerary architecture of some of the mounds was also revealed with the use of magnetometer (Figure 6).

Parallel to the 'Catalogue…' project, studies of barrow landscapes in the upper Dniester basin were conducted as an additional project. As a result, a number of regularities were recorded in the location of cemeteries and their structuring. Such principles as adaptation by the builders of the necropolises to the local geomorphological and hydrographic conditions, the specific linear or linear-group arrangement of barrows, and the continuity of cemetery formation in (gradual) stages can be mentioned here (Makarowicz et al., 2017, 2019).

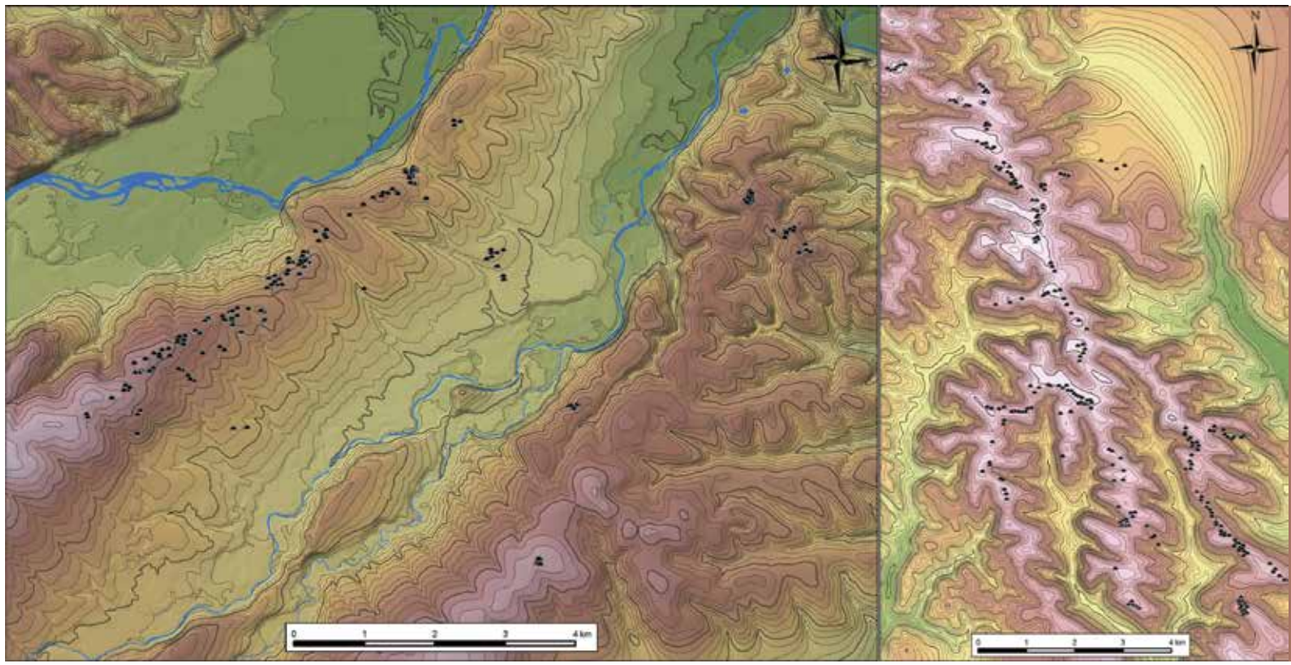


Figure 7. Komariv and Krasiv – the largest and most extensive Upper Dniester barrow necropolises from the Late Neolithic and the Middle Bronze Age (after: Makarowicz et al., 2016a).

The mound builder principle of adaptation to the local morphological and hydrographic conditions was commonplace. Cemeteries most often consisted of several segments separated by depressions or stream valleys (Figure 7). A recurrent rule was to build barrows in the zones of flattened hills and elevations, often in the watersheds of rivers or streams. Occasionally they were situated on gentle hillslopes; however, even in those cases they were on relatively flat surfaces (gradients of up to 5-8 degrees). Studies of barrow landscapes with the use of GIS tools revealed that mounds could only be observed from certain locations. Also from the barrows themselves it was possible to see only a certain part of the landscape (e.g. a stream valley). The most important thing, however, was the visibility between the mounds or groups of mounds (intervisibility) resulting from their topography and mutual proximity. Consequently, other barrows or the whole group could only be seen when walking along the line of barrows (Makarowicz et al., 2019).

The cemeteries discovered in the Upper Dniester basin were usually characterised by linear and linear-group arrangements of barrows, the longest of which – consisting of several hundred monuments – spread across several kilometres (Figure 7). This specific arrangement was closely connected with the terrain morphology. Linear alignments retraced the structural axes of the hills and cluster/group arrangements appeared wherever erosive incisions and denudation depressions made it impossible to build long lines of barrows (Makarowicz et al., 2019).

Barrow culture communities also regularly followed already existing layouts and arrangements of the features. In the majority of necropolises where larger groupings of barrows occurred, there was a noticeable custom of integration of the monuments of the Komarów culture from the Bronze Age into the pre-existing lines of mounds previously erected by the Corded Ware culture groups. As a result, these cemeteries formed a kind of 'palimpsest' created over more than a thousand years, with their final structuring taking place at the end of the first half of the 2nd millennium BC (Makarowicz et al., 2018, 2019).

Project ' Continuation and Change'

Within the framework of bio-cultural research programme on the borderland between the East and West of Europe, a NCN project entitled 'Continuation and change. Barrow culture communities from the 3rd and 2nd millennia BC in the Upper Dniester drainage basin in light of multidisciplinary studies' has been conducted. This project is undertaking the next stage of the studies on the prehistoric communities inhabiting the borderland between Eastern and Western Europe.

The aim of the project is to understand the mechanisms and trajectories of the socio-cultural development in the Upper Dniester Basin (Precarpathia, western part of Podolia) during the period 2800-1500 BC. Due to the lack of identified settlements from that period, the only source of information on the socio-cultural transformations in this part of Europe are barrow cemeteries. The mounds were erected in them by representatives of three successive communities from the Late Neolithic and Early and Middle Bronze Ages.

The core research problem of this project is to identify the periods of continuity and interruption in the construction of barrow cemeteries in the Upper Dniester Basin during the aforementioned time period. Among the questions it aims to answer is whether the cultural changes during the period in question were of a fundamental nature and related to an inflow of non-local people (migrants) or rather the result of long-term gradual changes (in stages) within the same, local population. Furthermore, what was the significance of the barrows for their makers: was the funerary/sacral function always the most important one, or – especially in the later period (the 2nd millennium BC) – was the social and political role of these monuments equally important? To answer these questions, the project aims to provide information on the chronology of the development of the selected cemeteries, stressing the regular linear alignments of barrows, as well as to propose a scenario for their construction and the arrangement of different barrow lines. Finally, an important issue addressed by the project is the question of transformations in the natural environment caused by the deforestation activity during the construction of these necropolises.

The adopted methodology combines modern research methods of archaeology and the natural sciences (archaeological sciences), used in the previously discussed projects.

As part of the project, in the autumn of 2019, field-walking and non-invasive surveys were conducted on several hitherto unexplored (or only fragmentarily studied before World War II) barrow cemeteries in the Ivano-Frankivsk and Ternopil Oblasts in western Ukraine. Using modern research methods including RTK GPS, drone photogrammetry, laser total station measurements, and geophysical prospecting with magnetometer, the monuments were recorded in the field and their under-mound architecture was explored. Digital models of cemeteries and their surroundings, plans, and cross-sections of the barrows were made. The coring of several mounds provided information about their stratigraphy and samples were collected for ^{14}C dating. Based on the results of the non-invasive prospecting, excavations were implemented at three necropolises in the subsequent field seasons and, in 2020, they were carried out at the first necropolis – Miluvannya (see: Figure 2) – a cemetery adjacent to the necropolis in Bukivna.

As a result of this research, two barrows made by the Middle Bronze Age communities were identified (Figure 8). In one of them a burial of two horses with their heads and limbs facing each other and a few vessels of the Komarów culture, including a vase with 'Transcarpathian' features of the Otomani-Füzesabony culture, were recorded. The second, smaller barrow, yielded several under-mound structures, including a large mortuary house constructed from clay and wood with human remains cremated *in situ* (Figure 9). In the fill of the feature and its surroundings, at least 26 vessels of 'Komarów' style were found. Several hundred samples were taken from the barrows for, *inter alia*, palaeopaedological, lithological, geochemical and pH tests. Detailed work is currently under way to compile field documentation and investigate collected ceramic, lithic, archaeobotanical and archaeozoological materials.

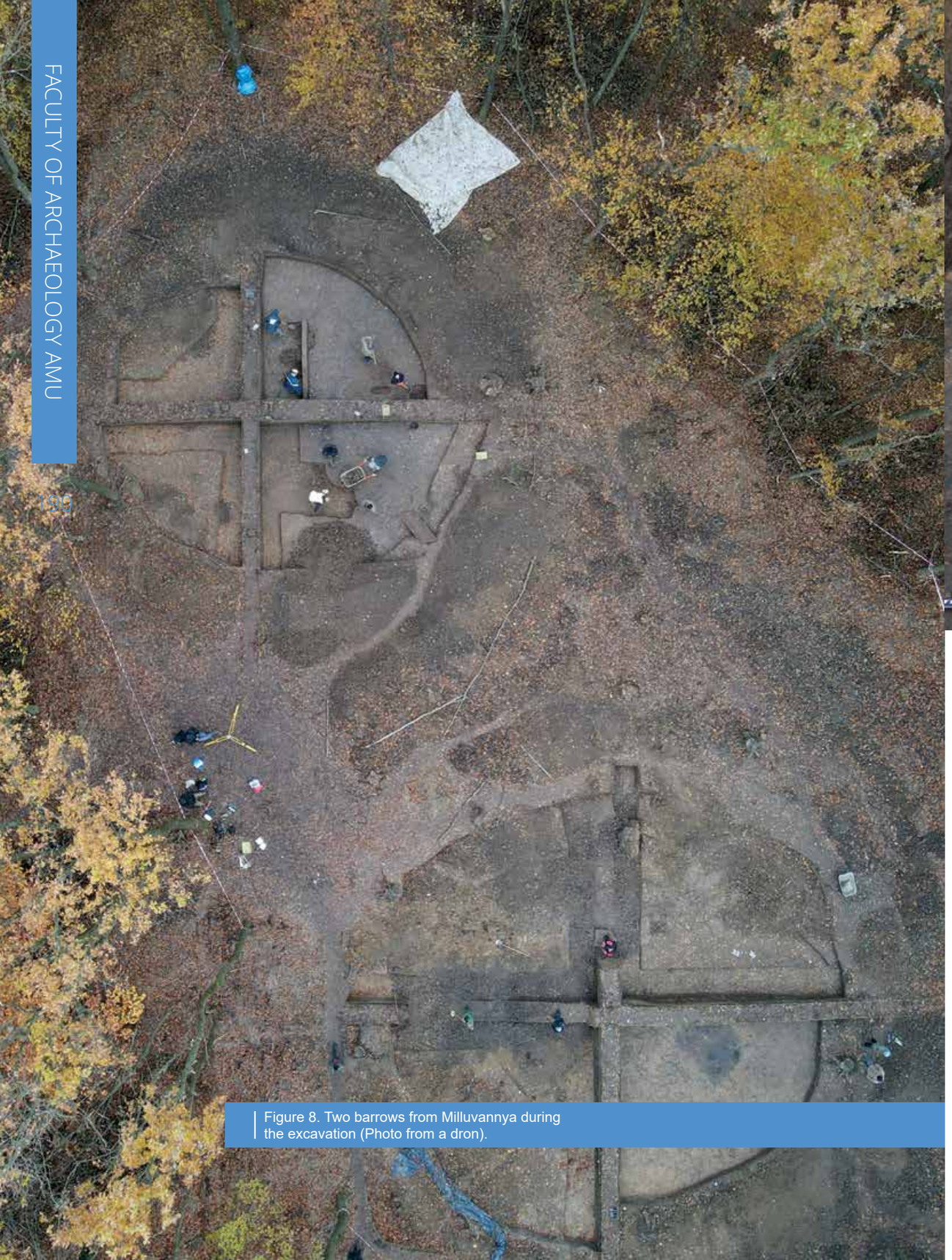


Figure 8. Two barrows from Milluvannya during the excavation (Photo from a dron).



Figure 9. Mortuary house from barrow 260 in Milluvannya.

A tangible result of the project's implementation so far are articles about the landscape archaeology (Makarowicz et al., 2019) and geoarchaeology of the region, in which the results of prospecting and geomagnetics and their interpretation were compared with the excavation research. This in particular applies to the under-mound architecture of the 'double barrows', and especially to the graves with mortuary houses (Romaniszyn et al., 2021). Parallel to the field research, material from various studies covering the period of the 3rd and 2nd millennia BC are being selected in Western Ukraine for specialized analyses using modern methods of archaeological sciences.

Thanks to the realization of the above mentioned project's objectives, it will be possible to obtain comprehensive information, allowing formulation of a model of cultural development of the 'barrow culture communities' who inhabited the borderland of the forest-steppe and forest zone in the 3rd and the 1st half of the 2nd millennia BC in the Upper Dniester Basin.

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Kakucs-Turján: a multi-layered settlement in Central Hungary

Mateusz Jaeger, Robert Staniuk, Sofia Filatova, Gabriella Kulcsár

Abstract

Investigations of the settlement of Kakucs-Turján have applied a multi-disciplinary approach to recognize the everyday reality of communities living in Early and Middle Bronze Age Hungary. Field prospection and preliminary excavations allowed characterization of the overall site parameters, while the subsequent excavation seasons provided evidence of a complex settlement history wherein a major transition from behaviors producing a flat to a multilayered site was identified as a major turning point. Analyses of material culture and botanical remains point to stable lifestyles and subsistence practices across generations of inhabitation of the settlement within which differential access to exotic resources and non-local objects was part of the way of life. This paper provides a state-of-the-art overview summarizing the main findings of the focal points of research at Kakucs-Turján.

Keywords: Hungarian Bronze Age – Tell Settlement – Vatya Culture

Kakucs-Turján and Middle Bronze Age fortified settlements in the Central Danube region

The Kakucs-Turján settlement is located approx. 35 km from present-day Budapest (Figure 1). It was investigated from 2013 and 2017 by an international research team as part of the “Kakucs Archaeological Expedition”. The research was conducted as a collaboration between the Institute of European Culture, Adam Mickiewicz University in Poznań; the Institute of Archaeology of the Hungarian Academy of Sciences in Budapest; and the Institute of Prehistoric and Protohistoric Archaeology, Graduate School “Human Development in Landscapes”, and Johanna-Mestorf Academy at the Christian-Albrechts-Universität zu Kiel. The research was co-financed by Polish, Hungarian and German institutions (Jaeger et al., 2018).

The site was part of a dense network of multi-layered and tell settlements of the so-called Vatya culture. Approximately 45 sites have been identified in the area where this ceramic style was prevalent, most of which were surrounded with fortifications at some stage of their existence (Figure 1). The settlement areas fall between 2 and 3 ha and the surrounding wooden-earthen defenses were typical for the Central European Bronze Age: ramparts, ditches, and palisades (Jaeger, 2016). While settlements were located in various landscapes, evidence of developed agriculture and husbandry points to preferential choices enabling communities to engage in specific economic strategies (Jaeger, 2016). Apart from economic and strategic considerations, which may be approached as purely pragmatic factors, a conspicuous characteristic of Vatya fortified settlements is that their locations often overlapped with places that had previously been inhabited in the Early Bronze Age (EBA).

As for the internal layout of the settlements, one can rely only on a limited number of sites that have been explored over a more extensive area. The buildings were situated at a small distance from one another. In a number of cases, they were constructed in the manner typical of tell settlements, i.e. consistently in the same locations throughout the period of occupation. Spaces adjacent to the houses hosted various production activities (Jaeger, 2016).

A unique feature of some Vatya fortified settlements is the spatial division of their interior. In the case of Kakucs-Turján, archaeological research revealed a complex system of fortifications which split the Middle Bronze Age (MBA) settlement into three sections. Given the available sources, it seems likely that the division was initially functionally-oriented, separating particular activities undertaken by the inhabitants. Consequently, different parts of the site have different stories to tell.

Revealing Kakucs-Turján: non-invasive and geoarchaeological investigations

The investigations of the Kakucs-Turján settlement were initiated by a multi-disciplinary geoarchaeological prospection aimed at characterizing the archaeological record for targeted excavations (Niebieszczański et al., 2018). The geophysical survey revealed a settlement with a tripartite shape (zones A, B and C; Figure 2) that extended over 2.2 ha (Niebieszczański et al., 2019). Investigations of the magnetic images and analysis of material obtained from the coring transects revealed three types of anomalies. The first type were wall-like features that had a rectangular shape and a width of up to 1 m. These anomalies have only been identified in zone A and their arrangement suggests a development of houses around a central feature located in the main part of this zone (Niebieszczański et al., 2018). The second type were ditch-like structures with an elongated shape and a depth and width of ca. 4.5 m to 12 m, respectively. These structures were located both on the exterior of the settlement, surrounding it, as well as on the interior, dividing it into three parts (Niebieszczański et al., 2018). Finally, the third type most likely represented water reservoirs that constituted an element of the ditch, located in the northern section of the site (Niebieszczański et al., 2018). It is possible that the circular reservoirs served as a deliberate measure implemented to achieve hydrological depression, allowing the water from a nearby source to flow into the ditches (Pető et al., 2018). However, a comprehensive reconstruction of how the system worked and what functions it served requires further investigations.

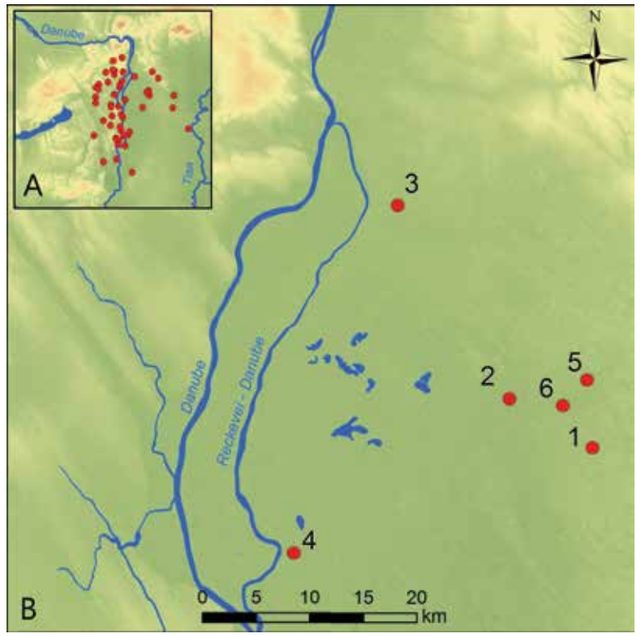


Figure 1. Vatya fortified and multi-layered settlements in Hungary (A) and in the Kakucs microregion (B): 1 – Dabas-Dabasi szőlők, 2 – Dabas-Sári/Bugyi, 3 – Soroksár-Várhegy, 4 – Dömsöd-Leányvár, 5 – Kakucs-Balla-domb, 6 – Kakucs-Turján.

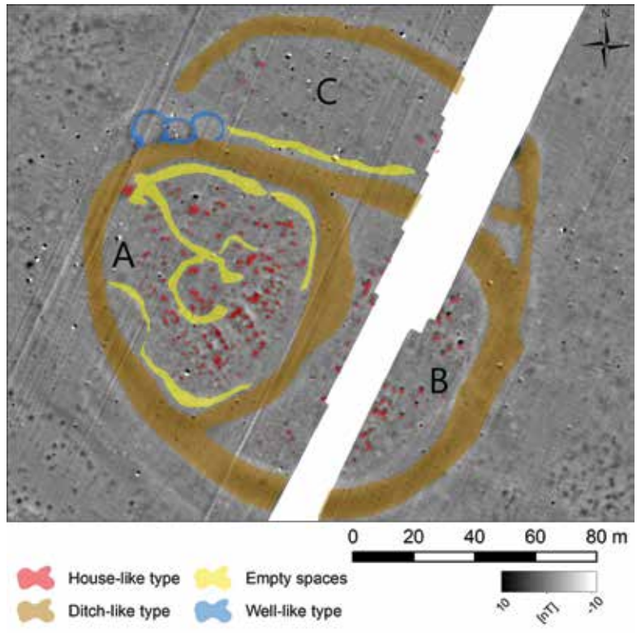


Figure 2. Interpretation of magnetic anomalies at Kakucs-Turján.

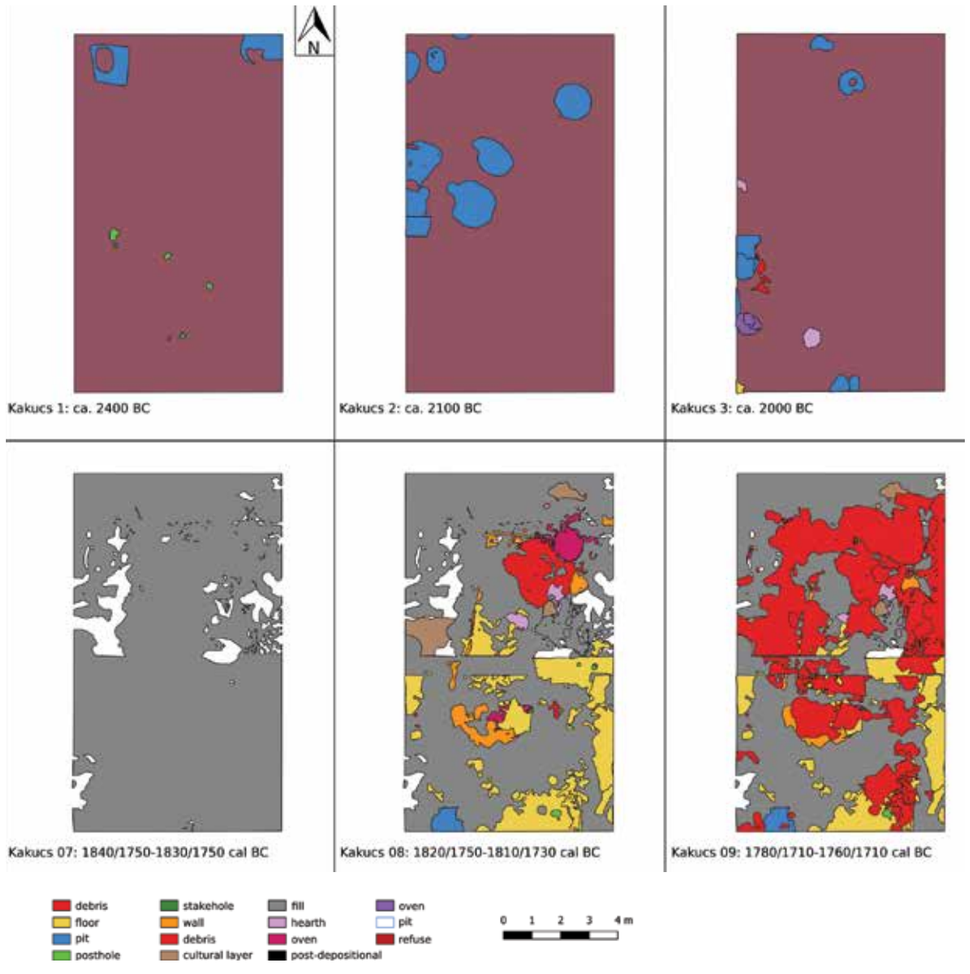
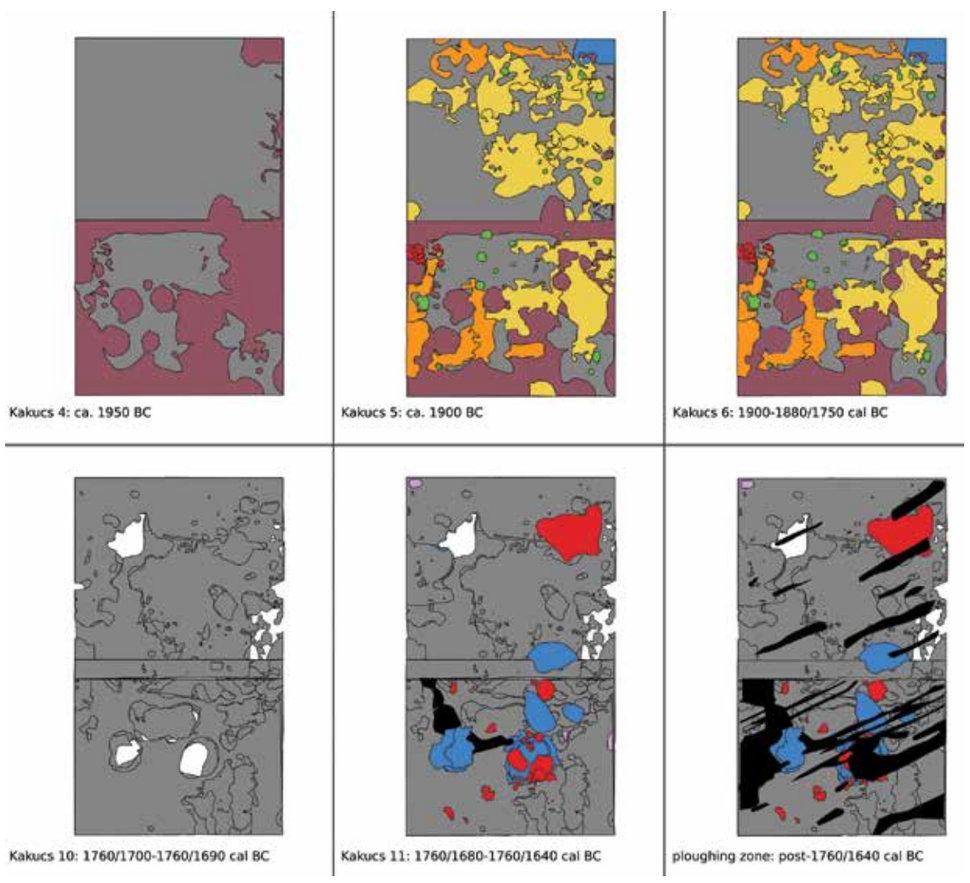


Figure 3. The occupational sequence and distinct habitation phases of Kakucs-Turján.

Excavation results and site history

The multi-layered settlement of Kakucs-Turján emerged as a result of continued, yet changing occupation. The current results indicate that zone A was characterized by the most intensive occupational sequence (Figure 3). While architectural structures were also documented in zone B, the intensity of household remains was significantly lower, suggesting a later re-use of the area for domestic purposes. The findings included house remains, storage pits, hearths, and a destroyed oven. Zone C was largely devoid of Bronze Age finds, which would support the initial interpretation of the area as primarily used for animal grazing.



The formation of the settlement was initiated by the aggregation of relatively mobile societies (Jaeger et al., 2018). This initial stage of habitation, conventionally positioned ca. 2400 BC, was significantly destroyed by the later stages of the settlement, and could only be associated with the remains of a post-based structure accompanied by pits re-purposed for waste disposal (Kakucs 1). The subsequent stage was characterized by intensive digging and the re-purposing of the existing voids by filling them with different quantities of household-related waste (Kakucs 2). The area previously used for waste disposal was re-purposed for production facilities, including a large firing installation; the only directly recognized relic of a household linked to this stage was a piece of a thick floor found in the corner of the trench (Kakucs 3).

Only after these first three stages of flat settlement did characteristic behaviors resulting in the formation of a multi-layered site arise– a relatively uniform fill was distinguished across the entire surface, pointing to the re-deposition of waste as a levelling substance (Kakucs 4). Immediately afterwards a household was established on the previously levelled ground,

corresponding to the outline documented in the earliest settlement stage (Kakucs 5). The house was rectangular and comprised of a thick, ca. 20 cm clay floor and wattle and daub walls. After ca. 30-50 years the house was abandoned and destroyed (Kakucs 6). The missing architectural components such as fragments of wall debris suggest that parts of the structure were removed from their initial position prior to levelling. This time a thick layer of sediment mixed with refuse (animal bones, bone tools, broken ceramics) was distributed across the entire excavated area (Kakucs 7). Like before, a household was established on top of this levelling horizon, similar in orientation to the previous household (Kakucs 8). Despite architectural similarities, it was characterized by a division into two rooms (NW- and SE-oriented). The northern room was accompanied by a large clay oven, which was part of the house wall. After ca. 30 years the house was abandoned and destroyed (Kakucs 9) and the entire area was levelled again with a sediment comprising primarily of refuse (animal bones, bone tools, broken ceramics; Kakucs 10). Another household was erected on top of the levelled surface, the majority of its architectural features were destroyed by modern ploughing, only deep storage pits and some working surfaces were documented (Kakucs 11). The subsequent occupation stage is only hinted at in the ploughing zone, although the density of material culture as well as the distribution of finds suggest that another levelling took place before the final house remains were destroyed in the modern period (ploughing zone).

From a chronological perspective, the settlement existed for ca. 800 years, 400 of which were characterized by a tell-like occupation form. The transition between a flat and tell-like settlement most likely occurred ca. 1950 BC, and is marked by an increasing intensity of occupation. The tell-like occupation form was definitely in existence between ca. 1900-1640 cal BC (Jaeger et al., 2018) (Figure 4), although the destruction of the archaeological record due to ploughing, a relatively common thread in the archaeology of tell settlements in the Carpathian Basin (Bátora et al., 2012), suggests that the settlement was still occupied during the 16th century BC. The chronology of the Kakucs-Turján site was based on the integration of stratigraphic data and radiocarbon dating for Bayesian modelling (Jaeger, Kulcsár, Taylor & Staniuk, 2018 Appendix 1).

Kakucs phases (see fig. 1)	Absolute duration (1 sigma)	Hungarian Bronze Age periods	Hungarian Bronze Age periods cal BC (Fischl et al. 2015)
Kakucs 1	NA	EBA1-2	2600-2200/2100
Kakucs 2	NA	EBA3	2200/2100-2000/1900
Kakucs 3	NA	EBA3/MBA1	2000/1900
Kakucs 4	NA	MBA1	2000/1900-1500/1450
Kakucs 5	NA		
Kakucs 6	1871/1778-1866/1769 BC		
Kakucs 7	1865/1762-1865-1751	MBA2	
Kakucs 8	1863/1746-1862/1742 BC		
Kakucs 9	1861/1736-1862/1728 BC		
Kakucs 10	1860/1696-1859/1692 BC	MBA3	
Kakucs 11	1860/1680-1859/1660 BC		
Kakucs 12	NA	Iron Age - Sarmatian period	NA

Figure 4. Chronology of settlement phases and occupation of Kakucs-Turján.

Ceramic analysis

The analysis of ceramics was aimed at establishing the chronological trends of material culture change – specifically in vessel forms, decorations, and technology – as means of investigating the relationship between architectural sequences and the material culture used. The overall aim was to determine whether the documented sequence was characterized by major qualitative changes, as is often proposed for the EBA and MBA communities in the Carpathian Basin, where increasing hierarchization and specialization, or rise of political structures is to be expected (Earle & Kristiansen, 2010).

The collection of ceramic finds was carried out in relation to the stratigraphic units excavated between 2013 and 2016. A total of 29771 individual sherds from all settlement phases were analyzed, representing approx. 50% of the entire ceramic assemblage. These finds were grouped into three distinct categories: mass finds (n=24165), selected finds (n=3098), and matching sherds (n=2508). The first category comprised of heavily fragmented material without distinguishable form traits; the second comprised of fragments with discernible typological information; the third is a mixed category of fragments which could be matched and used[1] to reconstruct complete vessels. In this final case the number of individual sherds was reduced to a single number representing a reconstructed unit. Overall, the distribution of samples shows that phases 2, 7, 10, and the ploughing zone were characterized by the largest amount of deposited material culture (Figure 5).

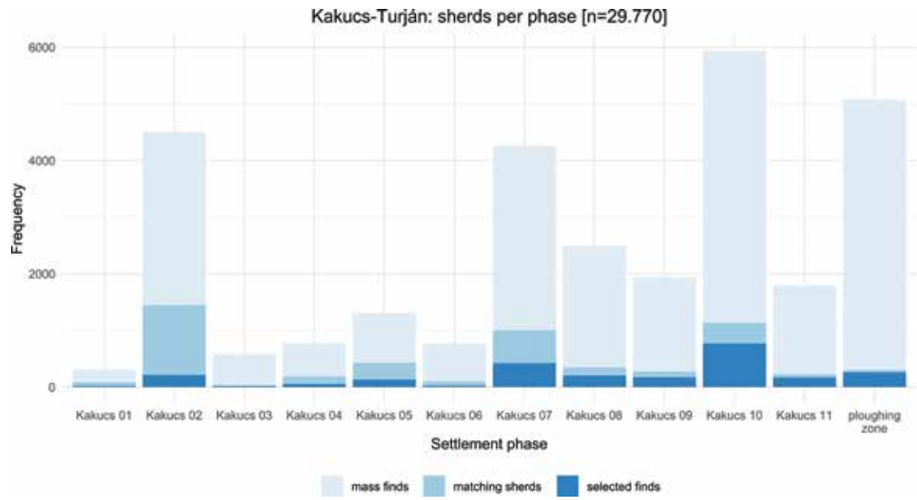


Figure 5. Phase-based distribution of ceramic sherds.

[1] The results of the ceramic analysis of Kakucs-Turján given below were presented in detail in Staniuk, 2020.

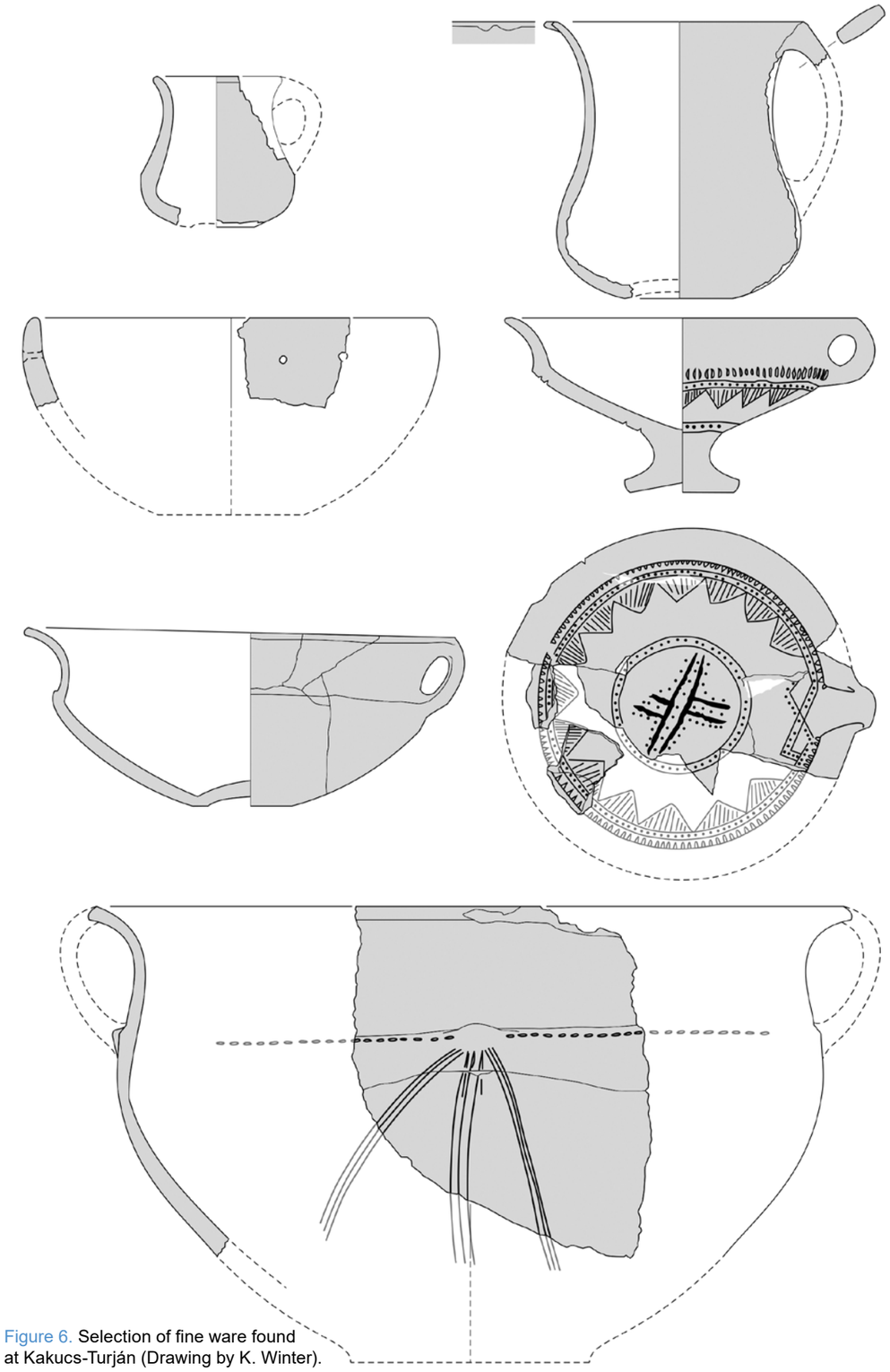


Figure 6. Selection of fine ware found at Kakucs-Turján (Drawing by K. Winter).

Small-scale differences in vessel appearance were investigated using a hierarchical classification system, based on the analysis of metric variables supplemented with increasingly detailed consideration of visual components. The system was based on the definition of functional categories, which could be further characterized in terms of the overall shapes, followed by the description of individual parts. The functional categories comprised of cups, jugs, bowls, wide bowls, pedestalled bowls, vases, pots, and jars (Figure 6). The investigation has shown that while these categories underwent visual changes related to appearance of specific form variations over the course of settlement's history, the differences between non-tell and tell phases of the settlement were related to the disappearance of a single functional type (Figure 7). Instead, the analysis indicated only restricted attempts at modifying the existing functional categories, pointing to the maintenance of a set of practices involving pottery. The distribution of different categories throughout the settlement history was generally similar, which suggests that the main difference between the investigated household and waste disposal phases was the quantity of discarded materials, most likely resulting from the deposition of refuse from numerous adjacent structures.

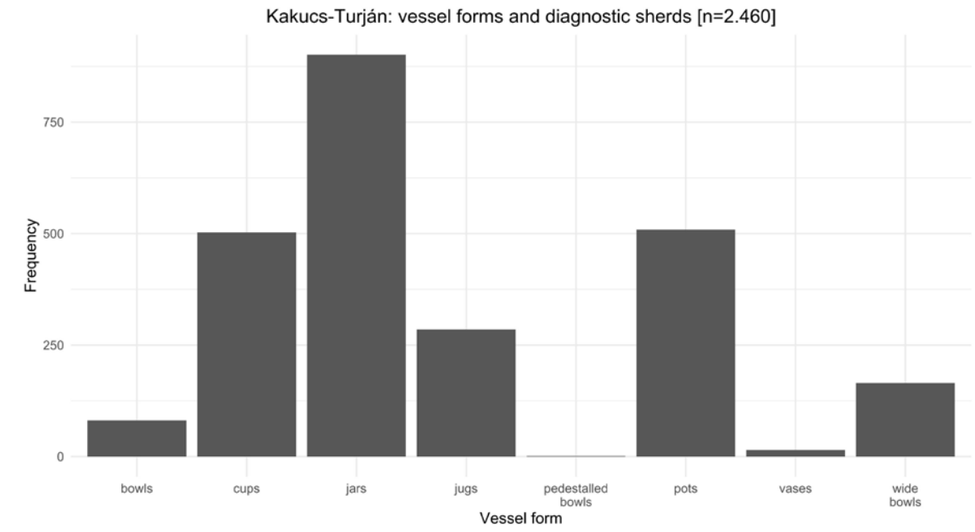
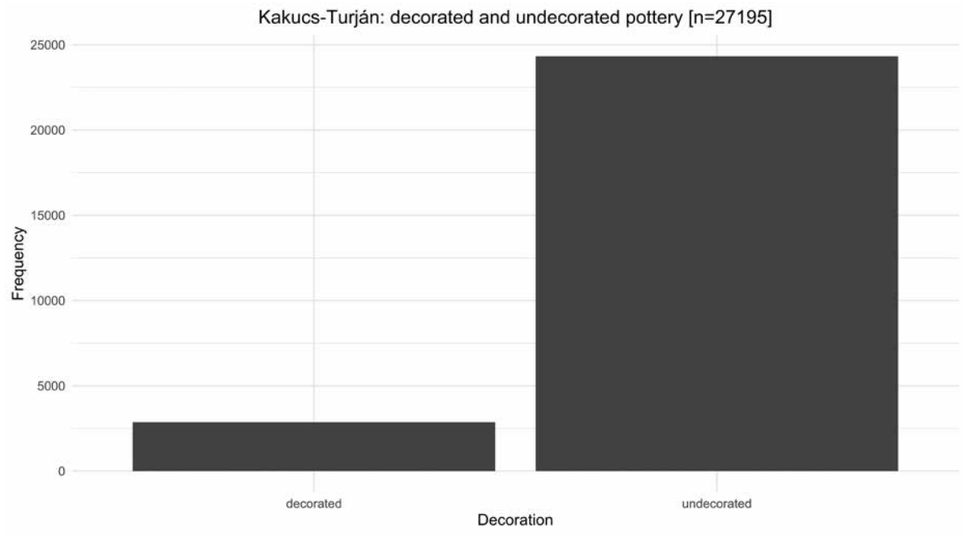


Figure 7. Distribution of vessel forms.

The analysis of pottery decoration was directed towards determining whether the persistence of vessel forms was matched by a similar consistency regarding how their appearance was manipulated. The decorated sherds were documented using a hierarchical classification system in order to recognize the highest resolution of the decoration manufacturing (techniques), to complex combinations involving the positioning of decorations on specific surfaces (systems). The analysis indicated the presence of long- and short-term trajectories in use of decorations which, despite the variability of decorative motifs, did not indicate any major stylistic changes during the history of the settlement (Figure 8). This continuity is most discernible when comparing the presence of decorated and undecorated sherds in each phase, the latter of which represented approx. 90% of the entire ceramic material.



I Figure 8. Decorated and undecorated pottery.

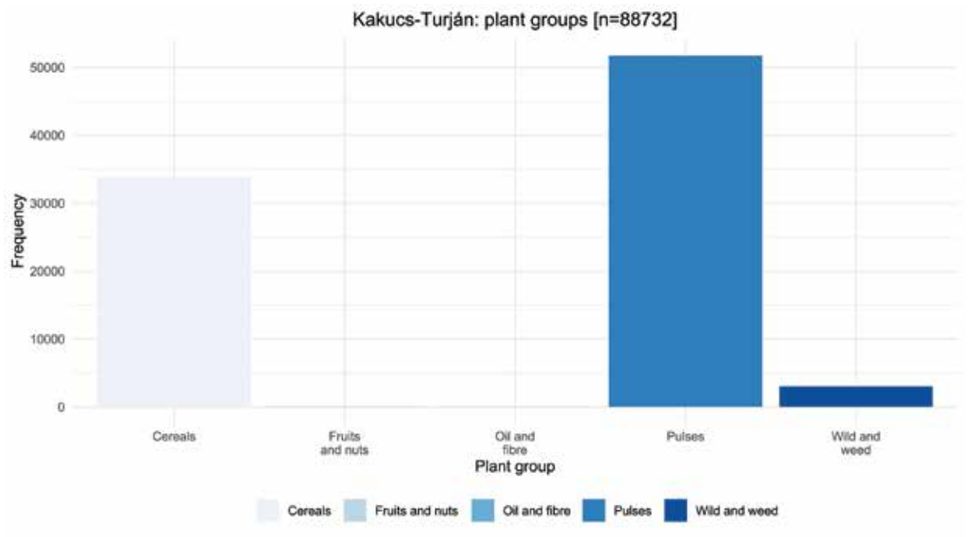
The technological analysis followed the *chaîne operatoire* approach, where the analysis of the subsequent stages involved in vessel production are used as analytical threads to recognize potential changes in how communities produce their pottery (Gosselain, 2018; Rye, 1981). The findings indicated that the changes in settlement's history were generally accompanied by a continuity in technological process relying on tempering pottery with grog, and eventually grog and sand. The firing technique was predominantly bonfire firing and other technological parameters were stable throughout the entire history. Only small-scale changes were visible, such as the appearance of non-tempered ceramics in the final stages of the settlement, a process which required extraction of high-quality clays or development of a rigorous system of clay preparation.

The findings of the ceramic analysis contrast with the proposed top-down models of social development as a result of the emergence of bronze technology (Staniuk et al., 2020). Instead of recognizing increasing hierarchization tied to powerful individuals (Earle & Kristiansen, 2010), the majority of settlement activities are directly tied to households, anthropological units of people involved in shared living, which were effectively responsible for the over-arching similarity of material culture manipulation (Kienlin, 2015). The unavailability of other comprehensively analyzed ceramic datasets raises questions as to whether this phenomenon represents a trajectory unique for the settlement of Kakucs-Turján or is representative of the general trends in the Early and Middle Bronze Age Middle Danube Valley. However, for the time-being, it is considered as a first step towards recognizing the diverse forms of social complexity involved in community life in the Bronze Age Carpathian Basin.

Paleobotanical analysis

The macrobotanical assemblages of seeds and fruits from Kakucs-Turján were systematically collected during excavations of trenches 1-3 in zone A, between 2013 and 2016[2]. 395 amalgamated samples (originally 458 samples) containing 89,614 remains of seeds and fruits were studied from 26 types of archaeological features. Samples were available from all habitation phases, albeit in unequal amounts; for example, habitation phases 1 and 2 were represented by six and seven samples, respectively, while phase 10 was represented by 152 samples. The objectives of the macrobotanical study were (i) to identify the processes that had contributed to the formation and deposition of the assemblages from each habitation phase and (ii) to interpret the remains (diachronically) with respect to the plant economy of the inhabitants.

Using univariate and multivariate statistical analyses, a variety of plant-related activities were distinguished, including daily-routine activities such as crop processing, food preparation, and waste disposal, and rare activities such as storage destruction. The contribution of these activities to the formation of the assemblages of each habitation phase varied depending on the use of the area from which they were collected, which mainly consisted of either occupation of domestic structures or waste disposal. Furthermore, analysis of the spatial distribution of the assemblages revealed that processes of post-depositional disturbance, such as levelling and the digging of pits and postholes, most likely contributed to redeposition and mixing of macrobotanical remains from several habitation phases.



I Figure 9. Distribution of plant groups identified in the samples from Kakucs-Turján.

[2] The results of the macrobotanical analysis of Kakucs-Turján presented here are a concise summary. Complete descriptions of the analysis can be consulted in Filatova, 2020.



Figure 10. Seeds of lentil (*Lens culinaris*) from the fourth habitation phase from Kakucs-Turján.

Domesticated plants were dominant in the macrobotanical dataset of Kakucs-Turján and the remains of wild plants, weeds, fruits, and nuts were only rarely encountered (Figure 9). Finds of pulses were the most numerous, followed by cereals and oil and fibre crops. Lentil (*Lens culinaris*; Figure 10) and einkorn (*Triticum monococcum* ssp. *monococcum*; Figure 11) were identified as the main staple crops throughout the entire habitation of the settlement and were supplemented by four cereal and five pulse species, respectively, including barley (*Hordeum vulgare*), pea (*Pisum sativum*), and emmer (*Triticum turgidum* ssp. *dicoccon*; Table 1). An elaborate diachronic comparison of the crop spectra was hampered by the unequal amount of samples and remains per habitation phase. Despite potential bias, it is suggested that a diversification of the crops cultivated by the inhabitants of the settlement took place during the Middle Bronze Age, as an especially broad variety of pulses has been identified.

Taxon	Plant part	Absolute quantity	Number of samples	Common name
Lens culinaris	Seed	43455	352	Lentil
Triticum monococcum ssp. *monococcum*	Grain	17249	307	Einkorn
Pisum sativum	Seed	7433	186	Pea
Triticum monococcum ssp. *monococcum*	Glume base	4536	85	Einkorn
Hordeum vulgare (undiff)	Grain	2462	239	Barley
Hordeum vulgare (h)	floret	2142	106	Hulled barley
Triticum turgidum ssp. *dicoccon*	Grain	794	136	Emmer
Vicia ervilia	Seed	421	77	Bitter Vetch
Vicia faba	Seed	115	12	Broad bean
Triticum monococcum/dicoccon	Glume base	91	13	Einkorn/emmer
Lathyrus sativus	Seed	49	21	Grass pea
Triticum turgidum ssp. *dicoccon*	Glume base	36	14	Emmer
Triticum monococcum/dicoccon	Grain	28	18	Einkorn/emmer
Hordeum vulgare (n)	Grain	25	14	Naked barley
Linum usitatissimum	Seed	22	6	Flax/linseed
Triticum aestivum/durum	Grain	21	14	Free-threshing wheat
Hordeum vulgare	Rachis fragment	10	2	Barley
Vicia sativa	Seed	6	2	Common vetch
Triticum aestivum ssp. *spelta*	Glume base	3	3	Spelt
Triticum turgidum ssp. *durum*	Rachis fragment	1	1	Hard wheat
Panicum miliaceum	Grain	1	1	Broomcord millet
Cerealia indet	Grain	6416	252	Indeterminate cereals
Leguminosae sativae indet	Seed	228	57	Indeterminate pulses

Table 1. Overview of the crop taxa identified in the samples from Kakucs-Turján expressed as absolute numbers of finds and as the total number of samples in which the taxa have occurred.

The cultivation of a diversity of pulses and cereals might have been part of an agricultural risk-management strategy, wherein mixtures or maslins of crops were cultivated in order to ensure sufficient yields even if one specific crop failed to produce harvest (Martson, 2011). Currently, the analysis of the material suggests that it is likely that the inhabitants of Kakucs-Turján practiced intensive mixed farming, whereby crops were stored as (semi-)clean harvests by individual households.

The unique character of the macrobotanical dataset of Kakucs-Turján is especially apparent from the vast assemblage of pulses, which far outnumber finds of cereals in the dataset. No other assemblages from settlements of the Middle Bronze Age in the Carpathian Basin have been reported with a higher amount of pulses than cereals, and this observation is rare for charred macrobotanical datasets in general (Sarpaki, 1992). In light of the current evidence, the explanation for the striking presence of pulses remains speculative; a multitude of advantages are associated with cultivating pulses, including fixation of nitrogen in the soil, flexible growing conditions, and, although subjectively, their palatability (Butler, Tesfay, D'Andrea & Lyons, 1999; Enneking, Lahlou, Noutfia & Bounejmate, 1995; Palmer, 1998). It is furthermore possible that the prevalence of pulses resulted from exchange with Balkan and/or Aegean communities, where similar diversities of pulses are observed for the Bronze Age (Kroll & Reed, 2016; Marinova & Valamoti, 2014; Stika & Heiss, 2013). Regardless of the

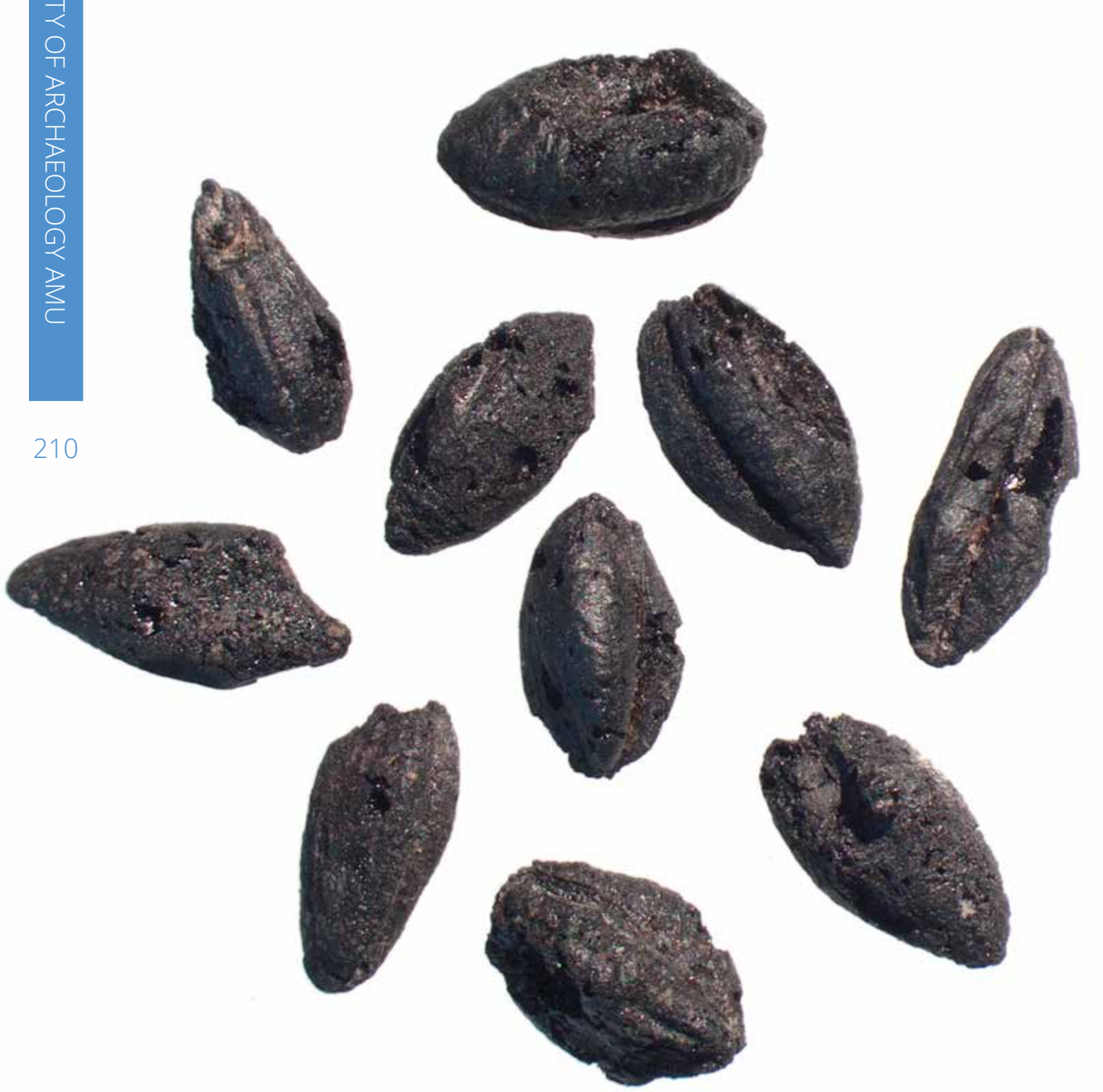


Figure 11. Grains of einkorn (*Triticum monococcum* ssp. *monococcum*) from the third habitation phase of Kakucs-Turján.

explanation, it is clear that the preference for growing pulses distinguished Kakucs-Turján from other (Vatya) communities in the region and it is likely that this practice formed part of the identity of the inhabitants. The prevalence of pulses at Kakucs-Turján further illustrates that agricultural practices of Vatya communities did not follow a uniform pattern and that more research is needed in order to unravel the diversity of Bronze Age foodways in Hungary.

Archaeolozoological analysis

The archaeozoological analysis targeted only remains found in the Middle Bronze Age pits. A total of 30.15 kg animal bones coming from those features were identified (N=3520, NISP=3625) (Biller, 2018). As expected, the proportion of domestic species exceeds that of the wild animals in the given assemblage. Among the domestic species small ruminants (sheep, goat) were the most common, followed by cattle, swine, domestic horse, and dog. Horses were underrepresented in Kakucs-Turján, as generally is the case in MBA assemblages from sites in modern Hungary. Each body region of all the main species (cattle, small ruminants, pigs) was found, which may indicate local processing on-site. In the case of cattle and small ruminants, the importance of secondary utilization (such as draught power, milk, and wool) also seems to have been relevant in addition to primary exploitation for meat.

In the group of wild species, the presence of hare and fox could suggest interest in the utilization of fur. Fishing likely played only a secondary role in food provisioning because of the distance of major bodies of water from the settlement. This assumption seems to be indirectly supported by the relatively higher presence of small mammalian bones than fish bones in the hand-collected assemblage. Tiny remains of small mammals and fish bones have similar taphonomic properties. Therefore, the almost complete lack of fish bones and remains of other aquatic species may indicate their small significance in the local MBA diet.

The basic information concerning animal remains we currently have at our disposal cannot help reconstructions of the natural environment in detail. Nevertheless, the high number of small ruminants' bones that prefer dry-grass pasture and the presence of hare (together with the aforementioned poor representation of aquatic species) point to a relatively dry grassland habitat in the settlement's environment. However, the keeping of cattle requires much more water and richer, long grass pastures in floodplains or lush hillsides. Pigs are more likely to be associated with oak forests and frequently inundated areas (Bartosiewicz, 2006). The presence of remains from large game species suggest forested areas in the proximity of the settlement, but their small numbers indicate a low intensity of hunting.

Kakucs-Turján and the outer world

Archaeological research has produced a series of finds that point to the development of a close relationship of the local MBA community with the outside world.

The central Danube basin is deprived of the natural resources necessary for the development of metallurgy. Nevertheless, both gold and bronze items were discovered within

the remains of MBA buildings. Although they do not constitute proof of local production, they indicate the organizational capacity of the inhabitants who obtained non-local resources (copper, tin, gold, bronze) and used metal objects. In 2013, a gold item (*Lockenring*) was discovered in the western section of trench no. 1, in the layer which constitutes the general "fill" of the trench, near layer KEX13-15: 60034 (part of debris of younger Vatya house; Kakucs 9) (Figure 12). Bronze (or, possibly, copper) finds make up a set of 9 artefacts: namely small, damaged ornaments (3 specimens of unidentified pin types); small tools (awl and chisels); and fragments of damaged objects whose function cannot be established. Most were discovered in layers associated with MBA houses.

Connections of local communities with closer and more distant regions of Europe are also reflected in the ceramics. Next to pottery forms and ornamentation that are typical of the local Vatya style, a fair number of imports were identified (Figure 13). Among those, Encrusted Pottery and Kisapostag vessels are the most numerous group. In addition, some of the discovered vessels can be associated with Hatvan, Füzesabony, and Gyulavarsánd styles,

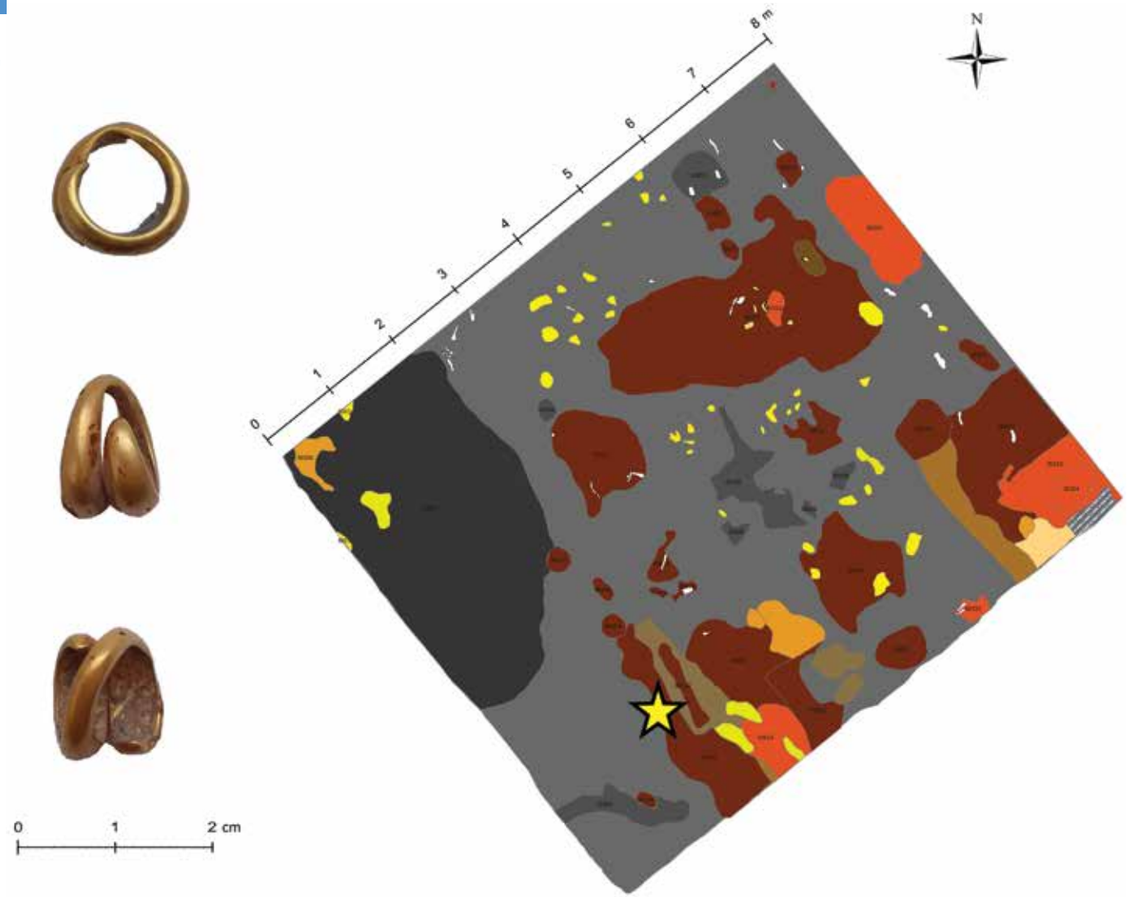


Figure 12. Gold lock-ring from Kakucs-Turján and its location in trench no 1 (marked with yellow star), in layers of the Middle Bronze Age house remains.

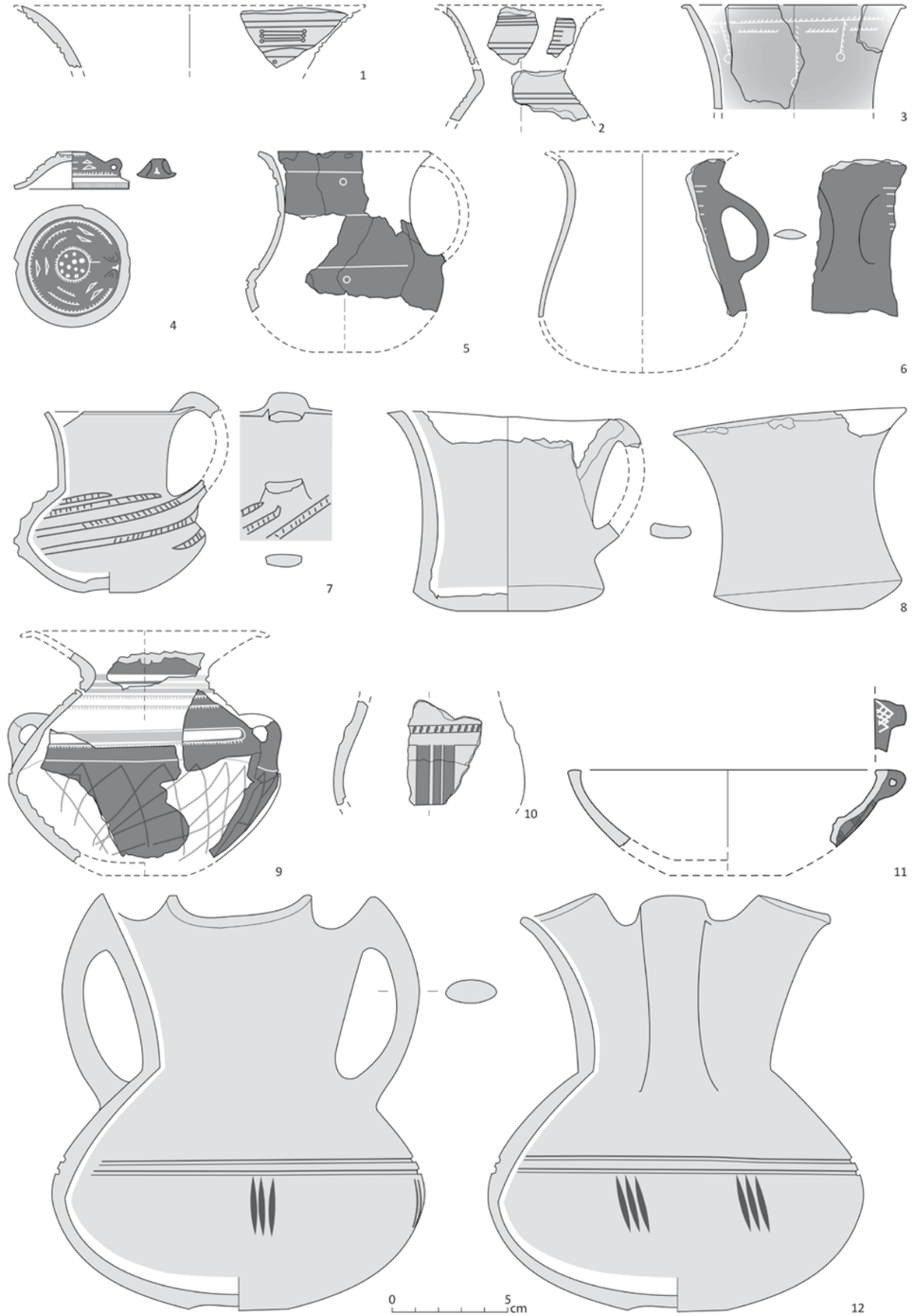


Figure 13. Selection of stylistically non-local ceramics found in zone A of Kakucs-Turján

suggesting a north-eastern direction of interaction, and one vessel displayed traits of the Maros culture, whose principal area of distribution is south of the central Danube basin. Imports aside, there are also artefacts which draw particular attention as local imitations of vessels bearing “foreign” stylistic traits. At present, once could list several pieces attesting to local attempts at emulating non-indigenous styles, for instance imitating the typical Gyulavarsánd ornamentation. Still, the most conspicuous example of such a practice is a vessel imitating a Maďarovce cup (which in turn drew on the classical cup of the Únětice culture) (Figure 13). The imitation cup at Kakucs-Turján was made using a technique resembling local production methods. Most of the vessels described above were found in a single household. This suggests that its inhabitants not only adhered to the local tradition but also had knowledge of, used, and even imitated vessels originating from other cultural-geographic regions.

Very significant finds extending the network of interregional connections of Kakucs-Turján’s inhabitants are fragments of amber beads discovered in the remains of the younger Vatya house. In total, the site yielded five small amber fragments. Two were found in situ. The other three fragments were identified in a laboratory while studying, under a microscope, material gathered by floating soil samples. Based on the stratigraphy and absolute chronology of the context of the discovery of individual fragments, the presence of amber should be associated with the period around 1800-1650 BC. In the light of the performed spectral analysis (FTIR method), all discovered finds are Baltic amber (Jaeger et al., 2020) (Figure 14).

Summary and research perspective

Previous studies of the Kakucs-Turján site have provided basic information on the economic and spatial development of the settlement. The next stages of the research will focus on a more complete recognition of the absolute chronology of the settlement, the individual elements of the fortifications and the relationship between neighboring fortified settlements in the region. Their proximity suggests the existence of a complex political-economic system. In order to fully reconstruct its parameters, it is necessary to obtain detailed information on the chronology of their formation, development, and the history of surrounding them with fortifications. Research focused on these goals will be continued by the existing Polish-Hungarian-German team in the coming years.

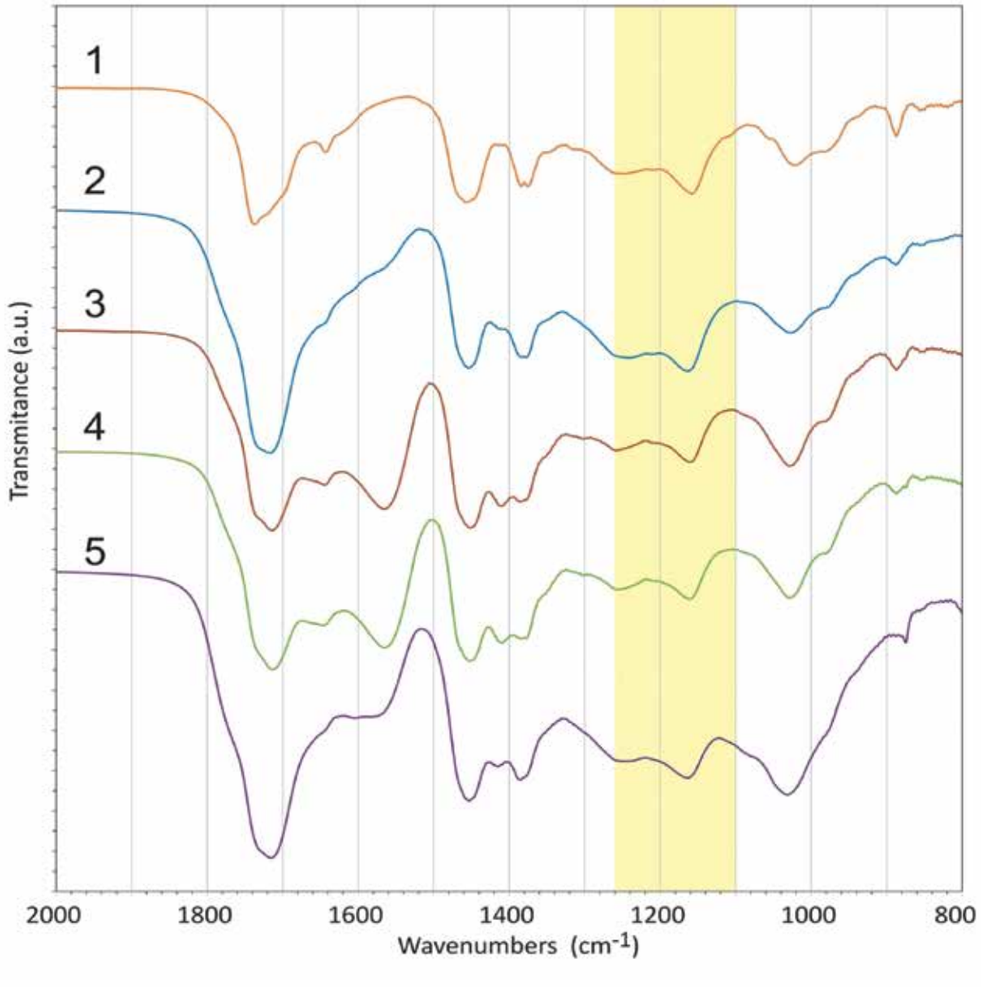




Figure 14. Fragments of amber beads from Kakucs-Turján and FTIR analysis results of all discovered amber finds: 1 – reference sample of succinite; 2 – finds of two lumps in situ; 3 – lump from soil sample 125; 4 – lump from soil sample 102; 5 – lump from soil sample 122.

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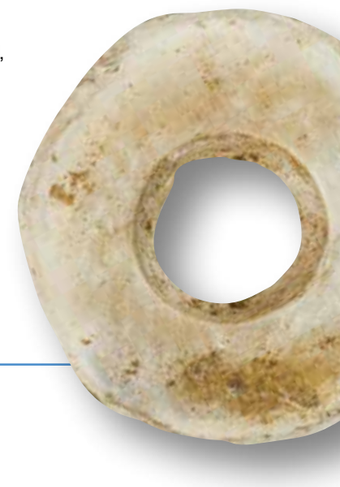
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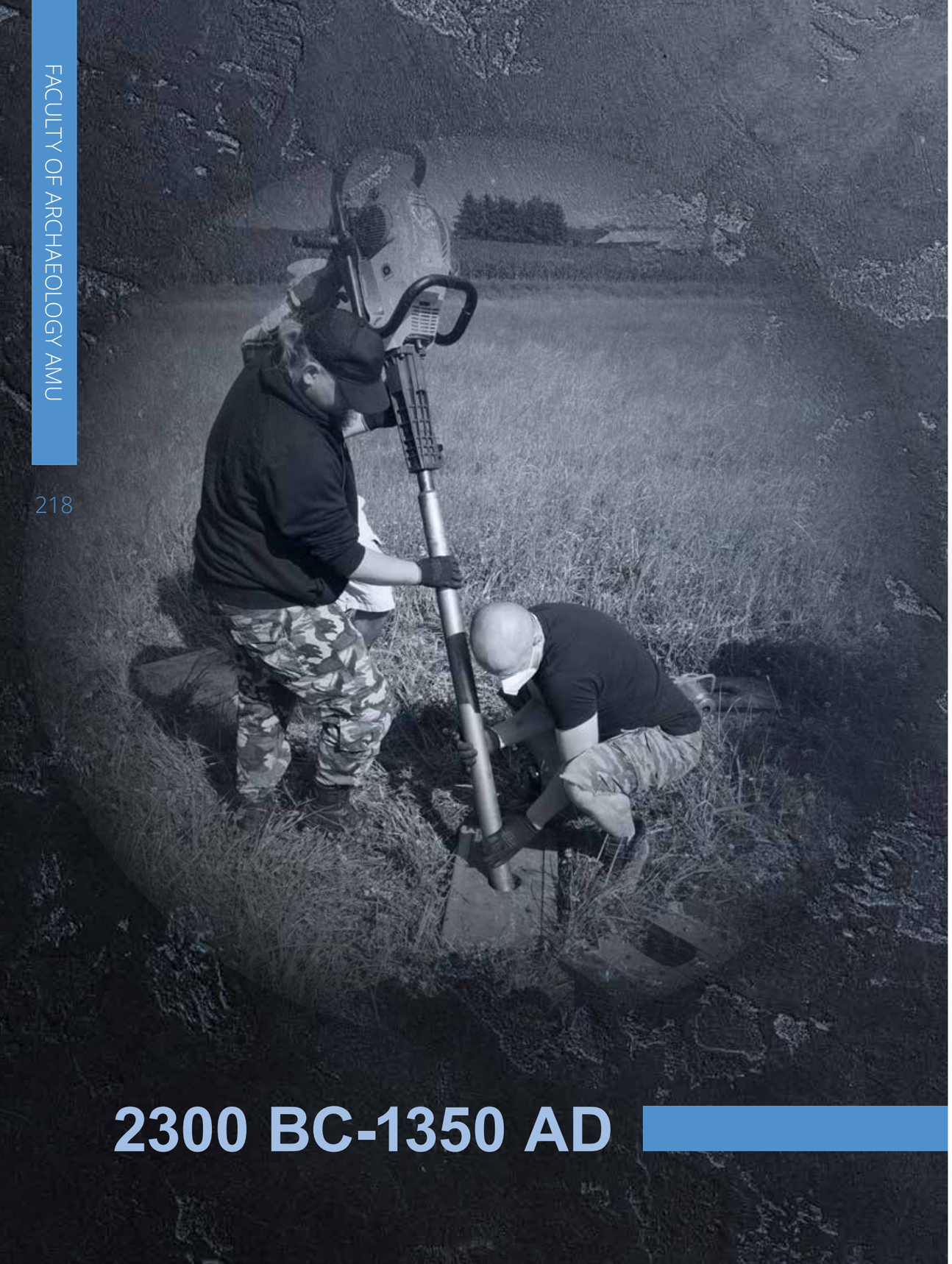
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When archaeology meets environmental sciences: the Bruszczewo site revisited

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Abstract

Settlement archaeology is often supported by geoarchaeology in which human habitation is drawn on the timeframe of landscape changes derived through interdisciplinary research. An example of a geoarchaeological approach to settlement study is the Bruszczewo Lake project conducted in Central-Western Poland. The area of Bruszczewo and the Samica River Valley witnessed human occupation since the Neolithic period and is most widely known for the presence of an Early Bronze Age fortified settlement. Previous research provided initial information about the presence of a lake and marshland in prehistoric and early historical times. A new geoarchaeological project aims to create a detailed environmental and landscape transformation history combined with the extensive knowledge of the archaeology of the area. Using GIS techniques, conventional drilling, and vibra-coring, a new set of data is brought to light and analysed in palaeoenvironmental terms. Constructed geological profiles across the valley revealed the basin's morphology and provided insight into the subsequent landscape transformation phases, from the Late Glacial ribbon lake lasting until the end of the Bronze Age to the marshlands that thrived until the Early Medieval period. The ongoing analyses of samples derived from drillings provide a perspective for detailed reconstructions of landscape changes.

Keywords: Geoarchaeology, Environmental Archaeology, Bruszczewo, Palaeoecology

What is geoarchaeology and what does it tell us?

Current archaeological research often meets various sciences that are beyond the conventional scope of human studies. As one of the principal purposes of archaeology is to reveal the human past, so is the goal to reveal the habitat in which humans lived. For this reason, numerous non-archaeologists have been involved in excavations, analyses of finds, and contextual research for decades. Alongside biology, anthropology, chemistry, and other branches of science that allow archaeologists to reconstruct various aspects of the human past, the combination of archaeology with earth sciences aims to reconstruct former landscapes in which people existed in prehistoric and early historical times. As the combination of various methodologies applied in archaeological research have already found themselves named in current scientific nomenclature, including bioarchaeology, petroarchaeology, and zooarchaeology or archaeozoology, the same applies to the fusion of palaeoenvironmental, or palaeogeographical sciences with archaeology. Presently interchangeably used terms include geoarchaeology and environmental archaeology. Despite applying a different suite of approaches, analyses, and fieldwork methods, they ultimately aim for the same purpose – to reconstruct the relationship between humans and the environment.

Geoarchaeology – as understood in the scope of this paper – answers archaeological questions using various methods derived from geology, geomorphology, physical geography or geophysics, combined with other earth sciences and biological aspects of the past, for instance by revealing vegetation history or hydrological conditions (Rapp & Hill, 2006). Studies in geoarchaeology vary both in terms of spatial and directional scope. The first division can be considered as on-site compared to off-site approaches; however, further distinctions can be seen as, for example, reconstructing microregional human influence on the landscape (e.g., Doyen et al., 2016) versus the regional pattern of human relations with the surrounding environment (e.g., Fouache et al., 2008; Ghilardi, 2018). These interdisciplinary and multifaceted research methods have been employed long enough to be considered an immanent part of settlement archaeology or past landscape studies (Rapp & Hill, 2006). The intention of this article is to present geoarchaeology in practice and its valuable addition to settlement archaeology on the basis of a microregion in Bruszczewo located in Central-Western Poland (Figure 1).

Bruszczewo microregion during the prehistory and early historical times – what happened there?

The area of Bruszczewo village, c. 50 km south of Poznań (Figure 1), is most widely known in archaeological disputes as the place where a fortified settlement from the Early Bronze Age, belonging to the Unetice culture people, was discovered (Czebreszuk & Müller, 2004) and has witnessed numerous studies and excavations oriented towards exploration of this site (Müller et al., 2010). It is considered as an unique representation of defensive installations of the Unetice culture (Jaeger & Czebreszuk, 2010). The discussed site lies on a promontory

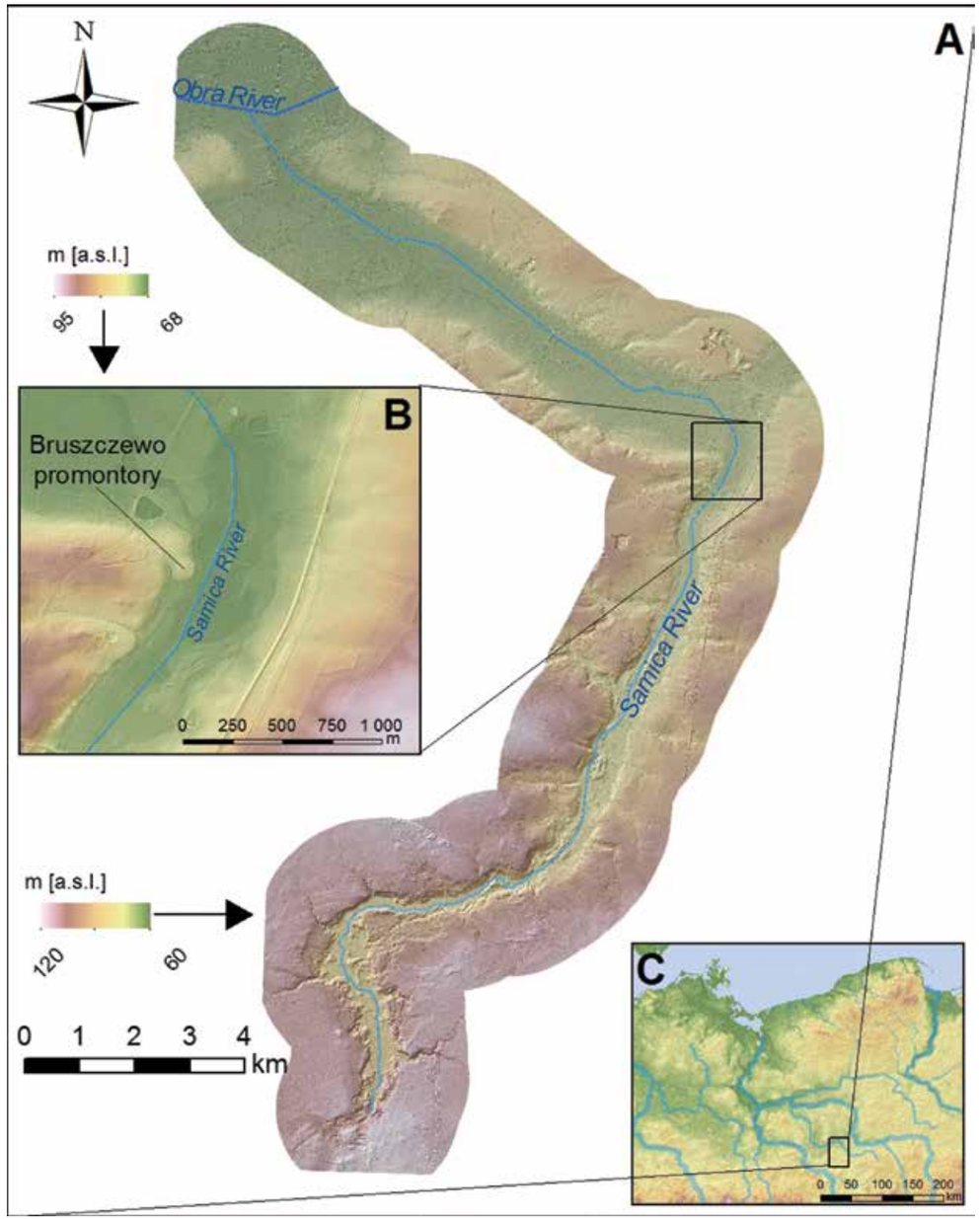


Figure 1. Samica River Valley (A) and the extent of the Bruszczewo microregion (B) in Central-Western Poland (C).

slope, extending over the middle of the course of the Samica River Valley (Figure 1A). The settlement was separated at that time from the rest of the slope by a ditch (Bork, 2010) or a moat (Hildebrandt-Radke, 2010), and on the inner side by a palisade and a rampart (Jaeger, 2015) (Figure 2).

Undoubtedly the largest archaeological effort was focused on the EBA settlement; however, the Bruszczewo microregion comprises a much longer habitation history. Several Neolithic stages of human presence in the area was documented both on the discussed promontory as well as in its vicinity (Szmyt, 2015). After the EBA phase of occupation and a supposed habitation hiatus during the Middle Bronze Age, this section of the Samica Valley witnessed an intense Lusitian Urnfield culture occupation in Late Bronze Age and the Early Iron Age, manifested in the presence of a peculiar ritual place and an associated extensive urnfield cemetery nearby (Figure 2) (Ignaczak, 2015). Remains from the Roman Period occupation are observable in several locations indicating ongoing human presence in

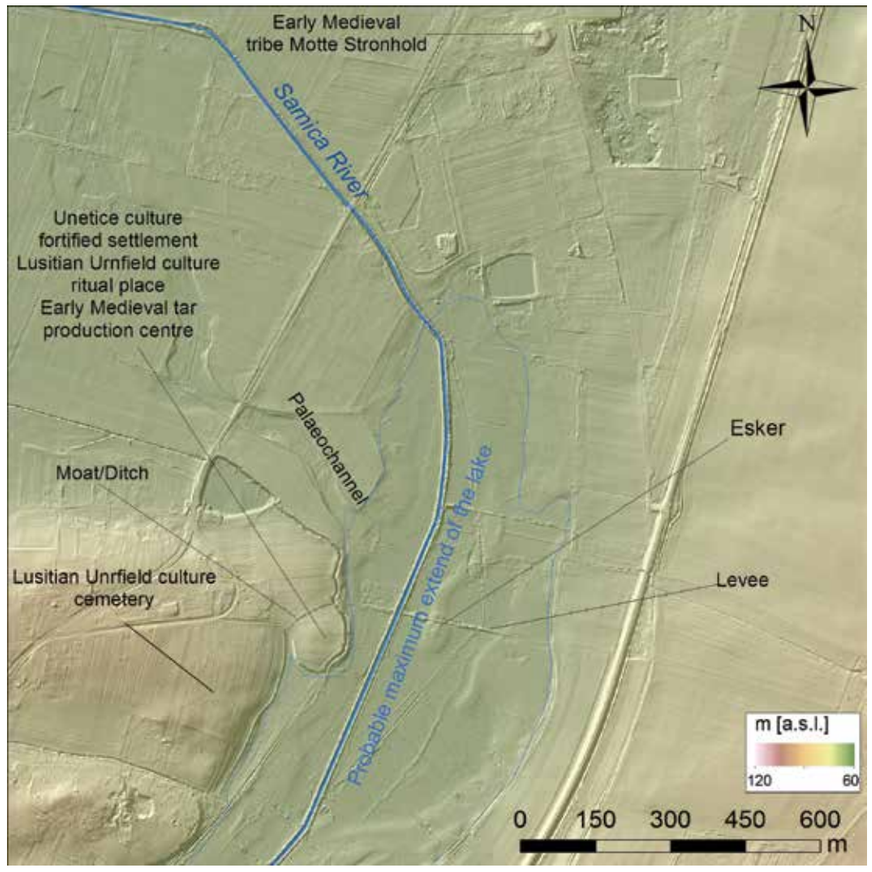


Figure 2. The Bruszczewo microregion with archaeological and geomorphological features discussed in the text indicated.

the area until the Migration Period (Szydłowski, 2004). After several centuries of turbulent and uncertain times during the latter phase, the Bruszczewo area was again stably inhabited by Slavic tribes in the Early Medieval and consequently incorporated into the Early Polish State during the tenth century AD (Figure 2) (Brzostowicz, 2002). These phases of early historical times are represented both on the promontory, where tar production took place, as well as in the northern part of the valley were the Slavic motte stronghold of Obra tribes was raised.

As seen from the perspective of habitation history, the area of Bruszczewo and the middle course of the Samica River marks an important spot on the archaeological map of Central-Western Poland, being a place of almost uninterrupted human occupation for several millennia. The interchanging cycle of human presence in the region offers a good perspective for investigating anthropogenic interventions on the landscape as being dependent on the scale of human occupation, its duration, tools involved in land cultivation, subsistence strategies, and even ritual activity.

It is not common to perform all such reconstructions; however, in the case of the Bruszczewo microregion, the landscape bears great potential due to its geomorphological and geological characteristics. The bottom plain of this section of the Samica Valley is currently a meadow that developed on a thick series of peat deposits. Therefore, it might be assumed that the past appearance of the Samica Valley might not reflect its present state. Since the beginning of excavations of the EBA settlement on the promontory in the early twenty-first century, researchers found significant evidence for landscape change in this part of the valley, which further prompted initial geoarchaeological research (e.g., Bork, 2010; Haas & Wahlmüller, 2010). Several brief geoarchaeological surveys that took place both on the promontory as well as in the valley plain indicated the presence of an extensive lake in the past, which was subsequently overgrown and drained, forming a vast marshland (Hildebrandt-Radke, 2013). A specific core from a meadow north to the EBA site was briefly analysed through palynological means (Haas & Wahlmüller, 2010) and provided insights into local vegetation changes from the Late Neolithic to the early stages of the EM. According to the dated palynological profile and identified sedimentary environments throughout the core, it appeared that a freshwater lake occupied the valley at least until the transition to the Roman Period. The lake subsequently transformed into marshland, which according to the researchers were present until the EM. The flora of the region was affected by changing human influence several times. The earliest stage recognized as experiencing a significant anthropogenic intervention is visible during the EBA when much of the forest in the area was exploited, both as a result of land cultivation as well as deforestation to provide wood needed for the construction of extensive fortifications. After the abandonment of the settlement, the woodland regenerated slowly and witnessed another phase of human presence during the LBA/EIA. The last stage of significant human impact was dated to the Roman Period, when settlements were spread around the valley.

The Bruszczewo Lake project – a new perspecitve and some initial results

Despite the significant data provided by earlier investigations, much of the detail of the landscape history around the lake remains unclear. For instance: how vast was the lake in its maximum of development? Did the lake diminish in its entirety during the BC/AD transition? Were there any fluctuations in water table level during its presence? How deep was the lake's

basin throughout prehistory? Were the lake's waters incorporated into the defensive ditch during the EBA by hydrotechnical installations? Why did the lake transform into marshland and how did this process impact the local settlement? When did the Samica River start controlling sedimentation patterns in the valley bottom, thus changing the settlement pattern in the valley? Are there any traces of slope degradation and erosion around the lake due to the agricultural activities? To explore these research questions, in 2019 a new multidisciplinary project was started and oriented exclusively towards the geoarchaeological recognition of the Bruszczewo microregion, specifically landscape transformations throughout prehistory and the EM period. This initiative includes numerous scientists from different fields of study, including archaeology, history, geomorphology, geology, palaeoenvironmental sciences, and geophysics. The project assumes to obtain detailed chronological information on the environmental changes, both biotic and abiotic, and connect these dynamics with the already well-recognized history of human occupation in the area.

Looking from above – remote sensing

The first step of data collection was done through GIS studies of the microregion and the evaluation of morphological features within the valley (Figure 2). Several LIDAR-based digital elevation models distinguished a peculiar form in the central part of the valley's plain that was not included on maps produced by earlier researchers due to the lack of precise elevation models at that time. This particular feature represents the remains of an esker (os), formation that often lie within glacial tunnel valleys (Figure 2). Despite its Pleistocene origins, it is an important feature in the context of past human habitation, as its presence might indicate the existence of dry land within the former lake. Often eskers form oblong islands in lakes and such a situation might also have been the case in the Bruszczewo lake, or later when marshland dominated the valley's plain. Within the drilling conducted at the prominent elevation of the os structure, a pottery fragment dating to the Neolithic or Bronze Age period was found at the transition between the lowest peat levels and esker sand deposits. This small artefact might reflect that at least during Neolithic times, the esker was surrounded by the lake's water and remained a dry island.

Another feature revealed during the examination of the LIDAR scans was a narrow ridge of land cross-cutting the valley's plain in the area of the fortified EBA settlement. A preliminary interpretation of this feature is that it was raised by human hand as a levee to provide a path across the valley (Figure 2). Whether this feature is connected to the prehistoric settlement activity remains doubtful; the most probable explanation is that it was erected during Medieval times, possibly also changing the hydrological conditions in the valley.

The morphology of the valley derived from the elevation model also suggests the maximal former extent of the lake, which is indicated by a depression in the central part of the investigated area (Figure 2). At its northwestern margin, a specific fluvial feature was registered, indicating the presence of a palaeochannel from a time before river regulation. The historical cartography analysis performed for this area documents a regulated course for the Samica River since at least beginning of the nineteenth century AD.



Figure 3. Vibra-coring procedure in Bruszczewo.
The sampler is being stabilized in a drilling spot (Photo: Sebastian Teska).

Drilling the peatland and a search for an island

After the evaluation of cartographic materials combined with the identification of the geomorphological features of the area, the fieldwork campaign for drilling began. The aim was to create a geological cross-section of the Samica Valley's plain to define the thickness of lake and marshland deposits. At first, the method used for this purpose was vibra-coring. It produces cores with an undisturbed stratigraphy of sediments of great depths in a relatively short time (Canti & Meddens, 1998). Using this equipment, sediments are pushed into a PVC tube inside a steel sampler. In contrast to conventional drilling, the sampler is pushed into the ground by means of a pneumatic jackhammer, thus omitting any disturbance of sediments (Figure 3). Although the method is suitable for dry areas, its application in wetlands is obstructed by the presence of highly saturated sediments, such as gyttja.

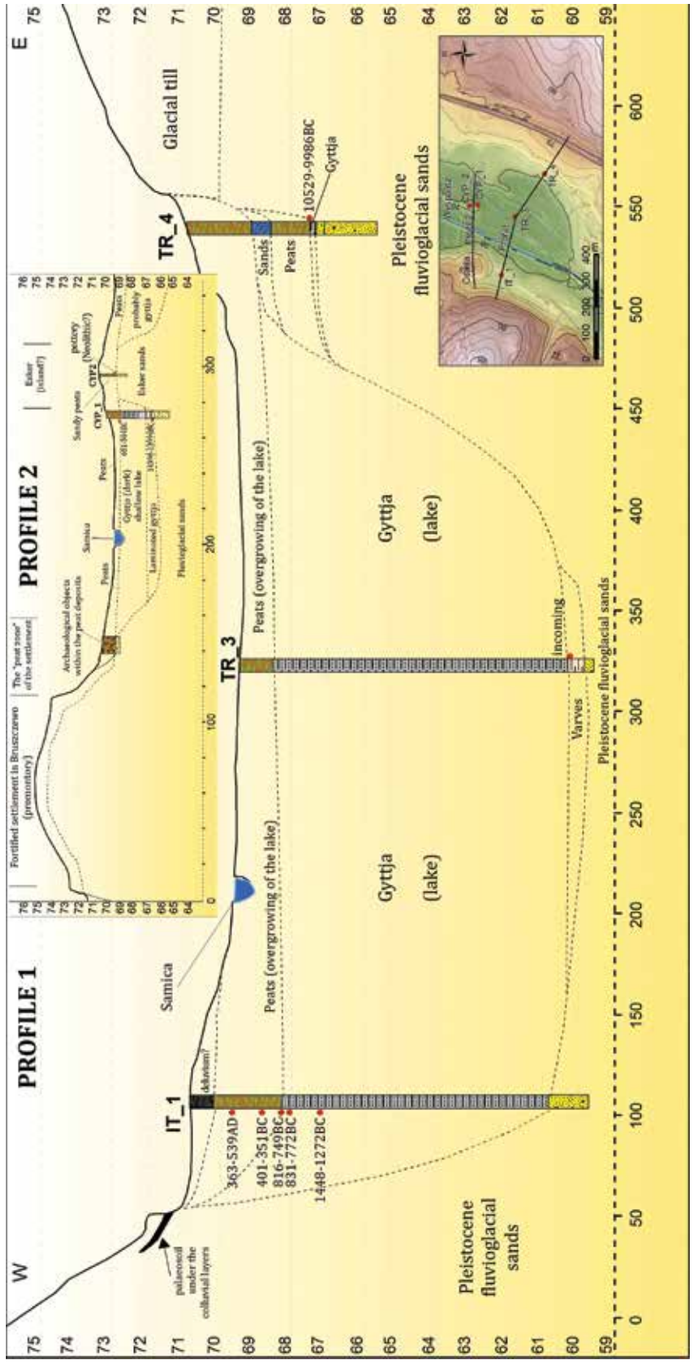


Figure 4. Geological cross section of the Samica Valley with lithology and the initial radiocarbon dates indicated.



Figure 5. Varve sedimentation registered in the TR_3 core in the central part of the basin.

However, the vibra-coring in Bruszczewo did provide crucial information about the thickness of marshland and lake deposits in different parts of the valley. Both the western and eastern edges of the floodplain comprise of 2.0 to 2.5 m of peat, which reflects the stages when the lake was becoming overgrown (TR_1 and TR_4 in Figure 4). In the central part of the basin (TR_3), the peat thickness did not exceed 0.5 m, which indicates the gradual diminishing of the former reservoir towards its centre (Figure 4). Directly beneath the organic sediments, a series of gyttjas were encountered in every core, representing the freshwater lake stage of landscape development. Surprisingly, the thickest gyttja deposits were registered in the western part of the basin (TR_1), reaching a depth of 9.5 m below ground level (b.g.l.). A slightly shallower gyttja deposit was encountered in the central part of the basin (TR_3), were it reached 9.3 m b.g.l. In this particular core (TR_3), the gyttja was deposited over clearly laminated varve sediments dating to the Late Pleistocene (Figure 5). Underneath this unit, the well sorted, yellowish Pleistocene sands of a tunnel valley were reported at a depth of 10 m b.g.l. The basin's profile therefore reflects a typical U-shaped tunnel valley – a remnant morphological feature of the Pleistocene age (Figure 4).



Figure 6. The Instorf corer.
Section 4.0 to 4.5m b.g.l. of the IT_1 core.

An additional core (CYP_1) was performed in the slightly sloping part of the esker's southern margin (Figure 4). A series of peat, gyttja, and sand layers was registered throughout the core, indicating a changing environment from shoreline to a deep-water conditions and dry land (island) episodes.

The cross-section of the basin constructed on the basis of the vibra-coring results provided important information for archaeological discussion (Figure 4). First, the thickness of lake deposits was much greater than previously thought. Earlier research was focused mostly on the Bronze Age phase of landscape development and therefore the archived cores for the northern context of the settlement reached a depth of only 5.5 m b.g.l. The newest data suggest that the lake bottom in the very southern proximity of the fortified settlement (ca. 70 m) had a significantly steep inclination. Thus, it might be interpreted that the settlement was not accessible through a shallow lake, but rather deep water, and was approachable only by boat from the south, east, and north. The inclination of the lake bottom was not identical on the opposite, eastern side. Despite the fact that the drilling was conducted at nearly identical elevations, the gyttja sediments did not reach greater depths.

Another interesting observation stems from the comparison of the archive excavation data and the drilling on the esker. During the EBA, when the promontory was turned into a fortified settlement, its eastern foothill was also occupied. Several houses were identified in the so-called "peat zone" (Müller et al., 2010) at an elevation of approximately 69.5 m a.s.l. When confronting this information with the highest modern peak of the esker, located approximately 150 m to the east, its elevation exceeds 70.5 m a.s.l. - at least one meter above the housing structures (Figure 4). This comparison indicates that there is a strong possibility that there could have in fact been an island during the EBA – which is a game changing perspective in terms of archaeology. Such an interpretation, however, requires further investigation regarding the CYP_1 core and its dating. Additionally, a magnetometric prospection is planned for the surface of the esker to search for prehistoric human activity in this zone.

How to reveal the landscape history and human impact?

The TR_1 core was supposed to be used as an indicator of landscape changes and human influence reconstruction. Its depth exceeding 9.5 m b.g.l. promised an optimal chronological timeframe for the reconstruction since the Early Holocene. Also, its position near the promontory suggested that it should contain suitable materials for dating (e.g., terrestrial plant remains, charcoal, or artefacts). However, due to the high saturation of gyttja sediments between 4 and 7 m b.g.l., the obtained core was affected by an extreme degree of compaction (over 50%) during vibra-coring and thus conventional coring was also performed using the Instorf corer (Figure 6).

This method provided optimal results, as the cores were undisturbed and no compaction was reported during the extraction. To reconstruct the palaeoenvironmental, first the sampling stage had to be performed. As the project aims to obtain a detailed chronological timeframe, it was decided to sample the IT_1 core by each 1 cm segment, thus providing the four datasets described in the following paragraphs for analysis.

1. Sedimentological analysis – what can the sediments tell us?

To reconstruct the sedimentary environment, it is necessary to know the physical parameters, structure, and texture of deposits (Racinowski et al., 2001). This is done by macroscopic observation of sediments and grain-size analysis. Both sieving samples and submitting them for laser diffraction analysis allows the environment in which the material was deposited to be defined. Also, the analysis of basic geochemical compounds provides additional identification of sediments. In the scope of this analysis, it appears that there are two main lithological units within the IT_1 core. The sections from the ground surface to 2.5.m b.g.l. comprise highly organic peats that represent the marshland that formerly occupied the valley bottom. Below lies a thick layer of gyttja that marks the stage when a lake dominated the area. The border between peat and gyttja at 2.5 m b.g.l. was preliminarily radiocarbon dated to c. 900 to 800 BC (in archaeological terms, this is the transition between the LBA and EIA). Within the gyttja, at least two levels of more organic sediments were identified that inform about eutrophication due to possible human activity in the area. An ongoing, detailed sedimentological study is oriented towards precise recognition of sedimentary environments. For instance, it will be possible to identify phases of pulsating deposition like influxes of material from adjacent streams or during episodes of slope instability.

2. Geochemical analysis – lead in the water?

As the archaeological evidence points to the presence of different economic practices during prehistory and early historic times, samples were also submitted for geochemical analysis of elements within the sediments. By tracing the presence of particular chemical elements, it is possible to detect, for instance, metallurgical activities – especially those connected with bronze smelting or iron processing (e.g., Cortizas et al., 2016). Also, the measurements of phosphate allows points in time when human were present in the surroundings of the lake to be identified (e.g., Zlateva et al., 2018). In addition, the identification of various elements might shed light on eutrophication stages of lake development, thus supporting the results of other analyses.

3. Palynological analysis – forested or deforested landscape?

One of the most crucial elements when reconstructing past landscapes is to reveal the vegetation history (Moore et al., 1991). This is done through palynological analysis, which is based on identifying and counting the pollen and palynomorphs of trees and other plants deposited in aquatic environments and embedded in their sediments. Such a study was previously performed in the area of Bruszczewo (Haas & Wahlmüller, 2010); however, it was mostly oriented towards the recognition of the EBA phase of the settlement. The current approach aims to improve the previous reconstruction by providing a more detailed timeframe for the analysis by, for example, obtaining a high number of radiocarbon dates and also focusing on other habitation periods. The most important research questions in this matter are related to human presence/absence or, in other terms - landscape degradation/regeneration patterns. By investigating the consequent stages of vegetation composition in an area, it is possible to relate them to human activity and changing subsistence strategies – for instance: how did the EBA fortifications influence the woodland composition in the area? How fast did the vegetation recover after the abandonment of the site? Did the LBA/EIA habitation influence the landscape through ritual and funerary activities? Are there any traces of human habitation during the Migration Period in the pollen record? Is there any evidence for birch regression during the EM period when tar production took place in Bruszczewo? Or do we see any traces of Prince Mieszko the First, when he raided the area to subjugate the pagan tribes?

4. Diatom studies – plankton in Bruszczewo Lake?

Another part of this ongoing research is diatom studies of the specimens extracted from core samples. Especially important in this matter are the gyttja sediments that comprise vast numbers of the remains of these microorganisms. By identifying particular diatom species, it is possible to reconstruct the water conditions of a lake. Fundamental in this matter are questions concerning the fluctuation of the lake's water table over time, fresh water influxes or stagnating water conditions, and the eventual pollution of the lake. Addressing these issues might explain the hydrological environment that accompanied human habitation in particular stages – were the lake waters drinkable or did the rise of the water table force humans to abandon the site?

5. Macrobotanical remains identification – what do we need seeds for?

All of the above-mentioned analyses would tell us nothing if they were not embedded in a timescale. The most precise method of dating is to use radiocarbon AMS dating of organic remains from terrestrial and wetland plants (e.g., seeds, fruits, buds, cones, leaves etc.). However, not all plant material is suitable for such a procedure including, for instance, remains of aquatic (submerged) plants. Their age is often affected by the so-called "reservoir effect", in which the living organism absorbs "old" carbon dissolved in aquatic environments (Philippsen, 2013). Such a dating result might be overaged even at a millennial scale.

On the basis of the identified plant macroremains, radiocarbon dating is being performed, while the results are calibrated and furtherly processed into the "age-depth" model (Bronk Ramsey, 2008). The latter provides information about the sedimentation rate along the core and therefore allows the result of a particular analysis to be situated within a timescale.

What do we get at the end?

The first results of the Bruszczewo Lake project reveal great potential for reconstructing landscape changes. The project's activities performed to date have provided new data about the landforms in the area and their parameters, new landscape features, and perspectives for further palaeoenvironmental investigations that are already underway.

A newly discovered island that supposedly accompanied the fortified settlement may bring us to search for new habitation structures dating to the EBA or other periods. This could force researchers to reinterpret the defensive aspect of the landscape in Bruszczewo (Figure 7). Also, for the first time a geological cross-section of the valley was constructed and allowed the slope of the lake bottom near the site to be defined, thus further supporting the usage of the lake as a defensive feature. The gradual diminishing of the lake and it's dating already influence our knowledge of the Lusitian Urnfield culture's cemetery and ritual space, which in light of current data were surrounded by marshes and wetlands rather than an extensive lake. Dating of the upper parts of peat also suggest the presence of marshland in the EM, a period not identified in previous research.

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Figure 7. A view on the Samica Valley from the western slopes. The promontory on which the EBA fortified settlement was established is visible on the left side of the photograph.

The most important and still ongoing research is the multiproxy palaeoenvironmental reconstruction (in terms of vegetation history, hydrological parameters, and geochemistry) of this area, which aims to provide detailed and chronologically precise information about landscape changes. All these data will be confronted with the extensive archaeological knowledge of the Bruszczewo microregion. The final goal of this project is to recreate the complex, multi-aspect settlement history of this important part of Central-Eastern Europe.

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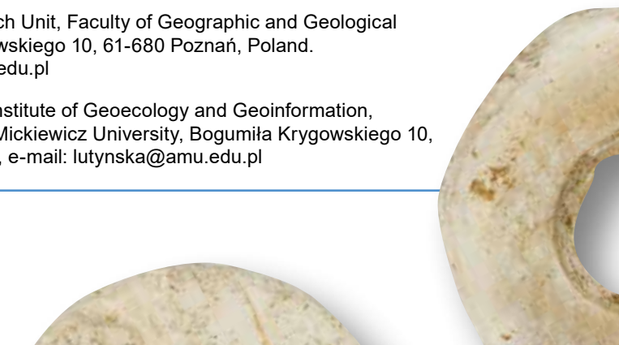
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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From clay you are

Rafał Koliński

Abstract

The people of Mesopotamia believed that they were created by the gods to serve the gods: to work for them in the fields and care for the herds of animals that, through sacrifice, provided the gods' livelihood. Perhaps this is why mythological motifs are almost absent in the art of Assyria and Babylon. Two small fragments of stone decorated with a convex relief, discovered in 2013 by the archeological team of the Institute of Prehistory at the entrance to the Gūndk cave in Iraqi Kurdistan, belie this claim. They come from a relief scene originally hewn into the rock-face around 2200 BC, but blown up by vandals in the 1990s. Thanks to this recent discovery by the team carrying out the Upper Greater Zab Archaeological Reconnaissance Project in Iraqi Kurdistan and previous drawings of the relief made in 1850 and 1947, it can be proven that the scene showed the god Enki and the goddess Ninmah in the process of molding people out of clay, as described in Mesopotamian myths. Saved for posterity by archaeologists from Poznań, the fragments of the damaged relief are the only known examples of this unique scene.

Keywords: Mesopotamia, Early Bronze Age, Mesopotamian art, Mesopotamian mythology

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Panel 1

Panel 3

Panel 2

Figure 1. UC 006 cave seen from the south-east.
On the left the place of reliefs is marked (Photo: Dariusz Piasecki).

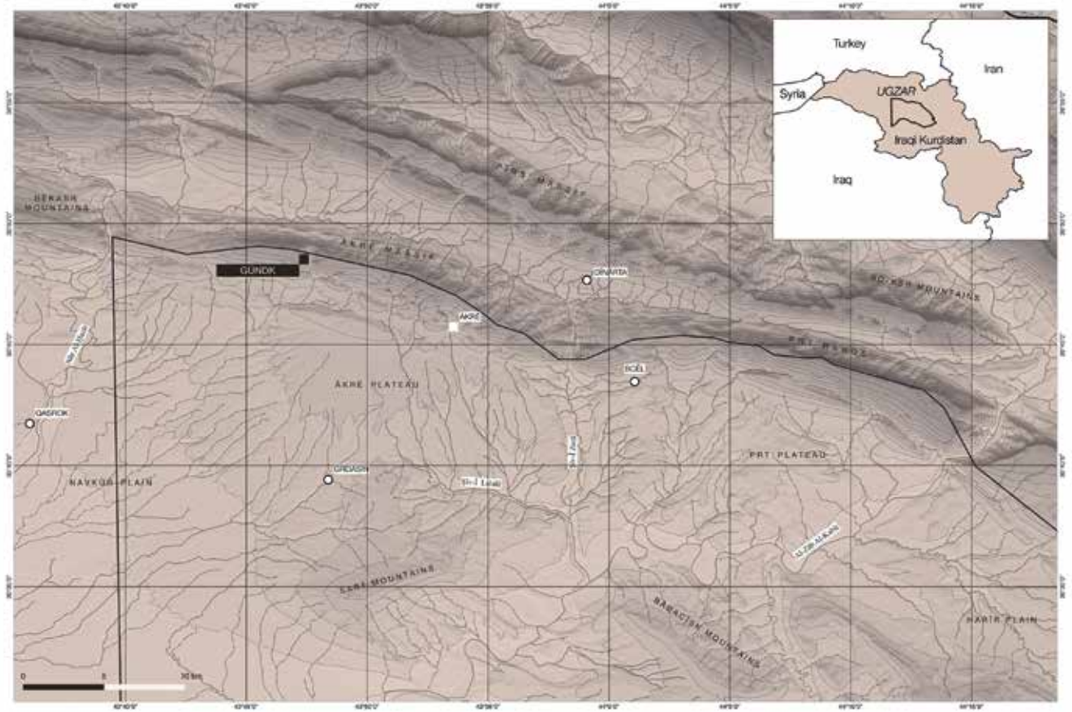
Introduction

The creation of the world and people by a god or gods is a key moment in any cosmology and is the starting point for further stories of shared history. In Mesopotamia, this task fell to Enki and Ningal, who molded people out of clay mixed with blood of a slain deity-genius to endow man with an immortal soul. The cause of the act of creation was essential: the Mesopotamian pantheon, despite its immortality and omnipotence, had to grow crops and herd animals in order to have something to eat. Faced with a rebellion of gods who found such a life of toil unbearable, Enki promised to create beings – humans – that would relieve them of their daily duties, allowing the immortals to enjoy their lives and sustain themselves through sacrifices made in their temples. This act defined the relationship between gods and people forever; the purpose of human existence was to serve the gods under the supervision of a rule, or "shepherd" appointed for this purpose.

It is astonishing that neither this act of creation, nor the majority of other myths are portrayed in Mesopotamian art. Works of art focus primarily on illustrating the relations of kings and gods (showing sacrifices, prayers, kings receiving the insignia of power from gods, or building and consecrating temples) or the splendor of a ruler (throning, hunting, or gaining military triumphs). Only in the Akkadian period (approx. 2330-2150 BC) were some myths illustrated (e.g. about Etana and his journey to heaven, punishing rebelling geniuses, or about the god Shamash/the Sun rising over the mountains), though not in monumental art, but rather on cylinder seals (Otto, 2019, p. 426).

In the years 2012-2017, archaeologists from the Adam Mickiewicz University conducted the Upper Greater Zab Archaeoelogical Project, an archaeological survey in Iraqi Kurdistan. The aim of the project was to make an inventory of archaeological sites and other cultural heritage monuments in an area of 3,058 km^2, located north and northwest of Erbil, on both sides of the Greater Zab River. During the survey 313 archaeological sites and 78 other monuments (architectural objects and cemeteries) were documented, increasing the number of known monuments in the study area more than fourfold.

The most interesting and unexpected discovery, however, was the finding of two stone fragments with relief decorations covering one face. We made this discovery in August 2013 near the village of Gūndk, situated in a valley approximately 20 km west of the village of Ākrê, in the mountains of the same name (Figure 2). As it turned out, both fragments belonged to one of three relief panels carved into the rocky slope of the mountain at the entrance to a large rock shelter and cave (Figure 1). We later learned that in 1994 (Reade & Anderson, 2013, p. 82) or 1996 (Koliński, 2016, p. 168) "treasure hunters" placed explosives under one of the reliefs in the hope that it marked a place where treasure was hidden. The explosion completely destroyed the depiction and seriously damaged the second relief above it, causing irreparable harm to two of the three oldest rock reliefs known in Mesopotamia. The losses are all the greater because the reliefs themselves had been relatively poorly researched due to their location in a part of Iraq which, since the 1960s, has been shaken by a series of Kurdish uprisings against the government in Baghdad.



I Figure 2. Location of the UGZAR study area and of Gundk Cave (Map by Joanna Mardas).

The earliest mention of the reliefs in Gūndk was made by the Reverend George Badger, who in April 1850 went to visit the Nestorian bishop Avraham residing in the Mār Āudi'šīo monastery west of the village. After spending the night in the monastery, one of the priests took him to a nearby cave, called "Guppa Mar Yohanan", and showed him two reliefs carved into the rock (Badger, 1852, vol. I, p. 390). Upon his return to Mosul, Badger mentioned them to the discoverer of the Assyrian palace in Nimrud, Henry Austen Layard, who subsequently visited the site on July 15, 1850. He was accompanied by his draftsman, F. Cooper, who made the sketches and then the drawings of the reliefs that Layard included together with their description in one of his books (Layard, 1853, pp. 368-369). The published drawing is quite schematic, but it seems to be faithful to the character of both scenes. The upper relief (now partially damaged) showed a man hunting a wild goat. The lower one shows two people sitting on opposite sides of a semicircular object, on which two smaller human figures stand, supported by the larger

figures. On the left you can see two standing figures, the first of which holds a child in its hands. On the right you can see a standing man with his arms raised, and at the edge there are two figures killing an animal placed between them (Figure 3). Layard considered both reliefs to be Assyrian monuments (although Badger, while not a professional, noticed the differences between the depictions discussed and the orthostats discovered by Layard in the palace in Nimrud), and he found the lower scene reminiscent of the ritual of baptism (perhaps due to the fact that the cave was dedicated to John the Baptist).

Another researcher who came to Gūndk to document the reliefs was Walther Bachmann. His visit in May 1914 took place in dramatic circumstances, because his visit took place just after the Kurdish nomads invaded the village. For this reason, he limited himself to photographing the reliefs and inspecting them with a telescope. He used the photo, unfortunately of poor quality, as the basis for a drawing showing both scenes. Bachmann concluded that the lower relief depicted a feast during which an animal, shown being hunted in the upper relief, was consumed. However, he was unable to recognise either the child held in arms of the second figure from the right, nor the small figures between the seated persons, and considered the right side of the scene to be completely unreadable. Unlike Layard, Bachmann ruled out an Assyrian date for the monuments based on the archaic style of representations: in his opinion this could indicate that they were either clearly older or made by unskilled craftsmen (Bachmann, 1927, pp. 28-31).

The goal of correctly documenting the three reliefs (in the meantime a third relief was discovered inside the cave) was set by an Iraqi team consisting of archaeologists Akram Shukri and Mahmud al-Amin and the photographer Antran Manookian. During their visit in October 1947, new photographs of all the reliefs were taken, on the basis of which another series of drawings was created and published by al-Amin in an article from 1948 (al-Amin, 1948). Unfortunately, the poor print quality made the photos barely legible; only the drawings can be reliably referenced. In the lower relief, the central and right parts very clearly resemble the drawing by Cooper, with three differences: 1) the person standing behind the back of the man sitting on the right holds a basket on his head, 2) the scene at the right end of the depiction is illegible, and 3) all of the figures are less regular, which probably more closely reflects the nature of the monument itself. The author's interpretation, written in Arabic, is difficult to access – only Ahmed Kozad in his doctoral dissertation (2012) published what is clearly a summary of the text of al-Amin, in whose opinion the scene shows the bathing of children. The original dating remained unclear, though al-Amin suggested similarities to the Hittite reliefs at Yazilikaya, Turkey, from the 13th century BC. Curiously, although published in the same volume of the same journal and using the same illustrations as al-Almin, a text by Tawfik Wahbi refers rather to Bachmann's interpretation: the scene is said to represent a feast wherein an animal hunted in the relief above was served as the main course (Wahby, 1948, p. 148). In turn, the author of the entry "Gundük" published in 1971 in Reallexikon der Assyriologie sees a ruler sitting on his throne in this scene and points to a very distant analogy with the Elamite relief from Malamir in Iran (Calmayer, 1971).

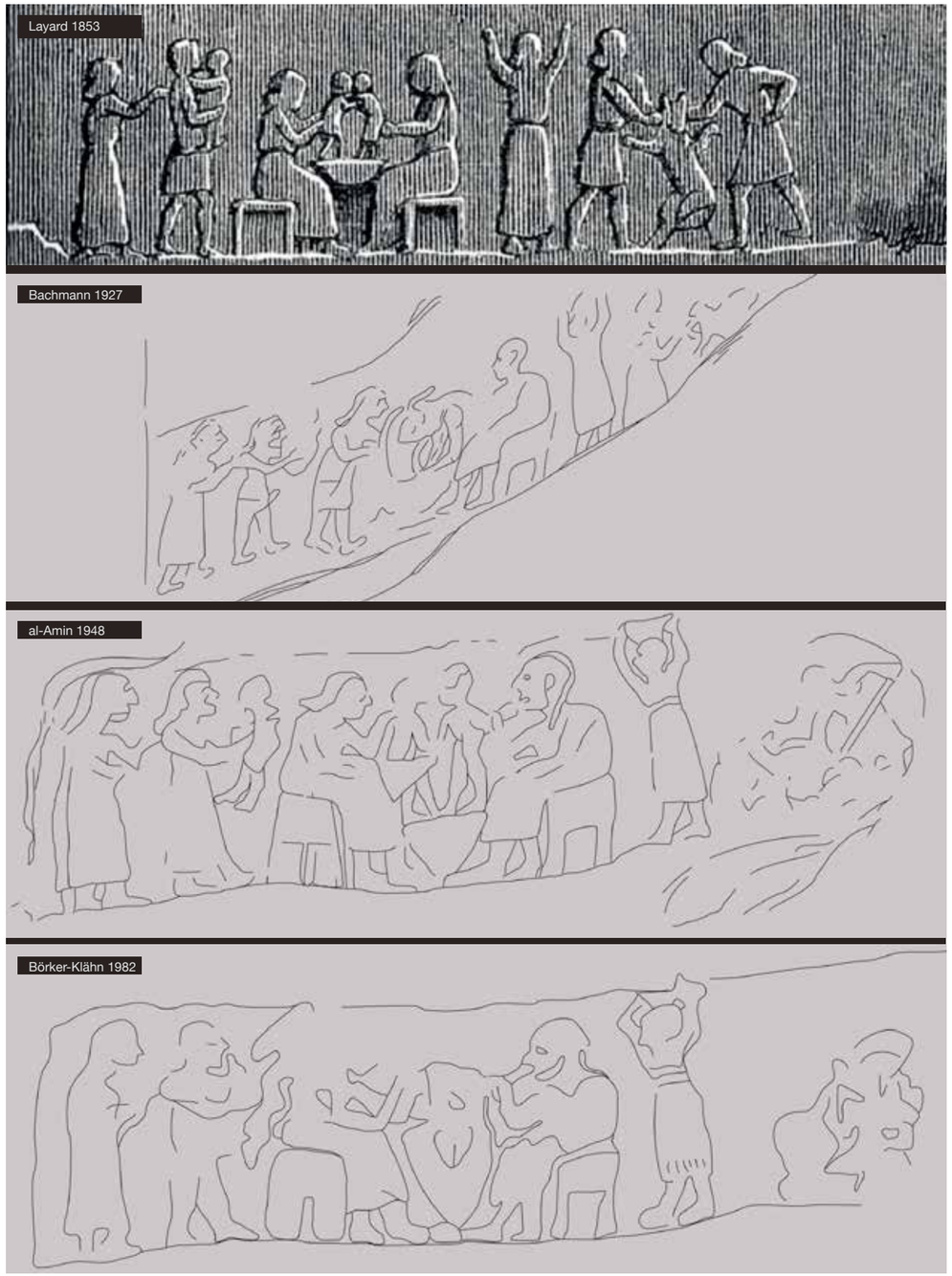


Figure 3. A drawing and copies of drawings showing different interpretations of the scene on the destroyed Panel 2. From the top F. Cooper, W. Bachmann, M. al-Amin, J. Börker-Klähn (Copies by Xenia Kolińska).

Panel 3

Panel 1

Panel 2

Figure 4. View of the western wall of the UC 006 cave. The left photo shows the position of the reliefs, and on the right the preserved fragment of Panel 1. Below is a reconstruction of the discovered Fragment B and a photo of the preserved Panel 3.
(Photos by Dariusz Piasecki, drawing by Xenia Kolińska based on the original published by al-Amin).



Panel 1



Panel 2. Central scene



Panel 3

Colour photos taken by Reiner Boehmer in his visit to the cave in 1978 were, it seems, the basis of a new set of drawings created by Jutta Börker-Klähn and published in her book on Mesopotamian relief steles and rock reliefs. (Börker-Klähn, 1982, pp. 75-76, 174-176, 234). In her opinion, the relief depicted a banquet scene known from other types of Mesopotamian art: in particular votive plaques and scenes on cylinder seals showing two people sitting on chairs and drinking beer from a jug standing between them with the help of straws. Börker-Klähn placed it among undated monuments, but expressed the opinion that it was probably created in the third millennium BC. Julian Reade and Julie Anderson, who visited Gūndk on June 27, 2009, concluded that the panel we are interested in no longer exists (Reade & Anderson, 2013, pp. 81-82). In a study of the contents of the panel, they argued for its interpretation as a banquet scene and for a date of creation between 2700 and 2300 BC (Reade & Anderson, 2013, pp. 84, 86-88, 94).

When members of the UGZAR mission first visited Gundk on August 28, 2013 they found two of the three reliefs irrevocably destroyed (Read and Anderson's publication of 2013 was not known to the team members at the time). On the same day, while routinely searching the slope below the cave for ceramics, two relief-decorated rock fragments were found that must have belonged to the damaged panels (Figure 4). Despite subsequent visits to Gūndk in 2013, 2015 and 2017, the purpose of which, apart from documenting the surviving reliefs and the cave itself, was to search for more relief fragments, no others were found.

Fragment A (Figure 5), the smaller of the two, shows part of the silhouette of a standing human figure dressed in a robe decorated with a vertical stripe filled with diagonal lines. These lines seem to reflect a hem or fringe decorating the robe's edge. Judging by the curvature of the edge separating the figure from the background, it must be a standing human figure, and more precisely a part of his or her back. There are three standing people known from the previous documentation of the reliefs: two on the left and one on the right of the sitting couple in the center of the presentation. All the drawings of the relief show that the figure on the right with the basket on its head is wearing a skirt that only reaches the waist, an outfit that is never decorated with a fringe or hem. Likewise, the person on the left standing directly behind the seated one in most of the pictures wears a short robe. So by elimination it appears that Fragment A contains part of the last figure standing in the far left part of the scene.

Fragment B (Figure 6) is bigger and more interesting. It shows a semicircular object with its flat part facing up. There are two people standing facing each other on this flattened part. The person on the right is preserved as two legs visible to the knees, while the figure on the left is preserved as one leg. To the right of the semicircular object, an outline of the lower part of the figure of a sitting person in a robe decorated with a stripe adorning its edge is apparent – a foot and a leg to the knee are preserved. To the left of the semicircular object you can see the outline of the leg and foot of the second seated figure. There is no doubt that the fragment comes from the central part of the original scene which shows two people sitting on stools facing each other.

The discovered fragments are of great importance, as they allow investigation of what kind of scene is depicted in the relief, evaluation of previous documentation, and attempts at new interpretations (Figure 7). Fragment B clearly indicates that of the four known drawings, only those



Figure 5. Fragment A of Panel 2
(Photo: Dariusz Piasecki).

of Cooper and al-Amin reflect the true meaning of the scene. Of these two, Cooper's drawing seems to be more artistic and less accurate, though it importantly shows the left part of the scene illegible in later documentation. Thus, al-Amin's drawing seems to be the most faithful and was used to determine the original location of the fragments found by the archaeologists from Poznań. Furthermore, Fragment B clarifies beyond any doubt that the scene shown is not one of a banquet. The theme of bathing children, proposed by Layard and al-Amin, should also be rejected because such a scene neither appears in Mesopotamian art nor has any particular significance in its culture.

What then was presented by the creators of the relief? A significant clue is the presence of a person with a basket on his head. This motif appears in Mesopotamian art in the Early Dynastic III period (c. 2600-2350 BC) and in the period of the Third Dynasty of Ur (2104-2002 BC) in the context of monuments related to the construction of temples (building stelae and foundation figurines). The depiction of a king carrying a basket filled with clay is a symbolic synthesis of the construction process; the clay is used to form bricks which, after drying, will become the walls of the structure. In the case of the Gūndk relief, the basket can therefore be argued to depict the transportation of clay. Another important clue is the inclusion of children, something extremely rare in Mesopotamian art. The only known aspect of the culture of Mesopotamia that connects these two elements is the myth of the creation of mankind. As mentioned above, it played a very important role in defining the relationship between humans and gods. However, the actual work of creation is mentioned in the texts only briefly.

While the earliest record of this myth comes from Sumerian and Akkadian texts written in the second millennium BC, they most plausibly reflect an older tradition, namely of the 3rd millennium BC. (Lisman, 2013, pp. 175-181, 183-186, 194-195). In the Sumerian myth of Enki and Ninmah, Enki is inspired the idea of his mother, Namma, how to free the pantheon from frustrating duties by dumping the burden of work on newly created beings. In the act of creation itself, he is accompanied by the goddess Namma and assisted by the goddess Ninmah, who decides the fate of mankind:

Enki (…) said to his mother Namma: My mother, the creature you planned will really come into existence. (…) You should knead clay from the top of the abzu; the birth-goddesses (?) will nip off the clay and you shall bring the form into existence. Let Ninmaḫ act as your assistant; and let Ninimma, Šu-zi-ana, Ninmada, Ninbarag, Ninmug, […] and Ninguna stand by as you give birth. My mother, after you have decreed his fate, let Ninmaḫ impose on him the work (…).[1]

A different version of the creation of mankind, being molded from clay in the form of bricks, we find in The song of the hoe:

He (Enlil) set this very hoe to work; he had it place the first model of mankind in the brick mould.[2]

[1] Enki and Ninmah Myth (ll. 28-37). Transl. Jeremy Black, https://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.1.1.2#
[2] The Song of the Hoe (ll. 19-20). Transl. Jeremy Black, https://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.5.5.4#



Figure 6. Fragment B Panel 2
(Photo: Dariusz Piasecki).

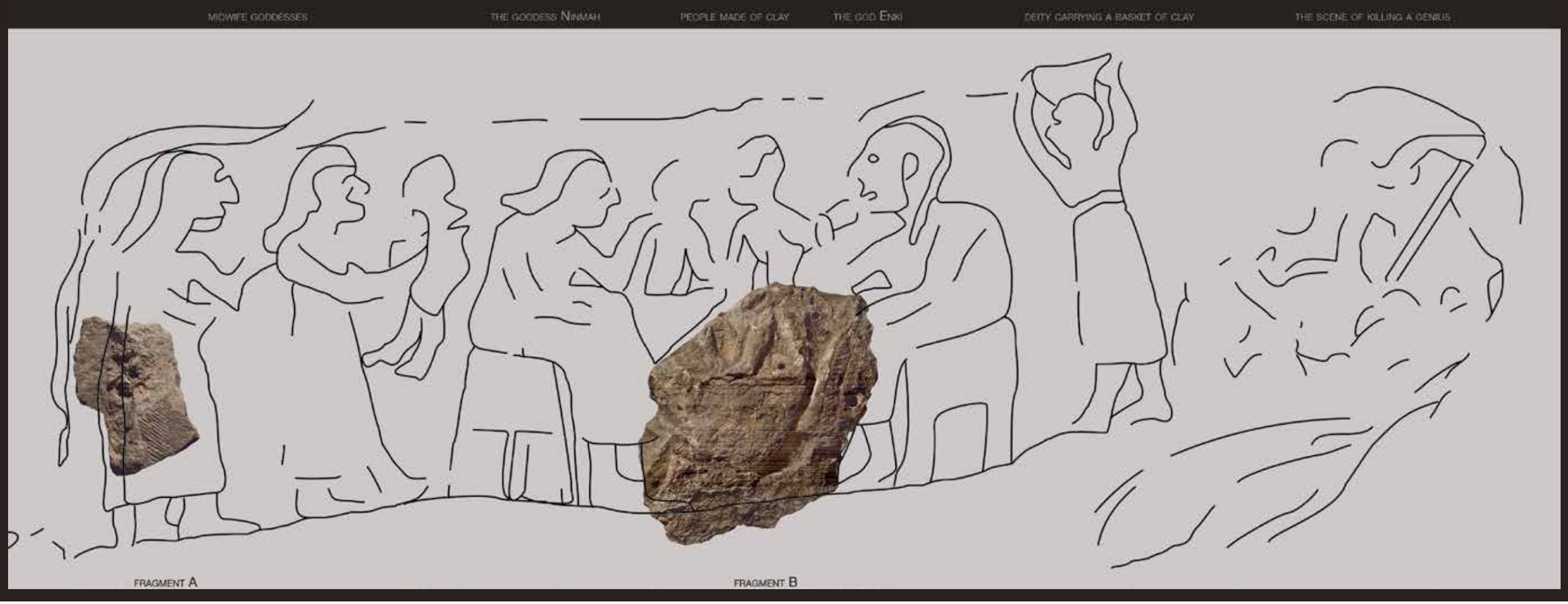


Figure 7. Reconstruction of the position of the found relief fragments with the drawing of Panel 2 by al-Amin (Drawing by Xenia Kolińska, interpretation by Rafał Koliński, photos by D. Piasecki).

The Akkadian poem Atra-hasis, whose main thread is the story of the Flood, earlier describes the rebellion of the gods and the creation of people with the following words:

> *Midwife Bēlet-ilī, wise Mamma, you are the mother goddess, creatress of destiny: create human-kind to carry the yoke (…). Mamma opened her mouth (…): Though the power to do it indeed is mine, the way it is done is the business of Ea (…) let him give me clay that I may do it. Ea opened his mouth (…): (…) Let one god be slaughtered and the gods will be thereby cleansed. With his flesh and his blood let Bēlet-ilī mix some clay, so that god and man are mixed together in the clay, (…) from the flesh of god let the spirit be produced.*[3]

The above text is a Neo-Babylonian copy of the original from the beginning of the second millennium BC and therefore it gives the late forms of the names of the deities making up man: Ea instead of Enki and Bēlet-ilī or Mamma instead of Ninmah.

These texts agree with each other about one important detail: the material from which people were formed was clay. The Sumerian version does not mention any other ingredients, while in the Akkadian myths the element of the blood of a killed god or genius appears. This change is significant as in even later sources like *Enuma elish* or *The Creation of Humanity*, humanity is created from the blood and flesh of a slain god: specifically Kingu and Alla-gods (Spar, 2009) respectively.

The destroyed relief is undoubtedly a faithful portrayal of the most important episodes related to the act of human creation. The narrative of the events can be followed from right to left, with the climax in the center of the scene. On the right, we see the preparation of the necessary “raw materials”. At the very edge, if we are to believe Layard, we see the scene of the killing of an animal. Although according to later versions of the myth it should be a deity or genius, this slaughter can be connected to the idea that blood must be added to the clay so that people would receive an immortal soul. Then we see a man carrying a basket of clay on his head – the main material used to create humanity. The central scene shows a male person seated on the right, a female deity seated on the left, facing the former. On an object placed between them resembling a slow wheel for throwing pottery, we see the silhouettes of two just formed people, much smaller that the other depicted persons. The two people on the left, behind the seated female, are possibly divine nurses, assisting in the process of creation, just like in childbirth. The one closer to the seated pair holds another human being in her hands, the formation of which has just been completed. The depiction of three smaller figures, two

[3] Atra-hasis Myth (tablet II, ll. 76-98), George & al-Rawi, 1996, p. 171.

between the creator gods and the third one in the hands of a nurse, emphasises the fact that the scene described is not a single creative act, but the process of creating the entire human species. If my interpretation is right, then the seated persons may be identified as Enki and either Namma or Ningal, the protagonists of the creation myth.

The fragments found allow not only a new interpretation of the monument, but also enable its more precise dating. The previously identified iconographic motif with a man carrying a basket with clay on his head cannot be helpful here because it is used in art in various subperiods of the second half of the third millennium BC. Much more precise dating is possible thanks to the identification of the relief's subject matter as referring to mythology. As mentioned earlier, depictions devoted to mythology appear exclusively in the Akkadian period (c. 2330-2150 BC cf. Otto, 2019, p. 426). Furthermore, garments with hems are also Akkadian innovations. In monumental art, this type of robe first appears on a statue of the Akkadian king Manishtusu found at Susa (SB47, Louvre Museum, c. 2270-2255 BC). We also see similarly dressed dignitaries on some Akkadian seals, such as the Scribe's Seal from Tell Brak (Felli, 2001) and the cylinder seal of the scribe Kalki (BM 89 137, The British Museum). Without exception, on earlier monuments of sculpture and glyptics, the dignitaries wear long skirts of fur (*kaunakes*), typical of the Early Dynastic Period and still present on the monuments of the first Akkadian ruler, Sargon. Consequently, I have no doubts that the relief in question must come from a later part of the Akkadian period. The same date can be argued forthe third, undamaged relief (R. Koliński, Gūnduk: the oldest rock reliefs in Mesopotamia. Talk presented at *Past has the future* conference at the University of Warsaw, 24 April 2021). Consequently, it must be considered that the Gündk reliefs were created approximately between 2250 and 2150 BC. Although slightly later than Reade and Börker-Klähn believed, they remain the oldest known examples of rock reliefs from Mesopotamia.

The discovered fragments allow for one important observation: as mentioned above, the garments depicted are hemmed. Neither the photos taken (including those taken by Dariusz Piasecki from our team), nor the most careful examination of the reliefs through a telescope or binoculars allowed all the details of the representations to be appreciated; none of the previous drawings or descriptions mention the presence of hems. This observation highlights the pressing need to fully register the preserved reliefs with detailed photographic documentation, 3D scans and latex impressions to enable their reconstruction should they be damaged. Admittedly, this will not be an easy task as the preserved reliefs are located at a height of 7 and 12 meters above the ground respectively.

If the interpretation of the relief in Gūndk proposed here is correct, it is a monument of exceptional importance both for the history of art and the history of Mesopotamian religion. Nowhere else do we find a similar scene of such cardinal importance for the illustration of the worldview of the ancient inhabitants of this land and the values that governed their world. This fact makes it all the greater the pity that the act of vandalism irretrievably destroyed this monument. Two fragments found in 2013 by archaeologists from AMU, currently stored in the archaeological museum in Duhok in Iraqi Kurdistan are the only material evidence of this unique monument. Finding them not only saved the most important fragment of this unique representation, but also allowed a critical review of the existing interpretations of the relief and the proposal of a new explanation of the content of the representation and its meaning.

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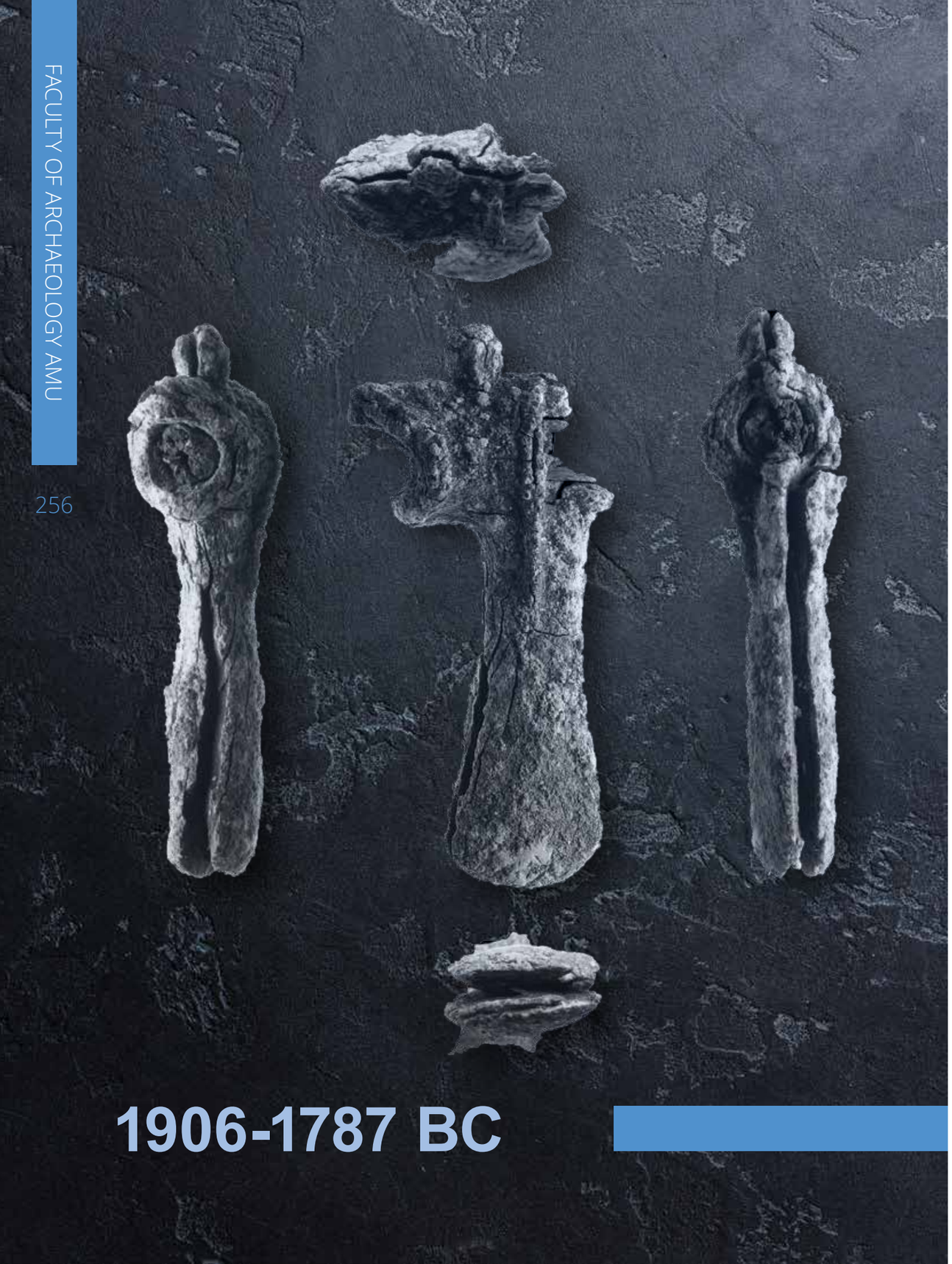
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From the cradle to the grave

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Abstract

From the cradle to the grave, we are accompanied by the concepts of mortality and immortality. We experience the first as humans but ascribe, unknown to us, the state of eternal being to the gods. In various models of the universe, death may mean the end of everything, a new beginning, or a state of waiting to join the ranks of the Immortals. In Mesopotamia, death means Perduring; souls of the dead were confined to Underworld, where they lasted in darkness, suffering thirst and hunger.

At the beginning of the 2nd millennium BC in Mesopotamia the attitude towards the dead is changing significantly. Cult of ancestors and repeated offerings to dead were meant to improve their condition, and, in turn, secure their support to the living. The GP26 chamber tomb discovered at the Tell Arbid site in northeastern Syria in 2009 by archaeologists of the Institute of Prehistory, Adam Mickiewicz University, is a perfect illustration of these changes. The underground chamber tomb built next to the house became the resting place of three generations of its inhabitants, judging from the fact that at least 15 people were buried there successively. Prestigious grave gifts testify to the wealth of the family, and the finds of sacrificial vessels and animal bones illustrate ceremonies performed during the funeral. The tomb was ritually closed by burying the dog in the shaft leading to its chamber. The tomb was avoided being robbed in antiquity, thanks to which archaeologists from the Adam Mickiewicz University could study it and shed light on the beliefs and splendor of the inhabitants of northern Mesopotamia dating back almost 4,000 years.

Keywords: Mesopotamia, Middle Bronze Age, burial customs, chamber graves

When the gods created mankind, for mankind they established death,
life they kept for themselves[1]

Organization of the Universe

The Mesopotamians believed that the Universe was made up of three different spheres: Heaven, Earth, and the Underworld. Only gods can stay in heaven for it is the zone of immortality. The earth below, which can be haunted by gods and spirits, is inhabited by mortal creatures. However, they are of unequal status as death brings the final end only to animals. Man, containing in himself the divine element eṭemmu, is destined for a different fate. This immortal particle leaves the body after death and seeks refuge in the Underworld, accessible through tombs dug into the ground.

Because of this, the most important duty of the Living towards the Dead in Mesopotamia was burial. Proper burial ensures an *eṭemmu* a safe passage to the Underworld and thus prevents it from turning into a malicious spirit that harms the living. The Underworld is inhabited by the spirits of the Dead and gods assigned to this zone. Intruders may enter here, but have no right to leave. Hence, the Sumerians called the underworld Irkalla, the "land of no return". As Jean Bottéro writes, existing in the Underworld appears as a warped reflection of life on Earth: Death puts an end to everything that is good, clear, cheerful, joyful, motivated, reassuring, and happy in our existence (Bottéro, 1980, p. 43). In the Underworld, an *eṭemmu* still lives and feels needs such as thirst and hunger; but in a dry land full of dust, it is not able to satisfy them on its own (Hockmann, 2010, p. 14). Only the Living, by making sacrifices, can keep it satisfied. In this way, images of existence after death made the Dead an integral part of society whose "coexistence" was regulated by a system of rituals. At the same time, the desecration of a grave, and in particular the bones contained in it, was considered one of the worst crimes that could be committed. Not only was the place where sacrifices were made to the ancestors destroyed, but by annihilating the mortal remains, an *eṭemmu* was condemned to eternal torments.

The above rules underwent modification at the end of the third millennium BC after the arrival of the Semitic tribe of the Amorites in Mesopotamia. They brought with them the worship of ancestors and the belief that the shadows of the dead can intercede with the gods for the living, winning their favour. A new and significant element of these beliefs was the desire to maintain the closest possible bond with deceased members of the family. That is why the Amorites reorganised living space in settlements and households: they decided that it was safest and most convenient to locate the grave inside the house or in the yard. Such a location makes it easier to perform rituals improving the existence of the dead in the Underworld (Jacquet, 2012), allows the protection of a grave from destruction, and maintains the aforementioned bond with the ancestors.

The situation of the dead who did not have a guardian or someone who would take care of their existence in Irkalla was dramatic: they peregrinated in the dark of the Underworld, choking on clay and dust. For those who were not buried, an even worse fate awaited – wandering on Earth and feeding on waste. It was believed that a spectre that wanders the world turns into a malicious demon capable of driving people mad and making them sick. Likewise, a spirit whose worship has been neglected could have disastrous effects on the living. Magical formulas served to ward off evil; judging from their content, rituals were addressed to ghosts, including anonymous ones (KAR 227, col. III 8-24 and 27-50; LKA No. 79, translated by Ebeling, 1931, pp. 131-132). The dead who had numerous offspring were in a better position: more people made sacrifices to them and cared for their existence in the afterlife. Only unborn children enjoyed special favours and could function in the afterlife without the support of a living family.

It was therefore common for the living to designate in advance a *pāqidu* - the person responsible for looking after their soul. This function was usually performed by the eldest surviving son, whose duty it was to perform the *kispûm* ritual to ensure an eṭemmu continued. Pāqidu performed libations by pouring out water (*mê nakû*) and saying the name of the deceased (*šuma zakāru*) (Bayliss, 1973, p. 116). The rite seems simple, but it is known from the texts that, as part of the sacrifice, the deceased was also offered water, bread, flour, oil, wine, hot broth, beer flavoured with roasted grains, and honey as well as sometimes goat, sheep, cow, or turtle (!) (Tsukimoto, 1985, pp. 39-42, 55, 59-62).

We believe that, in a moral sense, *kispûm* was a rite that could be performed independently, combined with a feast or funeral feast, or included in magical rituals. The latter include texts LKA 79 and LKA 80, describing the funeral of a "scapegoat" intended as a substitute for a sick man (Tsukimoto, 1980, pp. 129-135), and texts CT 45, 99 describing a *kispûm* ritual performed *ina ṣerim* ("in the steppe") during which a figurine representing a demon was buried (Tsukimoto, 1985, pp. 140-145). Upon burial, sacrifices were made of food (flour, dates, bread, beer, etc.) and gifts in the form of a set of articles of everyday life (bowls, leather goods, etc.) and ornaments (earrings, tiaras, arm rings, bracelets) (Tsukimoto, 1980, pp. 129-135).

How often was *kispûm* performed? Various terms appear in the sources: most often the months of *abu* (literally "father, ancestor") or *ajjaru* (Tsukimoto, 1985, p. 84) are associated with offerings for the dead. It is also known that the ritual was performed on the new moon, as in a certain letter the sender requests from his brother garlic, onions and several kinds of fish and asks: *During the whole year on kispûm, during the new moon days in your father's house, what can I give?* (CT 43, 106) (Tsukimoto, 1985, p. 46). It can therefore be assumed that it was during this time that family members gathered for a ritual meal during which sacrifices were made and advice was sought from the deceased ancestors and deities of the Underworld (Bottéro, 1980, p. 38).

GP26 – family tomb

In the eastern part of the site of Tell Arbid excavations uncovered five residential houses inhabited in the period around 1906-1787 cal BC (Figure 1) (Koliński & Goslar, 2019, Table 2) and

[1] Gilgamesh Epos, tablet X, col. III, ll.3-5. George, 2003, p. 278.

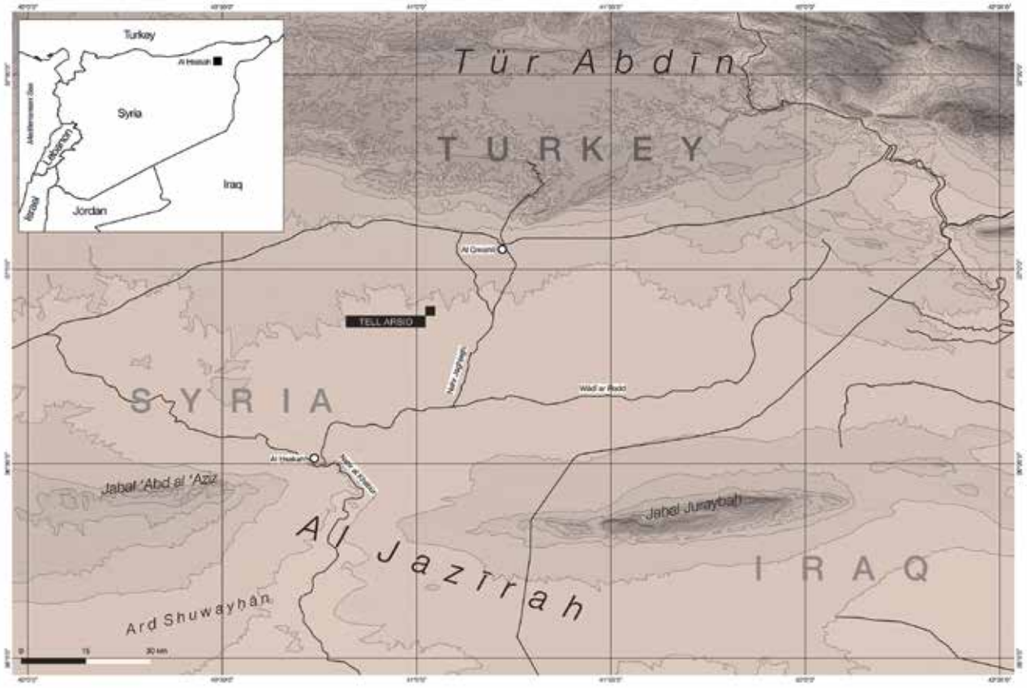


Figure 1. Map of the north-east Syria showing location of Tell Arbid (Map by Joanna Mardas).

related five small cemeteries, which consisted of chamber graves, cist graves, shaft shaft graves, and pit burials. The tomb GP26 stood out: it was the largest, it was ritually closed after the last funeral, and it had avoided being robbed in antiquity.

Tombs of this type, referred to by the Akkadian word *kimaḫḫum* (Jacquet, 2012, p. 125), look impressive after excavation, but we must remember that the chambers were hidden underground and could only be reached through a vertical shaft. Construction began with the excavation of a large cavity oriented on an east-west axis. At its bottom, a burial chamber was built of dried bricks – its construction started with two longer walls over which a barrel vault was erected. Then, one of the shorter sides was closed permanently and the other opening was used as the entrance to the tomb. A shaft was dug to meet this entrance, allowing its use for burials. After each funeral, the entrance was blocked with bricks and the shaft was covered with earth (Figure 3).

A vertical wall was erected above the entrance to the chamber and served several functions (Figure 2). Firstly, it signaled the location of the shaft. Secondly, it prevented earth from falling down in the event that it was necessary to clean the shaft to open the chamber and bury a newly deceased. Finally, because it protruded above the ground, it created a kind of low bench that was a convenient place to sacrifice to the dead. In terms of orientation and

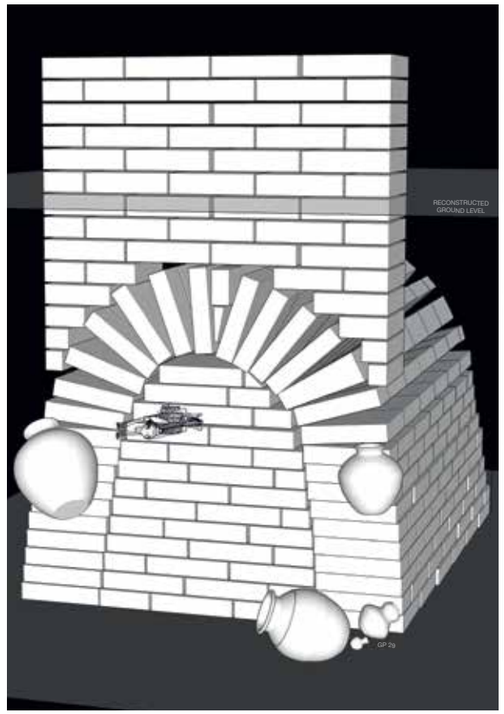


Figure 2. Reconstruction of the tomb and individual phases of the shaft leading to the GP26 chamber (Reconstruction by Maciej K. Morawski).

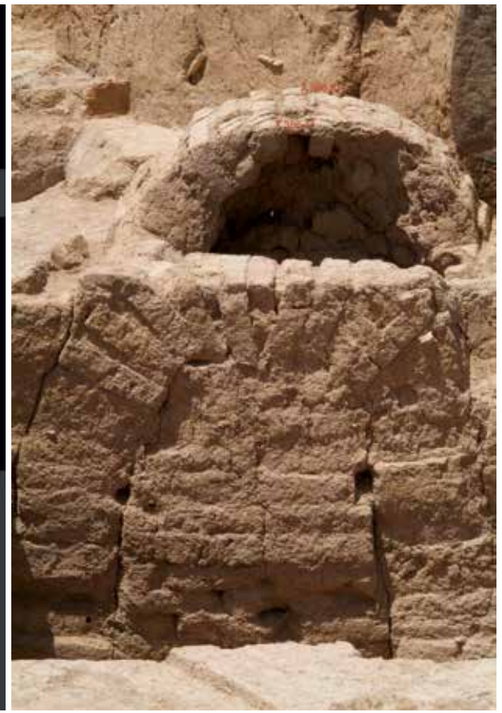


Figure 3. The facade of GP26 after the tomb has been exposed (Photo: Tomasz Tam).

construction, tomb GP26 is similar to all chamber graves in the settlement, with the façade wall and shaft protruding above the ground also observed in some cist graves.

Bones belonging to at least 15 people were found in grave GP26, and an additional burial was placed in the northern corner of the shaft (GP29). The uncertainty as to the number of dead stems from the fact that bodies previously placed in the grave were moved deeper into the chamber to make room for the next corpses. The body was always placed with its head towards the inside of the chamber, its back to the wall, and in a flexed position. In the case of GP26, human bones were mixed with animal bones (presumably sacrificed at funerals) and grave goods. At the time of discovery this complex formed a layer with a thickness of approx. 30 cm. The last buried person was a woman over 40 years old. Earlier, the bodies of three men (one aged 20-25, two with no age determination) and three more women (one aged 35-40, two with no age determination) were placed in the grave, although the poor state of preservation of the bones makes some of the identifications less than certain. In addition, the remains of seven children (aged 7-14, 5, 4, 3, two under 1, and two newborns) were found in the chamber (cf. G7/37/62 in: Sołtysiak & Koliński, 2012, Table 2). The body placed in the shaft belonged to a child about 9 months old at the time of death (cf. G8/37/62 in: Sołtysiak & Koliński, 2012, Table 2). The total of four adult women and three adult men suggests that people belonging to

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Figure 4. A set of vessels found in the burial chamber
(Photo: Marcin Szabłowski).

two or three generations of the same family and their children were found resting in the tomb. Given that graves of this period were family burials, the total of four adult women and three adult men suggest that people found in GP26 belonged to two, maximum three geneartions of the same family.

In the burial chamber GP26, 428 items were found, including 23 metal products, 9 ceramic vessels (Figure 4), one vessel of stone, and 405 beads of various materials (Kolińska, 2017a). Only five of the listed items are related to the last burial: a pin of bronze with a flat head possibly originally fastening a robe across the chest, three beads of carnelian and jade, and a small bronze plate probably placed on the tip of on one of the fingers. Three large storage vessels were placed in the tomb shaft.

The grave – a link in the family bond

The discovery of a group of houses and related cemeteries at the Tell Arbid site, illustrates the change in social ties that resulted from forging new relationships between the living and ancestors as well as the consequences of this phenomenon. For the needs of the community of the Living and the Dead, not only the organisation of the settlement space was changed, but a new type of sepulchral architecture was invented: chamber tombs enabling repeated burial in the same location as death took individual family members (Koliński, 2017). This tomb united the remains of family members in a physical sense, while in a spiritual sense it was the seat of collectively understood ancestors. At the same time, it performed a sacred function; here rites were performed and sacrifices were made supporting ancestral spirits in the Underworld. We know that in the Old Babylonian period, the direct recipient of the *kispûm* was most often the father of the person performing the ritual, whose name was mentioned during the ritual – but the cult secured the existence of all deceased relatives as well, including those whose presence in the memory of the living had faded over time (Tsukimoto, 1985, pp. 163-183).

The *kispûm* ritual served to provide both the livelihood of the ancestral spirits and their favour towards the living. However, ritual activity in and around the tomb was not limited to *kispûm*. The tomb was also the setting in which the climax of the funeral took place. Finally, when it stopped being used, it could either be ritually closed or the remains of the burials could be removed from the chamber and taken to the family's new home where they were re-interred.

Rituals of passage

The body of the deceased, posed a kind of threat to the living – it could spread impurity. Because of this, it was of utmost importance that the dead quickly received a proper burial and the whole place could be cleansed. Thus, the funeral usually took place the day after death and the bodies were rapidly made ready for it (Jaquet, 2012, p. 124): they were washed, eyelids were painted, the and the face was covered with cloth, as Gilgamesh did to his friend Enkidu (George, 2003, p. 655). The deceased was then dressed in new or clean robes and adornments were put on. Such attire distinguished people going to the Underworld from the living who wore rags during mourning, as reflected in the epic of Gilgamesh: when Enkidu decided to come to the Land without Return, Gilgamesh advised him to put on old attire riddled with holes to prevent him from being recognised as a newly arrived deceased, and thus make it possible to return to earth (which Enkidu did not do and had to stay in the Underworld) (Scurlock, 1995, p. 1885).

The funeral, referred to by the Akkadian word *ḫidirtum* (Jacquet, 2012, p. 128), was the occasion for the family to make their final farewell to the deceased and took place during a feast that could last up to two days. During it, the deceased was seated on a chair while the living imbibed beer, ate bread and meat, and hired mourners expressed the pain of the loss (Veenhof, 2008, p. 112). After the feast, the corpses were placed in a grave prepared for their reception: the shaft dug out, the entrance unblocked, and the remains of the previous decesased moved further into the chamber. The body was placed on its side and weapons or prestige items were placed next to it as well as food for the road (usually a lamb's leg) and vessels filled with liquids. The funeral rite was performed by a priest whose task it was to prevent the impurity that was understood as manifestly part of the deceased from spreading to people and objects. After the funeral, everyone and everything that remained outside the grave had to undergo a ritual of purification. Mourning for the deceased lasted from 7 to 15 days (Scurlock, 1995, p. 1885).

Objects found in the tomb, in a way witnesses of past events, can be divided into two categories: the personal goods of the deceased accompanying them on their way to the Underworld and permanent elements of the tomb which could be filled with universally necessary funerary substances on the occasion of the next burial. The first category is related to the rite of passage and is intended to distinguish the newly arrived deceased and facilitate their entrance into Irkalla. The second is connected to ensuring them a prosperous existence after death.

The gifts associated with the deceased and accompanying them during the rite of passage of death, include weapons, ornaments, and other prestige items. The weapon is represented in GP26 by a shaft-hole axe and three bronze daggers. Interestingly, in the hole for the axe-handle, there are remains of wood, still awaiting identification. The shaft-hole axe has a very characteristic shape, with a slightly widened cutting edge and an ellipsoidal knob on the butt (Figure 5). Surprisingly close analogies come from Ashur during the Third Dynasty of Ur (the last century of the third millennium BC): one from the so-called "Kupferfund", a treasure of metal products deposited in a vessel hidden in the temple of the god Ashur (VA 5013, Haller & Andrae, 1955, p. 12, Taf. 27a), and another found in the Erdgrab 2305 in the area of Ashur's ziggurat (Andrae, 1922, p. Taf. 60, 1938, p. 80, Taf. 38c; Hockmann, 2010, pp. 94-95, Taf. 20-21). Despite the difference in scale, the similarity is so great that we argue that the specimen from Tell Arbid was made in the same period and was inherited in the family or was acquired as a prestigious "antiquity", a sign of the high social status of its owner. The daggers from GP26 are relatively short and represent types common in northern Mesopotamia and northern Syria in the late third and early second millennium BC: two examples of type 35 and one type 10 or 11 according to Philip's classification (1989). In light of the fact that three adult men are buried in the grave, it is tempting to assume that each of them was laid to rest together with his dagger. The group of prestige items may also include two artefacts, of which only bronze fittings in the form of a metal foot attached to a shaft with rivets remain. The small diameter of the fittings

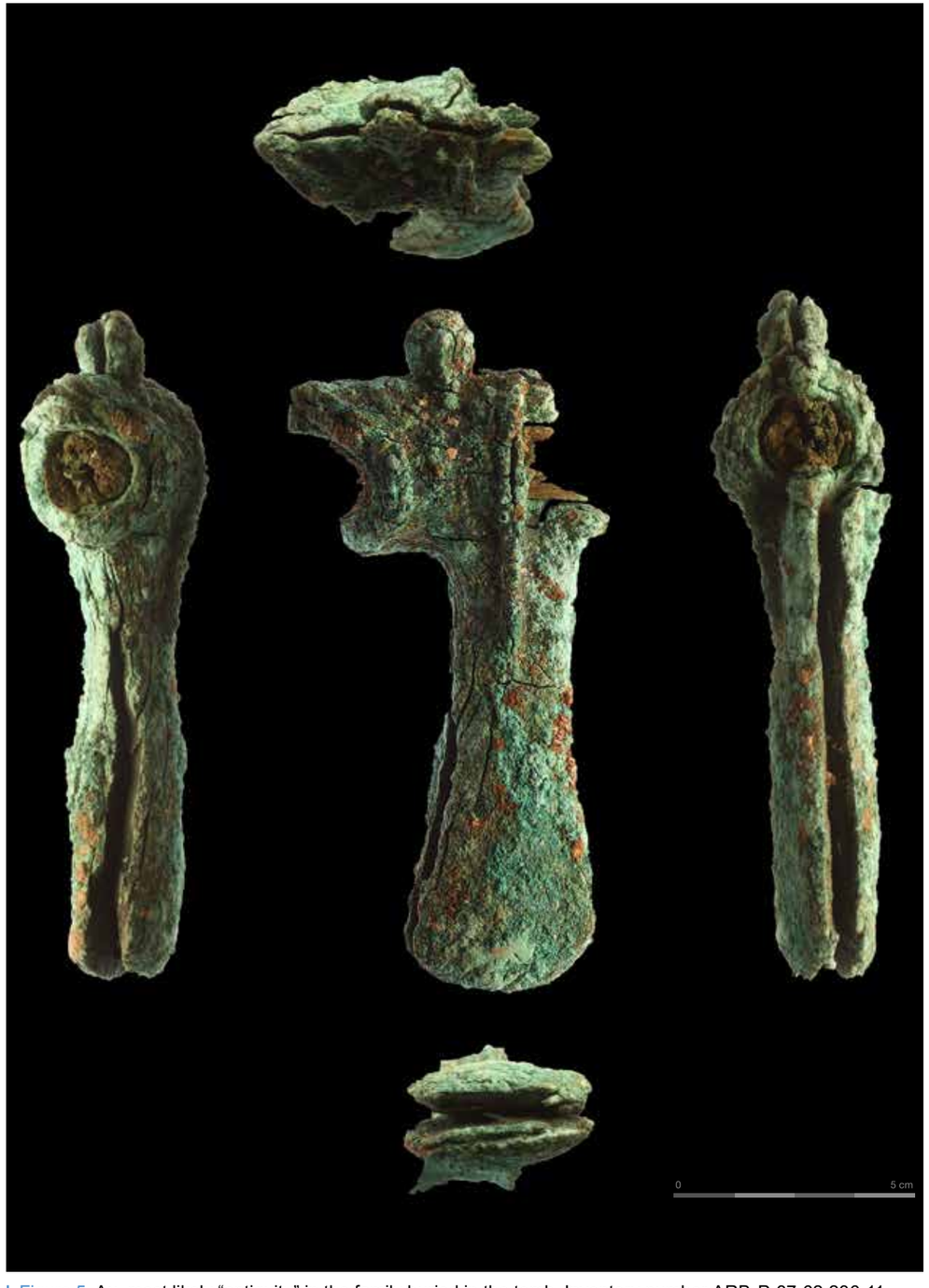


Figure 5. Ax, most likely “antiquity” in the family buried in the tomb. Inventory number ARB-P-37-62-236-11 (Photos by Marcin Szabłowski, plate by Xenia Kolińska).

(2-3 cm) suggests that they belonged to walking sticks or short rods, which may also be a sign of social status. We do not know such finds from other graves in the region, which makes interpretation difficult. Bronze tweezers can also be included in the category of prestige items.

The subcategory of ornaments is richer and more varied. It includes various bronze products: in addition to the already mentioned bronze pin found with the final burial of an adult women, two pins, one with a flat head, the other with a hemispherical head were found; as well as a bracelet; and a small plate with a hole, probably for sewing on a garment. Beads constitute the largest group of ornaments. Some are made of semi-precious stones: 45 are carnelian (Figure 6), 19 are agate, 3 are lapis lazuli, 6 are rock crystal, and 3 are jasper. The rest were made of shell (245) and frit (76). In 6 cases the material could not be determined. A separate group consists of 6 complete beads from the shell of nassarius gibbosulus, living in the Mediterranean Sea (Kurzawska, unpublished data). In the category of ornaments we also included a flat disc of alabaster with a hole 4 mm in diameter, too small to be placed on a shaft like a club. Instead, it was probably part of a necklace or had been sewn onto fabric or leather.

The second category of items placed in the grave, which includes vessels, was related to the satisfaction of *eṭemmu’s* needs after the rite of passage of death. This purpose was served not by the vessels themselves, but rather by the dishes or products that were deposited within them, usually beer, barley, dates, or yogurt/milk (Scurlock, 1995, p. 1884). On the other hand, meat, in the form of a leg or a quarter of an animal, was placed next to the deceased.

The analysis of the contents of the graves at Tell Arbid showed that the chamber of each chamber grave, regardless of the size and number of burials, was nevertheless equipped with the standard so-called drinking set. This set consists of two jugs of different sizes placed against the wall of the chamber in front of the deceased. In the case of the GP26, the chamber of which was opened many times, it was decided to replace the original set with a newer one, also consisting of two vessels; the older set, with due respect, was placed against the blind wall of the chamber. The other vessels found in the chamber include a small narrow-necked jug, the type very often found in children’s graves - hence the name “milking jug”, three shallow small bowls, and a half-preserved pot. It can be assumed that these were gifts allotted to single individuals. The number of these vessels is smaller than the number of adults who were interred, making it difficult to say which principle was followed in this case.

In the tomb of the infant buried in the shaft (GP29) we found gifts related to the existence of the child in the Underworld: a jug, a small “milking jug”, and a set of gifts related to the rite of passage: a bracelet of bright metal (silver, lead?) and a set of 17 beads, including 9 made of *engina mendicaria* shell, a snail probably from the Persian Gulf (Kurzawska, unpublished data; Kolińska, 2017b).

The two storage vessels found in the shaft had also served as containers for gifts deposited after the funeral. They were placed one on the left and one on the right side of the entranceto the chamber.

Undoubtedly, the tomb and the shaft leading to it were a special place. All activities in this area were planned and well-thought-out. It is possible to distinguish six phases of successive use of the shaft. In the first phase after the construction of the tomb, the shaft was probably empty.



Figure 6. A group of carnelian beads (Photo: Marcin Szabłowski).

This contradicts the assumptions of the reconstruction of burial customs, and at the same time a certain regularity emerges: all chamber graves with excavated male burials have vessels in the shafts. The graves where women were buried never. The question arises whether the first person buried in GP26 was a woman. In the second phase, a deceased child was deposited in the northern part of the shaft (GP29). It is unclear why it was not placed in the chamber. Perhaps its death took place shortly after the previous funeral, and therefore it was decided not to open the tomb. In the third phase, related to one of the following burials, two large jugs were placed on the sides of the entrance to hold food/drink for the deceased. In the fourth phase, during the next funeral, the vessel on the right of the entrance, destroyed during the opening of the shaft, was replaced. In the fifth phase, the last deceased was buried, the remains of whom were found in anatomical order at the entrance to the chamber. The last act related to GP26 was the ritual closure of the grave. It consisted of sacrificing a dog and burying it in the upper part of the shaft, just above the top of the chamber entrance. This discovery gives a unique insight into the proceedings of the event of the final closure of a tomb: it is ritually sealed and given a magical guardian. The presence of a complete dog skeleton in a chamber grave is rare. We know of only two such cases: one from Tell Arbid (Piątkowska-Małecka & Wygnańska, 2006) and the other from Tell Barri (Pecorella, 1999). However, neither of the mentioned cases involved closure of the entrance to the grave and neither do we know any rite relating to this practice. The discovery at Tell Arbid is therefore evidence of a previously unknown practice.

Summary

Is the chamber grave GP26 a phenomenal discovery or a sad entry in the archaeological register? Here we argue it is the first, as the results of the AMU mission shed new light on the concept of “family” understood as the There and Here community by showing how tangible ties between the Living and the Dead were built. Most importantly, they allowed verification and reconstruction of some of the burial rituals known from the literature as well as revealed new elements. Undoubtedly, GP26 is a place where one can see how personal attachment turns into a duty to serve loved ones, in the hope that when we leave someone will take care of us, regardless of wherever we are and in the face of the unknown that comes from Death.

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Metallurgy in the Early Bronze defensive settlement in Bruszczewo, site 5, Śmigiel commune, Kościan district: One more step on the way to the synthesis

Janusz Czebreszuk

Abstract

Long-term excavations carried out in the defensive settlement of the Únětice Culture in Bruszczewo (Śmigiel commune, Kościan district) have resulted in an abundant assemblage of artefacts related to metallurgy. These represent various ready-made products (i.e., ornaments, tools, and weapons), as well as some scrap prepared for smelting. Other finds included smelting by-products (metal prills/droplets) and unfinished and never used artefacts with preserved casting seams. Also, the artefact assemblage recorded at this site connected with metallurgy but made of other materials is unique in Europe. In this context, it is worth mentioning: tuyeres, melting pots, and clay footings, as well as a stone casting mould used for making open bracelets. This article presents an analysis and a description of these finds. The metal artefacts were analysed on the basis of the results of a metallurgical study, to which almost all metals recorded in Bruszczewo were subjected. Also, the applied chronological frame was based on the types of metal typical of the Únětice culture. The significant number of artefacts and their multi-aspect, archaeological and metallurgical analyses, place Bruszczewo among the key points on the map of knowledge of Early Bronze metallurgy on our continent. Moreover, this article indicates that the presented site offers great research potential that can be used in further studies into prehistoric metallurgical knowledge, including technological innovations.

Keywords: metallurgy, Bruszczewo, Early Bronze Age, Únětice Culture, metallurgical knowledge

Introduction

Both in the 1960s and during the latest archaeological campaign carried out from the turn of the last century, the settlement in Bruszczewo has provided an amazing abundance of metallurgy artefacts. What is more, they are very spectacular artefacts. Hence, to this day, the defensive settlement in Bruszczewo represents an exclusive case in terms of the variety and quantity metallurgy artifacts in the entire Únětice culture.

During the research conducted by Z. Pieczyński (1964-1968), three axes and two dagger blades were found. Their in-depth analyses are available in the archaeological literature (cf. in particular: Pieczyński, 1985, Fig. 1; Blajer, 1990, pp. 104-105; Czebreszuk, Müller & Silska, 2004, pp. 18-19; Rassmann, 2004, 2010; Silska, 2012, pp. 115-121; Jaeger, Czebreszuk, Müller & Kneisel 2015).

In the 1965 season, one axe (unprovenanced find, Silska, 2012, Fig. 76: 1) and one dagger blade (Ft. 19, Silska, 2012, Fig. 76: 5) were found. In the 1967 season, a hoard which was 'shallowly sunken into the undisturbed subsoil' was discovered in Trench Y, designated as Feature 82 (Silska 2012, p. 55, 115, Fig. 35, Fig. 76). It consisted of 3 artefacts: two axes (Silska, 2012, Fig. 76: 2, 4) and one dagger blade (Silska, 2012, Fig. 76: 3). Presumably, the hoard had been wrapped in cloth (Silska, 2012: 116, Fig. 35).

In addition to the aforementioned artefacts, some metal products were recorded – but those artefacts are far less frequently noted in the literature. One of them was a tiny fragment of a 'bronze awl' (from Feature 81) which was subjected to the metallurgical analysis despite its meagre size (No. 2758, cf. Silska, 2012, p. 115, Fig. 77; 78 and Table 9). Moreover, a 'nugget of raw bronze' (Silska, 2012, p. 115) was reported as having been found (this artefact is currently registered as lost). Also, a 'metal prill (droplet)' was subjected to metallurgical analysis (No. 2769B, cf. Silska, 2012, Table 9 and Figs. 77 and 78). There are no data on this origin of the find or the circumstances of its discovery at the site, though.

The objects related to metallurgy, discovered in the 1967 season in the Bruszczewo settlement were truly spectacular. These were four tuyeres, the first of which was preserved in its entirety (Pieczyński, 1985, Fig. 1: 2; Czebreszuk et al., 2004, Fig. 4: 2; Jaeger et al., 2015, Fig. 6.4, second from the left in the rear row), the second tuyere was preserved in two fragments (Pieczyński, 1985, Fig. 1: 1; Czebreszuk et al., 2004, Fig. 4: 1; Jaeger et al., 2015, Fig. 6.4, first and last from the left in the rear row), the third was preserved as one fragment (Pieczyński, 1985, Fig. 1: 3; Jaeger et al., 2015, Fig. 6.4, first from the left in the front row), and the fourth was represented by only one fragment (Pieczyński, 1985, Fig. 1: 4). The artefact published in Jaeger et al. (2015, Fig. 6.4, front row, second left) might represent another type of tuyere (asymmetric in longitudinal section). Other finds included one crucible (Pieczyński, 1985, Fig. 1: 6; Czebreszuk et al., 2004, Fig. 4:11), and one casting spoon (Pieczyński, 1985, Fig. 1: 4; Czebreszuk, et al., 2004, Fig. 12; Jaeger et al., 2015, Fig. 6.4, last from the left in the front row). The most spectacular, however, were three clay footings (Pieczyński, 1985, Fig. 1: 8-10; Czebreszuk et al., 2004, Fig. 4: 6-8) and one fragment of a sandstone shell mould used for the production of armlets/bracelets with stamp-shaped ends (Pieczyński, 1985, Fig. 1: 7; Czebreszuk et al., 2004, Fig. 4: 9; Silska, 2012, Fig. 119; Jaeger et al., 2015, Fig. 6.4, back row, third left). These artefacts were found close to each other at the top of the hill in Trench W near Feature 75B, which was classified as a hearth (Silska, 2012, p. 116). Hence, the literature on the subject uses the terms 'founder's workshop' (Pieczyński, 1985, p. 167) or 'metallurgical workshop' to describe this feature (Czebreszuk et al., 2004, p. 18).

By the turn of the century, the collection of finds was more numerous but consisted of less spectacular artefacts. Some are not very characteristic in terms of typology. This situation is the result of the use of a metal detector during this research stage. Thanks to this method, it was possible to discover a greater number of small objects, including fragmented scrap prepared for smelting, as well as waste and debris associated with the metallurgical process, such as prills (solidified droplets formed when liquid metal is poured into the moulds). Another effect of the methodology used was the acquisition of items unrelated to the Bronze Age (including the modern ones). Due to the poor degree of preservation of particular artefacts, it was not possible to select a subset from the Bronze Age for metallurgical analysis, and so those representing subsequent periods may also have been included.

In total, 55 analyses were conducted (repeated in the case of some artefacts), including at least 14 analyses of slag (Rassmann, 2010, Table 2). Table 1 presents only metals and the objects related to metallurgy produced (probably) in the Early Bronze Age (Table 1). The analyses involved three stages. The first, conducted in the 1960s, included 6 artefacts analysed at the Central Laboratory of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences (then IHKM PAN); the artefacts had laboratory numbers: 2754B, 2755 to 2758, and 2769B (Silska, 2012, Table 9). At the beginning of the 21st century, four of the enumerated artefacts were re-analysed in Germany: 2754B = FMZM2823, 2755 = FMZM2824, 2756 = FMZM2825, and 2757 = FMZM2826 (Rassmann, 2004; Silska, 2012, Table 10). The most numerous series, containing 45 samples, was re-tested at the Central Laboratory. Those were samples with numbers 14739 to 14755, 14758 to 14782, and 14827 to 14829, and included artefacts obtained during the second stage of research at the site.

Some of these artefacts could be assigned to the defined types of copper from the Early Bronze Age (Rassmann, 2004, 2010). In particular, these were (see Table 1, Figure 1): copper of the Kläden type (14742 and 14751), copper of the Bresienchen type (14761, FMZM2824, and FMZM2826), copper of the Bennewitz type (FMZM2825), and 'pure' copper (14739, 14743, 14745, 14746, 14750, 14753, and 14827) (Figure 1). In addition, the next 7 analyses indicated the presence of both copper (14754, 14755, and 14758) and tin bronze (14741, 14748, 14749, and 14768), as seen in Table 1. It should also be noted that, yet another group of products could be associated with the smelting process, for example those with a high tin content and a clear percentage of another element – lead (Nos. 14747, 14752, 14762 and 14776). Artefact No. 14747 – a bead (Rassmann, 2010, Table 2: 5) – and a fragment of a 'doubleheader' (No. 14752, cf. Rassmann, 2010, Table 2: 6) still have casting seams.

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Ordinal No.	Metal type	Inv. No.	Trench	Object	Typology	Lab. No.	Literature	Remarks	Figures
1	Bresinchen	47Z029	47		metal fr.	14761	Rassmann 2010, Tabl. 1:6		1:2
2	Bresinchen	34Z001	34		metal fr.	14762	Rassmann 2010		
3	Bresinchen		Y	P82	axe	FMZM2824 and 2755	Rassmann 2004, Ryc. 124, first from left; Silska 2012, Tab. 9:2		1:3
4	Bresinchen		Y	P82	dagger blate	FMZM2826 and 2757	Rassmann 2004, Ryc. 124, second from right; Silska 2012, Tab. 9:4		1:1
5	Bennewitz		Y	P82	axe	FMZM2825 and 2756	Rassmann 2004, Ryc. 124, second from left; Silska 2012. Tab. 9:3		1:4
6	CM	34Z002	5		metal fr.	14741	Rassmann 2010		
7	CM	39Z013	39		pin, fr.	14743	Rassmann 2010, Tabl. 1:5		2:7
8	CM	403	22	119	disk	14745	Rassmann 2010, Tabl. 2:2		2:3
9	CM	395	3		dagger	14746	Rassmann 2010, Tabl. 2:1		2:2
10	CM	703	22		metal fr.	14748	Rassmann 2010, Tabl. 2:10		2:4
11	CM	2203	23		metal fr. dagger blate	14749	Rassmann 2010, Tabl. 2:4		2:6
12	CM	1803	23		doublehaeder' (dwugłówkowiec)	14750	Rassmann 2010, Tabl. 2:9		2:1
13	CM	2403	22	117	awl, fr.	14753	Rassmann 2010, Tabl. 2:7		2:8
14	CM	3603	27		wire coil, square section	14754	Rassmann 2010, Tabl. 2:3		2:5
15	CM	3103	from the surface		awl	14755	Rassmann 2010, Tabl. 2:11		2:9
16	CM	35Z006	35		metal fr.	14768	Rassmann 2010		
17	CM	11321	52		pin (Rollenkopf-nadel)	14827	Rassmann 2010, Tabl. 1:1	plot (Flache) 11, natural layer 11014	2:10
18	Kläden	47Z030	47		axe, fr.	14742	Rassmann 2010, Tabl. 1:7		3:3
19	Kläden	4703	29	146	knife / razor	14751	Rassmann 2010, Tabl. 2:8		3:2
20	Kläden		trench E,F,G,H		axe	FMZM2823 and 2754B	Rassmann 2004, Ryc. 124, first from right; Silska 2012, Tab. 9:1		3:1
21	Kläden?		trench Y	P81	awl	2758	Silska 2012, Tab. 9:5	missing (fully used for analysis?)	
22	BR+Pb	47Z031	47		metal fr.	14739	Rassmann 2010, Tabl. 1:3		3:6
23	BR+Pb	2503	22	125	doublehaeder' (dwugłówkowiec) with a casting seam	14747	Rassmann 2010, Tabl. 2:6		3:5
24	BR+Pb	3003	from the surface		bead with a casting seam	14752	Rassmann 2010, Tabl. 2:5		3:4
25	BR+Pb?	39R009	from the surface		metal fr.	14776	Rassmann 2010		
26	BR+Pb				metal drop	2769B	Silska 2012, Tab. 9:6		
27		44Z034	44		metal fr., round "punch"	14740	Rassmann 2010, Tabl. 1:4	doubtful, a lot of silver, Rassmann 2010:712	3:8
28		44Z032	44		"hoop", fr.	14744	Rassmann 2010, Tabl. 1:2	doubtful a lot of antimony, Rassmann 2010:712	3:7
29		12441	plot (Flache) 12		round-round "punch"			Bef. 12034, Abtrag 12006, -91/-92	
30		F12495	plot (Flache) 12	house 4	pin (Ösenkopf-nadel)		Kneisel, Müller 2011:312		
31			51		round-chisel "punch"				
32			F	P19	dagger blate		Silska 2012, Ryc. 76:5		
33			W	P75B	"founder's workshop"		Silska 2012:116	at least 11 artifacts, description in the text	
34		41119	41	174	crucible		Czebreszuk 2015, Fig.4.84, ID8051		
35		41152	41	174	crucible		Czebreszuk 2015, Fig.4.84, ID8068		
36		45173	45	190	nozzle, fr.		Czebreszuk 2015, ID8377		
37		36046	36	159	crucible, fr.		Czebreszuk 2015, ID8382		
38		49305	49	191	crucible, fr.		Czebreszuk 2015, Fig.4.99, ID8423		
39		49307	49	191	crucible, fr.		Czebreszuk 2015, Fig.4.96, ID8467		
40		49240	49	204	crucible		Czebreszuk 2015, Fig.4.109, ID8518		
41		49239	49	200	crucible		Czebreszuk 2015, Fig.4.105, ID8591		
42		56/97	7	from the EBA moat	crucible		Czebreszuk 2015, ID8820		
43		38048	38	humus	nozzle, fr.		Czebreszuk 2015, ID9020		

Table 1: Bruszczewo, site 5, Śmigiel commune, Kościan district. Metal and metallurgical artefacts.

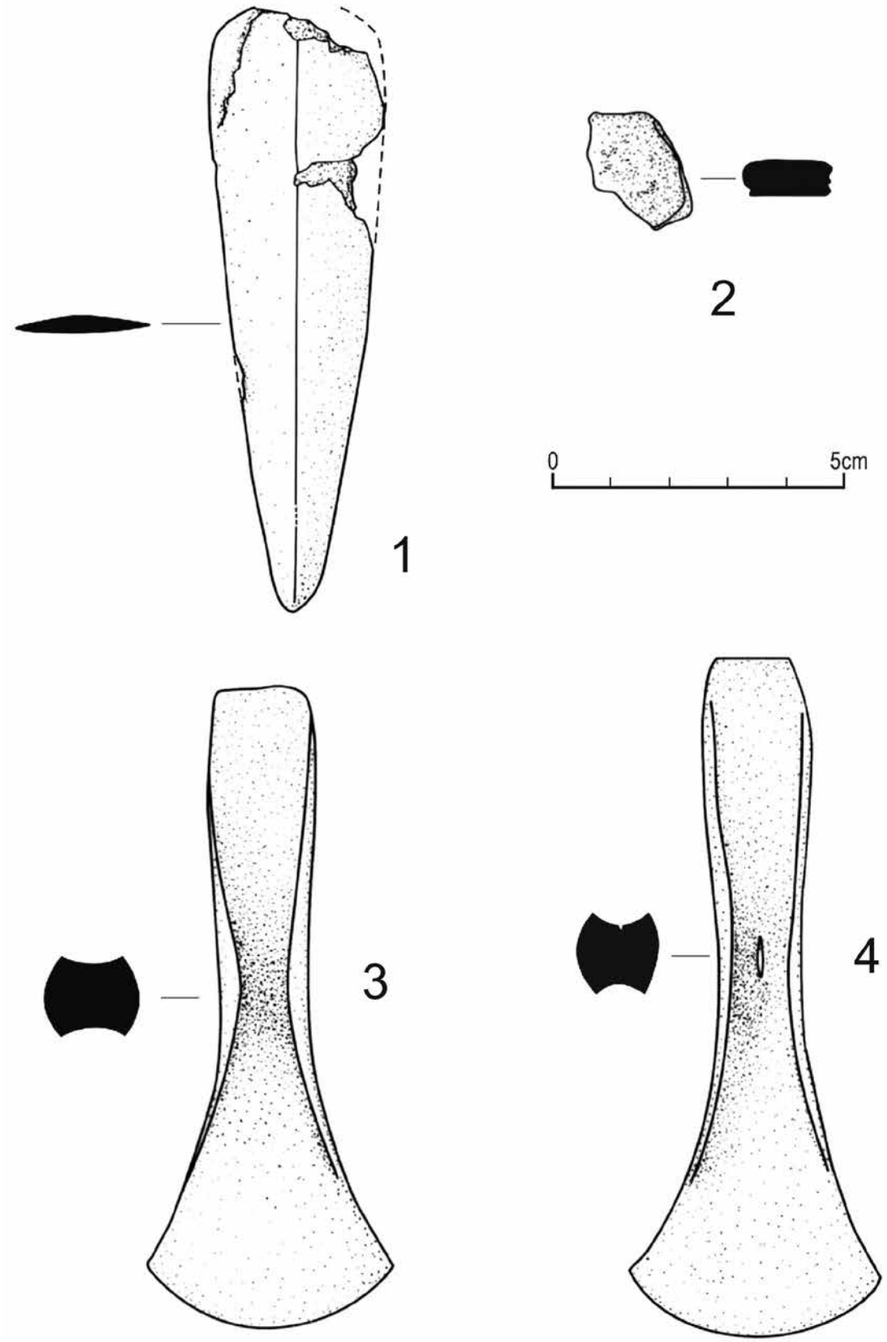


Figure 1. Bruszczewo, site 5, Śmigiel commune, Kościan district. Metal artefacts made of metal types Bresinchen (1-3) and Bennewitz (4). For more complete data on the artefacts, see Table 1.

The results of the typological and chronological analysis of the artefacts found in the 1960s have been previously reported in the literature (Blajer, 1990, pp. 104-105; Silska, 2012, p. 117) and therefore this work does not delve into that topic but instead focuses on the Early-Bronze artefacts obtained during excavations since the turn of the 21st century. Unfortunately, their typological analysis was stymied by the fact that very few artefacts were preserved in their entirety; only 5 such artefacts were recorded and thus analysed here.

A pin with a hammer-shaped head and rolled into a coil (no. 14827, cf. Rassmann, 2010, Table 1: 1) was made of 'pure' copper, but typo-chronologically it is characterized by a very long period of use (the entire Bronze Age) and an extensive area of distribution (Central Europe). Nevertheless, the stratigraphic position of this artefact from Bruszczewo is unambiguous (Trench 52, plot 11, natural layer 11014, Kneisel, 2010, p. 138) – falling at the end of the Early Bronze Age.

A dagger, or rather the blade of a dagger with one rivet preserved (No. 14746), seems heavily worn (shortened due to repeated sharpening?). It is only about 4 cm long (Rassmann, 2010, Table 2: 1) and originally it had 3 rivets. Its style is that of Únětice daggers.

Archaeological literature has hitherto interpreted the almost completely preserved artefact No. 14751 as a knife (Rassmann, 2010, Table 2: 8; see also finds from Radłowice in Lower Silesia – Furmanek, Dreczko, Mozgała-Swacha & Kopec, 2019, p. 131, Fig. 81). However, there exists an alternative functional interpretation of this artefact indicating that it could be a toiletry device – a razor. The best analogies that might support such a hypothesis are known from outside the Únětice oecumene, for example in the developed Wessex culture (Jarosław Sobieraj PhD, personal communication – for which the present author is very grateful). All in all, it is the oldest well-dated artefact from the Únětice culture within the Central European Bronze Age. Most importantly, though, it is a device used for personal hygiene that was obtained from a sedimentary context. Such care for sanitation seems one of the hallmarks of the then emerging elite. The occurrence of this type of find in Bruszczewo indicates that representatives of that social stratum lived there, a fact which requires all the more emphasis as the artefact in question comes from an unambiguous stratigraphic context (i.e., Pit 146) dated to the Early Bronze Age. The oldest hitherto personal hygiene devices (tweezers) were recorded in Central and Northern Europe in the Jutland zone; they represented the Early Bronze Age II (after Vandkilde, 1996) and were dated to 1500-1300 BC (Vandlikde, 1996, pp. 174-175).

The 'doubleheader' (No. 14750) is a piece that connects two chains with pins attached at the other ends. A complete example was found in the hoard from Wrocław – Gądów Małe (Sarnowska, 1969, p. 220, Fig. 76: c). This artefact is characteristic only of the Únětice tradition (Jaeger et al., 2015, p. 229) and is known from its classical phase.

A large-ear pin is another metal artefact found in Bruszczewo (Müller & Kneisel, 2010, Fig. 14). This type was very popular in the Únětice culture during its classical stage of development. Nevertheless, a careful metallurgical analysis revealed that the Bruszczewo specimen was made using advanced technologies (Müller & Kneisel, 2010, pp. 772-773), which, as a matter of fact, became widespread in the Middle Bronze Age (Kneisel, 2012). The stratigraphic context is very precise in this case as the artefact was found inside House 4, dating to the end of the Early Bronze Age (Müller & Kneisel, 2010, p. 773).

In addition to the typology, the aforementioned metallurgical analysis was a critical method for dating artefacts since it allowed the types of copper to be assigned to individual horizons within the Early Bronze Age (Rassmann, 2010, Fig. 1). One of the artefacts (No. 14761) belongs to Horizon II with copper of the Bresinchen type from the Early Bronze Age dated to the years 2100-2000 BC. Two other items from the hoard wrapped in cloth, an axe (FMZM2824) and a dagger blade (FMZM2826), were classified in the same way. Another artefact recorded at the site (FMZM 2823), an axe (unprovenanced find), may also be dated to the end of this horizon (Rassmann, 2004, p. 262) or the transition interval between Horizons II and III (Rassmann, 2010, p. 714). The other axe from the cloth-wrapped hoard (FMZM2825) was classified as Bennewitz type copper, associated with Horizon III of Early Bronze metals, dating to 2000-1850 BC. Another 9 artefacts were associated with Horizon IV (1850-1650 BC). Of these, 7 artefacts belonging to the metal group known as 'pure copper' (Figure 2). These are artefacts Nos: 14739 ('prill'), 14743 (fragment of a pin), 14745 (disc), 14746 (dagger), 14750 ('double-header'), 14753 (awl), and 14827 (pin) (Rassmann, 2010, Fig. 2B). In addition, the analyses of artifacts numbered 14751 (razor) and 14742 (fragment of an axe) revealed that their metal composition was that of the Kläden group (Figure 3), which places them at the end of the time period related to Horizon IV (i.e., around 1650 BC).

Accordingly, it can be concluded that the metal horizons discovered in Bruszczewo represent almost the entire period of development of the Early Bronze Age. In particular, it covers the time period from 2100 to 1650 BC. This unambiguously indicates that the metallurgical activity in the defensive settlement in Bruszczewo developed throughout its lifespan.

Also, special attention should be given to the characteristics of the typological and functional composition of the metal artefacts typical of particular horizons. For Horizon II, these include an axe (Bennewitz type, variant B) and a fragment of an unidentified object. For Horizon III, there are two axes and a dagger blade. In turn, for Horizon IV, artefact types include, among other things, a pin with a hammered out and rolled head, a dagger blade significantly shortened (probably) by repeated sharpening, and the 'doubleheader'. The remaining analyses were taken from fragments of unidentified items.

Such a distribution, wherein the oldest horizons yield only large objects and the youngest – usually scrap (i.e., destroyed or broken/prepared for re-smelting), may indicate that their deposition at the site was long-lasting. The oldest relics consist of fully preserved tools which were consciously left (as indicated by the hoard wrapped in cloth) or forgotten/lost. In Horizon IV, small fragments prepared for/created during smelting or those lost as a result of everyday activity prevailed.

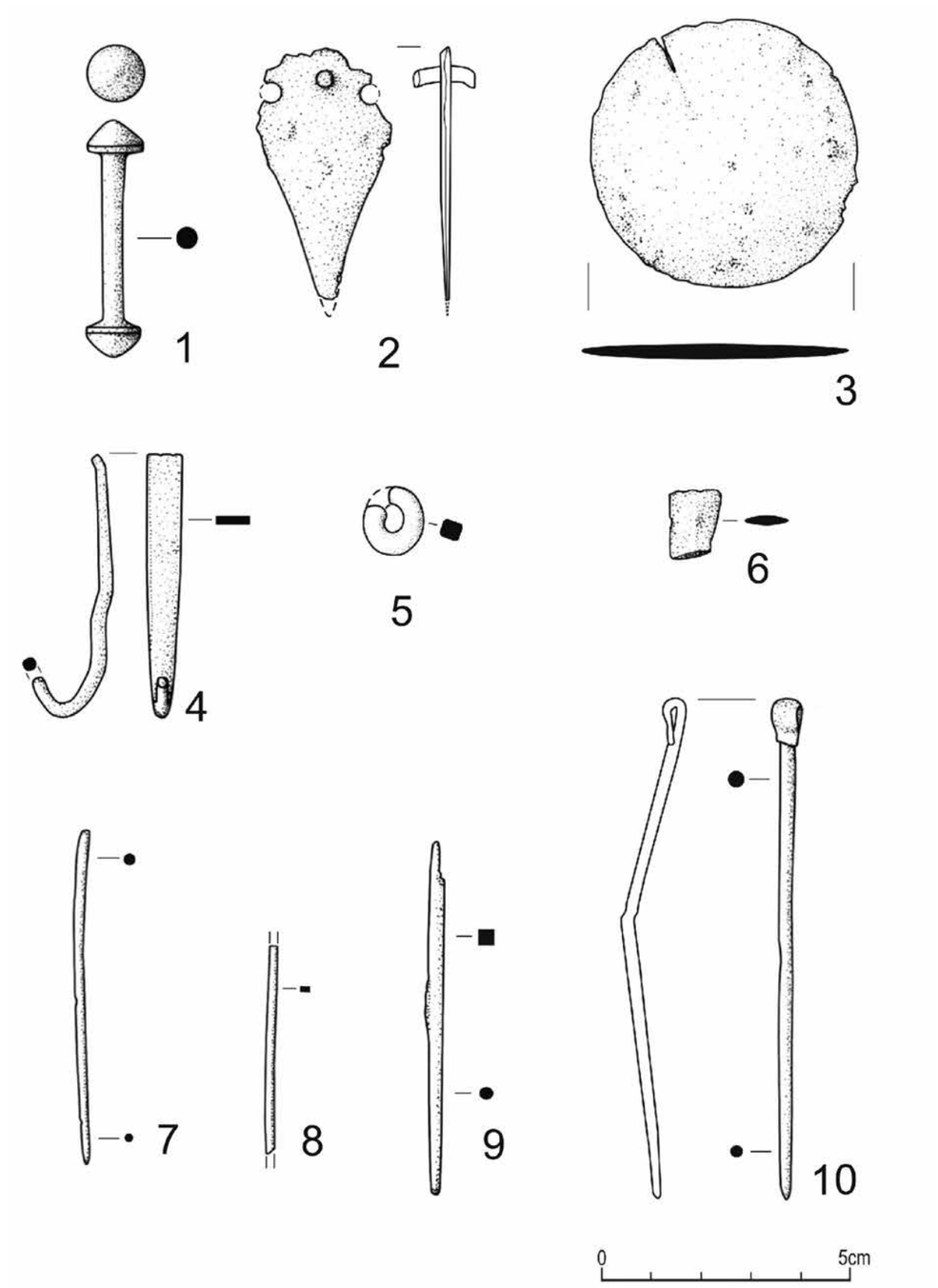


Figure 2. Bruszczewo, site. 5, Śmigiel commune, Kościan district. Metal artefacts made of metal referred to as ‘pure copper’. For more complete data on the artefacts, see Table 1.

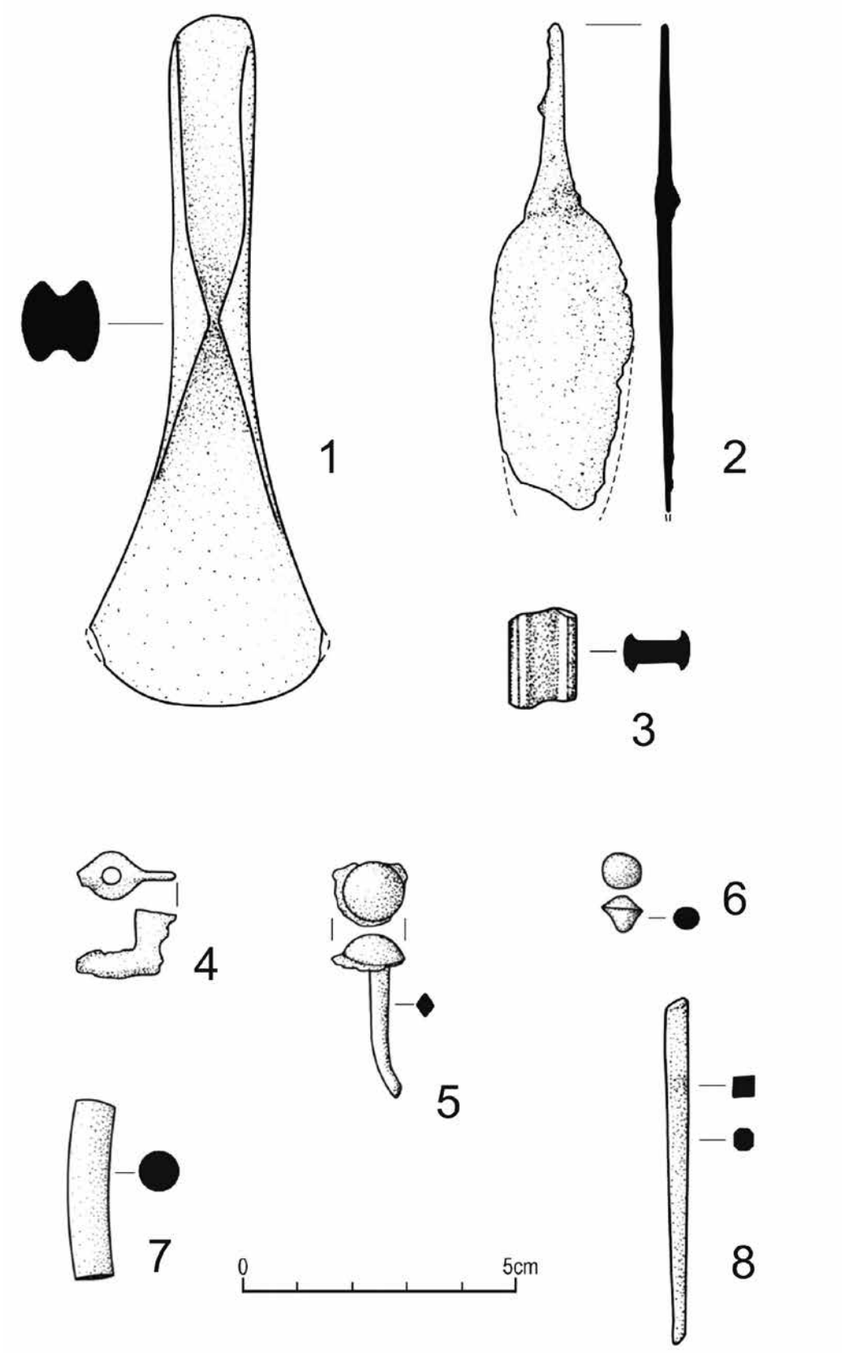


Figure 3. Bruszczewo, site. 5, Śmigiel commune, Kościan district. Metal artefacts made of metal type Kläden (1-3). Also, artefacts with high contents of: lead (4-6), antimony (7), and silver (8). For more complete data on the artefacts, see Table 1.

The foregoing analyses show the validity of the thesis prevalent in the literature that extensive metal smelting was present for an extended time in the Early Bronze defensive settlement in Bruszczewo and, in this way tools, ornaments, and weapons were manufactured, often with the use of advanced metallurgical technologies. These rich sources are therefore an appropriate basis for in-depth analyses. Consequently, they allow for more specific questions regarding the metallurgical knowledge of the Bruszczewo founders and their participation in the adaptation of the technological innovations that spread throughout Europe at the transition from the 3rd to 2nd millennium BC. It is also necessary to address the issue of the directions of the flow of metals and metallurgical knowledge, as well as to specify the timeline of the process of metal adaptation by the Bruszczewo community. These are the tasks that still pose a challenge to archaeologists.

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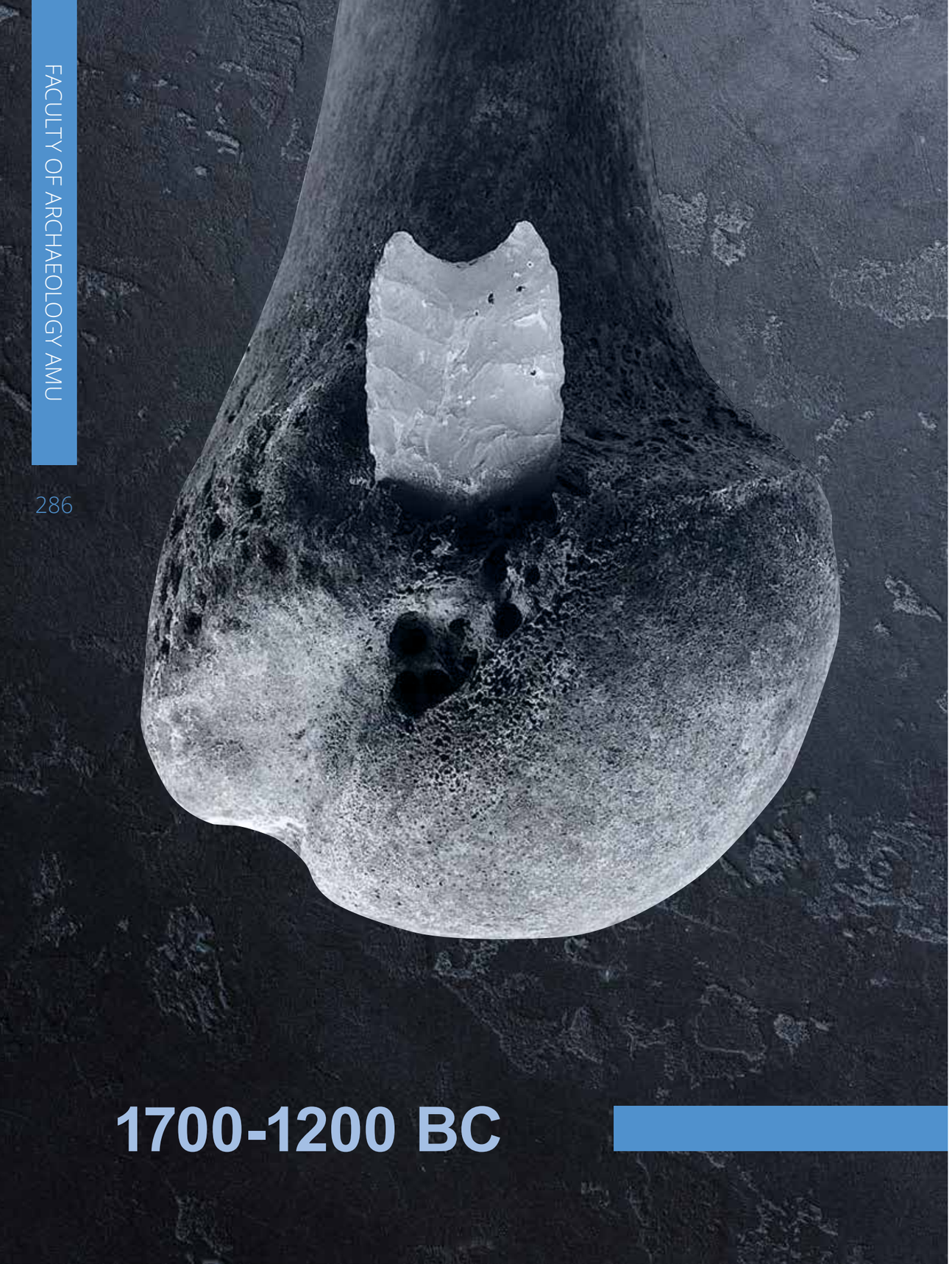
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Aspects of ancient warfare: Multidisciplinary research on war and warriors in Bronze Age Europe

Paulina Suchowska-Ducke

Abstract

The study of warfare among ancient societies – its nature, scale and impacts – has become an increasingly fertile multidisciplinary field of research in archaeology and related disciplines. This is particularly true for the European Bronze Age, an epoch that has produced iconic artefacts, architecture, images, and written sources that speak about war and warriorhood. Modern research has made it sufficiently clear that, far from being the singular acts of heroic individuals, ancient warfare was common, brutal, and well-organized. However, war, as an extreme form of social interaction, has also been a driver for technological and economic development. From Scandinavia to the Mediterranean, the archaeological record has preserved rich traces of the warrior elite that was instrumental in transforming Bronze Age societies. This body of evidence is being studied with increasingly diverse analytical tools, ranging from use-wear analysis of weapons to forensic analysis of human remains and GIS-based spatial analysis. The following is a summary of author's research on the multiple aspects and archaeological sources that surround the topics of war and warriors in Bronze Age Europe.

Keywords: war, Bronze Age Europe, multidisciplinary research

Dulce bellum inexpertis: A scholarly study of war

Violence and aggression are biological and behavioural forms of using force against other individuals. They have accompanied humans since the dawn of history. While aggression is associated with a vast repertoire of behaviours and can take many forms, the defining property of violence is that it causes physical harm to an "opponent". Violence, unlike aggression, is a deliberate action, often occurring between larger groups, and is characterized by intentionality and rationality. Depending on scale and form, it can evolve from individual disputes to organized

conflicts involving groups of people or entire communities. The English word “conflict” is derived from Latin *conflictus*, which literally means “fight” (composed from the Latin prefix *com*, meaning “with” and *fligere*, “to strike”). Over time, the term experienced a significant broadening of its original meaning. The Dictionary of Foreign Words and Phrases defines conflict as “an antagonism, a contradiction of interests or views, a dispute, quarrel or collision”. Conflict can transform into war, a militarily organized and politically motivated activity which, apart from violence, also features forms of negotiation. Thus, war is commonly understood as a kind of conflict between states or societies, in which all available military or non-military means are employed to achieve a goal. As a social process, it has profound consequences on the functioning of the communities and a destructive impact on human life. However, as a form of interaction, war can also drive the development and diffusion of technologies and innovations. Due to such unexpected effects, there are two opposing tendencies to understand the essence and the role of war in society (Otterbein, 1999). According to the first, war is a part of human nature that is necessary for the development of civilization and culture. According to the second, it is a disruption of a community’s life and an expression of degradation of man and society as a whole. In the latter view, the incidental and transitional nature of war is emphasized: It is a limited event that has a clearly defined beginning and an end.

Conflicts and wars during different stages of history were characterized by variations in frequency, scale, intensity and form. “Every age has its own kind of war, its own limiting conditions, and its own peculiar preconceptions” as was aptly summarized by Carl von Clausewitz (1832, p. 423). Therefore, various aspects of war, and also the essence of peace, provide a complex research topic. In Europe, the earliest systematic thoughts on these issues are those by ancient Greek and Roman authors. But it was only after the Second World War that polemology, the scholarly study of war (from the Greek *polemos*, meaning war), developed into an academic field of research (Więcek & Lasota, 2011). In the following decades, a multidisciplinary approach to the analysis of war, its meanings, and its manifestations was undertaken by the social sciences and humanities (e.g. philosophy, sociology, political science, history and military theory, anthropology and ethnology).

The study of war and its different aspects entered the field of archaeology relatively late, and from the beginning it was hampered by the discipline’s specific material sources (Vencl, 1984). Initially, the idea prevailed that past societies were predominantly peaceful. In addition, the dominant archaeological concept of war in prehistoric societies was that of a primitive, not well-organized, less serious, and less destructive phenomenon than in later (modern and industrial) times. Ancient warfare was regarded as heroic and ritualized, or simply attributed to social presentation or rivalry. The image of warriors was also idealized and embedded in the values and rituals of heroic warfare, in bravery and honour (Kristiansen, 1999). Brutality and killing were not part of this image.

A significant change that encouraged a more realistic study of violence and war in archaeology, started with the publication of *War before civilization*. *The myth of the peaceful savage* by Keeley in 1996. Since then, the idea has gained traction that war should be regarded as a widespread form of social interaction that needs to be studied in its social context and within an



Figure 1.1. Battle scene from Scandinavian rock art (Photo: Erlend Bjørtvedt).

adequate theoretical framework. Warriorhood, on the other hand, is now perceived as a complex social institution and social identity that is grounded in many different human aspects, including brutality and aggression (Vandkilde, 2006). Violence, suffering, and death are important aspects of warfare and warriorhood that complete the picture of prehistoric societies. The archaeological record indicates that collective violence has been practised since the appearance of humankind. The earliest evidence of a massacre comes from the 13,000 year old cemetery in Jebel Sahaba, located near the northern border of Sudan (Wendorf, 1968). Conflicts and warfare appear to have been pervasive during the Neolithic as a consequence of sedentism. At that time, the first fortifications also emerged. While the Neolithic witnessed the initial formation of a distinctive social identity, the *warrior* (Vandkilde, 2006a), the Bronze Age was characterized by widespread and organized war, the introduction of weaponry designed for combat, and the birth of a professional and well-trained warrior aristocracy (Kristiansen & Larsson, 2007).



Figure 1.2. Pylos Combat Agate Seal
(after: Stocker & Davis 2017).

Warfare and warriors in Bronze Age Europe: A multidisciplinary research

The Bronze Age was a formative epoch in European history and is characterized by socio-political developments that led to intensified connectivity and the emergence of long-distance communication networks that spread across the continent (see Suchowska-Ducke, Reiter & Vandkilde, 2015 for more references). These processes were rooted in the uneven distribution of copper and tin, the essential components of bronze, which quickly entered all spheres of human life, from weapons and ornaments to working tools and religious items. The resulting demand for raw metals soon transformed Europe into a strongly connected economic zone. Within this connected world existed widespread conflicts and wars, a form of social interaction that had a clearly destructive effect on human life. However, more than ever before, warfare was also responsible for the wide distribution of innovations and knowledge, for instance weapons technology, suggesting that a good share of economic potential was represented by profitable warfare. The emergence of a new professional warrior aristocracy that enjoyed much prestige was an important factor in the transformative changes that affected the material and social fabrics of Bronze Age Europe (Kristiansen & Larsson, 2007).



Figure 1.3. Mycenaean Warrior Vase
(Photo: Sharon Mollerus).

Figure 2.1. Battlefield of Tollense, after *LAKD MV, LA, Sabine Suhr.*

The motivations of Bronze Age societies to engage in warfare ranged from obtaining power and prestige and gaining access to commodities, resources, and territory, to taking vengeance for wrong doing and capturing wives and slaves (Osgood, Monks & Toms, 2000). Evidence of warfare and the existence of professional warriors on the European continent comes from various sources, such as iconography (frescoes, reliefs, figurines, and representations on jewellery, pottery, and rock art; Figures 1: 1, 2, 3), signs of battle injuries (*traumata*) on human bones (Figure 2: 1, 2), and efficient weaponry (Figure 3) known from archaeological excavations. In addition, written documents provide testimonies of conflicts and weaponry used in the Mediterranean Bronze Age. While these remain the primary sources of knowledge on warfare and warriors in the Bronze Age, recent multidiscipli-



Figure 2.2. Traumatic injury on human bone, after *LAKD MV, LA, Sabine Suhr.*



Figure 3. Late Bronze Age swords
(Photo: Juraj Lipták).

nary approaches introduced new methods to archaeological research that allow even more in-depth investigations into the topic. Among them are use-wear, metallurgical analyses, and neutron and X-ray examinations of different types of weapons to determine their properties and efficiency in combat (e.g. Kristiansen, 2002; Bunnefeld, 2016; Mödlinger et al., 2020; Figures 4). Geographical information systems (GIS) allow systematic spatial analysis of the dissemination of weapons (Suchowska-Ducke, 2015; Figure 5). Using advanced analytical methods, such as diffusion and network models, GIS can provide a more realistic and explicit geographical picture of warriors' mobility and its far-reaching impact on societies (Kristiansen & Suchowska-Ducke, 2015). Studies on the psychology and physiology of the human body indicate what sort of character traits professional warriors must have had (Grossman, 1996), and experimental archaeology shows what the fighting techniques could have looked like (Molloy, 2010; Hermann et al., 2020). DNA and isotope analysis of bones coming from the sites of prehistoric massacres and battlefields enable insights into the genetic signature of people involved in such conflicts and their places of origin (Price et al., 2017).



Figure 4. Use-wear analysis of swords
(after: Hermann et al., 2020).

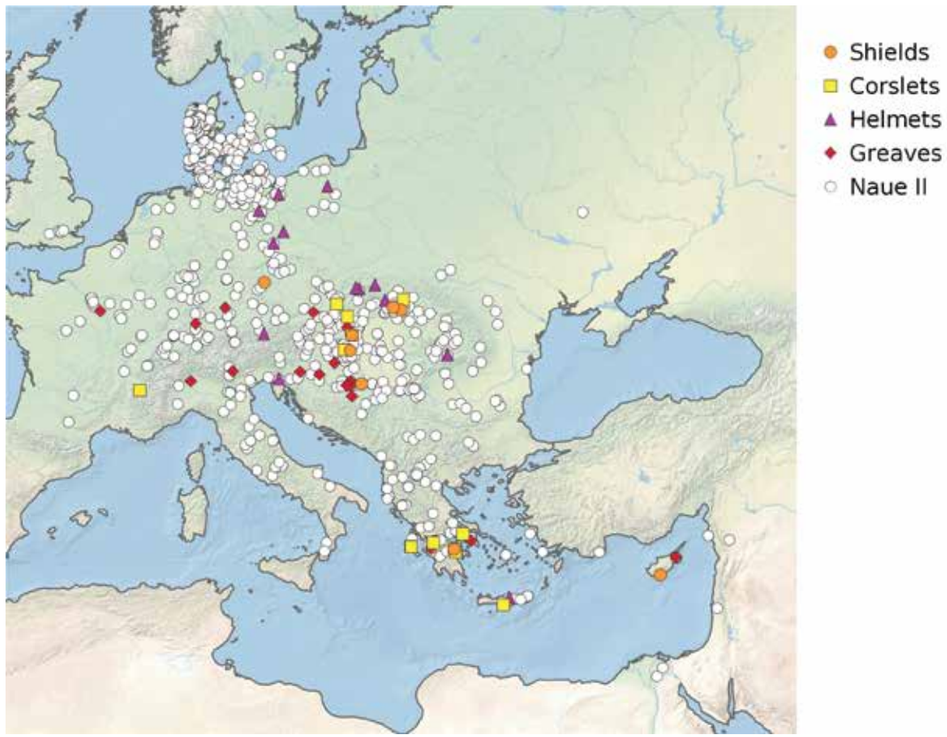


Figure 5. Dissemination of weaponry in Late Bronze Europe (after: Suchowska-Ducke 2020).

The author's own research on warfare and warriorhood in the European Bronze Age has focused on three main aspects: (a) the phenomenon of warriors' mobility and the role they played in the dissemination of new technologies and innovations, (b) the development of weaponry and its circulation, and (c) the influence of warfare on social change and transformations in the Late Bronze Age (Suchowska-Ducke, 2015, 2018, 2020; Suchowska-Ducke & Skrzyniecki, 2019). Comprehensive insights into past human mobility are key to understanding the diversity of European cultures. In archaeology, human mobility is evidenced by the distribution of similar material features, artefacts, or forms of organization over a larger geographic space. In the case of war, the evidence consists primarily of weapons, particularly the swords that were highly standardized and efficient items assigned to professional warriors. This type of offensive weaponry has been extensively analysed by many scientists. In addition to swords and other weapons, drinking vessels and toiletry tools (like razors and tweezers) were also important material attributes of a Bronze Age warrior's identity, as were some exceptional items, such as parts of armour (greaves, corslets, shields or helmets), combs, mirrors, and wooden camp stools (Deger-Jalkotzy, 2006; Kristiansen & Larsson, 2007). Interestingly, such "warrior packages" occur in the archaeological record from Scandinavia to the Mediterranean. This ample data formed the core of the author's studies of various aspects of war in Late Bronze Age Europe.

Answering the key questions of how far-reaching individual mobility of the Bronze Age warriors really was, and to what extent warfare was responsible for social change and transformation, requires supporting evidence from multidisciplinary sources. The aforementioned recent and comprehensive studies of previously known and newly acquired archaeological evidence have shed some light on aspects of war and conflict, as well as their role in past people's lives. Scientific analysis shows that weapons were designed to be robust and effective in fighting. Signs of use-wear, repairing and re-sharpening indicate that they were used in real combat. Also, forensic re-examination of human bones provide a good variety of data, demonstrating that more people than previously considered were engaged in collective violence or became its victims. According to Keeley (1996, p. 28) 90-95% of all known societies throughout history engaged in at least occasional warfare and many fought constantly. Since the rise of Bronze Age societies, military activity became widespread across much of the European continent.

The epoch's most famous battlefield in Northern Europe provides direct evidence that warfare was indeed well-organized and conducted by professional warriors. It was on the banks of the Tollense River where an army of possibly 2000 men engaged in battle, some of them coming from faraway places (Jantzen et al., 2011; Price et al., 2017). Thus, this battle site also brings into focus the question of how these warriors were able to travel across long distances efficiently. From an analytical perspective, GIS-based methods for reconstructing the physical networks that allowed far-reaching travels in the Bronze Age are key to understanding how expansive and costly the movement of people and objects really was, and what routes they would have taken. Therefore, a novel mathematical approach to archaeological network reconstruction using GIS was developed and implemented as a freely available open source tool (called v.net.models: Ducke & Suchowska, 2021). It combines basic archaeological data, simple connectivity models, and high-resolution terrain data to produce realistic reconstructions of network links. In this way, modern and multidisciplinary research tools shed light on a fascinating Bronze Age phenomenon of organised warfare and warriors' long-distance travels.

With an ever-growing body of archaeological evidence, increasingly powerful analytical tools and a scholarly tradition that stretches back many decades, the topic of connectivity and mobility in the European Bronze Age is currently undergoing a renewed increase in research activity. War and warfare, as particularly intense forms of social interaction, are among the most spectacular manifestations of this historical processes.

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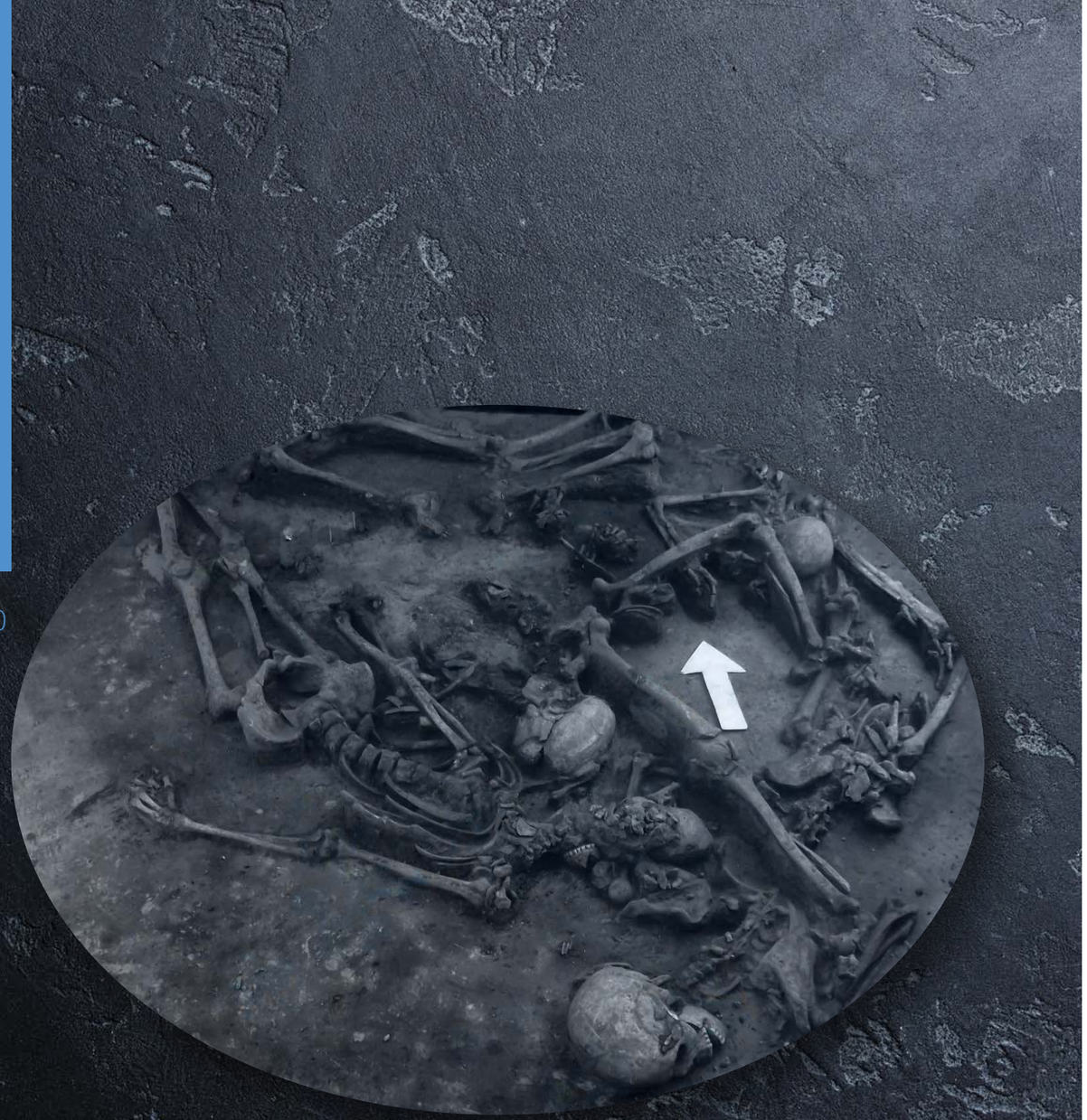
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Migration and kinship in East-Central Europe in the 1st half of the 2nd millennium BC

Przemysław Makarowicz

Abstract

This article presents the results of research conducted within the framework of a multi-disciplinary project investigating the issues of migration, mobility, and kinship of the Middle Bronze Age communities inhabiting East-Central Europe, more specifically the Upland belt of modern Poland and western Ukraine. The main objective of the project is to verify or falsify two hypotheses provided by the literature. The first one concerns the issue of the migration of the Trzciniec Cultural Circle (TCC) population from the Lowland belt of East-Central Europe south-wards into the Upland belt. The other considers kinship as a fundamental factor generating the emergence, rules of aggregation, and shape of the 'Trzciniec' social structures. In addition, the project addresses a number of issues related to the social structure, rituals, and diet of the study communities.

An application of the methods that are specific to humanities (archaeology and cultural anthropology) and sciences (physical anthropology, molecular biology – genetics, isotope geochemistry, physics, chemistry, and statistics), and possible genetic affiliations of the 'Trzciniec' communities and the population of the preceding Early Bronze Age groups (mainly the Mierzanowice and Strzyżów cultures) are presented; the potential kinship pattern of the deceased buried in the graves representing these cultural groups are also indicated. The results of Bayesian modelling of the ^{14}C date series for the TCC collective burials – a key factor in the study of the kinship and the mortuary rituals of this group – are highlighted. Finally, the paper discusses the current results of research on the mobility and diet of the communities from the late 3rd and 2nd millennia BC undertaken within the frame of this project as well as in cooperation with other research programmes.

Keywords: ancient DNA, stable isotopes, Middle Bronze Age, migration, kinship, Trzciniec Cultural Circle, collective burial

Introduction

The early 2nd millennium BC was one of the most dynamic and transformative periods in the development of social structures in East-Central Europe. It was defined by the rise of the phenomenon known to archaeologists as the Trzciniec Cultural Circle (TCC), which can be considered a long *durée* unit (Braudel et al., 1994) – a macrostructure characterized by a long duration and occupation of a considerable territory, in this case stretching roughly from the drainage basins of the Prosna and Warta rivers in the west to the Desna and Seym in the east, the Vistula and Neman in the north, and the Dniester and Prut in the south (Figure 1; Makarowicz, 2010, 2011). The TCC emerged first in the northern – Lowland – portion of the above-delineated area (1850-1800 BC), but in the course of a single century (four to five generations), Lowland cultural patterns ('fully-formed' culture) appeared in the Upland belt from Lesser Poland to as far south as Podolia and Volhynia. The interpretation of the reception mechanisms of these patterns has been intensively debated by prehistorians of East-Central Europe (Kempisty, 1978; Górski & Kadrow, 1996; Górski, 2007; Makarowicz, 2010).

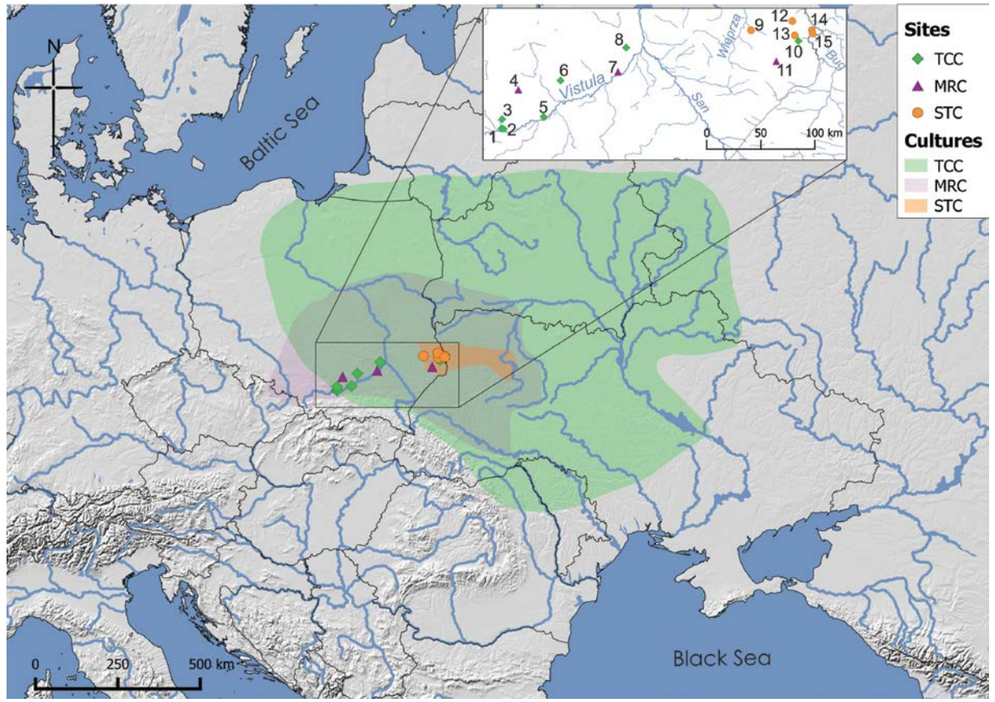


Figure 1. Spatial range of the Trzciniec Cultural Circle (TCC), Strzyżow culture (STC) and Mierzanowice culture (MCC), and sites involved in aDNA sudies. (1) Kraków Nowa Huta Cło; (2) Kraków Nowa Huta Mogiła; (3) Pielgrzymowice; (4) Koszyce; (5) Żerniki Górne; (6) Dacharzów; (7) Brodzica; (8) Pieczeniegi; (9) Świniary Stare; (10) Zubowice; (11) Stryjów; (12) Raciborowice; (13) Nieledew; (14) Hrebenne; (15) Strzyżów (after Juras et al., 2020).

Since 2015, an international team of scholars from different scientific institutions in Poland, Sweden, and Ukraine have conducted an interdisciplinary project financed by the Polish National Science Centre which indirectly relates to the discussion of the TCC origins in the Uplands and the nature of factors forming the social structure of this cultural complex. The project's objective is to verify or falsify two crucial hypotheses which prevail in the literature. The first concerns the question of the migration of the TCC populations from the Lowlands of East-Central Europe towards the south and the Uplands (Kempisty, 1978; Górski & Kadrow, 1996, 2001; Górski, 2007; Makarowicz, 2010, 2011). The other one considers kinship as the principal factor contributing to the rise and shape of the 'Trzciniec' social structures and defining their 'aggregation principles' (Makarowicz, 2003, 2010). A vital part of the project is the study of the burial ritual, mobility, and diet of the communities occupying Central and Eastern Europe at the turn of the millennia – 3rd and 2nd BC for both the TCC communities and the groups preceding this cultural circle.

The main sources of data for the outlined research questions are cemetery materials, mainly derived from the Upland zone situated in south-eastern Poland and the neighbouring lands of Ukraine.

The investigation of the issues raised in the title is made possible by the availability of new research tools for the comprehensive testing of the hypotheses cited above. The project makes use of the cumulated potential of many fields including archaeology and new research methods employed in 'archaeological sciences'. Comprehensive laboratory analyses were the key to the success of the adopted research strategy. They comprised: radiocarbon determinations, analyses of stable (carbon, nitrogen, oxygen) and radiogenic (strontium) isotopes, anthropological analyses, and ancient DNA analyses. The majority of analyses of bones focused on bones belonging to TCC graves. For comparative purposes, the remains of the deceased representing the communities of the Mierzanowice and Strzyżów cultures, i.e. the Early Bronze Age groups preceding the 'Trzciniec' communities occupying the Upland zone, were also analysed. Some of the archaeological, chronometric, anthropological, archaeogenetic and isotopic analyses have already been carried out while others are still underway.

Ancient DNA studies

Studies on ancient DNA (aDNA) conducted over the last several years have already provided strong evidence about migrations in various periods of prehistory. After a long period of depreciation of this factor of socio-cultural and population change by post-processualist critics, a new archaeo-genetic narrative has emerged (written by molecular biologists rather than by archaeologists) which explains the aforementioned transformations with more or less massive population migrations. This largely applies to the beginnings of the Neolithic way of life in Europe in the 7th millennium BC, starting from the area of Anatolia, and including the participation of hunter-gatherer groups in its creation, as well as the intrusion of steppe pastoral communities of the Yamnaya culture in the early 3rd millennium BC and the significant remodelling of the gene pool of the populations of the time (e.g. Haak et al., 2010, 2015; Lazaridis et al., 2014; Allentoft et al., 2015; Mathieson et al., 2015; Olalde et al., 2018).

Evidence and interpretations of these large-scale migrations have dominated the discourse on population mobility in prehistory.

Analyses of aDNA in Central and Eastern Europe are being carried out as part of the project with the aim to determine kinship of the individuals buried in necropolises at the end of the 3rd and 2nd millennia BC and to perform population studies to reveal genetic affinities with various communities from the earlier periods of prehistory. The largest pool of data pertains to the individuals buried collectively in the cemeteries of the TCC community, but the research also included the deceased buried in individual graves, both of the 'Trzciniec' and other cultural circles – mainly the Mierzanowice and Strzyżów cultures. Currently, the mitochondrial aDNA research has been completed and the analyses of the Y-chromosomes are in their final stage.

Mitochondrial genomes were obtained for 80 individuals, most of them radiocarbon dated using the AMS method, from several cemeteries located in the Upland zone of southern and south-eastern Poland. The aim of these analyses was to reveal the origins and genetic affinities of the Bronze Age populations from the region of southern and south-eastern Poland and to trace matrilineal kinship patterns present in the burials of those populations (Juras et al., 2020).

Studies on the mitochondrial aDNA indicate genetic continuity of the communities, which in the archaeological record are associated with the Late Neolithic Corded Ware culture (CWC) and the subsequent Bronze Age groups of the Mierzanowice culture and TCC. Also, the independent development of the Strzyżów culture community, a group inhabiting the Lublin Upland and an adjacent part of the Volhynian Upland in Ukraine in the late 3rd and early 2nd millennia BC, and its close genetic affinity with steppe populations (the Yamnaya and the Catacomb Grave cultures and later also the Scythians) were recorded. Furthermore, mitochondrial patterns identified in the Bronze Age communities from south-eastern Poland indicate examples of potential kinship through the female line occurring mainly among individuals representing the TCC (Juras et al., 2020).

Collective burials and Bayesian modelling

Collective burials, which are the key diagnostic feature of the mortuary rites of the TCC community and are related to the issue of kinship, are one of the most important aspects of the TCC funerary customs. The literature suggests a long-lasting use of graves in which, in some cases, a dozen or more individuals – representatives of specific descent groups, were buried. However, in the past, this view was based solely on observations of the stratigraphy of the graves and the arrangement of the remains of the deceased and was not supported by any analytical studies. In this project a series of over 90 AMS dates were obtained from 18 TCC cemeteries with collective burials in Poland and Ukraine. Using Bayesian modelling, the absolute chronology of the occurrence of the custom of collective burial of the dead was determined as c. 500-600 years (1800/1700-1200 BC). Collective burials, both cremated and skeletal and in both barrow and flat graves, were first recorded in the Upland zone and the custom generally 'spread' from the south-east to the north-west. Bayesian modelling of ^{14}C dates from a dozen mass graves in the cemetery at Żerniki Górne in the Lesser Poland



Figure 2. Examples of the 'Trzciniec' collective burials. Above – Pielgrzymowice, site 9, grave 669 (Photo: A. Lasota-Kuś). Below – Żerniki Górne, site 1, grave 62 (Drawing by J. Romaniszyn).

Upland – the largest 'Trzciniec' necropolis – confirmed its functioning for about 300 years. Partially synchronous use of graves was found and a scenario of spatial and chronological development of this cemetery was presented (Makarowicz et al., 2021). The collective graves were used for several dozen to over 200 years, with several to 30 individuals found in 'antipodal' arrangements, i.e. with their heads towards the shorter sides and long bones towards the inside of the grave (Figure 2). The next bodies were placed one by one or in groups of several at a time, after moving the remains of their predecessors. As a result, piles of bones were formed.

Investigations on diet

The project also included studies on the diet of the Bronze Age communities mainly in the Upland zone of Central and Eastern Europe. More than 120 AMS radiocarbon dates were measured on human and animal bones ('reference data') from an interval of about 1000 years (2200-1200 BC). A noticeable increase in δ13C ratios in human bone collagen was recorded in the mid-15th century BC, which was associated with increased consumption of C4 plants (Pospieszny et al., 2021). The first stage of the research on the diet of the communities representing that period was therefore focused on an issue which has been very popular in the literature for at least several years. Measurements of stable isotopes of carbon (δ13C) showed a steady increase in its values which peaked in the mid-13th century BC. This could be related to the local cultivation of broomcorn millet (*Panicum miliaceum L.*), a cereal with a C4 photosynthetic pathway that is one of the most significant plants in prehistory, originally domesticated in China ca. 6000 BC (Filipovič et al., 2020) and subsequently spread across Eurasia. In Europe, however, it is well documented only in the Middle Bronze Age, thanks to the direct dating of the charred grains of this cereal (Motuzaitė-Matuzevičiūtė et al., 2013). Analyses of stable isotopes of carbon and nitrogen, performed within the framework of the project at 37 sites from Poland and Ukraine, helped trace changes in the amounts of broomcorn millet in the 2nd half of the 2nd millennium BC (Figure 3). The regularities in this aspect of the diet of the individuals buried in the same collective graves correlated with the passage of time – from no millet in the menu, through its small admixture, to a high proportion of 33-56% – are of particular cognitive value (Pospieszny et al., 2021).

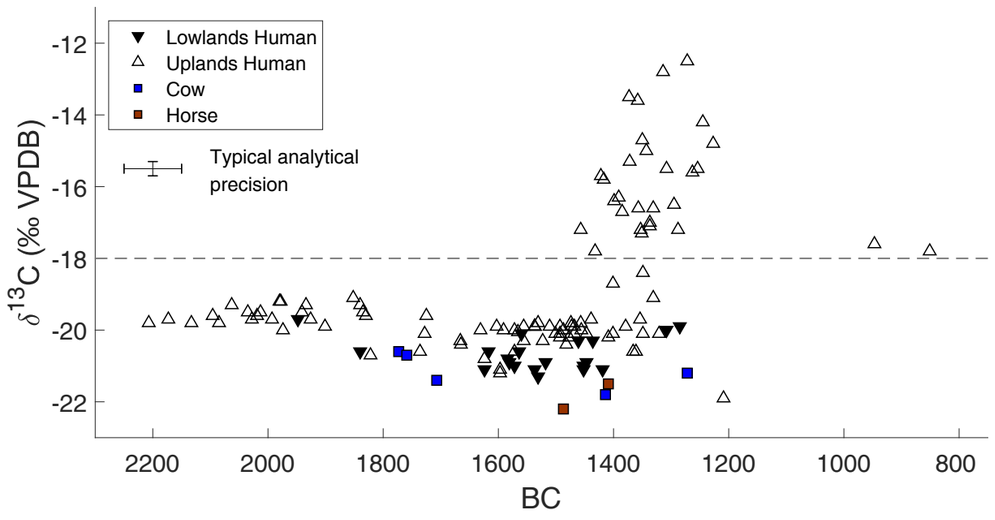


Figure 3. δ13C values for Bronze Age and Early Iron Age human and animal bone samples plotted against their calibrated absolute ages. The broomcorn millet "threshold" is marked with dashed line (after Pospieszny et al., 2021).

The mortuary goods discovered in the majority of the graves in which the 'millet eaters' were buried were local in character, but in a few cases the style of the discovered bronze vessels and other goods indicated contacts with the Otomani-Füzesabony culture groups from the Carpathian Basin. It is likely that this was the area from which broomcorn millet was introduced to the Uplands of modern Poland and south-western Ukraine, 2-3 generations after its occurrence in the Carpathian Basin (Pospieszny et al., 2021).

An alternative is the spread of millet from the Pontic steppes, where it has been well documented (dated charred grains) at the end of the first half of the 2nd millennium BC or possibly earlier (Filipovič et al., 2020). The increase in millet consumption to the levels of a staple crop in the mid-15th century BC could have been caused by demographic growth, well evidenced in archaeological record (Makarowicz, 2010; Górski, 2017). Millet is a drought-tolerant cereal with a short growing cycle and it was a good source of plant protein in case of a demographic crisis.

The research on the introduction of broomcorn millet cultivation realised within this project was also used in a larger project on the chronology of the initiation and dissemination of this cereal in Europe which included over 100 ^{14}C determinations. Bayesian modelling of these dates showed that, contrary to earlier opinions, millet did not occur on the European continent until the 16th century BC; it became widespread over the next two centuries (Filipovič et al., 2020), confirming the validity of the previously cited results of the East-Central Europe study (Pospieszny et al., 2021) at a larger scale.

A comprehensive summary of the results of research on the diet of communities inhabiting the Central and Eastern European borderlands is nearing completion. At the current stage of the study, it can be concluded that the carbon and nitrogen isotopic compositions of bone collagen indicate an omnivorous diet that included C3 and C4 terrestrial plant and animal resources, in which plant foods dominated.

Studies on mobility

As in archaeogenetic research, studies of population mobility based on the strontium and oxygen isotopic composition of human dental enamel have provided archaeologists with a new tool to trace the mobility and provenance of individuals. Research on the main topic of the project, i.e. the verification or falsification of the well-documented archaeological and chronometric hypotheses about the migration of TCC communities from the Lowlands to the Uplands of Central and Eastern Europe, is currently in its final stages. Nevertheless, it can already be concluded that most of the analysed samples from Lesser Poland, Lublin, and the Volhynian Uplands have local strontium isotope signals; there are few individuals that can be seen as newcomers ('non-local'). However, this could be due to the peculiarity of the analysed material which does not come from the initial phase of presence of the 'Trzciniec' culture communities in the Upland zone (no bone remains from this period have been preserved), but from the phase of relative stability of the settlement.

The results of the isotope analyses obtained in the course of this project also contributed to another project on the community of the Final Neolithic Corded Ware culture (2900-2300 BC) in south and south-eastern Poland (The Lesser Poland Upland and the Subcarpathian region). Measurements of strontium isotopes indicated the local origin of individuals from Lesser Poland and revealed a significant frequency of individuals with non-local origin in the Subcarpathian region (Szczepanek et al., 2019).

The outlined project can help to better our understanding of the complex nature of the processes underlying dynamic social transformations in East-Central Europe in the Early and Middle Bronze Ages. In particular, aDNA and strontium and oxygen isotope analyses have supplied new evidence explaining the questions of continuity/discontinuity in the late 3rd and early 2nd millennia BC in the Uplands on the borderland between Central and Eastern Europe.

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Treasures of Time:

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About the ‘interim’ or discovering the depths of the pre-Roman Iron Age

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Abstract

The pre-Roman Iron Age, i.e. the last five last centuries BC, is one of the most mysterious periods in Polish prehistory and constitutes an extremely interesting research issue, which help concentrate the studies on it, into a compact group of research problems. The studies on the pre-Roman Iron Age carried out by the group of researchers at the Faculty of Archaeology of the Adam Mickiewicz University are based on the research traditions of Poznań archaeology. The focal point of work in recent years has been settlement pottery, which is a mass source acquired during excavations whose potential has not yet been fully exploited. One way to better understand the possibilities that this type of mass material can bring has been exploitation of the potential of archaeometry. The ongoing studies on the problems of the pre-Roman Iron Age strive to detail and explain the processes and changes occurring at the time. They fit into the Poznań tradition of studies on this period, being a continuation of previous work undertaken on its intricate issues – empowering it and leading it out of the titular ‘interim’, placing it in the fully deserved centre of research interests.

Keywords: pre-Roman Iron Age; settlement pottery; archaeometry

The pre-Roman Iron Age i.e. the last five last centuries BC, is one of the most mysterious moments in Polish prehistory. In large measure, is the effect of a certain specificity of research eventuating from the distribution of interests in Polish archaeology. In fact, the pre-Roman Iron Age is an interface between two periods examined through the prism of different research trends not always directly related to its own phenomenon. The early part of the pre-Roman Iron Age seems to have flown smoothly from the events associated with the introduction of the Hallstatt culture into the environment of the Lusatian Urnfield culture and the transformation of this model into a new 'standard of civilisation'. This situation results in the fact that the earlier part of the pre-Roman period has become the domain of researchers of the Bronze Age and the Early Iron Age, who treat the 'Pomeranian episode' as a kind of closing-up stage of the 'Lusatian cycle'. In turn, its later part, dominated by the Przeworsk-Oksywie cultural circle, is usually perceived as a kind of prelude to the Roman period. This is suggested by the very name 'pre-Roman Iron Age', which was popularised in archaeological literature by H. J. Eggers (1955) and R. Hachmann (1961). Use of such terminology, is connected with the presupposition that the changes taking place in central and northern Europe at that time constituted an evolutionary path of development, crowned by the advent of a new civilization at the time of the Romans.

The events that that occurred in the interior of the continent during the pre-Roman Iron Age, took place in the shadow of the golden age of the La Tène culture. The lack of major interactions between cultural circles, especially in the earlier phase of the pre-Roman period, means that the situation of the Baltic zone is not an attractive reference for researchers delving into Celtic history, thus remaining on the margins of their interests. All this together causes the pre-Roman Iron Age to be treated as a kind of 'interim' – a time suspended between the events that already took place and those that are yet to come.

Treated as a complete cultural phenomenon, the pre-Roman Iron Age constitutes an extremely interesting research issue. This allows us to look at the changes taking place at that time as the quintessence of intense civilization changes taking place in the Baltic Sea region. Being in line with such a cognitive focus, this moment in history should not be regarded merely as the closing stage of the previous history or as a prelude to a new world emerging from it. In this light, it would rather become an independent moment, resulting from the active and creative transformation of the post-Hallstatt traditions into a new, self-contained Central European cultural model which in the 3rd century BC started to evolve as a result of interactions with the societies of the La Tène culture with its distant hinterland.

The studies on the pre-Roman Iron Age carried out from this standpoint by the group of researchers at the Faculty of Archaeology of the Adam Mickiewicz University are based on the research traditions of the Greater Poland Archeology. Since the turn of the 19th and 20th century, quite a few sites related to this period have been identified in Greater Poland (Undset, 1882; Blume, 1909, 1911, 1915; Erzepki & Kostrzewski, 1914; Kostrzewski, 1919b, 1919/1920). The materials collected at the turn of the century were the basis for the attempts to create the first syntheses, which significantly influenced the perception of the pre-Roman Iron Age not only from the regional, but also from the Central European perspective. These include the work by W. Demetrykiewicz (1900) on the dispersion of crown neck-rings. In particular, however, the monograph *'Die ostgermanische Kultur der Spätlatènezeit'* by Józef Kostrzewski has played a leading role in this topic (Kostrzewski, 1919a). The typological and chronological findings contained therein have not lost their value to this day, and the materials presented still constitute an important database for further research on the issues of the pre-Roman Iron Age. This work, along with synthesising approaches contained in two editions of *'Wielkopolska w czasach przedhistorycznych'* [Greater Poland in Prehistory] (Kostrzewski, 1914, 1923), contains such an in-depth presentation of the picture of cultural transformations in the pre-Roman Iron Age that the need for a new summary monograph has long since disappeared. Fortunately, this did not mean that studies on this issue were abandoned. In the interwar period J. Kostrzewski – in the context of his contemporary interests and a discussion with German researchers on the continuity of Slavic settlement – took a retrospective look at the problem of links between the material culture at the beginning of the Late pre-Roman Iron Age and the declining times of the Lusatian culture horizon (Kostrzewski, 1938), engaging in a discussion on the issues of ethnic affiliation of the communities of the time (Kostrzewski, 1936).

A significant increase in the source base, especially that connected with research on the later phase of the pre-Roman Iron Age, took place in Greater Poland in the 1950s as a result of research undertaken in large necropolises of the Przeworsk culture such as Wymysłowo (Jasnosz, 1952) and Młodzikowo (Dymaczewski, 1958) as well as the site in Kalisz-Piwonice (Dąbrowski, 1959). The studies carried out at these sites resulted in the systematisation of the source knowledge for many years, creating reference points for any further considerations on the pre-Roman Iron Age. Thus, they shaped the perception of cultural changes taking place over the last two hundred years of the the old era in Greater Poland (Jasnosz, 1972; Machajewski, 1986).

Another re-evaluation of the issues of the Late pre-Roman Iron Age occurred in the 1980s as a result of initiatives undertaken by Henryk Machajewski. This researcher pointed to some connections between Greater Poland and the zone of the Jastorf culture (Machajewski, 1986, pp. 274, 281). Presence of products from the Jastorf zone as mainly seen in the context of the flow of imports (Wołągiewicz, 1979, p. 36), well readable in the Late Pomeranian (Kaczmarek 1999, pp. 149, 150) and Early Przeworsk assemblages (Dąbrowska, 1988, pp. 192-204).

An exponential rise in the quantity of discovered materials allowed for a new insight into the problem of the pre-Roman Iron Age at the turn of the century (20th and 21st). To a large extent this was due to excavations conducted within the large-area linear explorations in Poland, these associated with construction works and rescue excavations. The year 2002 was undoubtedly a symbolic date in this respect – Henryk Machajewski organised a scientific conference *'Kultura jastorfska na Nizinie Wielkopolsko-Kujawskiej'* [The Jastorf Culture in the Greater Poland-Kuyavia Lowlands] at the then Institute of Prehistory of the Adam Mickiewicz University. The publication of the conference papers, supplemented with additional texts presenting the data growth at that time (Machajewski, 2004), reopened the discussion of the model of community formation between the third and second century BC (in this regard see in particular: Machajewski & Pietrzak, 2008a, 2008b; Machajewski, 2010, 2012). In



Figure 1. Sampling pottery by M. Teska, PhD for archaeometric analyses in the repository of the Museum of Archaeology in Poznań (Photo: A. Michałowski).

addition, new concepts presented in the volume undoubtedly were an inspiration for a group of archaeologists from the Institute of Prehistory of the Adam Mickiewicz University where, under the auspices of Professor Tadeusz Makiewicz, DSc, PhD, a research institute began to develop, programmatically implementing the study of this stage of history (Machajewski, 2008, pp. 110, 111).



Figure 2. Pottery on the museum table (Photo: A. Michałowski).

The research initiated at that time was actively pursued by a team working within the Faculty of Archaeology of the Adam Mickiewicz University, composed of Professor Andrzej Michałowski, DSc, PhD; Milena Teska, PhD; Marta Krzyżanowska, PhD; Patrycja Kaczmarska, MA; and Mateusz Frankiewicz, MA. The focal point of the work in recent years has been settlement pottery, which is a massive source of evidence acquired during excavations and whose potential has not been fully exploited yet (Figures 1-2). One way to better understand the possibilities that this type of mass material can bring has been exploitation of the potential of archaeometry. The archaeometric studies were conducted in cooperation with an analytical team led by Professor Przemysław Niedzielski, DSc, PhD, from the Faculty of Chemistry of the Adam Mickiewicz University (AMU), as part of the National Science Centre project OPUS 2014/15/B/HS3/02279: *Dzieje zamknięte w glinie. Wskaźniki geochemoarcheologiczne wielkopolskiej ceramiki z młodszego okresu przedrzymskiego jako źródło dla poznania zróżnicowania kulturowego* [History enclosed in clay. Geochemoarcheological indicators of Greater Poland pottery from the Late Pre-Roman Iron Age as a source for discovering the cultural diversity].

The archaeometric studies included pottery from settlements of key importance for the Greater Poland-Kuyavia Lowlands dating back to the transition between the Early and Late Pre-Roman Iron Age, such as Borzejewo 22; Daniszew 1 and 18; Grabkowo 7 and 8; Pławce 22; and Poznań-Nowe Miasto 226, 278 and 284 (in accordance with the conservation nomenclature Spławie 4, Krzesiny 30 and 33) (Figures 3-4). These ceramics were subjected to both quantitative and qualitative analyses on a scale unprecedented in the archaeometric

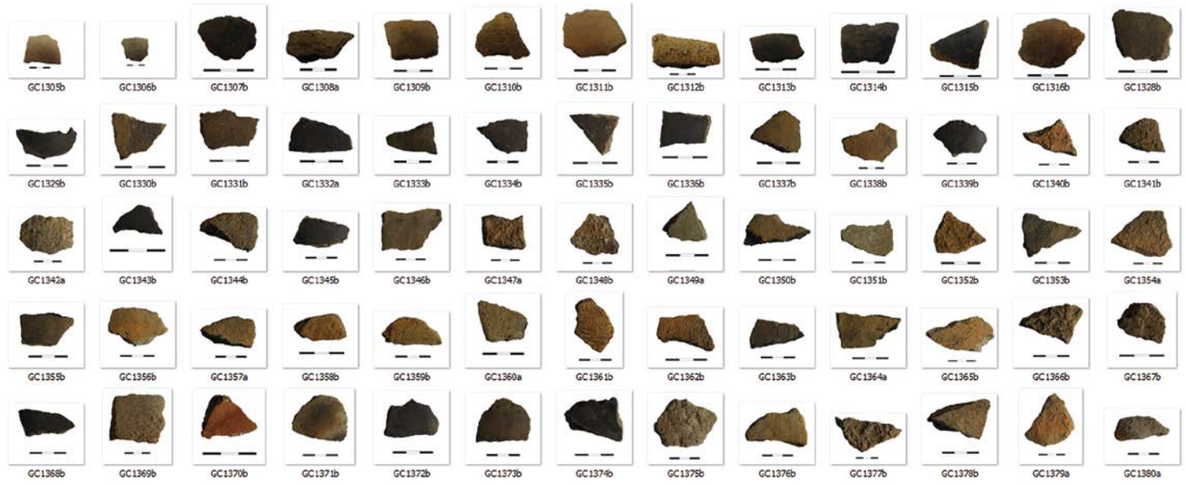


Figure 3. Pottery from the site in Borzejewo selected for an archaeometric analysis (Photo: M. Teska).



Figure 4. Description of macroscopic features of the material prepared for archaeometric analyses – M. Wawrzyniak, MSc, and Milena Teska, PhD (Photo: P. Kaczmarska).

literature (total of 1,694 samples were analysed, yielding 88,088 results). The chemical analysis of the selected artefacts was carried out on the basis of the following analytical procedures: a non-destructive analysis using the energy dispersive X-ray fluorescence technique (ED-XRF) and destructive analyses of the studied fragments including surface analysis of cores cut from pottery fragments and an analysis of a ground sample, both performed using the method of inductively coupled plasma optical emission spectrometry (ICP-OES) (Michałowski, Teska & Niedzielski, 2017).

The analysis with the use of the ED-XRF technique made it possible to obtain information on the composition of the pottery; 30 elements were determined. Although it is necessary to be aware of the semi-quantitative nature of the results obtained using the energy dispersive X-ray fluorescence technique, the size of the studied sample set (761 analysed samples, which gives 22,830 analysis results) allows statistical inference (Figures 5-8).

The analysis of the cores was carried out as an auxiliary tool in order to infer the depositional environment of the artefacts. For selected pottery samples, cylindrical cores were collected using a 8-10 mm diamond core drill, whose surface (except for one base) was protected against extraction made with hydrochloric acid 2 mol/L at 80°C.

The analysis of ground samples was the main tool of the archaeometric research. The research involved 1,572 samples of pottery obtained by excavations and 122 samples of clays and loams obtained during experimental firing under controlled conditions (different firing temperatures in reducing, oxidising, and neutral atmosphere – these tests were possible thanks to the use of a microwave furnace purchased for the project). After grinding in a mechanical agate mill, the ceramic samples were extracted with 2 mol/L hydrochloric acid at 80°C (Figures 9-12).

Huge number of results provided a sound basis for a statistical analysis, which in archaeometric studies usually barely involves several to a dozen elements for at most tens of samples. The dataset obtained within the project facilitated an application of statistical

Figure 5. Equipment for making ceramic cores and grinding the pottery samples – ‘makeshift’ laboratory in the repository of the Faculty of Archaeology (Photo: A. Michałowski).

Figure 6. Grinding of a pottery sample (Photo: A. Michałowski).

Figure 7. Professor P. Niedzielski and the spectrometer ICP-MS (Photo: A Michałowski).

Figure 8. Laboratory of Professor P. Niedzielski at the Faculty of Chemistry AMU (Photo: A. Michałowski).



Figure 9. Experimental paste preparation for a trial firing (Photo: M. Teska).

inference using descriptive statistics, a correlation analysis (Jasiewicz et al., 2021). The research carried out so far both within and outside the project is resulting in the creation of one of the largest archaeometric collections of prehistoric pottery. At the same time, the research has helped develop an innovative and universal method of dealing with mass material, such as the remains of clay vessels. This pioneering compilation of a huge body of information on the composition of the pottery constitutes a model for future archaeometric studies of mass material.

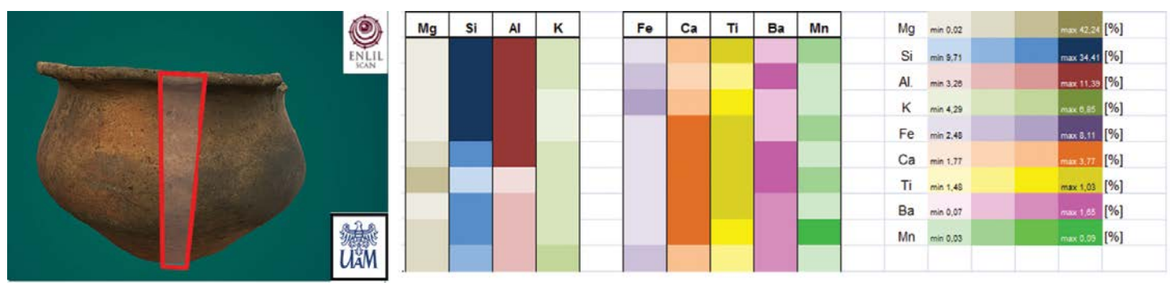


Figure 10. Graphical presentation of analyses of the elemental composition of the surface of a ceramic vessel from Grabkowo, site 7 (Ed. by K. Jakubowski).

The present authors express the hope that differences in the preparation of paste and in the firing of the vessels left some chemical markers in the finished product which, when abstracted from their structure, may become an independent key for the attribution of the ceramic material to a particular cultural model and thus demonstrate its homogeneity or cultural diversity (Michałowski et al., 2018). The current studies confirm the possibility of selecting potentially similar (local) and potentially foreign artefacts. Even on the basis of the preliminary statistical study of the XRF results obtained in the project, it is possible to demonstrate differences in the chemical composition of pottery acquired from different archaeological sites (Michałowski et al., 2020).

The ongoing studies of the problems of the pre-Roman Iron Age strive to detail and explain the processes and changes occurring at the time. They fit into the Poznań tradition of studies on this period, being a continuation of the previous work undertaken on the intricate issues of the pre-Roman Iron Age – empowering it and leading it out of the titular 'interim', placing it in the fully deserved centre of research interests.

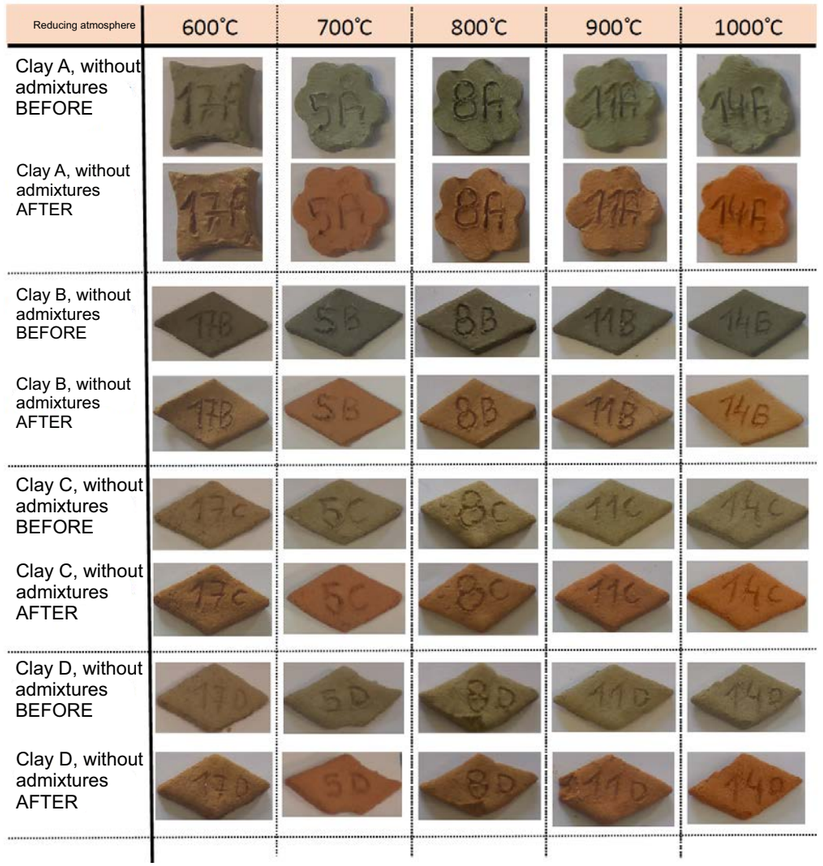


Figure 11. Overview of the effect of experimental clay firing (Ed. by K. Jakubowski).

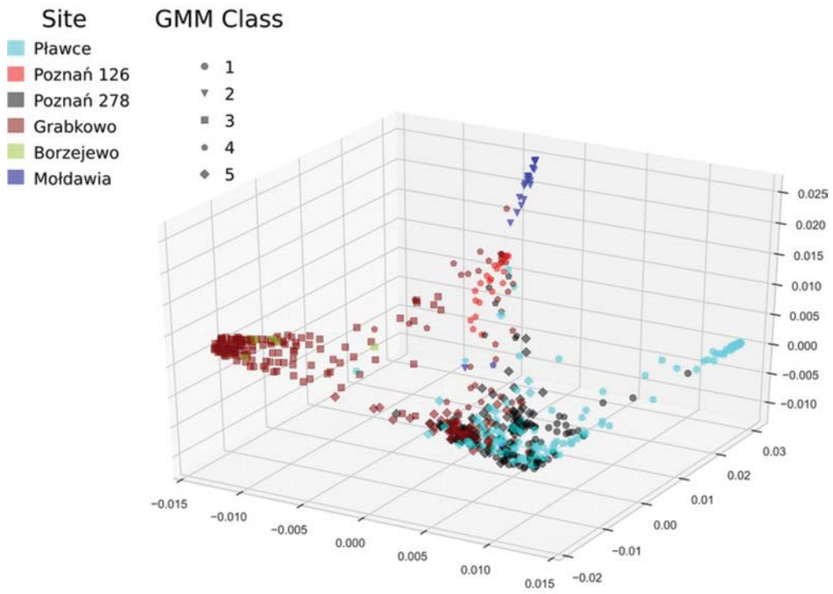


Figure 12. Diagram showing one of the statistical analyses of the results of the archaeometric research carried out using the XRF spectrometer (Ed. J. Jasiewicz).

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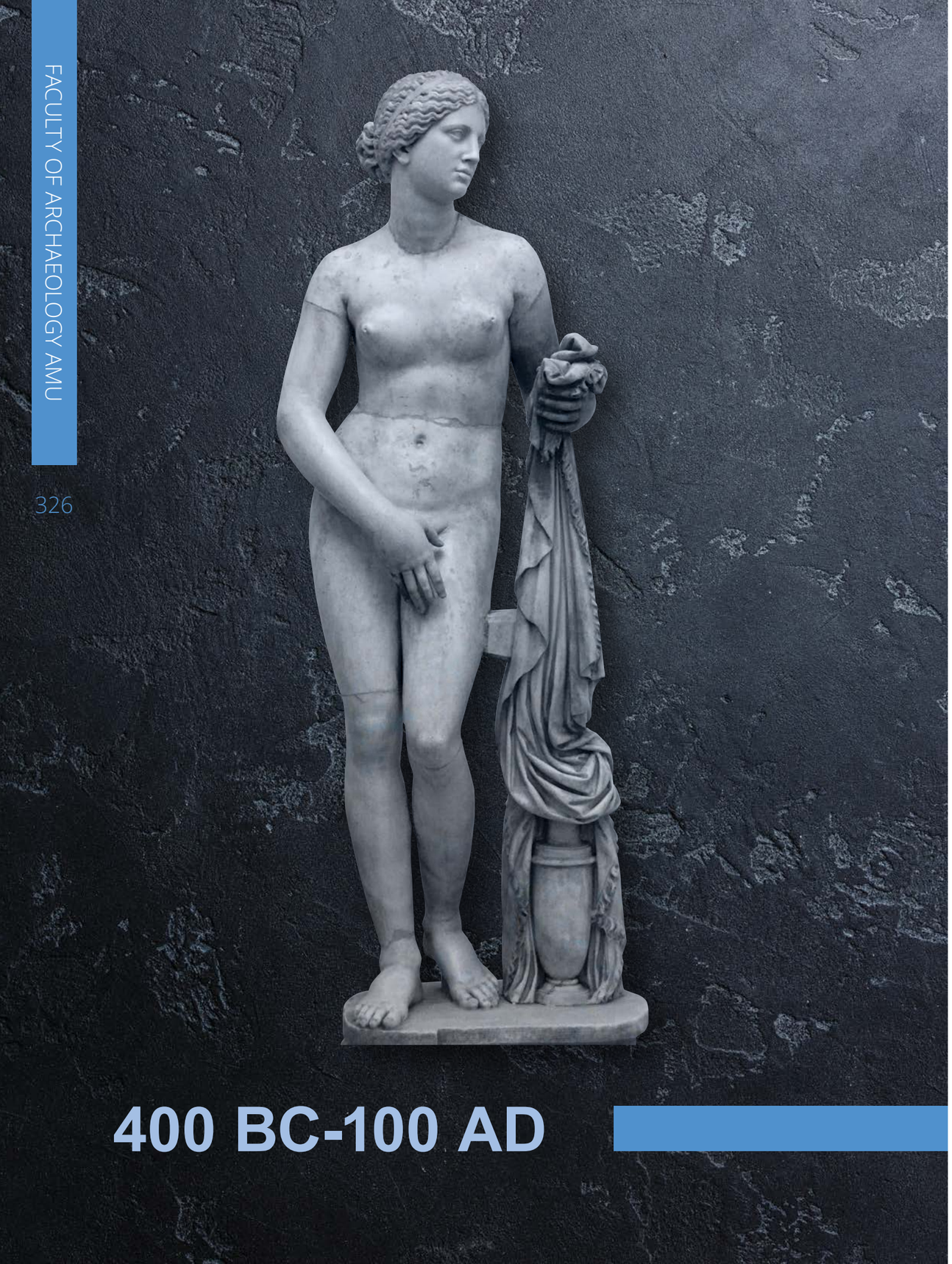
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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Some Remarks on the Problems of Art Research in Archaeology using the Example of Greek and Roman Sculpture

Ewa Bugaj

Abstract

This article briefly presents some of the author's research on art in archaeology, focusing especially on her contributions to research on Greek and Roman sculpture and its historiography. In particular, the problems of research on copies and imitations in Roman culture, Republican portraits of the elderly, the style of Greek sculpture, and the cult statue of Aphrodite of Cnidus are discussed.

Keywords: archaeology and art, Greek and Roman sculpture, Roman copies of Greek sculpture, Roman portraits, style of Greek sculpture

My research is characterised by an interdisciplinary approach in which I attempt to combine archaeological methods with those developed by art history and demonstrate common problem areas. However, it is on art, or more broadly speaking the visual culture of the ancient Mediterranean area and the interpretation of ancient visual representations within the social and political contexts of their production, functioning and reception, which I mainly focus. Within the study of classical archaeology, art has always held a prominent position. The phenomenon has been understood and interpreted for a long time as similar to modern art; modern aesthetic categories have been applied to it and its creators have been seen as artistic

individualities. This approach has been significantly reformulated in recent years, but the majority of approaches to ancient art, with simultaneous tendency to overlook their theoretical and methodological implications, is impoverishing these studies. Nevertheless, recently published textbooks and compendiums presenting and organising the current state of knowledge and directions of research (e.g. Marconi, 2014) and in-depth discussions of the history of ancient art and its position within contemporary humanities which show its roots in ancient authors' reflection and thus confront essentialist approaches with relativistic ones (e.g. Squire & Platt, 2010) represent a step in the right direction.

The aim of my scientific thought has been to broaden the field of scientific inquiry in archaeology to include issues often absent in its traditional framework. Hence, one intention of my considerations has been to present the importance of images, a subject of archaeological research, within archaeological interpretative procedures. I have achieved it by integrating knowledge of multiple forms of visual data from the archaeolocigal record, and, if necessary, also of other available evidence left behind by ancient societies. I have shown the possibilities afforded by the integration of methods applied by archaeology and history of art in archaeological interpretations and have presented discussions of various applications of these methods most clearly in articles concerning Roman and Greek sculpture (Bugaj, 2014, 2016, 2017, 2018).

As far as the Roman world is concerned, it should be recognized that sculpture has defined Roman art in general, as it was a common visual medium of the time that has remained relatively well preserved to this day. I have made more comprehensive reflections on this cultural phenomenon by concentrating primarily on Republican portraits of the elderly (Bugaj, 2014) and commenting on copies and imitations in Roman culture (Bugaj, 2006). My research approaches have promoted interpretation of such evidence as signs existing in a particular historical and political context, which help to clarify their specific visual expression. I have also tried to explain the social functioning of Roman art.

Copying or imitation are phenomena invariably linked with the Roman civilisation, a fact which has been widely commented on in scientific literature. My reflection on this subject fits into a contemporary research stream, which reformulates a former, pejorative view of this issue. Previously, it was this feature of Roman civilisation – imitation, mainly of Greek works and primarily concerning mythological and genre sculptures – which contributed to an opinion that what was established in Rome was merely a worse version of Greek art. More detailed study of Greek and Roman art in recent years, in my opinion, indicates that the two differed both in terms of objectives and achievements; it should no longer be claimed that Roman art is merely a repeating.

In my analysis I relied on the phenomenon of imitation within ancient literature, drawing on terminology used in considerations of fine arts (Hardwick, 2003). This terminology corresponds to various levels of referring to earlier texts, and this strategy has helped to give individual expression to commonly known examples of paintings, figures, topoi, which were used and understood as a common heritage. One of the main strategies used by the ancients in their artistic practice, which emerges from these studies, is emulation. Recently, emulation has begun to be introduced to a greater extent also to the analysis of visual arts from Roman



Figure 1. Funerary relief of the Vibii family from a Roman tomb, late first century BC.
Now in the Vatican Museums, inv. 2109 (Drawing by M. Markiewicz based on a photo by E. Bugaj).

times, and recognised as crucial (Gazda, 1995), a view I also share. Moreover, I assumed that for understanding the phenomenon of imitation in the Roman world, the question of its objectives and the meaning ascribed to such works by the ancients would be important. For this purpose, I analysed Cicero's letters to his friend Atticus (Marvin, 1993).

To summarize my considerations, I concluded that in ancient Rome an imitation was an active process of assimilation of classical heritage which engaged not only artists, but also poets, playwrights, and philosophers who attempted a dialogue with tradition during which new qualities were created, while the previously existing practices were selected, criticised, and adapted to the contemporary context. It was a process of making the past present which was essential for building a Roman identity. Images were actively involved, repeated thanks to widespread practices of emulation, and functioned as an important element of persuasive visual communication. I took up a similar problem of convincing visual communication in Roman culture in my next work.

In an article on the Roman Republican portraits of the elderly (Bugaj, 2014) I first thoroughly discussed the evidence and archaeological, historical, and social context in which they had functioned before analysing their numerous interpretations from a historical perspective. I discussed the genesis of the Roman veristic portrait in relation to the tradition of images of ancestors and death masks (e.g. Gruen, 1992; Flower, 1996), and confronted Roman sources with Greek (mainly Hellenistic) and Etruscan traditions. I referred critically to R.R.R. Smith's (1981) suggestions and also discussed the issue of defining portraits (Brilliant, 1991), emphasising that portraiture was meant not only to be similar to a model, but primarily was connected with a concept of identity as being perceived, represented, or understood in various times and places (Figure 1). Referring to S. Nodelman's findings (1993), I emphasised achievements of the Romans in this field, such as a new type of images with an unprecedented ability to express and project internal processes of human experience (Figure 2).



Figure 2. Marble portrait of an elderly woman, late first century BC, from Palombara Sabina, Italy. Now in the Palazzo Massimo collection, inv. 124493 (Drawing by M. Markiewicz based on the photos by E. Bugaj).

Furthermore, I attempted to investigate how the Romans themselves perceived portraiture and its functions, and cited numerous references on the subject by ancient writers. Referring to the most recent studies inspired by theories of aesthetics of reception and the communicative role of images in society (Fejfer, 2008), I discussed the role of statues in the Roman world. Numerous data indicate that being awarded with a portrait (statue), was considered one of the greatest dignities which could be then publicly obtained (Figure 3). Although I referred to J. Tanner's (2000) innovative sociological approach towards the Republican portrait in which the phenomenon was interpreted as a tool in the construction of relations of power, especially in a patronising system, I rather favoured L. Giuliani's (1986) findings as he, in my opinion, has analysed cultural diversity of Republican portraits most profoundly.

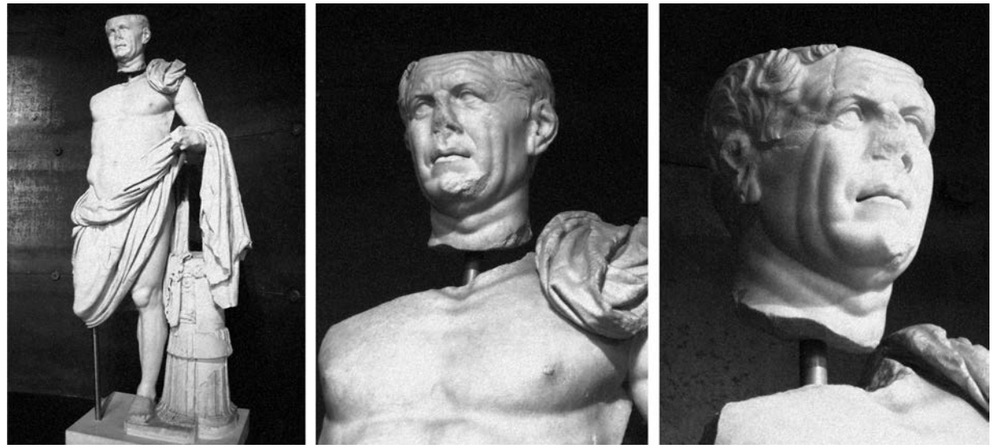


Figure 3. Portrait statue of a Roman General from Tivoli, c. 80-60 BC, Palazzo Massimo collection, inv. 106513 (Drawing by M. Markiewicz based on the photos by E. Bugaj).

I pointed out that the fact that the Roman Republican portraits were meant to emphasise individual achievements and dignity leads to a conclusion that they were supposed to be realistic, to portray particular people who had to be recognised (Figure 4). The Greeks liked to see their outstanding personae portrayed in a heroic or divine way, while Romans made them socially meaningful. Furthermore, in this society of high aspirations, high offices such as consul were achievable only after reaching the age of 40. A good consul should also be a father and guardian of the homeland - for this reason his look should be harsh, demanding, patriarchal and relentless. By emphasising their age the portrayed might have attempted to draw attention to their long-lasting service to the Republic and to the values they served and virtues they

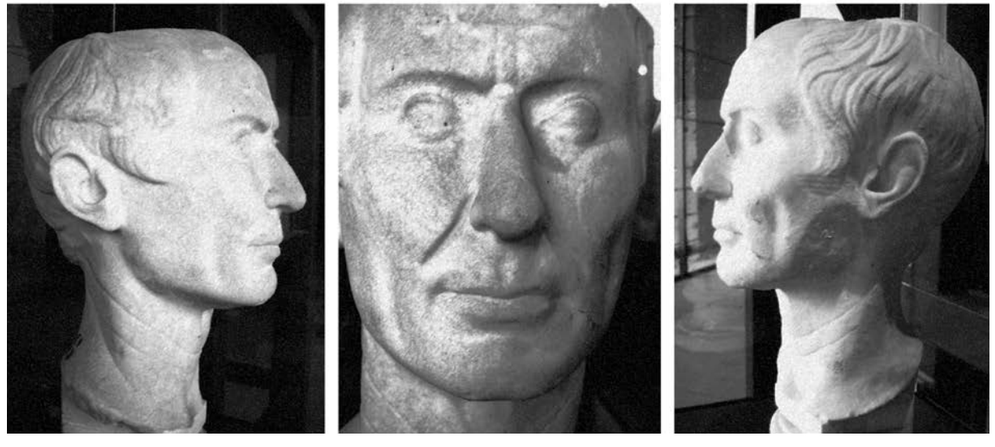


Figure 4. The Tusculum portrait of Julius Caesar made probably during his lifetime, dated to 50-40 BC, in the collection of the Museo d'Antichitá in Turin (Drawing by M. Markiewicz based on the photos by E. Bugaj).

ministered. Such desirable features of Roman character and function of the Roman Republican portraits led the Romans or other customers or freedmen making portraits of their patrons to order realistic images. In the conclusion of the text, I showed that this realism is a specific strategy of representation using conventions that were assumed to demand and receive a specific response from spectators.

In articles concerning new trends in the study of Greek sculpture (Bugaj, 2016, 2018), I intended to demonstrate that one important objective of recent study has been an attempt to achieve, at least to some extent, an understanding and perception of art as close to that of the ancient Greeks themselves as possible (Barrow, 2015). As a result, one of the most significant aims of study has become the development of more adequate attempts to understand art and to replace past methods equalising ancient and modern works of art. Implementation of this objective has been realised in various, sometimes radical, ways, including agitation to banish the 18th century aesthetics' concepts of ancient art, or even to quit using the category of "art" in the field of classical archaeology. In my considerations, I refer to those researchers, including Polish ones, who suggest that already in Antiquity there was reflection over the methods of production and the features of works of art; categorization had, already then, been attempted via philosophical thought, which anchored permanently within the aesthetics of the contemporary times (Tatarkiewicz, 1986; Porter, 2010; Tanner, 2010).

In the following parts of my texts I discussed what is, in my opinion, the main issue in the field of the study of Greek sculpture: an explanation of an origin of the phenomenon of the classical style, the issue that has been discaussed almost since the beginning of classical archaeology as a discipline. I describe various conceptualisations of the classical style, paying attention to their rooting in Hegelianism and the fact that 'style' within classical archaeology has been treated as a historical category, which is a highly problematic approach (Gadamer, 1993). I also refer to Ernst M. Gombrich's views, deeply rooted in science, that a peculiar revolution concerning ways of presenting in visual arts might have occurred in Greece, while also looking at their contemporary reviews (Vout, 2009). When briefly presenting the modern historiography of Greek sculpture, I indicate a dominant tendency to describe its development in terms of mimesis, and the consequences of such an attempt. I quote Christopher H. Hallett's (1986) deep and convincing analyses of the Greek classical style in which he successfully combines an existing tradition of the study of Greek sculpture with a new approach. I also concentrate on Richard Neer's (2010, 2014) reflections, as representing the most critical approach towards the past studies of sculpture.

Referring to R. Neer (2010) and Jeremy Tanner's (2001) studies (among others), I argue that the current shift in thought on Greek sculpture is a fundamental one. In the past, Greek sculpture was analysed as a relation between a work of art and its model or a work of art and the outside world. Currently, Greek sculpture is being analysed as a relation between a work of art and its (also ancient) receiver. This invalidates attitudes which restricted the development of art in the Greek period to only the categories of *mimêsis* and the "Greek revolution" to the mastering of depicting an illusion of reality in visual arts. On the contrary, it allows rich description of art as attempts by Greek craftsmen to create the thing embraced in the complex term *thauma idesthai*.



To conclude the considerations discussed in the articles, I assumed that the classical style in Greek art was a sort of solution to the problem of presentation within visual arts, which especially clearly manifested itself in sculpture. While not denying the influence the most talented craftsmen had on its development, which must have occurred, the style should not be interpreted as an invention of an individual genius. It was obviously not a result of a simple observation of nature and implementation of techniques to copy it better. On the other hand, it is also very problematic to demonstrate that its development was directly dependant on new political and philosophical ideas which appeared at the time, such as sophistry. However, situating art within a particular historic, social and political situation in the Greek world is usually well-argued in the literature on the subject. The least reasonable seems an assumption that it might have been a result of some inevitable development and a result of *genius tempi*, in this case a genius of Greek spirit. Greek sculptors worked and learned within a particular artistic tradition. This tradition had its own logic and technical expectations; it resulted, above all, from the expectations of the society. The strategies of presentation of particular subjects were important. However, it was the aim of the work of art – its meaning when observed – that really mattered. The style of each sculpture was a set of tools and a method of achieving such features of visualisation which were most expected, and as such it helped to create wonderful and graceful masterpieces, expressing themselves in the process of being watched.

In reference to research on sculpture, I also presented a text regarding investigations ofthe female nude in ancient Greek monumental art based on the example of Aphrodite of Cnidus (Bugaj, 2017). I first emphasised that Greek statues mostly represent deities and heroic figures in human forms. One of the reasons for this was the anthropomorphisation of the gods and heroes, the base of the

Figure 5. The so-called Aphrodite Braschi, Roman copy from first century BC of the iconic statue of Aphrodite of Cnidus, Munich, Glyptothek München, inv. 258 (Photo: Bibi Saint-Pol, © Glyptothek München, http://creativecommons.org/licenses/by-nc-sa/3.0/).

Greek religion. As a result, the image of the human body constantly occupied the imagination of sculptors. Recently, there has been a shift of interest in the study of Greek statues, particularly cult statues. Iconographic and iconological considerations have been increasingly replaced by attempts to comprehend and receive the sculpture just like ancient Greeks. My text quotes a large group of researchers who have undertaken fresh efforts to interpret Greek cult statues, combining a meticulous analysis of ancient texts with studies on the preserved body of works and contemporary reflection on visual culture and the ways it influences and is received by people. Important in these studies is also the recognition of the enormous impact of the modern, especially post-Enlightenment, tradition on the contemporary reception and meaning attributed to the ancient Greek art, especially statues (e.g. Barrow, 2015).

The article then provided a clear overview of various interpretations of the Aphrodite of Cnidus, a famous work of Praxiteles, in the context of the considerations about statues and their agency, and explored the development of the so-called naturalistic style in Greek sculpture (Havelock, 1995; Stewart, 1997). The paper shows

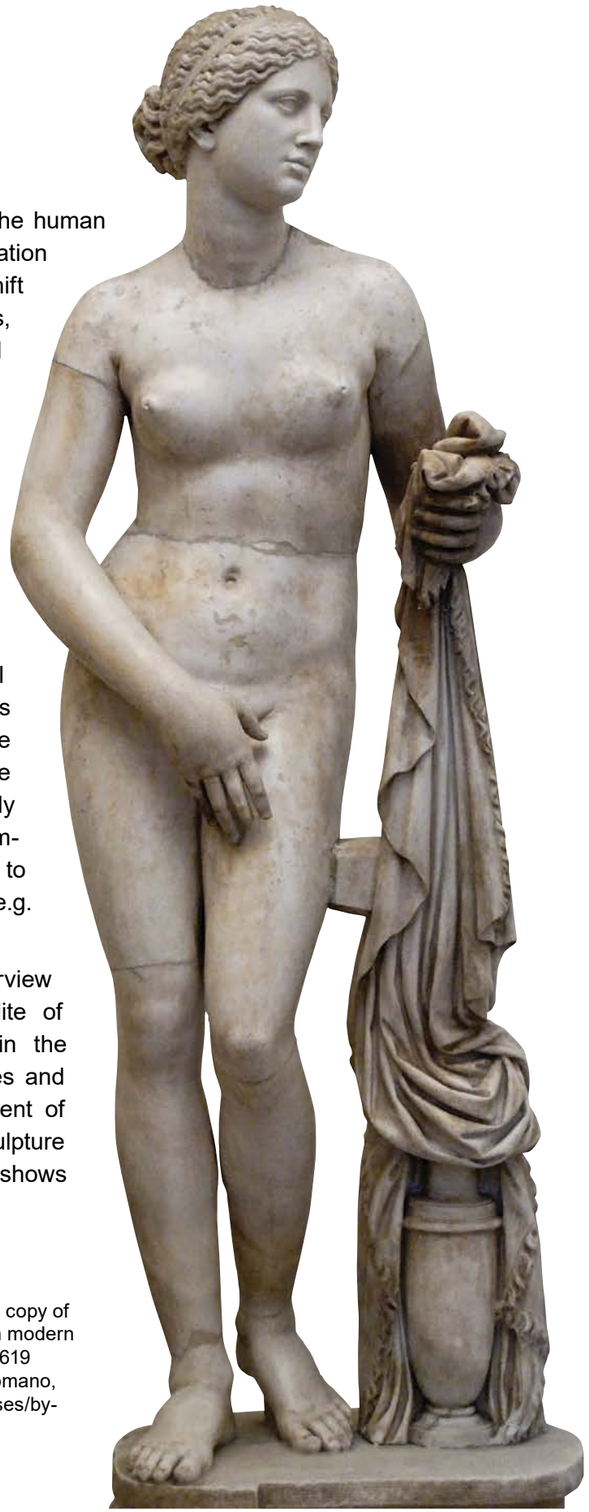


Figure 6. The so-called Aphrodite Ludovisi, Roman copy of the cult statue of Aphrodite of Cnidus, completed in modern times (head, limbs), Rome, Palazzo Altemps, inv. 8619 (Photo: Marie-Lan Nguyen, © Museo Nazionale Romano, PalazzoAltemps, http://creativecommons.org/licenses/by-nc-sa/3.0/).

how common research interest in goddess-related issues has been, most notably interest in the statue from Cnidus (Figure 5). On the one hand, this stems from the popularity of gender studies, blossoming also in research on Antiquity, and on the other hand, from a reflection on modern European art coming from feminist art history. Unfortunately, within these approaches, Praxiteles' work is subject to accusations because the sculptor supposedly showed Aphrodite as weak and embarrassed with her nudity, as opposed to proudly presented nudity in male statues (e.g. Salomon, 1997). The embarrassment manifested in covering up shows the goddess as weak and vulnerable, susceptible to injury. The naked Aphrodite of Cnidus is therefore believed to have been sexually objectified by being subordinated to the male gaze and thus devoid of any impact.

I argue that such interpretations overly reduce the meaning of the cult statues and their functioning in antiquity, as presented at the beginning of the paper. We cannot forget that Aphrodite was first of all a goddess, not an ordinary woman; the religious aspect of the functioning of the statue, so important for the ancients, should not be overlooked in the interpretation (Pironti, 2010; Bremmer, 2013). My paper thus showed that an ancient Greek, a follower of the goddess, is unlikely to have separated their gaze from their religious beliefs, given that the Greeks viewed the sculpture as a statue and the goddess at the same time. Other interpretations of Praxiteles' work are also given. Based on studies of religion as well as literary and historical references, it has been argued that Aphrodite cannot be called a modest goddess. Hence, her perfect and attractive body, carved by Praxiteles, was probably meant to emphasise her power (Figure 6). Furthermore, the decision to leave the genitals of the statue of Aphrodite of Cnidus unmarked could have resulted from an intention to distinguish her divine body from the bodies of ordinary women. This permitted the goddess, embodied in the statue, to retain impact and power.

The nudity of the Aphrodite of Cnidus rendered by Praxiteles in a very sensual manner, seemed to manifest her bodily availability, yet ultimately, the goddess was not fully accessible (both in the myths about the goddess and the legends about the statue). Her beauty, worthy of the highest admiration and lust and masterfully shown by Praxiteles, enabled the Greek to imagine her inner divine qualities. Thus, the aim of the representation was perhaps not to stimulate lusty glances and intimate relations with the statue, but to inspire religious awe and elation.

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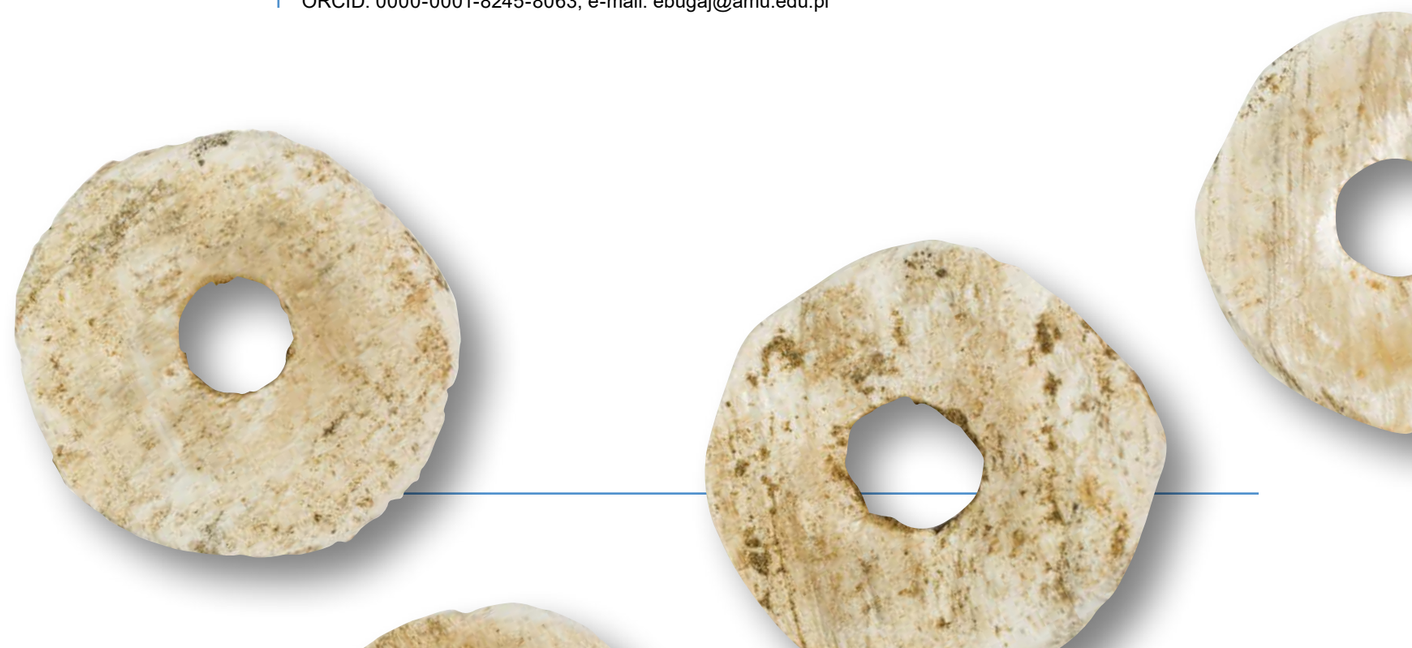
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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Barrows in the Skirts of the Forest: Excavation of a Wielbark culture cemetery at Mirosław 37, Ujście commune, Piła district, Greater Poland Voivodeship

Andrzej Michałowski

Abstract

Archaeological excavations carried out at site 37 in Mirosław since 2016 have revealed a barrow cemetery of the Wielbark culture. An enormous amount of data hitherto collected has greatly facilitated better understandings of the settlement patterns of the population represented by this cultural group in the northern part of Greater Poland. This information provides a truly compelling and valuable contribution into the study of the burial customs of communities inhabiting northern Greater Poland during the Roman Iron Age period. As a result of this work, two of seven preserved mounds were examined. These contained two female burials: an inhumation burial, dated to phase B2/C1 deposited in Barrow 7 and a cremation burial dated to phase C1a deposited in Barrow 1. Also, other objects were recorded in the area of the mounds, in particular traces that are evidence of metallurgical production. What is more, a fragment of the plane part of the site was identified using non-invasive research methods – magnetometer prospection. A part of this area was examined by means of excavation, which confirmed the occurrence of both burial goods (a burial that was first exhumed in antiquity, was possibly made from another, leveled burial mound) as well as other objects, present in the cemetery and related to the funeral activities. Additionally, the zone between Barrows 6 and 7 yielded the burial of a small child. The excavations have stimulated numerous research questions which have not yet been satisfactorily answered and are vital for describing the structure of the cemetery and providing its full chronology.

Keywords: Wielbark culture, barrows, burial custom, bloomeries, proglacial stream valley of the Noteć River

Many mysteries connected with the history of our lands that await discovery are hidden in the forests. This is because forests can perfectly preserve numerous sites, which creates the chance to make extremely interesting discoveries, whereas under different conditions, the objects could undergo serious degradation or be completely destroyed. The eponymous barrow cemetery of the Wielbark culture located in Mirosław is a good representation of such a site.

This site is located on the southern edge of the Lower Noteć Valley (Figure 1), within the sandy floodplain terrace known as the Walkowice Terrace (Kondracki, 2000, p. 130). In zone AZP 39-25, it is marked with number 104. The site lies on the land belonging to the State Forests, in the forest section 150a of the Sarbia Forest District, Jabłonowo Forestry.

The Mirosław 37 site was identified in January 2015 as a result of reinterpretation of maps made with the use of laser surface scanning technology – LIDAR (Light Detection and Ranging). Field verifications of the cartographic data were carried out repeatedly: first in 2015

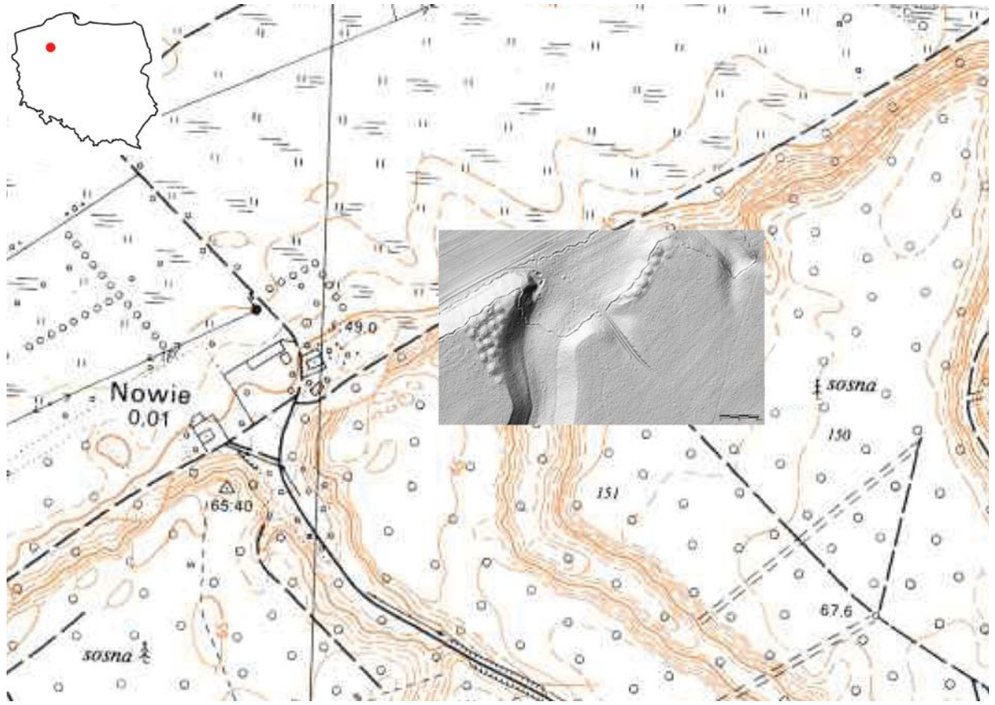


Figure 1. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Location of the study site. Scale 1:10 000 (Created by Andrzej Michałowski).

by Dr Jarosław Rola from the Stanisław Staszic Regional Museum in Piła, then in February 2016 by the same researcherand finally on 5 April 2016 by representatives of the Provincial Office for the Protection of Monuments in Poznań, division in Piła and by employees of the Sarbia Forest District. They confirmed the presence of 7 barrow mounds within the site, 6 of which were arranged in linear order along the edge of the proglacial stream valley of the Noteć River, whereas the seventh and smallest mound was located slightly to the south, on the side of the plateau adjacent to the main row of these features. Eventually, it was also the one selected for the initial excavations during the first season.

The first season of excavations was in July 2016 (Michałowski & Teska, 2016; Michałowski, 2017). Prior to commencing the second season of excavations, which took place in July 2017 (Michałowski et al., 2018), a non-invasive geophysical survey with the use of magnetometer was conducted by Dr Jakub Niebieszczański on April 7, 2017 (Michałowski et al., 2019). The third research season took place between July 1 and August 13, 2020 (Figure 2).

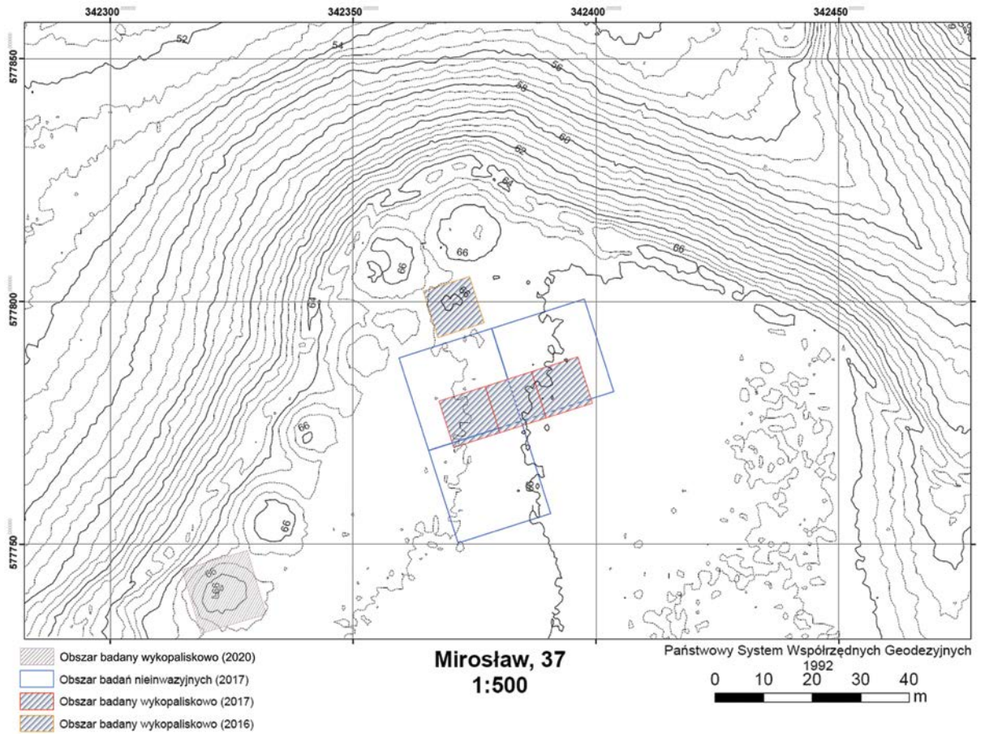


Figure 2. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Contour plan containing a collective summary of excavations from previous research seasons. Scale 1: 500 (Compiled by Jakub Niebieszczański).



Figure 3. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Drone photo of Barrow 1 with the line of the other mounts visible in the background (Photo: Mateusz Frankiewicz).



Figure 4. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Barrow 7, Feature 8 – inhumation burial of a female (iuvenis, aged c. 19-21) with grave goods typical of the Wielbark culture, phase B2/C1 (Photo: Andrzej Michałowski).

As a result of this field work, two barrows, numbers 1 and 7, were investigated, as was a strip of land measuring 300 m^2 lying parallel to the south of the line where the barrows were recorded (Figure 3). Both barrows examined from the cemetery in Mirosław differed significantly from one another in terms of structure and burial form.

The mound of Barrow 7 was entirely made of earth, with a simple stratigraphy, indicating that it had been built in a single construction event. Within the natural soil horizon in the central part of the mound was a burial pit that barely manifested on the surface. In it, at a depth of 1.5 m from the base of the mound, the inhumation burial of a young woman aged 19 to 21 years was discovered (Wrzesińska, unpublished data). The grave goods that belonged to the deceased were rich, although they did not differ from the standard burial practices of the Wielbark culture (Tempelmann-Mączyńska, 1988, 1989). On the right femur rested a small, bronze fitting for a delicate, thin belt. Above, in the pelvic section, a rectangular belt buckle and three type MLG3 rivets were found (Madyda-Legutko, 1986) together with a single bronze strap-end for a belt. The right arm of the deceased was extended while the left arm was flexed at the elbow and rested on the chest (Figure 4). Two bracelets were placed on the wrists. One was snake-shaped and the other was viper-shaped and of type III variation B after T. Wójcik (1982). Both bracelets were made of silver (Figure 5). Three bronze fibulae were found on the right side at chest level. Using Oscar Almgren's typology (1897), they should be tentatively classified as series AVII 213, AV 8, and AV 96. Another group of artefacts was located at the level of the clavicle. The finds recorded on that part of the skeleton included: a twin fibula of the AV 96 type and a silver S-shaped buckle. A silver cone-shaped pendant was also discovered among the cranial bones. It is worth mentioning that the excavated soil was sieved, which lead to the recovery of small bone beads and belemnites representing the remains of a necklace worn by the woman. The recorded grave goods made it possible to place the chronology of the burial within phase B2/C1 of the Roman Iron Age period.

In contrast, the stratigraphy of the mound of Barrow 1 was far more complex. Based on the recorded cross-sections of its earthen layers, it can be concluded that the construction of the mound was multi-phased. Initially, at least 3 phases of its construction were identified. The first phase concerned its eastern part. It was, most probably, the primary burial mound, with the centre riveted by wooden posts formed in a circle that left traces in the form of post holes (Figure 5). The western part of the mound was most probably destroyed when the burial pit was dug into the natural soil horizon. A stone kerb, which lay over the burial, partially levelled

Figure 5. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Barrow 7, Feature 8 – Part of the burial equipment of a young woman. Silver bracelets snake-shaped and the other – viper-shaped of type III variation B and a silver S-shaped buckle (Photo: K. Zisopulu).

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Figure 6. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Barrow 1, Quad B, supporting profile N. Primary burial mound with the inner structure delineated by the outlines of post-holes (Photo: Andrzej Michałowski).



Figure 7. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Barrow 1, Feature 12 – stone kerb of the burial chamber (Photo: Andrzej Michałowski).



Figure 8. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Barrow 1, Feature 12 – an piece of burial furniture accompanying an adult female (adultus, aged 22:30-35), a single bronze goad (Photo: Andrzej Michałowski).

the primary mound (Figure 6). The entirety of the structure was then covered with a new earthen layer. The stratigraphic structure of the western part of the barrow, which lacked the primary, older mound, was uniform. The stone structure present above the burial pit was built of large cut boulders using the dry stone method. It was rectangular in outline – such a structure indicates that it was a kerb to an inhumation burial. The grave was empty, though (Figure 7). An oval pit with a diameter of 1 m was found at its eastern edge. It was filled with some burnt material and the cremated remains of an adult female aged 22 to 30-35 years (Kozak, unpublished data). The cremation pit grave yielded fragments of bronze artefacts – 2 spurs, of which two goads were preserved (Figure 8), as well as 3 fragments of two heel bands. A preliminary visual inspection indicated that they were group VIId spurs in the Wielbark culture typology developed by E. Smółka (2014), and thereby they were the only sensitive timestamps, indicating the possibility of referring the burial to phase C1a of the Roman Iron Age.

The remnants recorded during the second research season most probably belonged to a levelled burial mound. Unfortunately, the barrow did not manifest itself in an exposed form on the surface of the site. Worse still, no trace of a mound was detected with the use of LIDAR data. The only clue to the possible existence of such a form at that location was an anomaly

that was caught in the image obtained from the geomagnetic research (Michałowski et al., 2019, p. 161). During excavation, the burial pit manifested itself immediately in the undisturbed soil horizons. Within the grave fill, a trench disturbing the primary structure of the grave was discovered. In the top part of the trench, a sandstone spindle whorl was deposited. The trench was filled with a large amount of burnt material and clearly identifiable fragments of charred logs. Wielbark culture pottery was recorded throughout the feature. The primary burial pit was recorded at the base of the levelled mound. In the transition zone between the trench and the burial pit lay a single, large sherd from a Wielbark culture vessel, decorated with a roughened triangular ornament. It can be assumed that leaving it in that place was intentional. The form and size of the burial pit indicate that originally it belonged to a cremated burial. Also, some traces of burnt material were recovered, probably originating from a pyre. The described situation indicates that the primary filling of the feature and the skeleton were intentionally exhumed in antiquity. A single fragment of a vessel was placed at the bottom of the feature. Next, the pit was set alight, which was followed by a single episode of backfilling the burial pit and 'sealing' the top part with a stone spindle whorl (Figure 9). It seems possible that the whole process had a symbolic character. Thus, the totality may be interpreted as traces of ritual practices performed at the site. Radiocarbon dating conducted at the Absolute Dating Laboratory in Cracow (Kraków) by Prof Dr Hab Inż Marek Krąpiec revealed that the burnt material obtained from the primary pit could be dated to 230±50 AD whereas the burial pit provided two dates of 375±70 and 415±50 AD (Figure 10). This shows the timing of the primary burial of the deceased and the date of the potential exhumation during the Migration Period (ca. AD375-500).

Another discovered burial feature was the cremation grave of a small child located between the mounds of Barrows 6 and 7 and enclosed by a kerb made of three large boulders. Apart from some burnt bones, that burial site yielded no other artefacts.



Figure 9. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Feature 15, Season 2017 – stone spindle whorl and a vessel fragment decorated with a roughened triangular ornament recorded in the top and base parts of the exhumation trench in the burial pit, respectively.

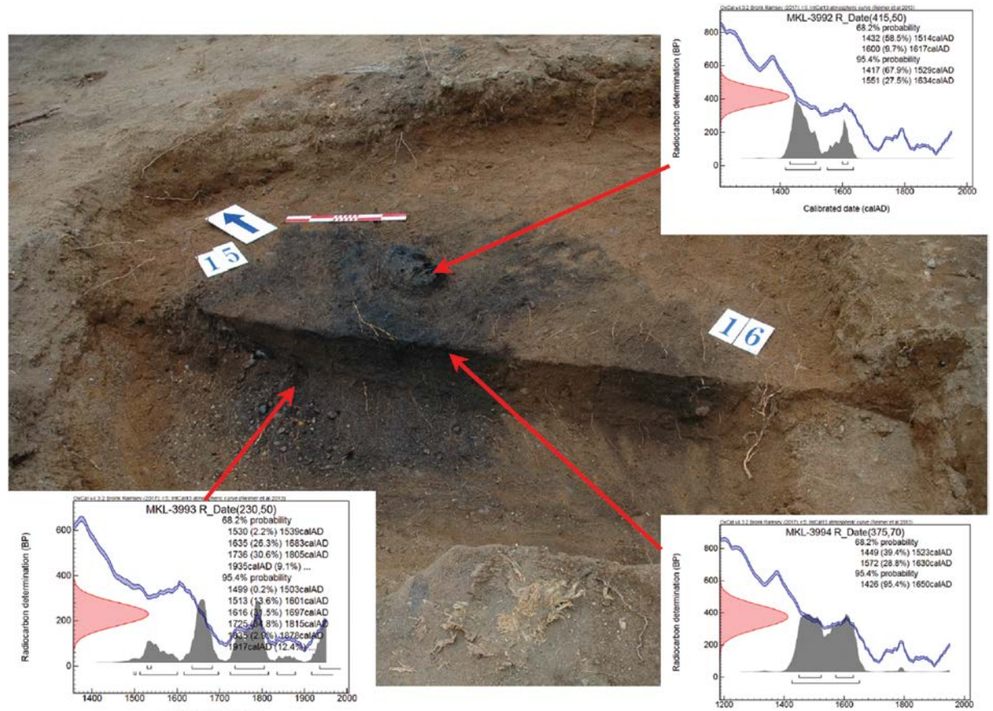


Figure 10. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). Feature 15, Season 2017 – a burial pit with an exhumation trench and radiocarbon dating conducted by Professor Dr Habil. Eng. Marek Krąpiec (Photo and compilation by Andrzej Michałowski).

Moreover, some non-funerary objects were recorded in the course of excavation works at the cemetery in Mirosław, although it cannot be ruled out that they were related to the activities undertaken within the cemetery for ceremonial purposes. Right at the border of the contemporary range of Barrow 7, a large, deliberately cut stone (boulder type) was recorded in the undisturbed subsoil. It was identified as a fragment of a stone from a tomb and was probably a coping stone for the analysed mound. Near it, a pit was discovered containing a single Wielbark culture pottery fragment in addition to stone flakes detached during the process of shaping the extension of the stele (Chachlikowski & Michałowski, 2021). Traces of stone working were also noticeable on the stones that marked the place of the child's grave and the boulders that formed the burial pit found in Barrow 1. What is more, it seems possible that the stonemasons who worked for the Mirosław necropolis built the two structures identified in the flat part of the site. They were classified as large hearths filled with overheated stones. This is the procedure used while preparing stone material for further mechanical treatment.

A slag block in a small smelting furnace (bloomery) pit was recorded under Barrow 7 and other traces of the presence of such features were found within the area covered by Barrows 7 and 1. While discussing these finds in Podlasie, Szymon Orzechowski brought awareness

to the co-occurrence of bloomeries and traces of black metallurgy with funeral objects within Wielbark culture cemeteries during the Cecele Phase (ca AD 10-200 (Orzechowski, 2012). The finds from the cemetery in Mirosław foster the first confirmed observations of this type of cemetery in the Lubowidz phase (ca AD 200-375) and in the western zone of the Wielbark culture area (Figure 11).

All seasons of excavations conducted at site 37 in Mirosław brought a staggering pool of data pertaining to the process of settling the northern part of Greater Poland by the population of the Wielbark culture. They also provided truly thought-provoking and valuable information to be used for the study of the burial customs of the local communities. However, as a result of the work conducted, numerous new research questions have arose that are still awaiting adequate answers. All of this calls for further research to be conducted in the Mirosław necropolis. An important factor in determining the full chronology of the site would be the excavation of at least one more barrow. To understand the structure of the cemetery, it is also advisable to excavate the zone between the barrows and the excavation unit established in 2017. This would allow a possible second row of barrows that were supposedly levelled as a result of the agricultural use of this area and the anticipated occurrence of flat graves in this portion of the site to be identified or ruled out. Another important research aspect is the recognition of the site's environmental base and finding the remains of the related settlement.

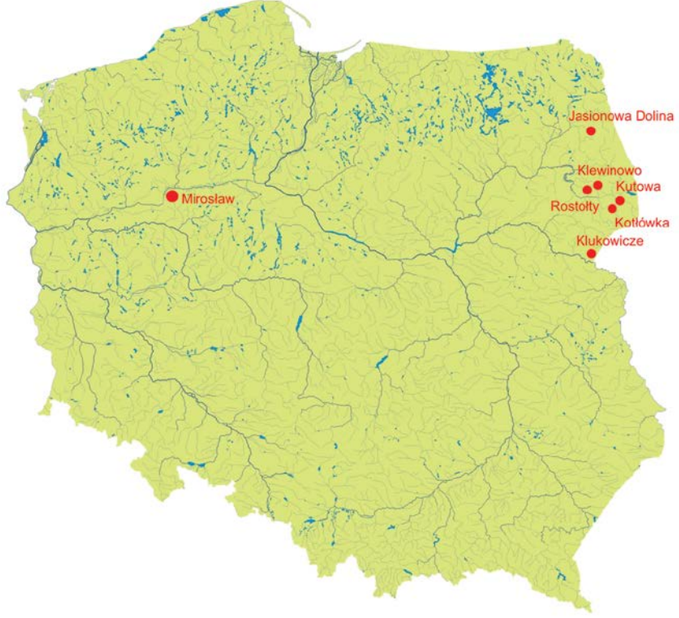


Figure 11. A barrow cemetery in Mirosław against the background of discoveries of traces of ferrous metallurgy identified in the context of the necropolis of the Wielbark culture (Based on Orzechowski 2012, compiled by Andrzej Michałowski).



Figure 12. Mirosław, Ujście commune, Piła district, Greater Poland Voivodeship site 37 (AZP 39-25/104). An indispensable member of the excavation team – Mr Arkadiusz Graś Msc Eng., forester of the Jabłonowo Forest District, the land manager, a great friend of the expedition – the best archaeologist among foresters and the best forester among archaeologists (Photo: Andrzej Michałowski).

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The excavations, which were supervised by the author of this report, were possible thanks to the courtesy of the Regional State Forests Directorate in Piła and financial support from the Forest Districts of Lipka, Kaczory, Krucz, Trzcianka, Wronki, Zdrojowa Góra, and especially the Forest District of Sarbia, which took the expedition under its wings. In particular, I would like to mention Mr Arkadiusz Graś Msc Eng., forester of the Jabłonowo Forest District, who was the good spirit of the research works (Figure 12).

Further, I extend my thanks to the company Viabud Sp. z o.o. from Walkowice and in particular to its owner, Mr Jacek Gruszkiewicz, for his expert assistance with the reconstruction of the burrow mounds.

Last but not least, I want to offer my heartfelt thanks to the many people involved in this project for their great physical effort as well as mental contribution, without which the research work would not have been possible, including all members of the Expedition – the employees, PhD students and the students of the Faculty of Archaeology of Adam Mickiewicz University, for their enormous help, involvement and great effort in uncovering the mysteries of the barrows from the backwoods.

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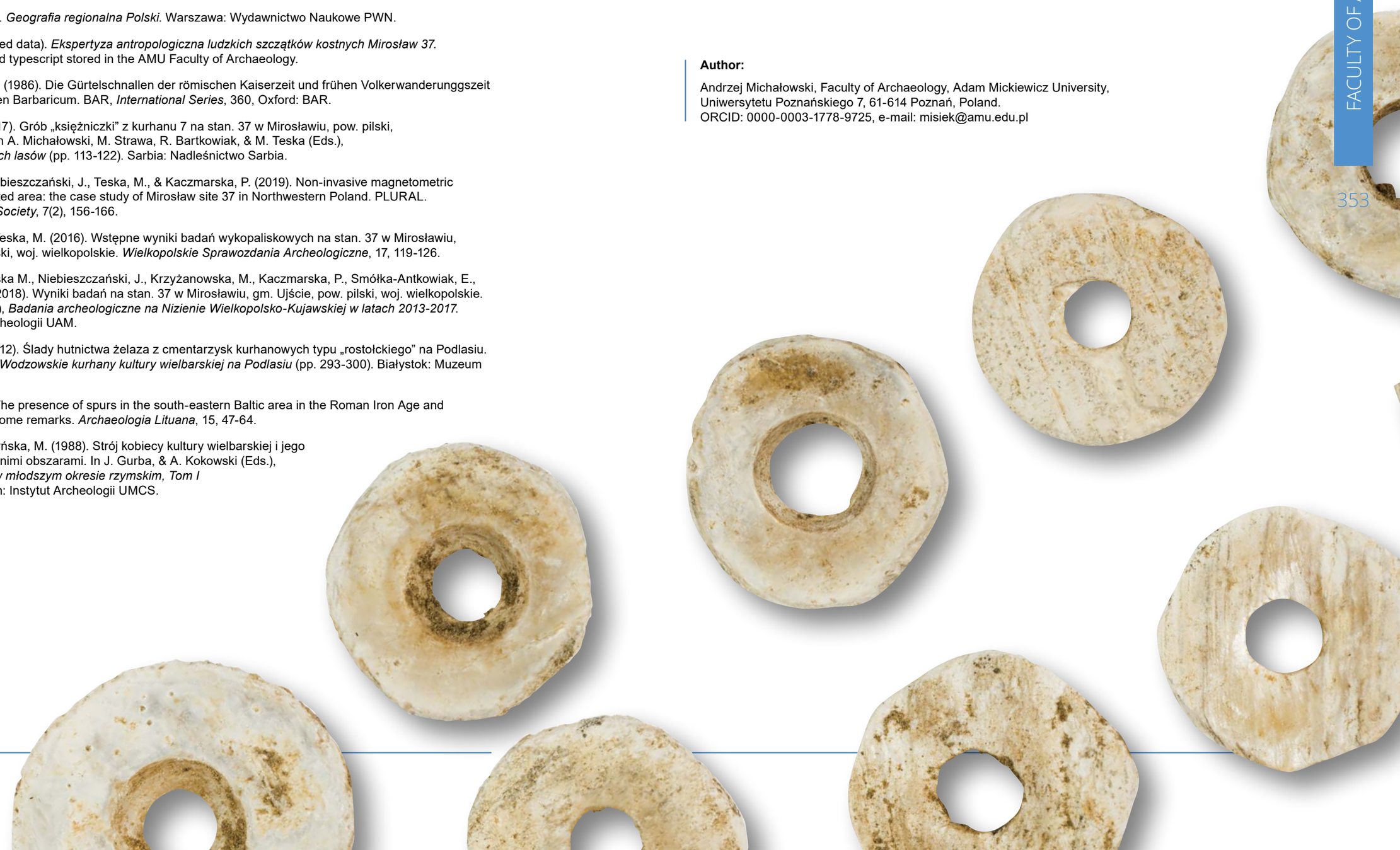
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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The stronghold in Grzybowo and its settlement base in the context of in-depth interdisciplinary research

Marcin Danielewski

Abstract

This article covers the issues connected with the early medieval stronghold in Grzybowo, which was built in the years 919 to 923 (dendrochronological dating). Its second construction phase took place in the years 929 to 935 and another at the beginning of the next decade of the 10th century. This complex belongs to the 'major settlements of the early Piast state' and has been systematically excavated since the end of the 1980s. The research conducted over the last few years (2018 to 2020), implemented within project No. UMO-2017/25/B/HS3/00016 and financed by the National Science Centre, has provided plentiful new results, but also has confirmed several older hypotheses concerning early medieval Grzybowo. Thanks to the results of this works, it was possible to demonstrate that the stronghold in the form known today (Site 1) primarily consisted of two parts, which in the 10th century comprised one of the largest settlement complexes in the Greater Poland at that time. An important element supplementing this settlement picture is a craft settlement (Site 6), traces of which were recorded to the south and east of the stronghold. In the course of this research, both in relation to the stronghold and the craft settlement, further excavations and non-invasive research methods were implemented, including ALS LiDAR (Airborne Laser Scanning and Light Detection and Ranging), Aerial Archaeology, magnetic prospection, GPR (Ground-Penetrating Radar), ERS (Electrical Resistivity Survey) and ERT (Electrical Resistivity Tomography). When necessary and possible, the results of these analyses were verified through excavation. As a result of this combined research, the stronghold complex in Grzybowo is becoming a better understood archaeological site.

Keywords: stronghold in Grzybowo, rampart, Greater Poland, interdisciplinary research

The Early Middle Ages was a time when significant settlement, economic, and political transformations took place in Poland, which resulted in the establishment of Civitas *Schinesghne* (the Gniezno state). The creators and first rulers of that system were representatives of the Piast dynasty, and strongholds became the most characteristic elements of the settlement landscape of those times. Typically, they were surrounded by huge wood-earth ramparts, the impressive structures of which were a visible sign of the power, economic and organisational opportunities, and prestige of the Piasts. They were also a focal point for the local settlement, enabling the local population to function and providing them with a sense of security.

The stronghold in Grzybowo represents one of the most fascinating settlement centres of the Piast state, but although it was built in the Early Middle Ages, it fell into oblivion very soon thereafter. Even today, this place is still referred to by the local population as the 'Swedish trenches', whereas German maps from the 19th century contain the term *'slawische Schanze'* (Slavic trenches). It seems likely, however, that a Swedish unit was stationed inside the ramparts and the remains of the stronghold might have been used as camp by some Napoleonic troops.

The beginnings of scientific interest in the castle date back to the 19th century and are connected with Wilhelm Schwarz. This scientist was the first to perform small surveys within the stronghold in 1878 and, on their basis, he concluded that they were the remains of a Slavic stronghold. Unfortunately, that interpretation could have resulted in a loss of further interest in this site at the time, due to the fact that in the 19th century, large areas of Greater Poland belonged to *'Regierungsbezirk Posen'* and one of the tasks of German archaeologists was to prove that those lands belonged to the circle of Germanic culture and, consequently, the strongholds were expected to be products of that culture. In the early 20th century, Karol Potkański, a historian from the Jagiellonian University in Cracow (Kraków), became interested in this site, listing the stronghold in Grzybowo as one of the most interesting centres of the Middle Ages (Potkański, 2004, pp. 266, 267, 298 and 299). Further, Władysław Kowalenko, an archaeologist, included this site in his catalogue of strongholds located in Greater Poland (Kowalenko, 1938, p. 218). More amateur research was carried out at the stronghold in the 1930s by Olgierd Brzeski (Hensel, 1953, p. 160; Wrzesiński, Łukaszyk, & Frydrychowicz 2014, p. 6), whose results were published before the outbreak of World War II (Brzeski, 1936-1938, pp. 151-153). However, no fully professional excavations were commenced until the end of the 1980s, when they were carried out on behalf of the Brzeski Foundation at the Poznań Society for the Advancement of the Arts and Sciences. Systematic archaeological excavations continued in the 21st century (until 2009) and were conducted mainly by Mariusz Tuszyński, but also by the Museum of the Piast Dynasty in Lednica. It is worth adding that the site of the stronghold has belonged to the aforementioned museum since 1997 (Tuszyński, 2004, pp. 18-23, 71; Wrzesiński et al., 2014, p. 6). After 2009, there was an almost ten-year break in the research of the Grzybowo complex, and then the implementation of the project entitled: 'The stronghold in Grzybowo and its settlement base in the context of in-depth interdisciplinary research', financed by the National Science Centre, caused the return to archaeological research at the stronghold and its surroundings. These excavations are carried out under the auspices of the Faculty of Archaeology of the Adam Mickiewicz University in Poznań and they primarily focus on two sites: No. 1 (stronghold) and No. 6 (craft settlement).

In the years 2018 to 2019, non-invasive research was carried out in the settlement in Grzybowo with the use of Aerial Archaeology, ALS LiDAR (Airborne Laser Scanning and Light Detection and Ranging), and geophysical methods including magnetic prospection, ERS (Electrical Resistivity Survey), GPR (Ground-Penetrating Radar), and ERT (Electrical Resistivity Tomography) (Figure 1). The work aimed to provide a deeper recognition of the site and to select locations that are particularly important for subsequent excavation.

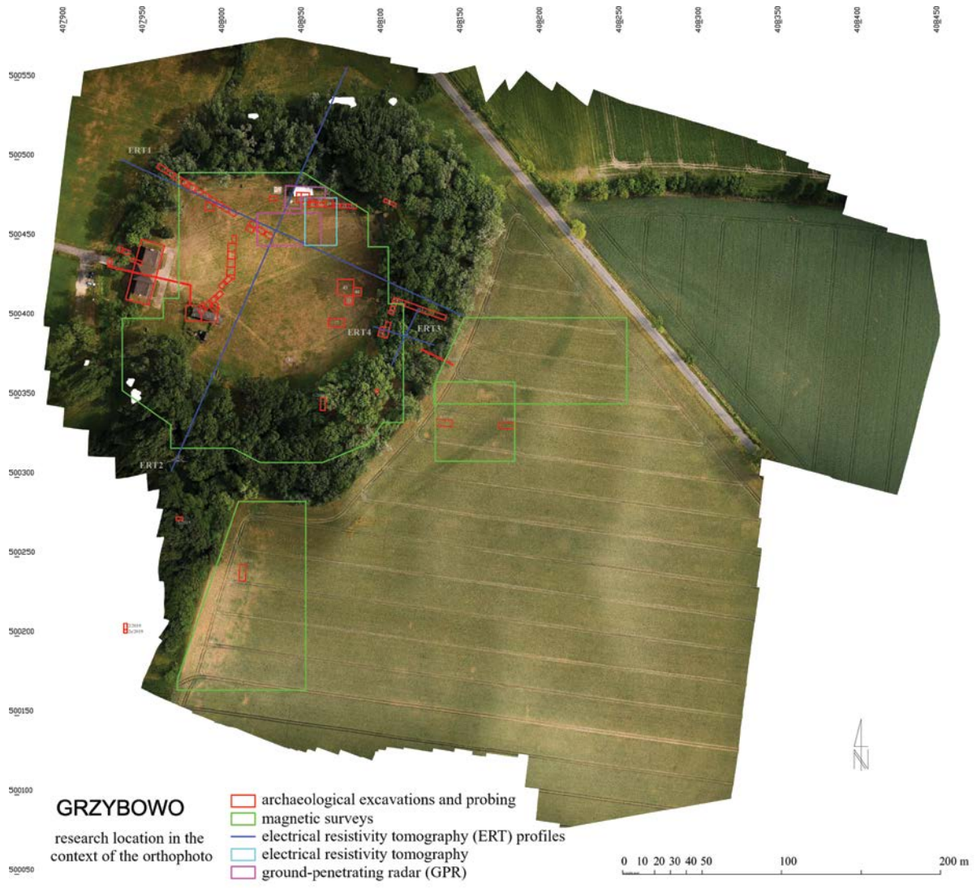


Figure 1. Orthophotomap with areas subjected to non-invasive research marked (Author: M. Bogacki).

The research using the magnetic prospection method was carried out at the settlement by W. Małkowski (modern residential areas and those parts of the site that were covered with dense vegetation were excluded from the study). Magnetic anomalies recorded in the settlement area were used to divide it into two groups. The first was related to a rampart surrounding a smaller stronghold, the possible range and structure of which belong to the riveting issues that still occupy the minds of the archaeologists who study the Grzybowo stronghold. The second is connected to the objects within the main square of the stronghold. For a more complete presentation of the research results, the spatial data (i.e., ALS LiDAR, magnetic mapping, and orthophotography) were compared. In addition, the results obtained for the studied area were verified through excavation.

The stronghold was also subjected to aerial reconnaissance, during which Miron Bogacki took vertical and oblique aerial photographs. On the basis of the collected data, a DSM (Digital Surface Model) as well as orthophotomaps were created, presenting both the stronghold and the craft settlement.

Site 1 was additionally subjected to research conducted my means of the ERT method. Measurements made using this method covered the area of the main square and the ramparts of the stronghold. A total of four ERT profiles were obtained as a result of the excavations that were carried out. Two crossed the smaller stronghold, the ramparts, the square, and the 20th century moat. They were arranged in such a way as to capture the most characteristic elements of the stronghold: the moat and the riverbed of the Struga River, the structures of the smaller stronghold, a depression in the northern part of the ramparts, four sections of the ramparts (northern, southern, eastern, and western), and the dyke. Two additional ERT profiles were placed where a gate was probably once located – a depression in the eastern part of the rampart (Tuszyński, 1995, p. 201; Wrzesiński & Danielewski, 2018, p. 98). The results of these studies allowed for better planning of further excavations.

The presented research was supported by the ERS carried out in the southeastern part of the smaller stronghold by K. Misiewicz. The analysed area was delineated in such a way that it partly overlapped the area tested through the GPR method to check the course of the rampart structures of the smaller stronghold.

Finally, the last part of the non-invasive research was the identification of selected sections of the settlement using the GPR method. This work was carried out by R. Mieszkowski during his two visits to the settlement. The first stage of the GPR research covered two study areas (GPR1 and GPR2) with a total area of 8 are, located within the line of the rampart, the area near the rampart, and the main square of the smaller stronghold (southeastern part of the fortified complex). The second stage of analyses concerned the area located near Trenches 50, 53, 55, 57, and 2/2018 (an area of c. 2.5 are) and was conducted with the aim of exploring that section for further archaeological excavations as well as to verify the location of the stone and wooden structure partially recorded in Trench 2/2018.

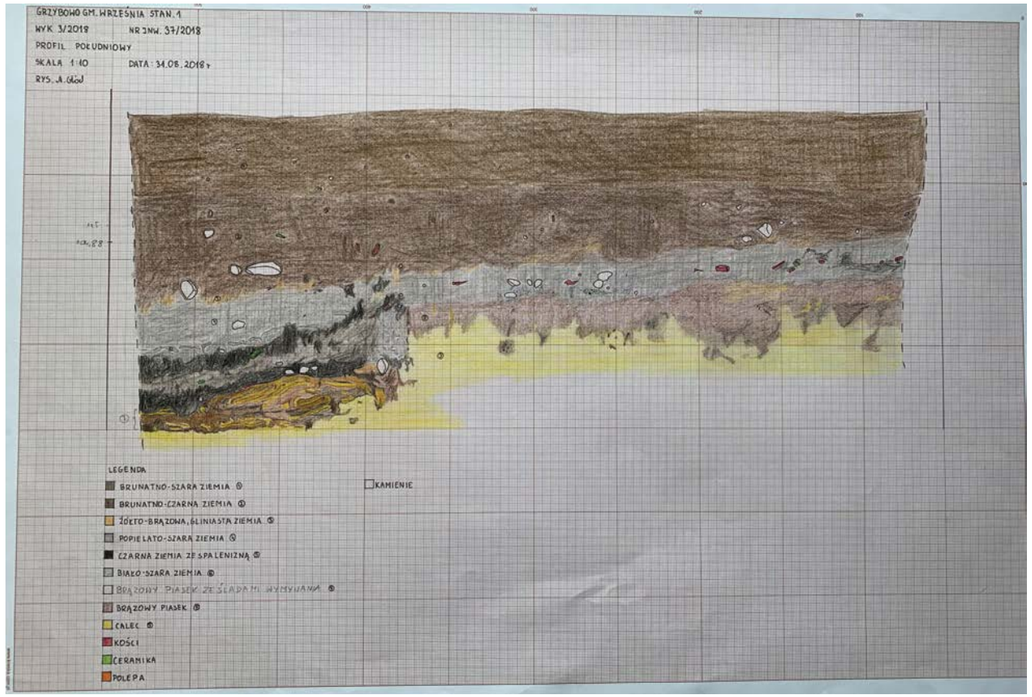


Figure 2. The southern profile of Trench 3/2018 (Author: A. Głód).

The results of the non-invasive studies provided a pool of data on the depth of the cultural layers, the distribution of particular objects, and the locations of the cuts of previous archaeological trenches. What is more, that stage of the archaeological work helped to better plan further excavations that were carried out in the stronghold from 2019 to 2020.

Excavations carried out in recent years in the settlement complex of Grzybowo focused on the study of three zones:

- the south-eastern area located near the rampart of the remains of the larger stronghold (Trench 1/2018),

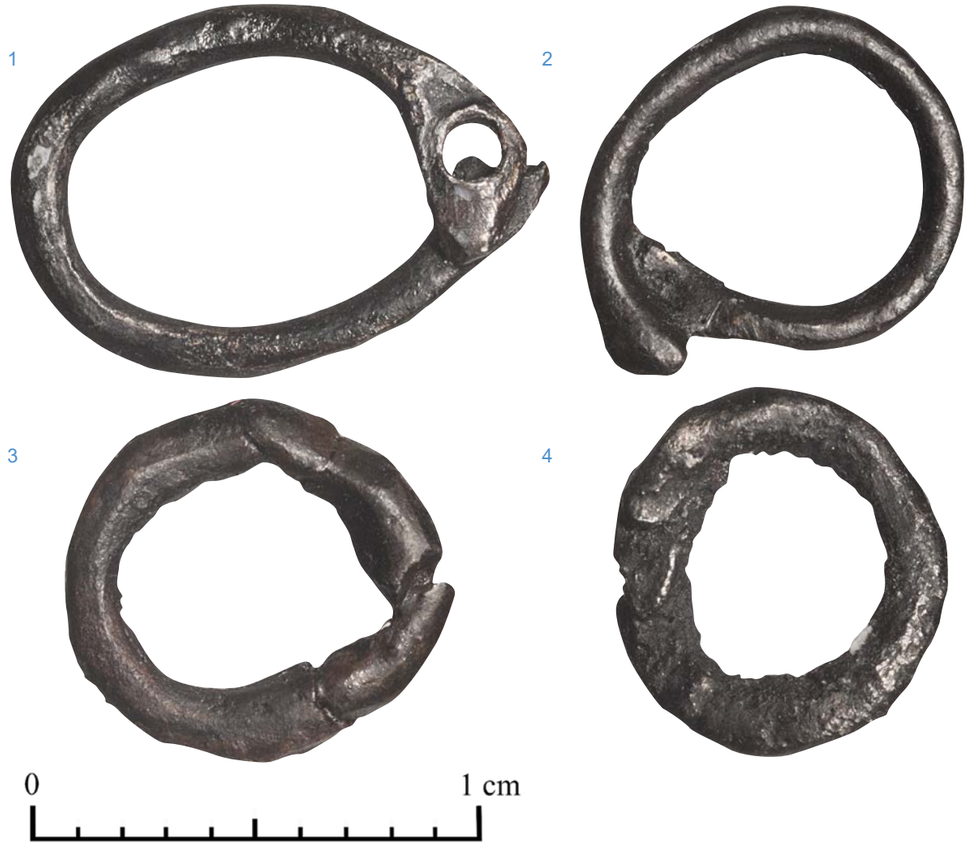
- the western area located near the rampart of the smaller stronghold (Trenches 2/2018, 1/2019, 1a/2019 and 1/2020), including completion of the exploration of Trench 55, which was initially investigated in 2007,

- the central zone of the smaller stronghold (Trench 3/2018, cf. Figure 2).

The results of these excavations enriched the data on (*inter alia*) the timeline of both strongholds. Here, the dendrochronological dating of the wooden stronghold structures was truly valuable because it clearly confirmed that the first phase of construction took place during the years 919 to 923. These fortifications were made of oak wood (including material derived from over 400-year-old trees). The construction work in Grzybowo was continued in the years 929 to 935 and at the beginning of the next decade of the 10th century, which shows that both the smaller and the larger strongholds were built almost at the same time. The data indicating the timeline of the site is complemented by the results of pottery analyses, which clearly shows that the settlement complex in Grzybowo was intensively used until the mid-11th century. Thereafter, however, the stronghold most probably ceased to perform its original functions (military, economic, and administrative), although (interestingly), in the light of radiocarbon dates, some skeletal burials were recorded there and date to the 13th to 15th centuries.



Figure 3. A horse's head uncovered at Site 1 Trench 1/2018
(Author: M. Jóźwikowska with additions by A. Głód).



Mail rings. 1. Inventory no. GRZ 366; 2. Inventory no. GRZ 1539;
3. Inventory no. GRZ 1985; 4. Inventory no. GRZ 1899.

Figure 4. Chain mail rings discovered at Site 1 in Grzybowo
(Author: M. Jóźwikowska complemented by A. Głód).

The fact that there was a smaller stronghold that functioned within the larger one, as was established during the research conducted from 1988 to 2009 (the data on its location and the course of the rampart structures was verified in 2018 to 2020) is another important argument that serves to confirm the elite character of this stronghold complex. The residence of the military elite in the stronghold (i.e., the royal retinue), is evidenced by the skeletal remains of horses (Figure 3), equestrian equipment, and horseshoes, but most of all – chain mail rings that represent fragments of chain armour (Figure 4) that were found in various parts of Site 1. However, little remains known about the non-military elite whose representatives may have lived in the Grzybowo stronghold complex. Nevertheless, it is agreed that the stronghold yielded several elite artefacts that might evidence long-distance exchange (Kurnatowska & Tuszyński, 2009, pp. 150, 151; Kurnatowska, 2011, p. 58; see Wrzesiński, 2016, p. 257). Also, it should be added that the quantity of such artefacts is not as abundant as some literature suggests (Kurnatowska & Tuszyński, 2009, p. 151; Kurnatowska, 2014, p. 22). Certainly, such an assemblage includes the artefacts that comprised the hoard originally discovered in 1899 and



Figure 5. An oblique photograph of the stronghold in Grzybowo – second aerial reconnaissance, June 2018, showing linear vegetation indices (Author: M. Bogacki).

rediscovered in 1999 (more about this deposit: Tuszyński, 2004, pp. 74-78; Andrałojć, Silska, & Szyngiera, 2011, pp. 52-53, 184-185; Szczurek et al., 2017, pp. 258-268) and some of the ornaments discovered in various parts of the Grzybowo stronghold complex (e.g., a bronze ring, phyllite whetstones, and beads made from amber, rock crystal, and carnelian or garnet). It should therefore be noted that the elite character of the castri from Grzybowo, which may date to the 10th or even the 11th century, cannot be compared to the elite character of other major strongholds (i.e., Gniezno, Ostrów Lednicki, or Poznań), sites that included goldsmith workshops (Banaszak, 2000, pp. 45-66; Kóčka-Krenz, 2006, pp. 257-272; Sawicki, 2018, pp. 355-361) or sacred and residential masonry architecture (Rodzińska-Chorąży, 2009, pp. 18-38; Sikorski, 2012, pp. 23-70, 119-130). Nevertheless, Grzybowo undoubtedly belongs among the most notable strongholds (Kurnatowska, 2008, pp. 319, 326, 356-357; Kara, 2009, Fig. 88; Kurnatowska & Kara, 2010, pp. 45-47, Fig. 9; Kurnatowska, 2014, p. 22). This assumption follows from the fact that the maximum area of the settlement was c. 4.4 ha, including the modern ring of the moat, which was c. 755 m in circumference. The area inside the rampart (measured at the base) was c. 2.20 ha wide and that determined the area of the main square, which was 553 m in circumference. The top of the rampart was c. 625 m in circumference and enclosed an area of c. 2.87 ha. The outer circumference (measured at the base) was 680 m and enclosed an area of c. 3.48 ha. Therefore, the Grzybowo stronghold was a powerful defensive facility, and it still seems to 'hide many secrets' from scientists.

Site 6, categorized as 'craft settlement', poses another research problem, though. Owing to the scarcity of data on the site (which was explored from 1989 to 1990; 7 trenches along the drainage ditch made along the western edge of the forest), excavation was carried out in two main stages:

- Stage 1 – non-invasive research using the methods of surface prospection, ALS LiDAR, aerial archaeology, and magnetic survey, conducted in selected zones of Site 6;

- Stage 2 – excavations carried out in three zones of Site 6.

The excavations were preceded by surface prospection carried out in the winter of 2018 in the forested area located south of the settlement. As a result, 30 locations containing concentrations of pottery and animal bone were recorded in the forest. As a consequence, it was decided to implement further non-invasive works, and ultimately – to verify this area through excavation.

The research of the Grzybowo settlement complex, realised in the years 2018 to 2019, benefited from aerial archaeology using drones. Three aerial reconnaissance surveys made by M. Bogacki, the first of which was carried out in March 2018, the second in June 2018, and the last in June 2019, predominantly brought opportunities to study the settlement structures located to the east and south of the stronghold. The photos and orthophotomaps clearly showed discoloration of crops in the field located east of the settlement. However, the most compelling evidence seems to be the linear, darker trail that runs along the ramparts from the southwestern part to the northern part and perhaps continues on the other side of the road (Figure 5). Notably, it cannot be excluded that this feature was also noticed and referred to as a 'ditch/moat' in the illustration included in W. Kowalenko's dissertation (Kowalenko, 1938, Fig. 1). Consequently, it can be assumed that in the 1930s, the remains were still visible in the field. This 'ditch/moat' extends c. 13-14 m wide to the south and up to 20 m to the north of the road. The trail has a clear 'break' at the height of the eastern gate of the stronghold. Perhaps it is a remnant of a passage leading to the gate through the alleged 'ditch/moat'. One more linear trail was recorded closer to the stronghold, also running in an easterly direction.

On the other hand, a large patch of dried, light-coloured crops found at the eastern boundary of the forest can be more confidently associated with the settlement remains located in the forest south of the stronghold (Figure 6). This barren area differs significantly from the crop marks recorded to the east of the stronghold (Figure 5). There are punctual traces of more intense green and some merge into geometric shapes (oval, round or square). In the corner of the wooded area that evolved at the junction of the line of trees growing on the rampart and the forest within the settlement, there is also an interesting, spherical mark, highly saturated with green (Figure 6). The entire area south of the ramparts – located within the forest and the field – has a size of c. 5 ha.



Figure 6. A vertical photograph of the area east of the forest with the craft settlement, showing crop marks in a wheat field (Author: M. Bogacki).

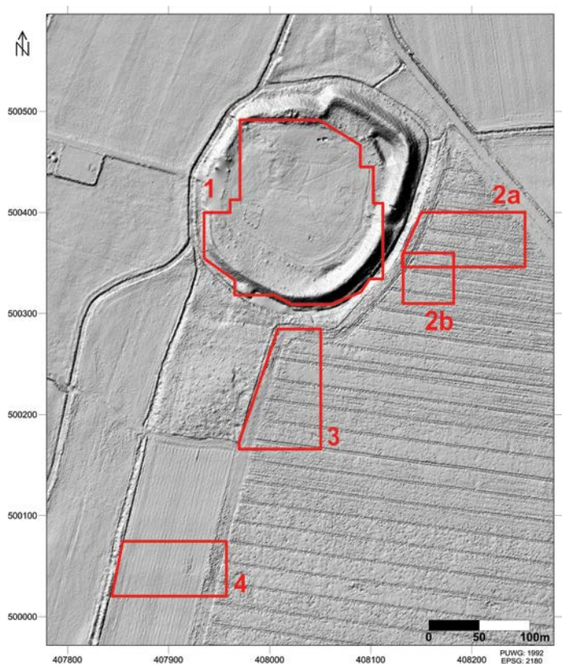


Figure 7. Location of the areas subjected to non-invasive magnetic survey in the context of the model from ALS LiDAR (Author: W. Małkowski).

The presented results of the analysis based on the aerial photographs of Site 6 were verified by the survey conducted by W. Małkowski in 2018 and 2019 within four research zones (marked as: 2a, 2b, 3 and 4 – Figure 7). Zone 2b (an area of 0.25 ha) yielded particularly interesting data, as the magnetic studies confirmed the presence of the 'ditch/moat' mentioned earlier by M. Bogacki (Figure 8). The survey also revealed numerous magnetic anomalies within Zone 3 (area 0.75 ha). The values of the magnetic field strength as well as the distribution of the magnetic anomaly on the histogram (i.e., punctual and linear objects with medium and strong magnetic impact that are possibly burnt or were deposited in the burned material or may even represent stone structures) indicate that one can expect a settlement-type site in this area. The cross correlation done through comparing the magnetic map and the aerial photography made it possible to observe burnt areas in the context of the vegetation indices and this mutual relationship seemed to be highly interesting and required verification based on the excavation method.

The results of the excavations were supplemented by ALS LiDAR images that illustrated the surroundings of the settlement, this time covering a far more extensive area than in earlier studies. Laser scanning examined eight elements of the settlement complex in Grzybowo:

- Site 1 (stronghold)
- Site 6 (craft settlement) divided into four research zones marked with numbers 4 to 7
- Site 4
- Site 8
- a newly discovered site (not yet numbered), discovered 300 to 350 m southwest of the stronghold and located on the western edge of the Struga River valley.

Finally, laser scanning was used to visualize two other defensive facilities (probably older than the stronghold in Grzybowo) – Małachowo-Złych Miejsc and Chłądowo. Both sites are located northeast of Grzybowo. The stronghold of Małachowo-Złych Miejsc is situated 12.27 km away from the stronghold in Grzybowo, and 14.59 km from Chłądowo[1].

The area outside the stronghold and classified as Site 6 was explored in 2019. The team of archaeologists recognized the settlement structures recorded during the non-invasive research carried out by M. Bogacki and W. Małkowski. At that time, their chronology was established, and an attempt was made to indicate the range of the individual zones related to the settlement base of the Grzybowo stronghold. The excavations carried out in 5 trenches indicated that the site, evaluated before 2018 as relatively homogeneous, was in fact very diverse. The methods currently available for the settlement analysis make it possible to conclude that the area to the south of the stronghold (now a forest and a field adjacent to it from the east) constituted its economic base. In this case, both the central zone (currently covered with forest – Trenches 1/2019, 2/2019 and 2a/2019) and the area bordering the forest from the east (Trench 3/2019 located within magnetic research zone No. 3) were investigated. Four features were recorded there, including 2 bloomeries and (probably) the remains of a blacksmith's workshop (a shallow pit-house with a lot of scrap prepared for reuse including iron waste, slag, and fragments of processed amulet container. This picture may be enriched with

[1] Distances in a straight line.

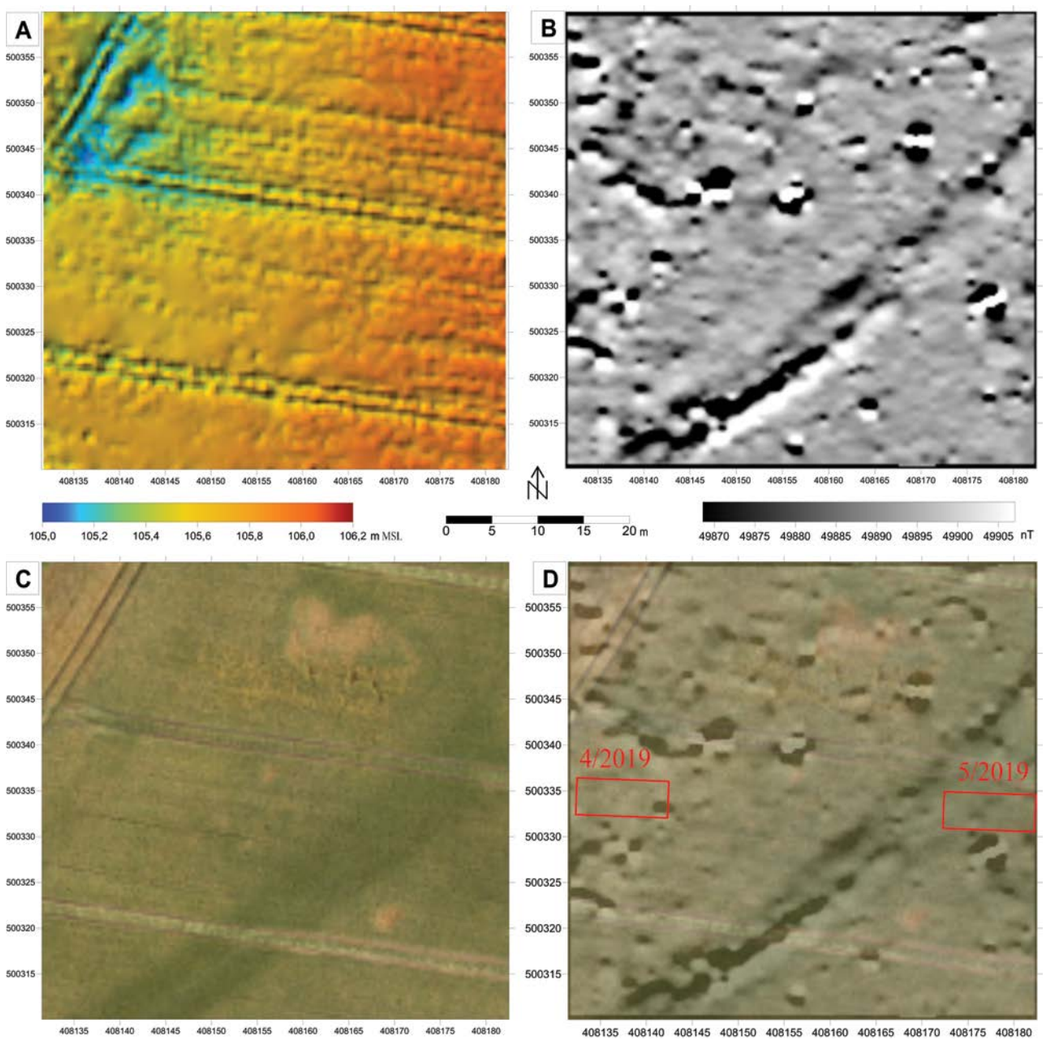


Figure 8. Summary of data detailing Zone 2b: A. ALS LiDAR; B. Magnetic map; C. Aerial orthophotography; D. Aerial orthophotography and magnetic mapping (opacity 50%) and location of trenches (Author: W. Małkowski).

data obtained from 7 trenches delineated within the drainage ditch and explored in the years 1989 to 1990. This was also where another 6 features were recorded. Accordingly, the question arises about the maximum westward extent of the settlement related to Site 6. It is difficult to give an unequivocal answer to this question because that area, located west of the drainage ditch towards the Struga riverbed (an area of c 1.08 ha), has never been excavated. These issues will certainly require further, advanced research in the future.

As for the area situated east of the stronghold – it was fortified with a ditch or ditches, and in this zone settlement features (in the form of punctual cropmarks) occurred far less frequently than in the area located to the south of the defensive structure. This was probably simply based on sound reasoning, as it would not have been sensible to build over the approach to the eastern gate, as it was undoubtedly crucial to maintain the defensive attributes of the stronghold at its 'sensitive place' (i.e., the gate entrance). That is probably why the number of archaeological features recorded in the form of punctual marks is much lower there than in the zone located south of the defensive structure. The c. 13-14 m wide ditch located c. 60-120 m from the eastern base of the rampart was confirmed within Trench 5/2019. Its timeline relates to phase D (950-1050) of the Early Middle Ages and the dating results are highly compatible with the lifetime of the stronghold and the settlement features discovered at Site 6 in the forested zone and in the skirts of the forest. Unfortunately, the excavations carried out within Trench 4/2019, where the second, narrower trench was thought to run c. 40-45 m from the eastern base of the ramparts, turned out to be far less fruitful. The research failed to record the remains of this trench and therefore it cannot be ruled out that this feature is now only detectable as a vegetative change within the humus layer.

The research carried out in the stronghold in Grzybowo and in its immediate vicinity over the last 3 years has brought many new findings. These have been discussed to a degree in this work. The excavations and research conducted as part of the 'Archaeological Photography of Poland' created the basis for current knowledge on the stronghold complex and the related open settlements. However, the settlement studies on the Grzybowo microregion can still be supplemented, and it is mainly non-invasive studies that provide such an opportunity. Therefore, future of research focused on settlements should be based on cooperation within interdisciplinary research teams. It seems necessary to note that non-invasive research methods – aerial photography, laser scanning, or geophysical methods – are the reality of modern archaeology. The present author believes that such an approach, together with the development and efficient expansion of the available source base, makes it possible to explain the genesis, development, and decline of the stronghold complex in Grzybowo together with its extensive settlement background.

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Treasures of Time:
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Poznań in the early Middle Ages

Hanna Kóčka-Krenz, Olga Antowska-Gorączniak, Andrzej Sikorski

Abstract

The information contained in the oldest written sources reveals that Poznań was the seat of the Bishop of St. Peter's Church and emphasises the military strength of the stronghold during the reign of Bolesław the Brave (Chrobry). They do not, however, provide any data about the size, fortifications, or development of the area covered by the stronghold or about the processes that transformed its buildings. As the written sources seem laconic, archaeologists must rely on the results of their research to reconstruct a picture of how the stronghold functioned. They reveal that in the second half of the 10th century, the prince/duke possessed a stone palas in the stronghold of Poznań with a separate reception hall, chancellery office, and treasury, as well as a stone palace chapel used for private devotion. Adjacent to the palas was a wooden building that was a goldsmith's workshop – one of the specialized workshops that fulfilled the needs of the court. The nearby paved square was probably surrounded by other buildings serving as courtly workshops. The second section of the stronghold, adjacent to the east, contained in its centre the cathedral church and the buildings that belonged to wealthy people associated with the ruler who performed military and administrative functions on his behalf. The third (northern) segment of the complex was probably intended for economic purposes. On the other hand, the fortified site of Zagórze was inhabited by a group of people who performed service functions for the rest of the stronghold's inhabitants. There is no question, therefore, that Poznań was a mighty fortalice that guarded approaches to the interior of the state, a stronghold which had administrative, economic, and sacral functions that was the residence of the first Piasts and constituted the main point of support in the management of their domain.

Keywords: Poznań, early Middle Ages, palace and chapel complex, residence of the first Piast dynasty rulers

It was only at the beginning of the 11th century that references to the stronghold of Poznań, the history of which dates back to the 9th century, were first recorded. These were first found in Thietmar's Chronicle (*Thietmari Merseburgensis Episcopi Chronicon*). In 968, the chronicler pointed to Poznań as the seat of Jordan – the first bishop of the Piast-ruled state (Thietmar, II, 22, pp. 73-74). In the year 1000, he recorded information that the bishop of Poznań, Unger, was not subordinate to the archbishop Radim-Gaudentius (Thietmar, IV, 45, pp. 208-209). Another mention of Poznań made by that chronicler is related to the military expedition of Henry II in 1005, who, pursuing Bolesław the Brave, stopped at the request of his leaders (princes) two miles away from the stronghold (Thietmar, VI, 27, pp. 352-353). The last reference discusses the death of the Poznań bishop, Unger, in 1012, who had "led his flock" for thirty years (Thietmar, VI, 65, pp. 406-407). Gallus Anonymus, who wrote his chronicle a hundred years later, included two pieces of information related to the stronghold of Poznań. The first concerns the armoured knights of Bolesław the Brave: "since from Poznań [he had] 1,300 of heavy cavalry (*loricati*) and 4,000 shield-bearers, ..." (MPH, T. I, p. 404; Gall, I, 6, p. 27). The other reveals the effects of the raid of Bretislav, Duke of Bohemia, on Polish lands: "It was then that the Czechs destroyed Gniezno and Poznań and seized the body of Saint Adalbert (Polish: Św. Wojciech) [...]. And those towns remained abandoned for so long that in the church named after Saint Adalbert the Martyr and St. Peter the Apostle, wild animals made their lairs." (MPH, T. 1, p. 414; Gall, I, 19, p. 45).

The earliest written sources inform that Poznań was the place of residence of the bishop who had a cathedral church dedicated to St. Peter at his disposal and emphasize the military strength of the stronghold during the reign of Bolesław the Brave. However, no information is provided about the size, fortification, or development of the area covered by the fortifications or about renovations made to the buildings. To reconstruct a picture of how the stronghold functioned – in light of the laconic written sources – it is necessary to use the results of research undertaken in Ostrów Tumski in 1938 by archaeologists from the University of Poznań, that continued after the Second World War as part of the 'Millennium' research project, and that was subsequently conducted nearly annually as the research programme 'Mieszko' realised by the University of Adam Mickiewicz from 1999 to 2014 (Kóčka-Krenz, 2016). The results of these studies have verified the position of Poznań in the structure of the state of the first Piasts.

The stronghold of Poznań was built on the sands, gravels, and silts of the largest of several islands slightly elevated above the water level and located within the Warta River alluvium (Kaniecki, 2004). The location was not selected at random, as its natural qualities facilitated the settlers' defence against potential aggressors and enabled contacts with adjacent territories. Also, the river, being a relatively safe communication route, provided the most cost-effective way to transport various goods, while the ford on the Warta River marked the direction of land routes used in the times of the first Piasts (Kurnatowscy, 1996; Górecki, 1998). The elongated and oval-shape landscape and especially the ground elevations of Cathedral Island recorded in the place of the modern church of the Blessed Virgin Mary (BVM), as well as in the area of the cathedral church and the elevation in Zagórze determined the initial settlement pattern of the stronghold.

When referring to the chronology and location of the first defensive fortifications, it should be emphasized that archaeologists do not have a unanimous opinion on this issue. The findings of archaeological research carried out in the last decade at the location of the church of the BVM, supported by dendrochronological analyses, indicate that the area of Ostrów Tumski became inhabited in the second half of the 9th century. At that time, a small stronghold was built on a hill in the western part of the northern half of the island. Its interior, about 40 m in diameter, was surrounded by wood-earth ramparts with a stone core, wherein the buildings were wooden houses. Fragments of pottery, the remains of cereals stores (i.e., millet, wheat, rye, and barley), spindle whorls, and animal bones recovered from this area indicate the typical settlement character of these structures.

The stronghold existed in this form until the mid-10th century, but soon afterwards it was systematically expanded until the end of that century. A two-part stronghold was established in the northern part of the island. The previous small stronghold was enlarged northwards to an area of c. 80 x 100 m and was intended for the royal court. Soon, the second part of the stronghold was attached to the east side and the complex was surrounded by a horseshoe-shaped rampart (Hensel & Żak, 1964) with dimensions estimated at 130 x 100 m (Kara, 1998). The new ramparts were also constructed of stone, timber, and earth, with the face reinforced by hooks and a wide berm on the outside. Also during that time, a defensive settlement was established in Zagórze, which was the third part of the castle surrounded by the ramparts running along the modern streets of Wieżowa and Zagórze. It is not clear, however, how the ramparts were terminated from the north, along the swampy ditch. Based on geological borehole data, an idea was put forward (Kara, 1998, p. 27; cf. also Kóčka-Krenz, Kara, & Makowiecki, 2004, p. 133) that the rampart was horseshoe-shaped and was completed with a palisade on the side of the ditch. It seems unlikely, however, that the settlement at Zagórze could have been so poorly defended in that section, since the other sections were surrounded by solid ramparts. A palisade enclosure would not have provided an effective defence and, moreover, it would have been easily destroyed when the water level was high due to floods or ice floe pressure. This question can only be resolved by further field investigation. At the end of the 10th century, the range of the stronghold was extended again by adding a new part to the northern side. Its massive ramparts, with a width of about 30 m, ran along what is now Fr. Ignacy Posadzy Street and the premises adjacent to its southern side (Wawrzyniak, 2005). Dendrochronological analyses of wood used for the construction of the defensive structures indicate that this activity took place in the 70s and 80s of the 10th century. However, at the present stage of research, it is not possible to identify the function of this part of the stronghold or to define the role of its southern section, strengthened at that time by an equally massive

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rampart. These construction activities prove conclusively that Poznań was an important point of support for Mieszko I, because during his reign it was intensively expanded and reinforced, resulting in four separately defended parts (Figure 1). This mighty stronghold was connected with the vicinal Śródka (which was probably a trade site) by a wooden bridge across the narrow Cybina valley, which was built in the 970s and 980s (Pawlak, 2008) and connected the stronghold to the entire settlement base that was developing along the right-bank tributaries of the Warta River.

The feature that distinguishes 10th century Poznań from the main Piast centres of that time is its buildings, particularly the monumental architecture created in the northern part of the stronghold complex. The stone seat of the ruler was built in the royal part. It was a rectangular structure, built on N-S axis (Figure 2). Its longer walls were c. 27 m, while the shorter walls were nearly 12 m long. The thickness of the building's walls reached 1.3 m and they were

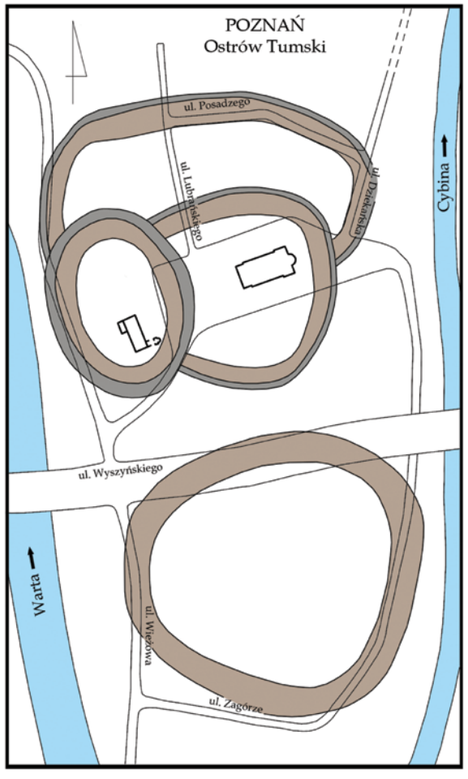


Figure 1. Poznań – Ostrów Tumski. The range of the stronghold's ramparts at the end of the 10th century (Drawing by Olga Antowska-Gorączniak).

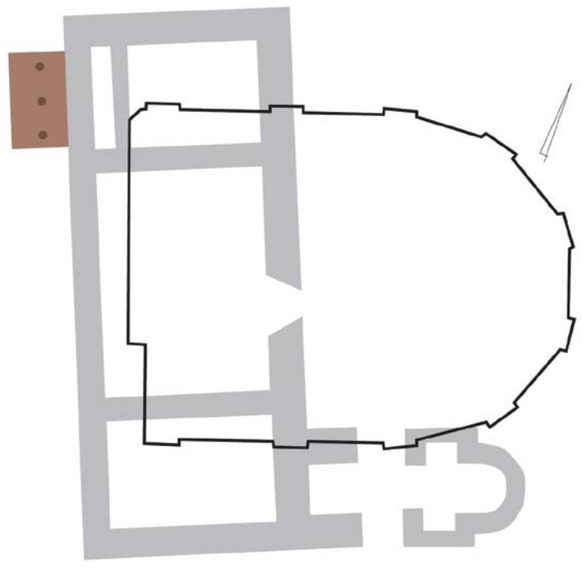


Figure 2. Poznań – Ostrów Tumski. An outline of the remains of the palace and church complex (Drawing by Olga Antowska-Gorączniak).

constructed of quarried stone slabs bonded with a thick layer of pure gypsum mortar. The uneven wall surfaces were then coated with gypsum plaster, both on the inside and outside. Also, the floors in the *palas* enclosures were made of gypsum mortar laid on a layer of crushed stone gravel. The entrance to the inner part was accessible through the annex at the southeastern corner of the palace, jutting out by 2.2 m in front of its body, with an entrance of the same width. Within the south wall was a flight of stairs leading to the first floor, which is evidenced by the bottom step slab that remained *in situ*. An additional, splayed entrance leading directly to the hall was created in the centre of the eastern wall of the building. The prince's *palas* was most probably c. 11 m tall, because this was the distance – measured from the foundations of the northern wall – at which its overturned remains rested.

At least four rooms were identified on the first floor of the building. They were arranged in the following way from the south to the north: the entrance annex was adjacent to the room (51 m^2) that preceded the central, large representative reception hall (102 m^2) while two other rooms were accessible through passages made in the next division wall. One was a narrow corridor only 90 cm wide but 5 m long (4.5 m^2) – perhaps it was a small treasury. Adjacent to it from the east was the last room, which occupied an area of 34 m^2. Two stamps were discovered in it: a heavily used lead one – with a worn matrix – and a bronze one, belonging to a Dominican, Brother Jacob. Also, a lead bulla with the inscription "DVX BOLEZLAVS" was recorded (Dębska, Dębski, & Sikora, 2008). These finds indicate that the room housed the chancellery office in which documents were stored and issued, although its chronology is unknown. Based on the metric data, the usable area of each floor of the secular part of the residence can be estimated at about 190 m^2. The chambers on the ground floor were intended for administrative and representative purposes, while the first floor probably housed the ruler's private rooms. The wooden beam found within the threshold of the entrance was dated to the years after 941 (Krąpiec, 2002), indicating that the stone residence in the stronghold of Poznań was constructed shortly after the middle of the 10th century; therefore, it is highly probable that it was the first monumental building in the state of the first Piasts. Its immediate surroundings were lined with a layer of fine gravel covered with gypsum mortar. A large area of floor surface hardened in such a way was recorded near the northeastern corner of the *palas*; perhaps it was a kind of *pavimentum* (i.e., the place where the prince exercised his rulership 'under the open air'). The palace chapel was an integral part of the royal residence – its remains were found well preserved next to the southern wall of the presbyterium of the modern Gothic Church of the BVM (Kóčka-Krenz, 2017).

The chapel was built opposite to the entrance annex to the *palas*, whose axis was an extension of the axis of the chapel. The two structures were not connected in the foundation and were separated by a distance of 2 m. What draws attention, however, is that the same construction technique was used for these two buildings, as both foundations were laid in a narrow trench of the same width and depth, filled with natural rock material and covered with earth. On the same level, in both buildings, the foundation merged into walls of stone slabs bonded with gypsum mortar applied abundantly. The walls of the *palas* and the chapel were finished on both sides with gypsum plaster and their interior was paved with gypsum screed on a layer of crushed stone gravel. It seems clear, therefore, that both construction activities were performed simultaneously, and the *palas* was combined with the chapel into one complex only

on the surface. Such a conclusion is prompted by a complete lack of foundations that would connect the ends of its northern and southern walls to the western part of the chapel. The above surface connection would have been in the form of arches spread between the upper parts of the walls and the entrance annex. Such a construction created both the exterior door frame and support for the gallery, accessible from the first floor of the *palas* (Figure 3).



Figure 3. Poznań – Ostrów Tumski. A reconstruction of the royal residence (a view from the north-east) (Drawing by Andrzej Gołembnik).

The palace chapel in Poznań is a hall church, terminated in the east in a deep apse with clear dimensions of 2.5 x 2.5 m. In the axis of the apse there was a sacrificial table standing by the wall. Its *stipes* was made of fine crushed rock gravel bonded with gypsum mortar. A detailed conservator's observation of the gypsum mortar surface on the western face of the original altar foundation indicates that it was finished with facing stones. The nave of the chapel was extended by 1 metre on both sides, with two shoulders merging into the foundation walls, and provided a space with a total width of 4.5 m and a length of 1.70 m. In the western part, the interior of the chapel narrowed to 2.5 m in width. The interior was lit by windows located in the walls terminating in the shoulders of the house of prayer at a height of about 0.5 m above the floor. Judging by the outline of the window in the overturned southern wall of the chapel, their openings were about 70 cm wide and 1.30 m high, with windowsills. The fact that the windows were set so low suggests that the chapel was lit by an upper row of windows and probably also by a window in the apse. The available finds allow for an inference about the interior finishes, too. The floor was made of gypsum screed on a layer of small natural stones – it is preserved in large areas in the apse. The walls of the chapel were abundantly plastered with a thick layer of gypsum, on which a thin layer of patch-paint was applied before a painted decoration was added. Unfortunately, the narrative of the painting is illegible today because only small fragments of the painted plaster have preserved. Perhaps it was related to the dedication of the chapel, as (for example) a very expensive dye, lapis lazuli, was used for painting the robes in images of the Virgin Mary. Moreover, more than 230 glass mosaic tesserae and fragments of plaster with their imprints were recorded, including one fragment with a tessera piece still embedded within. Thus, there is no doubt that they formed a mosaic image or pattern which probably decorated the apse (Kóčka-Krenz, 2005a). These tesserae entered the ground after the decoration was destroyed, in a layer dated to the 11th century. Therefore, the mosaic must have been made before that time, probably on the initiative of Bolesław the Brave, who had the opportunity to commission several great master builders from Kiev. The interior furnishings of the chapel must have also included liturgical objects, which today are represented only by the preserved bony linings of a reliquary box. The finds of 2 gems – one made of glass and the other, carnelian with the image of a lion (late Roman, ancient), which in the early Middle Ages were used for inlaying reliquaries, crosses, chalices, or covers of liturgical books – indicate that the local clergymen had at their disposal products from highly specialised goldsmith workshops. According to P. Skubiszewski (2001, pp. 162, 164, 165), such cult objects came to the Piast-ruled state mainly from Germany as gifts or the royal foundations. Although those artefacts have not preserved to the present day, the information provided by Thietmar of Merseburg in his *Chronicle* as well as by Cosmas of Prague and Gallus Anonymus indicates that the local churches did not likely differ much in their furnishings from the churches of Western Europe (Skubiszewski, 2001, pp. 150-151).

The Poznań palace chapel was built on a traditional Latin cross plan, which highlights its symbolic dimension. Its architecture refers to the architecture of buildings represented by churches of the Carolingian and Ottonian traditions. Owing to its relatively small dimensions, the building was well adapted for the capacity and needs of the royal court and ensured the opportunity for them to fulfil their Christian duties (initially to just several people). The deep cut recorded in the interior of the nave of this church gives rise to the assumption that an important person was buried in the worthy location at the foot of the altar, but the burial was either plundered or (more likely) the remains of the deceased were exhumed and placed in a new tomb when the palace chapel was destroyed and was not rebuilt on the old foundations. Also, it seems quite possible that its founder, Princess Dobrava (deceased in 977), eventually rested in the chapel, which was noted in the 13th century *Chronica Polonorum* (MPH, T. III:622; Nowacki, 1959, p. 8, footnote 22), or perhaps it was the resting place of Bishop Jordan – deceased circa 984.

The palace chapel was probably the first, but not the only house of prayer in Poznań. Another sacral building, which was built before the cathedral church, was the building of the mission station of Jordan, the bishop for the Polish lands appointed in 968. Under the main nave of the modern cathedral church are the remains of this building, which include the bottom of a limestone bowl where mortar was poured onto a layer of gravel about 4 m in diameter, a posthole in the central part, and some fragments of the surrounding walls. These remains were recognized as a square building containing a baptistery, to which a small temple may

have been adjacent in the east (Józefowiczówna, 1963; Kurnatowska, 2002). The ascription of baptismal functions to the bowl sparked a heated debate which is still ongoing. The opponents of such a classification recognise that relic as a device for mixing large quantities of mortar during the construction of the cathedral. However, this is contradicted by iconographic evidence, which shows that small containers were used for this purpose, in which portions of mortar were prepared for instant use (*Ornamenta Ecclesiae*, 1985, pp. 172, 173).

Poznań owes the commencement of the construction of the cathedral church to Bishop Unger, as its erection dates to the last quarter of the 10th century (Kurnatowska, 2002, p. 109). It was erected on foundations made from large natural granite boulders bonded with lime mortar, on which walls made of stone slabs and covered with lime plaster were built. The floor was made of a hard, smooth limestone slab. According to K. Józefowiczówna (1963) it was a three-nave basilica 49 m in length, its nave being 8.5 m wide and the side aisles were 4.25 m wide. It had a square chancel that terminated in an apse and was flanked by two annexes, and it was separated by a rood screen from the nave section. It was closed by massive western towers with two turrets provided with staircases, which had a gallery slightly jutting out eastwards and supported by a circular pillar. The walls of the church were smooth, plastered, and devoid of any vertical divisions. The main nave was separated from the side naves by rows of arcaded pillars and all three naves were covered with a flat ceiling. The window openings and portals in the northern and southern walls of the building probably had elaborate frames (Józefowiczówna, 1963, pp. 37-98; Świechowski, 2000, p. 199). In its centre, there were two rectangular tombs, originally positioned above the level of the floor. The older one had a corbel vault and was built of limestone hardpan and gravel finished with dark green gabbro stone. The building material for the younger tomb was gravel finished with lime plaster. It had a wooden floor inside and a door opening. The tombs were probably enclosed, and between them was an altar, presumably of St. Cross, as this was usually placed in the centre of sanctuaries to create a mystical centre (cf. Oswald, 1969). Thus, a mausoleum, the resting place of Mieszko I and Bolesław the Brave (Kurnatowska, 1990, 2001, 2002, pp. 109-110; Jasiński, 2004, pp. 61, 83), was created in the Poznań Cathedral. The purport of the archaeological sources supports the interpretation of the late medieval tradition of the Poznań Cathedral as the burial place of the first rulers of the Piast dynasty.

In addition to the secular and sacral monumental architecture, the position of the Poznań stronghold is also evidenced by other, perhaps not so spectacular elements of its buildings, that were yet necessary for the proper functioning of the court. One such facility was a goldsmith's workshop located in a 12 m^2 wooden building directly adjacent to the western wall of the *palas*. Its interior yielded traces of a burnt work-bench, and within it were recovered fragments of crucibles containing drops of gold, golden rivets, numerous particles and strands of this metal, carnelian beads and those made from glass, three small garnet stones, and small particles of gilded wood (the body of a box?; Kóčka-Krenz, 2006). These findings indicate that the goldsmith working in the Poznań workshop was familiar with ornamental techniques requiring a high degree of skill – filigree, granulation, and paving – and the room itself was built in accordance with the recommendations of the priest and monk Theophilus, contained in the treatise *'On divers arts'* (Kobielus, 1998, pp. 57-58). The workshop operated from the second half of the 10th to the first half of the 11th centuries (dating based on stratigraphy and ceramic material analyses; cf. Kóčka-Krenz, 2006) and gold ornaments for the royal family and perhaps liturgical equipment were manufactured there. This also means that the Piast rulers employed highly specialised craftsmen at their court in Poznań.

Given the power of the fortifications, the size and multi-section structure of the Poznań castle, as well as the method of its development, it can be concluded that the stronghold was modelled after Carolingian-Ottonian residences, in German literature referred to as *'Pfalz'* (Gauert, 1965, p. 3). A *'Pfalz'* was a political and economic 'system' with a diverse structure, which depended on the rank of the place and the resulting frequency and duration of the ruler's stay together with all his secular and sacred entourage. The most extended visits must have been those connected with religious occasions, especially Christmas and Easter, formal gatherings of the state authorities, and those adapted to a spending longer time in residence (e.g., during the winter period). Such places required adequate housing to provide the ruler with all his necessities, especially since he was usually accompanied by a very large entourage of at least several hundred people (Binding, 1996, pp. 35-58). Therefore, within the fortified palatial complex, there were various more or less interconnected units. As the written sources inform (*Brevium Exempla* – Metz, 1966; Binding, 1996, p. 60), there was a masonry royal house with vestibules and chambers equipped with fireplaces, a wine cellar, loggias, a stone chapel, and in the courtyard, along with other wooden houses (also for guests), there were workshops, a working room for women with a chamber, a kitchen, a bakery, stables, barns, and a granary, and also an orchard, fish pond, and garden. Although the building arrangement of individual seats of power was subject to change during their use, all contained fixed parts intended for similar purposes. These included a building containing an assembly hall for court ceremonies, a residential section, a palace chapel and an economic section. The adjacent settlement grounds housed the buildings for the court service: craftsmen and merchants (Binding, 1996, p. 60 ff.). They were, for certain, equipped with all objects necessary to fulfil the everyday needs of the royal household, 'so that one did not have to ask for them when they were needed' (Metz, 1966).

In the second half of the 10th century, the prince possessed a stone *palas* in the Poznań stronghold with a separate reception hall, an office, and a treasury as well as a stone palace chapel for private devotion. A wooden building that was a goldsmith's workshop adjoined the *palas*, and was one of the specialized workshops manufacturing goods for the court. The nearby paved square was probably surrounded by buildings that served as royal workshops. Adjacent to the east, the second section of the stronghold housed the cathedral church in the centre and the buildings of elite people who were in favour with the ruler and performed military and administrative functions on his behalf. The third section of this complex, the northern segment, was probably intended for economic purposes. The defensive settlement in Zagórze was inhabited by a group of people whose function was to serve to the rest of its inhabitants (Kara, 1998). There is no doubt, therefore, that Poznań was a powerful fortalice that protected approaches to the interior of the state, served as the residence of the prince and his court, and was a stronghold with administrative, economic, and religious functions constituting the main point of support for the ruler (Figure 4). The cathedral of Poznań, used as the monarch's

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Figure 4. Poznań – Ostrów Tumski. A reconstruction of the stronghold at the end of the 10th century (Material from the Poznań Archaeological Museum).

final resting place, played an important role in the system of assuming and exercising power (Meier, 1950). Religious rituals performed at the royal necropolis emphasized the continuity of the dynasty and the sacred character of its authority, as well as ensured prosperity for the state. According to Z. Dalewski (1996, pp. 38-39): “there is no doubt that Poznań played an important role in the structure of the Piast state which was comparable to that of Gniezno. It seems that, being a centre to a large extent created by the dynasty, Poznań marked a point around which the Piast tradition could be built and which, in the intention of the Piast rulers, was supposed to occupied an important place in the ideological and political structure that determined the durability of their power, defined by a combination of basic administrative and propaganda activities.”

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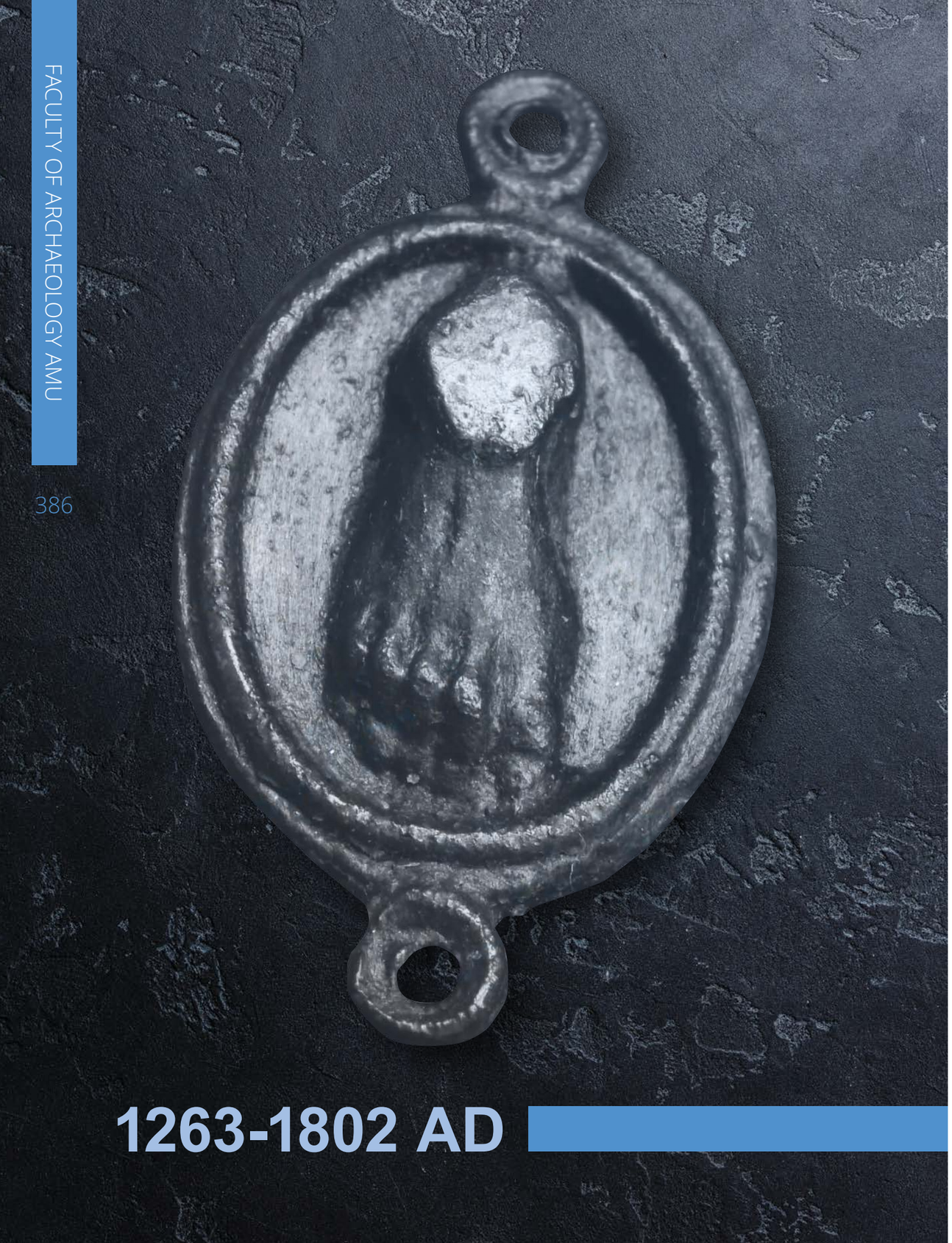
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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Research on Kolegiacki Square in Poznań (St. Mary Magdalene Parish Collegiate Church)

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Abstract

An interdisciplinary archaeological study of St. Mary Magdalene parish collegiate church, the largest in the city of Poznań, the adjacent cemetery, and the building development after these were decommissioned (the New Market, the municipal bathhouse, the fire basin from World War II, the lawn (with flower beds), and the car park) was carried out between 2016 and 2021 in Kolegiacki Square. This was the largest archaeological project carried out to date in the Old Town. In addition to architectural foundations, the result of this project is thousands of graves with enormous significance for not only the history of the former church, but also for Poznań and Poland. To some extent, this is confirmed by the European character of some funerary findings, including the so-called pearl mob cap and devotional items in graves, crypts, and ossuaries. In the temple walls and chapels, representatives of distinguished families and members of guilds found their resting place; epitaph stones and ceremonial tombstones were placed here.

Keywords: St. Mary Magdalene Parish Collegiate Church, Kolegiacki Square, archaeological research

“Rediscovered”

The Kolegiacki Square in Poznań was named after the former St. Mary Magdalene parish collegiate church, built on this site after the incorporation of the city. It was probably as early as in the fourteenth century (1388) that it acquired its impressive architectural form, although its greatest development can be attributed to alterations made in the fifteenth century (the most important in 1470). According to the records in the city chronicles, the height of the church tower was so impressive that it was considered to be the tallest religious building in Poland (the calculated height of the cupola would reach up to 114 m), and what is most interesting, until today it could compete only with the sanctuary in Licheń.

The extent with which the church was built is not surprising when we realise that for several centuries it was the most important in the city. Apart from its liturgical and representative functions, it was also the place where the most prominent citizens of Poznań were buried, whose foundations contributed to the growth of the city's wealth and the increasingly rich interior design of the church. There is no doubt that for the inhabitants of the modern city it became a kind of signpost and symbol of pride. It would probably remain so to this day, were it not for the church's unusual fate, which meant that splendour was mixed with tragedy, and happy accidents with disasters. The history of this church is an allegory of the fate of our country, at one point marked by power that soon disappeared into oblivion. It is significant that the destruction of the church towering over the city was initiated by a catastrophe in 1773, so "a moment" after the first partition of Poland in 1772. Lack of funds limited attempts to save and rebuild the collegiate church (maintained by the city since the 2nd half of the 16th century) in the shadow of the Jesuit college and the new church of St Stanislaus the Martyr (after the dissolution of the Jesuit Order). The final act of demolition of the ruins was carried out under the rule of Prussian invaders (though not without the tacit consent of the city's citizens), by whose decision the collegiate church was demolished at the turn of the 18th and 19th centuries. It finally disappeared from the city plan with the demolition of the tower in 1802. To add to this misfortune, some of the collegiate church furnishings and paraphernalia were lost or dispersed. For example, bricks, boulders, and stones that have been recovered were reused on nearby building sites or other investments in the expanding city.

This condition has had an impact on the scope of archaeological identification of the shape of the church, determination of the phases of its development, and the presence of funerary objects within its walls. At the present stage of research, it constitutes a certain limitation in reconstructing the history of this place that has been "empty" for over 200 years on the basis of unique and exceptional monuments that have survived in the ground.



Figure 1. Fragments of the medieval floor (Photo: Archives of the Collegiate Project).

After the demolition action

Although some valuable objects, perhaps also treasures, were removed (the workers smoked pipes heavily resulting in the presence of several hundred fragments), from the untouched and partly destroyed strata, some unique finds were excavated related to the function of the church and graves, and the backfill rubbish "from the city" used to fill the foundations after they were demolished (e.g., jettons, weights, lead seals, fragments of luxury ceramic and stone vessels, tiles, broken glass, etc.).

The excavated units are a kind of a record of the history of Poznan, from antiquity (e.g., single fragments of pottery from undisturbed soil levels), through the early Middle Ages (e.g., fragments of shells, spindle whorls, etc.), to the 20th century (e.g., post-war filling of the fire basin). Hence, in a small collection of sacral monuments, the following were recorded, among others: a chasuble (Grave 94 – burial of priest), reliquaries (capsules), clasps of liturgical books, as well as elements of temple decoration (i.e., a threshold, a stone portal decorated with bas-reliefs ("Vasa") stones, clay floor tiles (Figure 1), decorative wall tiles with glass glaze, fragments of epitaph stones and/or tombstones, painted plasterwork with inscriptions, and fragments of stone architectural details (Figure 2). Crucifixes, small crosses, medallions, Caravaca crosses (Dębski et al., 2021, pp. 40-47), caplers, rosaries, ceramic pipe, rings, wedding rings,



Figure 2. Fragment of a stone sculpture from the 16th to 17th centuries (Photo: Kateriny Zisopulu-Bleja).

Figure 3. Fragment of a rosary made of rock crystal, modern period (Photo: Kateriny Zisopulu-Bleja).



shreds of properly fastened (pins), grave dresses (e.g., haberdashery, pieces of fabric, net veils, hook and eyes, etc.), as well as knives, whetstones, needles, thimbles, scissors, and coffin appliqués (bronze and iron) are some examples of funerary elements also recovered from the site (Figures: 3-7).

Unique on a European scale are two burials. First, Grave 13, recovered by a pillar, dates to the end of the 16th to the beginning of the 17th century and showed traces of a craniotomy (Figure 8). Second, the remains of a "noblewoman" in Grave 409 had a so-called pearl mob cap on her skull made of more than 2,500 glass beads. By the pelvis, she was holding a rosary in her right hand and a golden ring with the Nałęcz coat of arms was on the ring finger of her clenched left hand (Ignaczak et al., 2021, pp. 174-176).

Figure 4. Fragment of devotional jewellery with the image of Christ's wounds, modern period (Photo: Kateriny Zisopulu-Bleja).



Figure 5. Bronze medallion with a preserved fragment of rope, eighteenth century (Photo: Kateriny Zisopulu-Bleja).



Figure 6. Bronze medallion with St. Ignacy Loyola, eighteenth century (Photo: Kateriny Zisopulu-Bleja).

Figure 8. The remains of the deceased from Grave 13 with traces of craniotomy from the end of the sixteenth to the beginning of the seventeenth century (Photo: Archive of the Collegiate Project)

Apart from that, the excavations in Kolegiacki Square produced a cumulative collection of over five thousand coins, the largest from any archaeological study of a Polish church. The inventory includes coins previously recorded in other churches in Wielkopolska, but also a Hungarian gold-gulden of Ladislaus V, King of Hungary and Bohemia (1453-1457), and an altyn minted in Misr (Egypt) during the reign of the Sultan of the Ottoman Empire, Suleiman the Magnificent (1520-1566; Ignaczak et al., 2021, p. 172).

After six seasons of research

Conducted continuously – at the nodal points of the whole project – fragments of unremoved foundations of the church (and chapels), as well as fragmented elements of the former church décor, were uncovered (the result of an "effective" demolition plan). In the southern part of the square, the architecture was accompanied by communication routes in the form of pavement dating back to the 17th and 18th centuries, forming a "junction" at the entrance to the vestibule (Figure 9). These marked the routes to the Presbytery, the Dark Gate, and the College (Figure 10).



Figure 7. The head of a ceramic pipe, 2nd half of the 18th century to the early 19th century (Photo: Kateriny Zisopulu-Bleja).

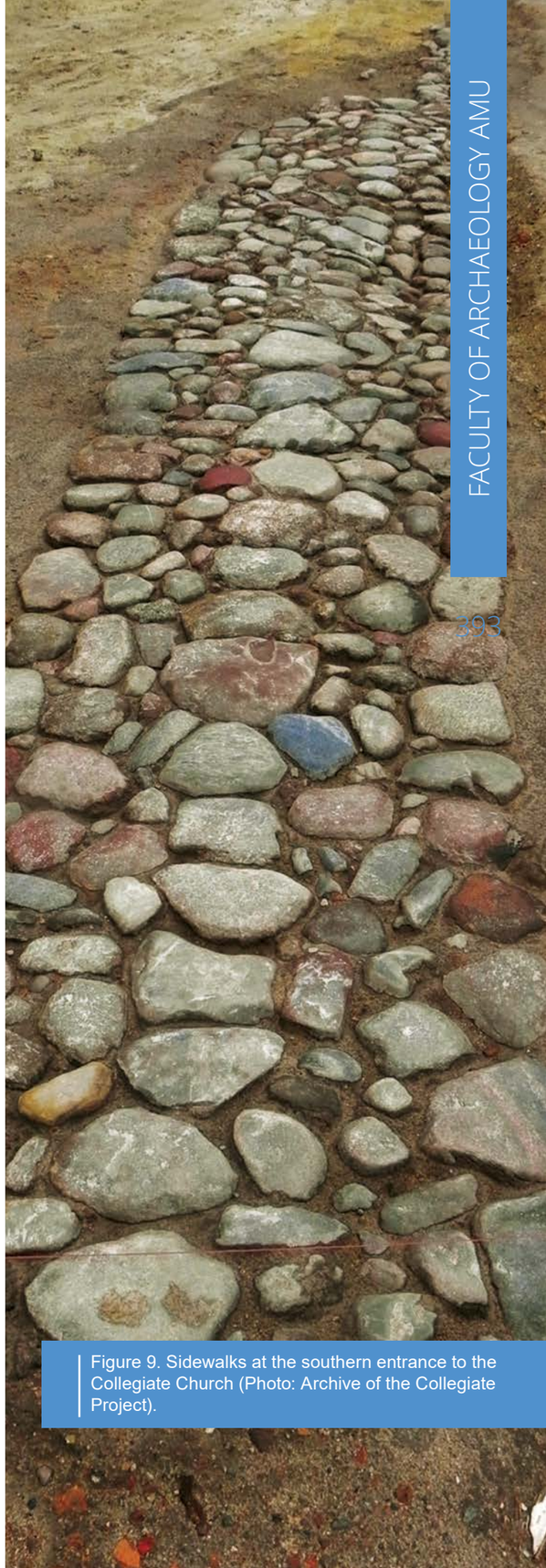


Figure 9. Sidewalks at the southern entrance to the Collegiate Church (Photo: Archive of the Collegiate Project).



Figure 11. Pillars and crypts discovered in the northern part of the Collegiate Church (Photo: Archive of the Collegiate Project).

Between the architectural foundations, the remains of over 4,000 deceased were discovered (in crypts, earth burials, and ossuaries), as were religious artefacts and those connected to the everyday life of the inhabitants of Poznań from the Middle Ages to the 20th century. These are some of the most important remains of the cultural heritage of Poznań, and their importance is – one can assume – vital for the study of national and European history.

The field excavations, financed by the Poznań City Hall (the Office for Coordination of Projects and Revitalisation of the City), were formatted from the very beginning as a complete research project that aimed to acquire all possible resources documenting the history of the collegiate church and its immediate surroundings (including sections of the city walls). The main assumption was the salvage character of the research – excavations were carried out only in those areas where the former church and churchyard cemetery are located that were in danger of being destroyed as a result of the restoration of Kolegiacki Square. The excavations therefore covered small areas, which fundamentally limited the interpretation of eroded foundations, crypts, and destroyed graves (Figure 11).

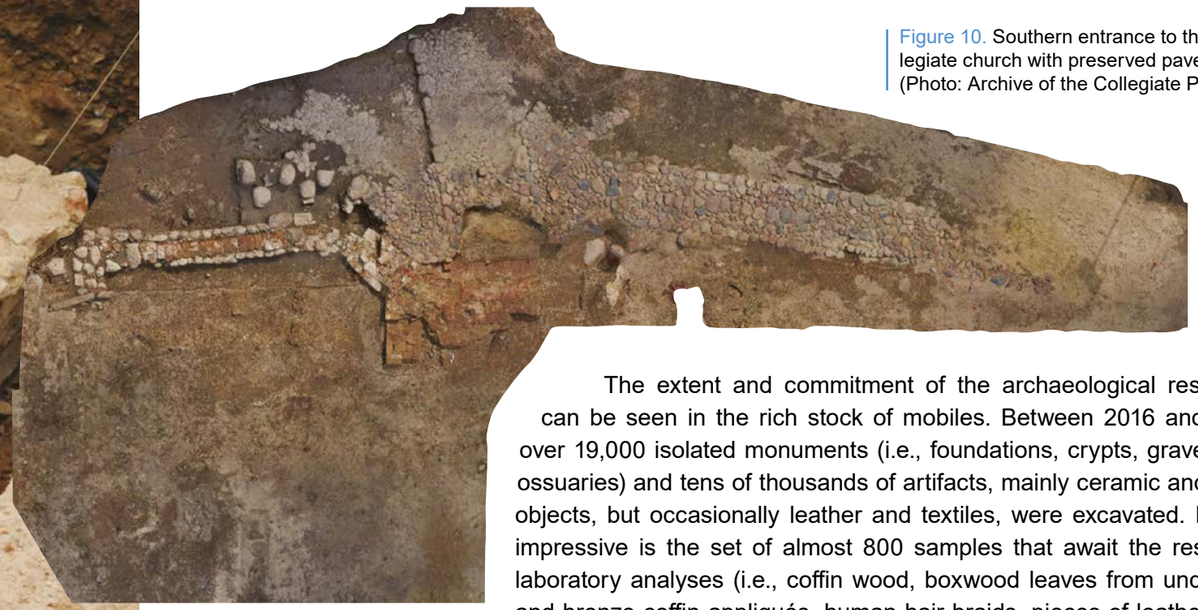


Figure 10. Southern entrance to the collegiate church with preserved pavement (Photo: Archive of the Collegiate Project).

The extent and commitment of the archaeological resources can be seen in the rich stock of mobiles. Between 2016 and 2021, over 19,000 isolated monuments (i.e., foundations, crypts, graves, and ossuaries) and tens of thousands of artifacts, mainly ceramic and metal objects, but occasionally leather and textiles, were excavated. Equally impressive is the set of almost 800 samples that await the results of laboratory analyses (i.e., coffin wood, boxwood leaves from under iron and bronze coffin appliqués, human hair braids, pieces of leather, cloth and haberdashery, lime from coffins, animal bones, mortar, sintering on building ceramics [effect of fire], metal melts, scales and bones, insects [from demolition ossuaries], oyster and snail shells, remains of organics in ceramic vessels, building ceramics samples, and soil samples).

The localized architectural remains date from at least three construction phases of the former St. Mary Magdalene church. At the present stage, they are dated to the period between the 14th and 18th centuries. These foundations most probably mark the western edge of the nave of the church adjacent to the tower and the southern entrance to the temple. The crypts discovered inside the church can mostly be associated with the chapels at the entrances to the collegiate church.

It can be assumed that between the fragments of the foundations, buttresses, and pillars that were not removed from the ground at the beginning of the 19th century, there may still be several thousand burials under Kolegiacki Square. These represent the dead buried after the incorporation of the city in the 13th century, around and within the then small church. With the expansion of the building, subsequent burials overlapped older ones resulting in 12 to 14 levels of tightly packed coffins encountered during excavation.

The study of the remains and monuments, once completed and subjected to specialist analysis, may provide a lot of new information, first about the collegiate church itself, and second, about how our ancestors, the inhabitants of Poznań, lived, dressed, and ate. We already know that their lives were as interesting as ours, that the world was not closed to them (as objects from the Collegiate Church “speak” of contacts with the remainder of Europe and beyond) and that pride in the city and in being a Poznanian commanded a respectful approach to the largest city church. And at this point, it should be written that history has come full circle, because we – the present inhabitants of the Przemys City – have a lot in common with both the collegiate church and the ashes buried within it.

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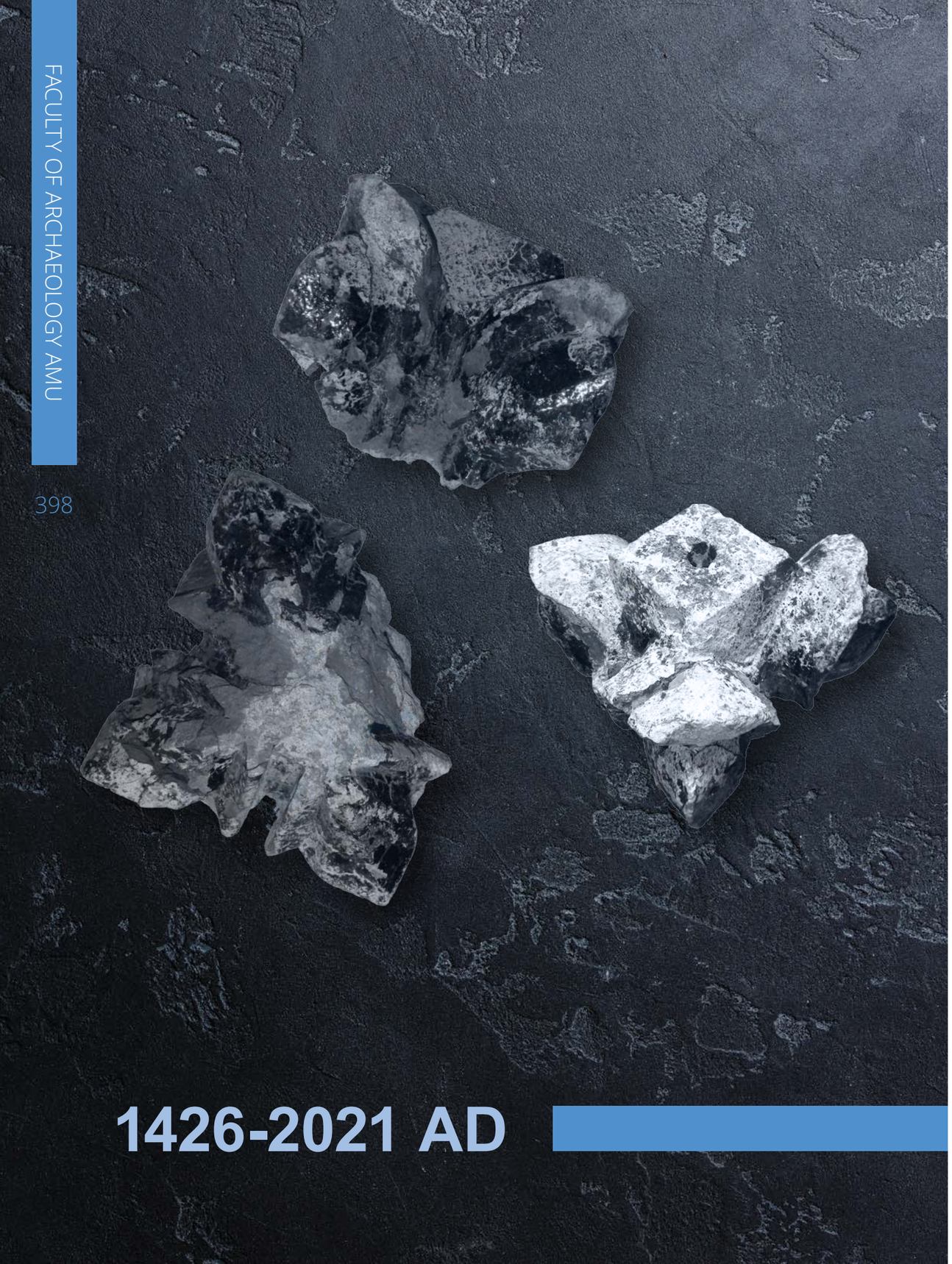
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FACULTY OF ARCHAEOLOGY AMU



Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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Archaeological research of the Gothic Church of the Blessed Virgin Mary on the island of Ostrów Tumski, Poznań

Olga Antowska-Gorączniak

Abstract

Between 1999 and 2015 an archaeological research of the interior and the immediate vicinity of the Church of the Blessed Virgin Mary on the island of Ostrów Tumski in Poznań was conducted.

This hall church, whose consecration took place in 1448, is part of the architecture style connected with the workshops of Master Builder Hinrich Brunsberg. Interestingly, the traceries of the study church windows correspond to similar elements from the churches in Brandenburg and Chojna (Brunsberg's work). But the fragments of Gothic pinnacles from the gable (according to written sources) were probably built by Lorek from Kościan. Also, the tracery decoration at the western portal of the Poznań cathedral, which was discovered during the post-war renovation works, confirms the presence of a similar façade decoration of the Poznań cathedral to that in Brandenburg. What is more, a fleuron found in the church of the Church of the Blessed Virgin Mary on the island of Ostrów Tumski is analogous to the same decorative element of the town hall in Tangermünde. This suggests that the workshops associated with that master builder, most probably participated in the rebuilding of the Poznań cathedral at the turn of the century (XIV/XV) and in the designing of the St Mary's Church, which was completed after Brunsberg's death.

The archaeological research included the cemetery that was operational from the 2nd half of the 15th century to the end of the 18th century, during which time, the deceased were buried inside the church. It was also where remains of several brick tombs/crypts were discovered. The youngest burial is an ossuary found in the middle of the nave, which contains bones moved there from the cathedral in 1784-1785. The brick and stone wall enclosing the cemetery was built in 1465-1466. Originally, the church and the cemetery were situated on a small hill, the slopes of which were reinforced.

Keywords: Gothic architecture, Hinrich Brunsberg, traceries, Poznań Cathedral, churchyard cemetery



Figure 1. Church of the Blessed Virgin Mary and Cathedral on the island of Ostrów Tumski, Poznań.

Introduction

This article is based on the results of archaeological research carried out by the staff and the students of the Faculty of Archaeology (formerly the Institute of Prehistory) of Adam Mickiewicz University in Poznań under the supervision of Professor Hanna Kóčka-Krenz in 1999-2015 in and around the Church of the Blessed Virgin Mary (NMP) as well as the data obtained from other places on the island of Ostrów Tumski. The archaeological sources presented here and the conclusions based on them are part of the doctoral dissertation written by the author of this text, whose title is 'Gothic architecture on the island of Ostrów Tumski in Poznań. An architectural and archaeological study' (Poznań 2019, unpublished). The research of the terrain around the Gothic church, whose main purpose was to identify the pre-Romanesque *palatium* from the times of the reign of Mieszko I and Princess Dobrava, provided an impulse for the study of the 15th century building workshops, the technique of erecting the Church of the Blessed Virgin Mary, and the identification of its surroundings.

The church

The Gothic church is located in the western part of the island of Ostrów Tumski (Figure 1) and was built on the site of the palatial chapel dating to the 2nd half of the 10th century bearing the same name as the island (Kóčka-Krenz, 2016). In the Middle Ages, this site was slightly elevated, as indicated in the written sources from the late 14th and 15th centuries, which referred to it as *'in Summo Posnaniensis'* or *'S. Mariae in Summo'* (Nowacki, 1951, pp. 318, 325). The archaeological investigations confirmed that on the south-western, southern and south-eastern sides of the Gothic church there was a gently sloping hill.

Records collected from the Acts of the Chapter and the Consistorial Acts by Fr. J. Nowacki (1951) suggest that the old princely chapel must have stood in its original place until the construction of the Gothic church began, as it was mentioned when describing the location of the cathedral school in 1405 and 1407. On the basis of the archaeological research it was confirmed that at the beginning of the 15th century, some construction works were conducted at that site, probably with the aim to extend the school or to reorganise the immediate vicinity of the pre-Romanesque chapel. This is indicated by remains of the foundations and the foundation pit of the unfinished building identified to the west of the gothic church and below its floor, along the southern nave.

The first ideas to build a church and perhaps also the beginning of construction works, in relation to the fundraising *pro fabrica ecclesiae*, can be traced back to 1426. This fact is also confirmed by numerous written records made before the middle of the 15th century, and information that the construction had probably commenced by 1431. However, some publications refer to 1433 or 1432 as the beginning of the construction of the Gothic church (i.a. Kohte, 1896, p. 32; Machowski & Włodarek, 1995, p. 189; Radacki, 2007/2008, p. 32). It must be acknowledged that this uncertainty in the date of the beginning of construction might affect attempts to establish the facts connected with the construction workshop. Unfortunately, as early as in January 1433, a shortage of funds for the completion of the church was reported. Consequently, the construction works were not resumed until 1444 – under the pontificate of Bishop Andrew of Bnin (1438-1479). Detailed records make it possible to trace the sequence of operations and some of the contractors are even mentioned by name. During 1444, the construction was supervised by *vicecustos* Michał Kuczkowski. In the summer of 1444, the perimeter walls were finished by Hanusz Prusz (a bricklayer/mason) and on August 12th, he returned the unused brick and a masonry tool known as a larry. Around the same time, at the general session on July 1st, 1444, the Cathedral Chapter decided that two peasants from the nearby bishop's and the chapter's estates should be sent to carry the timber for the Church of the Blessed Virgin Mary (Nowacki, 1951, pp. 326-327). That decision is confirmed by the treefelling dates (1444-1445) for the still preserved medieval, timber roof truss of the church, obtained thanks to dendrochronology (Krąpiec, 2013). Furthermore, according to written sources, roof trusses were installed and Lorek of Kościan built the gable and covered the roof with tiles in 1445. In the years 1447-1448, Niklos from Poznań and his son (of the same name) vaulted the interior. The church was consecrated in 1448.

Construction techniques and architectural technology

The foundations of the Gothic building reveal a secondary use of rubble obtained from the pre-Romanesque palatium, together with some remains of a bonding layer of gypsum, while in addition to the use of fragments of brick rubble and large, undressed boulders bonded with lime mortar. In the higher parts of the foundation and in the lower sections of the ground course, reused stone ashlar and regular blocks of travertine were also found. The last of the enumerated materials should be associated with demolition and rebuilding of the Poznań cathedral organ-loft at the turn of the century (14th and 15th). When building the foundation, narrow trenches, unbonded stones and rubble were used. Outside the building, the upper parts of the trenches were widened so that the masons had an easy access to the erected foundations and to the walls bonded with lime mortar.

The Church of the Blessed Virgin Mary is a two-and-a-half-span church with an ambulatory, from the east terminated in a pentagonally enclosed presbytery. Its naves are separated by arcades supported by pillars. One half of the span, on the west side, merges into the wall to design an area for the vestry, over which double galleries were built. The pillars, so to say, 'sunk' into the added wall. This element is indicated as a trace of the original intention to build a much larger building. Unfortunately, the archaeological research conducted outside did not confirm the planned extension of the building to the west – no continuation of built foundations or foundation trenches were recorded. Some art historians suggest that there were plans to extend the church (Kurzawa, 1983, p. 62; Kurzawa & Kusztelski, 2006, p. 67; Kowalski, 2010, pp. 179, 182-183) and the then existing church was eventually supposed to serve as its chancel. However, this thesis has not been proved. Instead, the archaeological investigations have shown that the original bases for all of the pillars were octagonal plinths. Similar octagonal pillar plinths with profiled supporting ribs are in the church of St. Catherine in Brandenburg. Today, only the pillars in the eastern part of the church in Poznań have an octagonal plinth, while the others have a simplified, hexagonal one – as a result of renovations conducted in the 19th century. The aforementioned brick church was built in the Gothic cross bond brickwork and was characterised by the use of a variety of mouldings covered with very dark olive green glaze. Both inside and outside, there is a noticeable change in the mouldings used from about 2/3 of the height of the building and a simplification of the upper part of the walls and the façades, which is interpreted as a trace of the change of construction workshops in the second stage of the works continued from 1444 (Kowalski, 2010, p.185). The similarities to the churches built by Hinrich Brunsberg and the related workshops are evident – especially from the outside. The plinth used in the church was a slightly protruding stone and brick structure, finished with stacked *scotia* mouldings and roll mouldings which are characteristic also of St. Catherine's Church in Brandenburg, the Church of the Blessed Virgin Mary in Chojna and St. Stephen's Church in Garz. The cornices in Poznań are made of unglazed mouldings, which are the result of renovation works conducted from the 19th century. However, the old, gothic ones, were covered with dark olive glaze (evidenced by those recorded in the case of the 19th century altar and the fragments found during the excavations). The pilaster strips carried into the interior with the characteristic corner mouldings and the trefoil supporting ribs running through the centre, refer to the aforementioned objects and can be treated as a 'showcase' of the workshop. Both the pilaster strips and the portals were trimmed with glazed and red-brick mouldings, used alternately. In the case of the pilaster strips of the Church of the Blessed Virgin Mary – there are pairs of statuary niches that are semi-circular in the cross-section and – similar to the church of St. Catherine in Brandenburg – prepared for an installation of statues/sculptures. This idea might have been partially implemented, because during the renovation of the church conducted at the beginning of the 21st century, in one of the niches on the northern side there was a trace of an iron pin in all probability left from the presence of (ceramic? wooden?) statue.

The resemblance of the Church of the Blessed Virgin Mary in Poznań to the church of St Catherine in Brandenburg an der Havel was first pointed out at the end of the 19th century (Kohte, 1896, p. 34). Julius Kohte attributed the construction of the Poznań church to the workshops from Brandenburg or Stettin (Szczecin), he also believed that the same workshop built the church in Kórnik. It should be noted that the church in Brandenburg has a ceramic inscription which mentions Master Hinrich Brunsberg from Szczecin (*magistrum Henricum Brunsbergh de Stettin*) as the architect of the church in 1401 (Schumann, 2015, pp. 41-42). Although only this building has the 'architect's signature' left, based on style – it has been possible to include further buildings in the works of the same building master. Max Säume (1926) included the Church of the Blessed Virgin Mary in Poznań in this group, along with the churches in Chojna, Szczecin, Stargard and Garz as well as the town halls in Chojna, Szczecin and Tangermünde. L. Therefore, Przymusiński, who expanded on this idea, rightly pointed out the similarity of profiles and composition of the pilaster strips and the portals of the Poznań church with Brunsberg's line of development representing the period of c. 1430. Usually, an apprentice or a member of the closest circle of Hinrich Brunsberg was indicated as the first builder of the Church of the Blessed Virgin Mary (Przymusiński, 1956). However, suggesting that it was Hanusz Prusz, mentioned in the sources (Kurzawa & Kusztelski, 2006, p. 66), is devoid of any strong basis. This name appears in relation to the final stages of construction after the aforementioned change of workshop in 1444.

Some researchers question the possibility of attributing so many completed structures to a single architect, occasionally using the term 'architect's legend' (e.g. Skibiński, 1995, p.122). However, the proposed iterpreatation of Hinrich Brunsberg perceived as a mason master and 'entrepreneur' seems truly compelling and might alleviate some of these scholars' concerns (Böker, 1988, p. 235; Schumann, 2015, pp. 44, 54-56). According to this interpretation, Brunsberg would have had a managerial role supervising other skilled building workshops and so he might have been involved in several projects at the same time – just like an entrepreneur. The author expands on this topic in the further part of this work and shows Hinrich Brunsberg's participation not only in the construction of the Church of the Blessed Virgin Mary, but also of the façades of the Poznań Cathedral.

The workshop of Hinrich Brunsberg

Thus the question is what features, according to researchers of architecture, are associated with the works of Hinrich Brunsberg? The following characteristic features of his workshop belong to the most frequently stressed:

- Hall churches with an ambulatory, having in the plan a polygonal termination, projecting from the east end and a system of buttresses carried to the interior with chapels between them (Zaske, 1978); the basilica church in Stargard is an exception to this rule,

- The use of lierne vaults in most buildings (Schumann, 2015, p. 54),

- Pilaster strips with characteristic decoration made of alternately arranged glazed and unglazed mouldings. Characteristic corner mouldings and a central supporting rib, pairs of niches (ultimately – with statues of saints) on 2-3 floors and a tracery detail (Radacki, 2007/2008; Badstübner, 2015, p. 37; Schumann, 2015, pp. 45-47),

- A specific form elaborate detailing, defined by N. Zaske as brick impressionism (Zaske, 1978, p.180); this distinguishing characteristic is to be found in many publications (e.g. Radacki, 2007/2008, p.17; Schumann, 2015, p.41),

- A blind window with two arches and a rosette, created with the use of elaborate openwork traceries discussed as a 'decorative motif' and traced through several phases of development (Oleś, 2015).

As far as the Church of the Blessed Virgin Mary is concerned, the above requirements are met thanks to the form of the structure – a hall with ambulatory, the lierne vaults, the method of construction, and the decoration of the pilaster strip. It should be noted that the chancel of the Poznań cathedral dated to the turn of the century (14th and 15th) also has an ambulatory.

Fragments of characteristic construction ceramics can shed further light on the problem of which workshop built the Cathedral and the Church of the Blessed Virgin Mary on the island of Ostrów Tumski in Poznań. In addition to the mouldings, which can be admired until now in the body of the Church of the Blessed Virgin Mary, some elements of 'artistic ceramics' representing fragments of traceries and pinnacles, have also been identified in various places of the study the area (Antowska-Gorączniak, 2014). The first collection of them – 48 fragments of traceries and a few more found years later in the warehouses of the Museum of the History of the City of Poznań (branch of the National Museum in Poznań), and described as 'a cathedral rosette 1963' (*rozeta katedralna* 1963) (inventoried in the 1970s, No. MNP/DA25/ from b tor) – is characterized by an ornamental, three-dimensional design, truncated edges, triangular or diamond-shaped indentations and dark-olive-green glaze. The most numerous group is the openwork decorations of the façade (the lowest, small traceries) with carved motifs of large and smaller crosses (Figure 2). Analogy to this design can be found on the façade of the northern chapel of the church in Brandenburg (Figure 3: a, c), as a frieze at the tower of St Mary's Church in Stargard (Figure 3: b, d) and as a frieze made of unglazed elements on the Świecka Brama in Chojna (Figure 3: e). It seems likely that the in situ remnants of them were seen c. 70 years ago by Fr. J. Nowacki, who described the western façade and portal as follows: 'The next part of the wall up to the base of the great window was adorned with

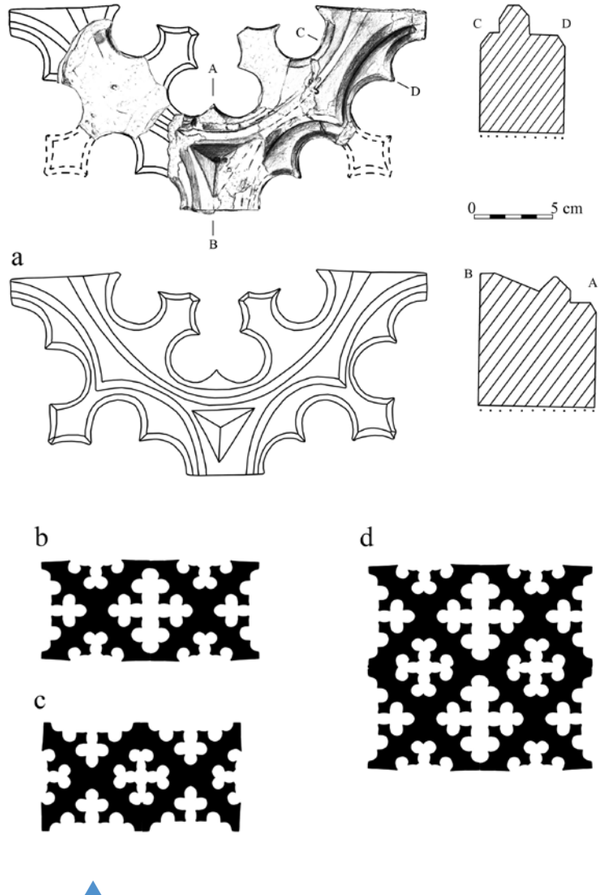


Figure 2. Examples of traceries (a) from the friezes or elevations of the buildings on the island of Ostrów Tumski in Poznań and a reconstruction of the cross bond brickwork (b-d).

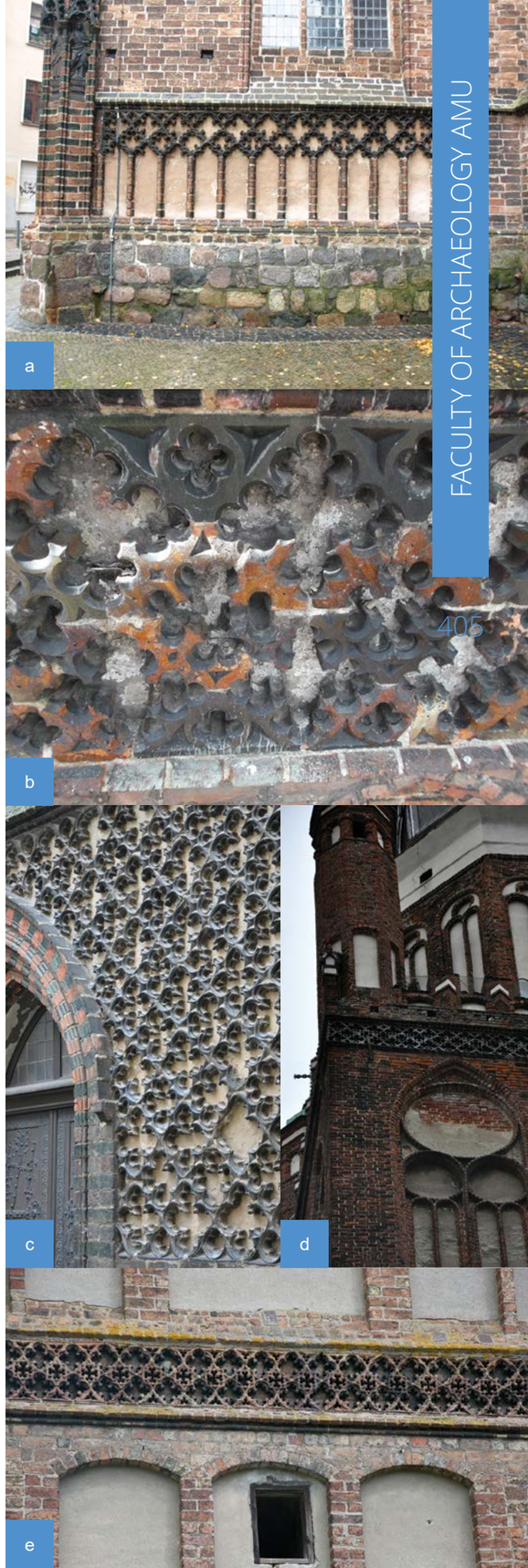


Figure 3. Tracery decoration of the façades: Tracery decoration of the façades: Church of St Catherine of Brandenburg, side of the northern chapel – a; portal area of the north façade – c; parish church in Stargard, tracery frieze on the tower – b, d; Świecka Brama in Chojna, frieze – e.

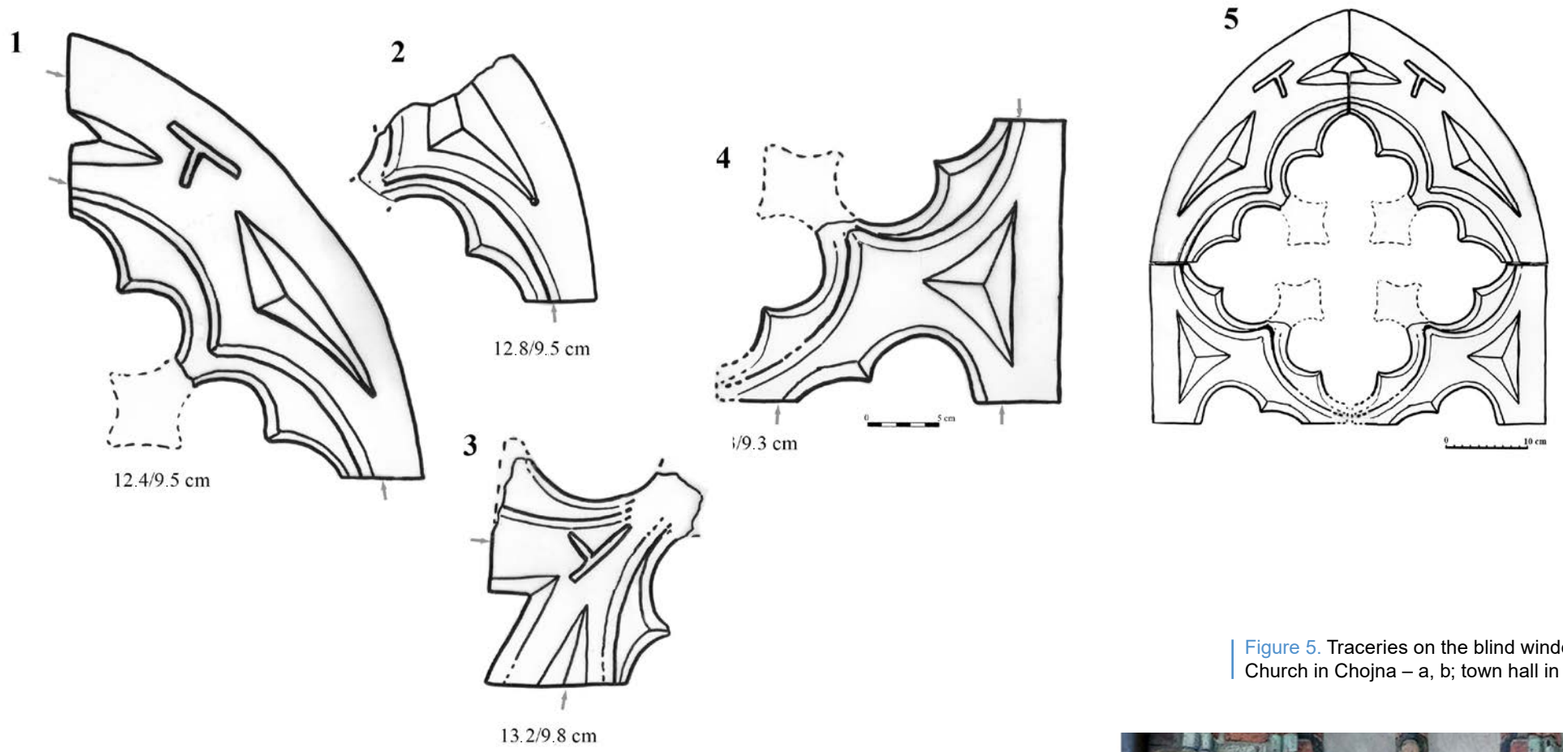


Figure 4. Cathedral traceries from the research of the 1950s (Collections of the Museum of the History of the City of Poznań, a branch of the National Museum in Poznań; No. MNP/DA25) (1-4). Reconstruction of the ogival blind windows (5).

a sumptuous tracery, the remains of which were found when the Baroque layers were being removed' (Nowacki, 1959, p. 98). Unfortunately, their reconstruction during the post-war regothicisation works was abandoned. It is likely that the west façade of the Poznań cathedral most closely resembled the traceries from the portals of the northern chapel in Brandenburg, where the openwork traceries with the motifs of large and smaller crosses reach the line of the window sills. The flat-faced traceries in the tower of St Mary's Church in Stargard covered with honey-coloured glaze are slightly less similar.

It is noteworthy that the large, massive traceries (height from 13.1-13.6 cm) did not just decorate the face of the façade but constituted self-supporting structures, for example, in the attics, on the ogival windows or the blind windows, which was confirmed by the discovery of mounting holes (diameters from 0.9 to 2.6 cm) made with the aim to connect these elements, probably using iron wall ties/anchores. Three fragments which come from windows terminated in a sharp arch or blind window (Figure 4). The closest analogy to the above reconstructions are the traceries from the blind windows on the façade of St Mary's Church in Chojna, where they were used for decoration of the pilaster strips (Figure 5: a, b). Each element of this ogival blind window from the church in Chojna was engraved exactly in the same way, including the indentations of the triangles and the openwork on the top. According to the workshop crite-

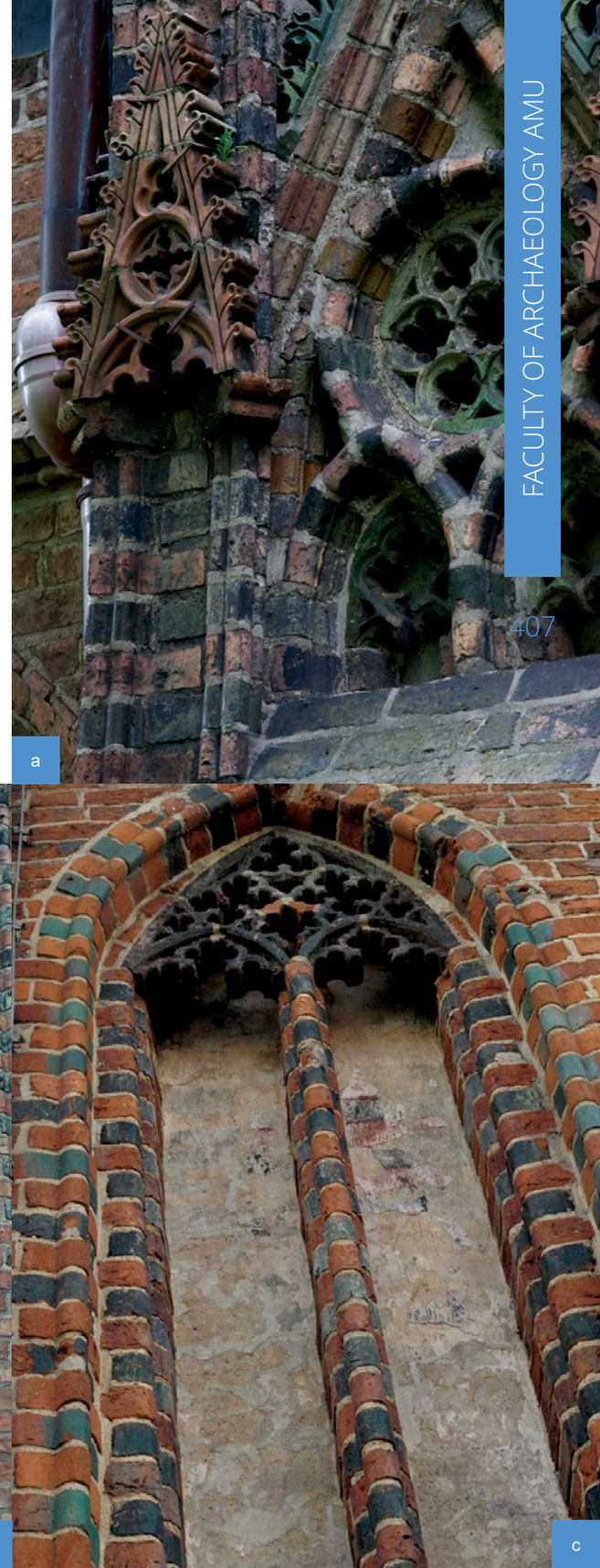


Figure 5. Traceries on the blind windows: St Mary's Church in Chojna – a, b; town hall in Szczecin – c.

ria set out by K. Oleś, this analysis of the blind windows and the rosette should be referred to as the Brunsberg motif and can be used to identify the work of the master builder Hinrich Brunsberg (Oleś, 2015, pp. 29-32). Furthermore, they can be used to phase his works. For example, the parish church in Chojna represents the third phase in the pattern of development of Brunsberg's structural design. Equally elaborate, decorative traceries but with a slightly different design are found in the blind windows located in the southern elevation and at the entrance of the town hall in Szczecin (Figure 5: c). The next elements of tracery acquired from the warehouses of the Museum of the History of the City of Poznań are fragments of rosettes (Figures 6: 1-4, 7: 1-8). It is possible to reconstruct two different types of rosettes. Some of them allow a reconstruction of two different decorations of this type. The first of the rosettes is a fragment

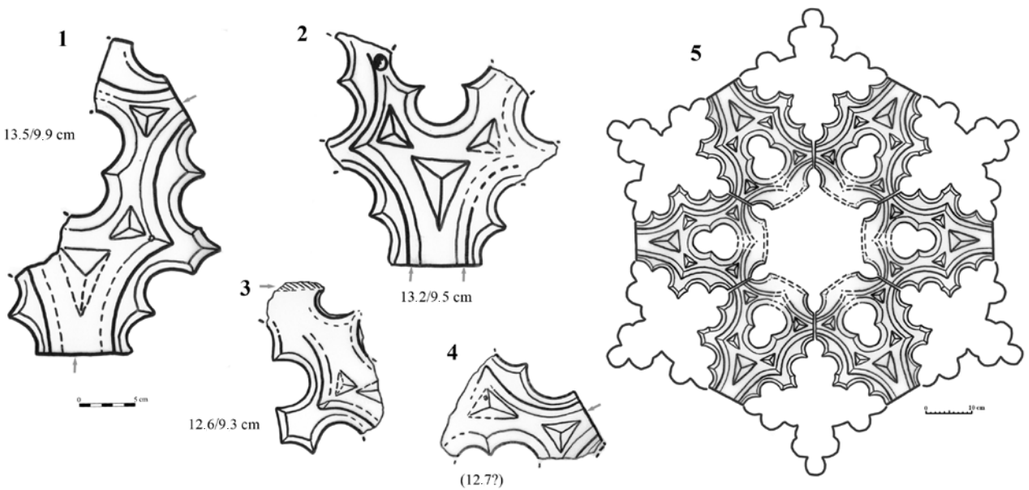


Figure 6. Traceries (Collections of the Museum of the History of the City of Poznań, a branch of the National Museum in Poznań; No. MNP/DA25) and a reconstruction of rosette 1.

of the central part, richly engraved with motifs of a star/flower, fischblase ornament, crosses made of quatrefoils with engraved triangles on the upper surface (Figure 6: 5). The second of the rosettes (Figure 7: 9) is a reconstruction of its circumference, about 1 m in diameter, with motifs of rosettes and the fischblase ornaments. Similarly engraved and spatially moulded, rosettes with *chiaroscuro* effect are known from the top of the town hall in Tangermünde (Figure 8: a, f) and from the church of St. Catherine in Brandenburg (Figure 8: b-e). Particularly similar are the rosettes of the gable parapeted walls in the northern chapel, where the motifs of crosses, fischblase ornament and rosettes were also used. The Poznań rose windows were probably originally located in the cathedral attic.

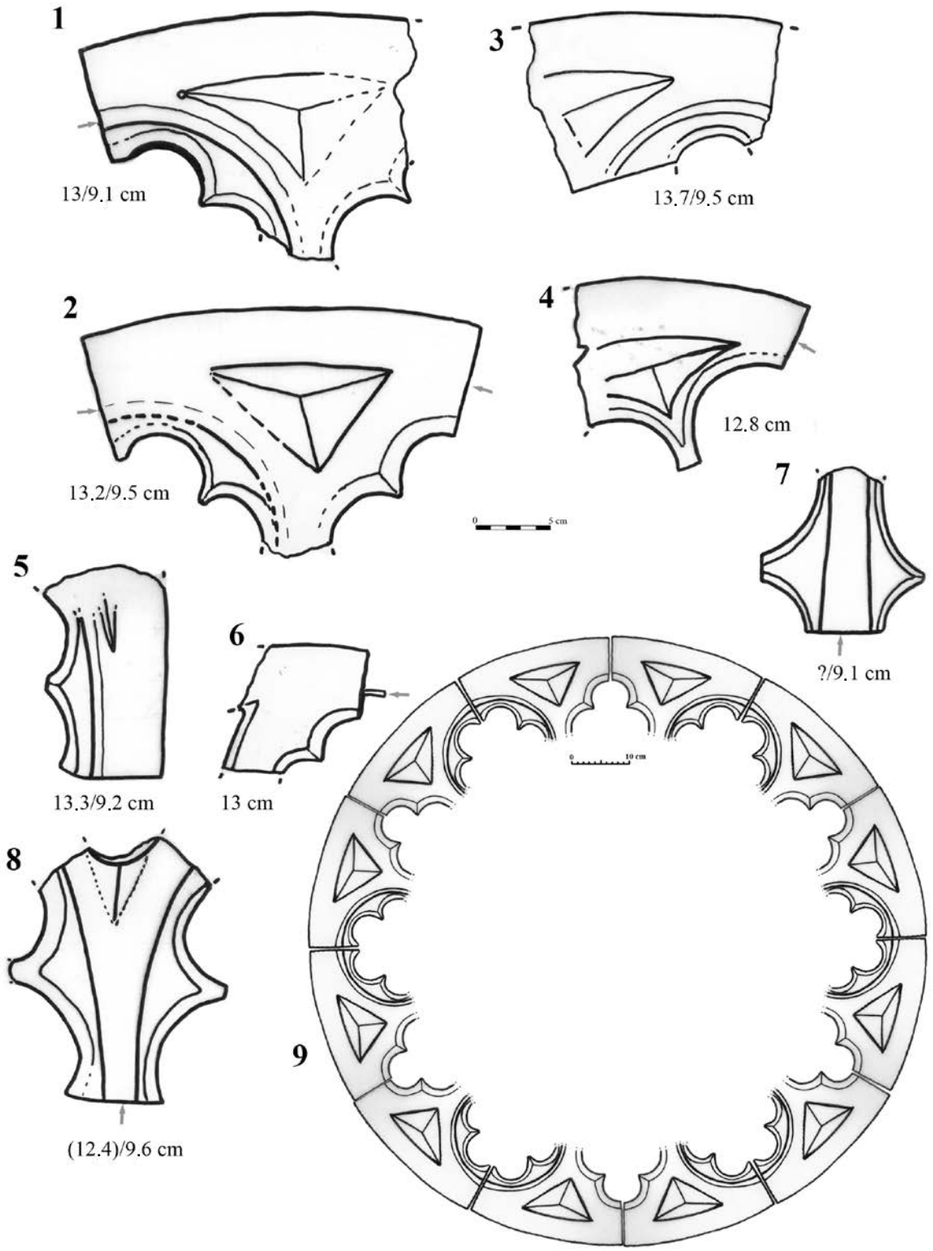


Figure 7. Traceries (Collections of the Museum of the History of the City of Poznań, a branch of the National Museum in Poznań; No. MNP/DA25) and a reconstruction of rosette 2.



Figure 8. Rosettes on the gabbles and in the attic: town hall in Tangermünde – a, f; Church of St. Catherine of Brandenburg – b-e.

Another group of characteristic elements of building ceramics are fragments of a fleuron and pinnacles. The fleuron with a mounting hole in its base and reconstructed from 15 fragments (Figure 9: a, b) was excavated from the foundation of the vicarage which had ended up in the brick rubble as reused building material where it was discovered. The fleuron finds a direct analogy in a similar element from the town hall in Tangermünde, where it decorated the ornate gable with openwork rosettes (Figures 9: c; 8: a, b). In contrast, heavily fragmented pieces of pinnacles (13 fragments) recorded in the immediate surroundings of the Church of the Blessed Virgin Mary, and particularly in the 19th century layers on the west side of the church, find no analogies in the architecture typical of the West Pomeranian workshops. Their edges are decorated with 'flounce-shaped' mouldings, grooves and dimples (Figure 9: d-f). It can be assumed that this is the work of the author of the gable mentioned in written sources – a mason from Greater Poland, Lorek from Kościan (Antowska-Gorączniak, 2013b).

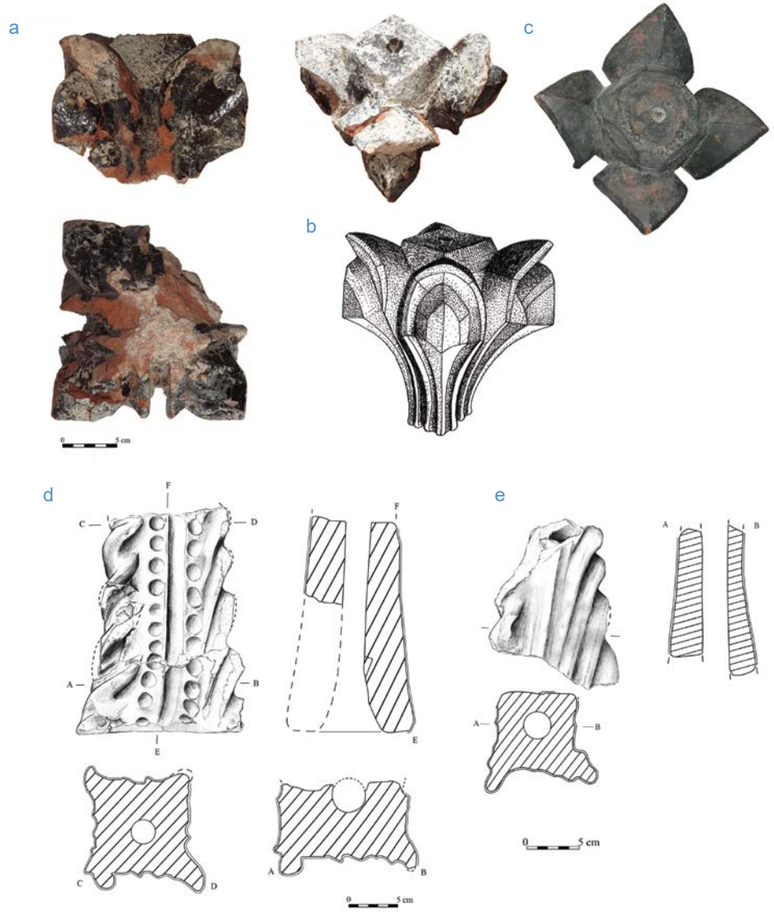


Figure 9. Fleurons and pinnacles: fleuron presented in the vitrine in the town hall in Tangermünde – C; fleuron from the foundation of the vicarage located at 3 Posadzego Street on the island of Ostrów Tumski – A and its reconstruction – B. Fragments of pinnacles from the gable of the Church of the Blessed Virgin Mary – D-E.

Some of the presented fragments of traceries and the fleuron were deposited in the well-dated layers or foundations, in a buried trench belonging to the uncompleted building along the southern nave of the Church of the Blessed Virgin Mary and in the foundations of the 16th century defensive walls and of the vicarage. On this basis, it can be concluded that they come from the cathedral in Poznań, which at the end of the 15th century and at the beginning of the 16th century was strongly affected by some construction disasters caused by a gale and a lightning strike (Antowska-Gorączniak, 2013a, p. 213).

Reconstruction of the cathedral organ-loft lasted from the 14th century to the beginning of the 15th century, during which period Brunsberg's workshops ran such construction projects as the parish church in Stargard, the St Mary's Church in Chojna, the church of St Catherine in Brandenburg, the church of St Stephen in Garz and the town hall in Tangermünde. The characteristic construction detail and a similar duration of work on the cathedral are in line with the concept according to which Master Brunsberg should be perceived as an entrepreneur. Although no written sources confirm his presence in Poznań, there were certainly some West Pomeranian Brunsberg construction workshops operating in this region. Also, it is highly likely that Hinrich Brunsberg contributed to the design of the Church of the Blessed Virgin Mary on the island of Ostrów Tumski in Poznań, as its design seems to be a miniature version of the Church of St Catherine of Brandenburg – a showcase of the said Master. Perhaps it was created in parallel with the work on the Poznań cathedral's façades. In the light of the information that the fundraising for the erection of the Church of the Blessed Virgin Mary commenced in 1426, and the last known mention of Brunsberg in document dates to 1428 (related to an inheritance case after the death of another builder – Nicolaus Craft), his contribution to this construction project cannot be explicitly denied. The exact date of Brunsberg's death is unknown but it is assumed that it was after 1428 (Zaske, 1990; Schumann, 2015, p. 44). Therefore, perhaps the interruption of the works on the construction of the Church of the Blessed Virgin Mary in 1433, resulting from a lack of funds, should also be viewed through the context of the death of its alleged architect – the coordinator of the construction work.

The cemetery in the vicinity of the Church of the Blessed Virgin Mary

There was a cemetery both within and around the church (Figure 10). Preliminary investigations lead to the conclusion that the burials should be related to the Gothic church, and people were buried in this place from the second half of the 15th century up to the modern times. No older graves associated with the pre-Romanesque chapel of the princely palace have been identified, though. So far more than 160 skeletal burials of single bones and bone concentrations have been recorded in the layers and the ossuary. The cemetery was not reserved exclusively for the clergy, which is evidenced by the fact that the discovered remains included bones of females and children in addition to males. It may be assumed that in addition to the clergymen of the Poznań church (grave 114 contained prayer beads, grave 136 contained an embroidered stole) the benefactors of the church and their families were also buried there. Inside the church, the bodies were usually buried in coffins placed along the longitudinal axis of the building and oriented E-W (with a slight SW-NE deviation) with their heads to the west, there is one exception where the head was to the east. A more concentrated, multi-layered arrangement of the human remains was recorded in the northern nave and in the central section of the southern nave. Some burials were located in specially built brick crypts or tombs (Figure 10:4). Here, the arrangement of the remains of the deceased was consistent with the course of the walls of the crypt. Only the crypt in the north-eastern part of the presbytery, which contained the skeletons of three individuals and mixed bones of others, was examined in its entirety. Based on the burial goods, it may be dated to the second half of the 17th century. Several steps used to lead to the crypt from the north-western side. The crypt was buried due to the destruction of its vault and the breach in the vault of the crypt and its covering with rubble was probably caused by a construction disaster recorded in the first half of the 18th century. At that time, in 1762, the gothic lierne vaults in the eastern part of the church were replaced with sail vaults supported on buttresses (Kurzawa, 1983, p.62). Finally, the crypt may have been covered with flooring during the 19th century renovations, as they are mentioned in an earlier inspection of the church 'bury the vaults and the bones of the deceased present there' (Kurzawa, 2003, p. 367). Interestingly, the construction process of that crypt resulted in the demolition of the older stone and brick structure – probably also a tomb – was fragmentarily preserved on the western side. The western part of a brick crypt/tomb in a symmetrical arrangement to that in the north-eastern presbytery was identified in the southern aisle. Other remnants of a tomb were uncovered in the middle of the nave. Interestingly, the only preserved wall was the eastern, shorter one with remains of toothings projecting at the end of the side walls running westwards. The toothings were made of irregularly arranged Gothic frog bricks (bricks with a 'frog' indentation made with fingers) with sections of clearly recognisable Gothic brickwork and lime mortar with smooth joints. The location of the tomb i.e. in the central part of the nave – *in medio ecclesiae* – reflects the high social standing of the person who was buried there. The building material used indicates a late-medieval provenance of this feature, but the burial itself was not preserved. The other three walls of the tomb were pulled down during the secondary relocation of human bones to become part of the mass burial – the ossuary (Figure 10:6). However, it is possible to determine when the bones were placed in the central part of the church and from where they were moved based on written sources. A note by Canon Ludwik Richtter, says that '[...] in the Year 1784 in the month of November the deceased Bishops, Canons and *Cleri Minoris* were moved from the basement of the Cathedral Church of Poznań and buried. In this Church of the Blessed Virgin Mary, in the middle of the church, a *Sepultura* was held, at which, as a clerical student at the Seminary of Poznań, I was present at the time' (Kurzawa, 2003, p.367). The day the bones moved from the cathedral were buried – October 20, 1785 – can also be found in the archival documentation (Archdiocese Archives in Poznań, General Records of the Church of the Blessed Virgin Mary *in Summo* in Poznań, No. 0A X 131). The documents of Archbishop Leon Przyłuski contain a sketch of a slab which used to be located above the ossuary, with a relief of the skull and crossbones and the inscription *'PIIS MANIBUS CONFRATRUM AC PRAEDECESSORUM SUORUM CAPITULUM CATEDRALE POSNANIENSE IN SOLENNI OSSIUM IN HOC LOCO SEPULTURA ANNO DOMINI 1785 DIE MONUMENTUM POSUIT'* (Kurzawa, 2003, p. 372). The relocation of bones from the graves of the cathedral crypts has been related to the many years of reconstruction of the building after the fire of 1772 (Warkoczewska, 2003, pp. 110-113). The two layers of bones separated by a thick layer of sand discovered during excavation of the deep pit suggest that the

exhumation of bones from the cathedral and re-inhumation in the church ossuary might have been carried out twice; this would explain the difference in dates (1784 vs. 1785). Anthropological analysis helped to determine the MNI of adult specimens as 229 and of children as 17 and revealed that the ossuary contained the bones of adult males, females as well as children (Kubicka 2014, pp. 78-82, 84-86). This strongly suggests that the ossuary was not only the burial site of clerics that were moved from the cathedral crypts.

On the basis of their layout, the burials identified outside the church can be associated with two phases in the lifecycle of the cemetery. The older phase (15th-16th century) was represented by the graves on the E-W axis (SW-NE deviation), usually with the head to the west. The younger, modern phase (17th-18th centuries) was represented by the graves found aligned mainly NW-SE, with the head to the south – although the layout of some younger burials corresponded to the older phase (the cemetery of the Blessed Virgin Mary Church is currently being studied in detail). The cemetery territory was originally separated by brick and stone fencing, which was unearthed during archaeological investigations (Antowska-Gorączniak & Sikorski, 2003). It was built using some relics of older structures (Figure 10: 2, 3). Sometime after the mid-15th century, the south-west, south and east sections of the fence were added, built on a pier and post foundation (Figure 10: 1). The fragments of the fence can be related to the Consistory Files, which mention the construction of the enclosure around the church of the Blessed Virgin Mary in the years 1465-66 by the legacy of the church custodian Wojciech Szamotulski (Nowacki, 1951, p. 328). Around the second half of the 17th century, a brick crypt was added in the central part of the southern course of the enclosure. The enclosure itself existed at least until 1787 – the date of publication of Ignacy Lasota's plan, on which the wall was marked for the last time. The ruined fence was pulled down at the turn of the century (18th and19th). Today there is no trace of the cemetery. At the beginning of the 19th century, the Gothic church of the Blessed Virgin Mary was also threatened with demolition – fortunately though, it was thoroughly renovated in the middle of the 19th century (Kurzawa, 2003, pp. 364-372).

The occupation level around the church in the cemetery zone was slightly lower than the current one, reaching the foundation offsets (20-40 cm). However, outside, the walls reinforced with buttresses, the area sloped strongly down to the south-west, south and south-east. The slope of this elevation was reinforced with a layer of paving made of small pieces of rubble, strongly compacted and supplemented with fragments of brick rubble and animal bones (mainly finger segments). This layer articulates with the face of the cemetery wall and based on stratigraphic principles, can be dated to after the construction of the cemetery wall. In the early 16th century, the area outside the enclosure was levelled and a cobbled fieldstone road running along the wall with deep gutters was built there instead.

Conclusions

This year, another major renovation of the Church of the Blessed Virgin Mary along with the revitalization of its immediate surroundings have been completed. Due to the joint exhibition project of the Archdiocese of Poznań, the City of Poznań and the Archaeological Museum – 'Everything began here – an exhibition of the testimonies to the beginnings of the Polish

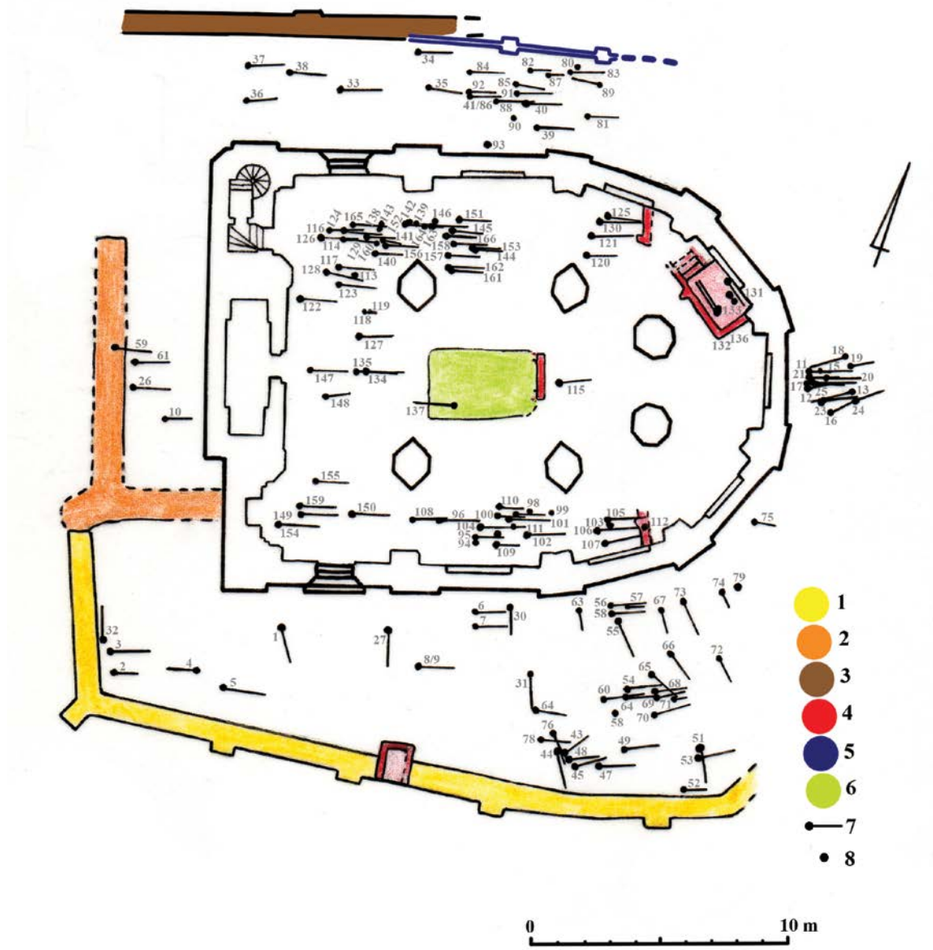


Figure 10. Cemetery of the Church of the Blessed Virgin Mary: distribution of burials documented in the years 1999-2015 and representation of the perimeter wall; 1 – cemetery enclosure on the pier and post foundation; 2 – older brick and stone foundations; 3 – cemetery perimeter wall discovered in 1946; 4 – brick crypts; 5 – modern fencing; 6 – ossuary; 7 – burials with determined orientation; 8 – clusters of human bones with indeterminate burial orientation.

statehood on the island of Ostrów Tumski in Poznań' (a project co-financed by the European Regional Development Fund as part of the Greater Poland Regional Operational Program for 2014-2020) both the interior of the building and almost the entire adjacent area are excluded from the possibility of conducting excavations for several years. A glass installation showing the course of the walls of the *palas* of Mieszko and new floors using brick tiles whose size is analogous to the ones obtained during the excavations have been provided. Further investigations of the graves from the cemetery of the Church of the Blessed Virgin Mary and the architectural relics have therefore been left to future generations of archaeologists.

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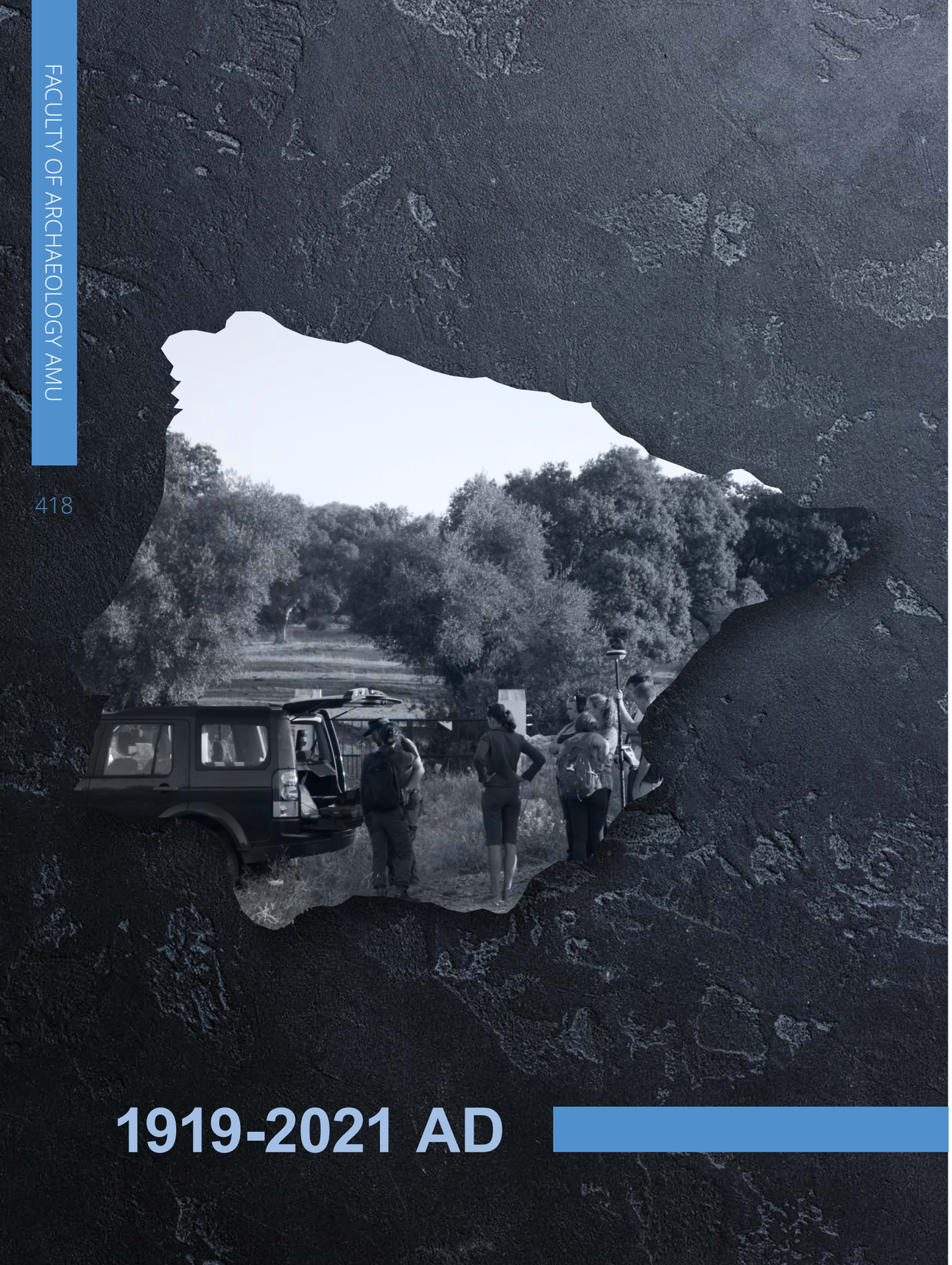
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Treasures of Time:

Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

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Polish archaeological research in the Iberian Peninsula

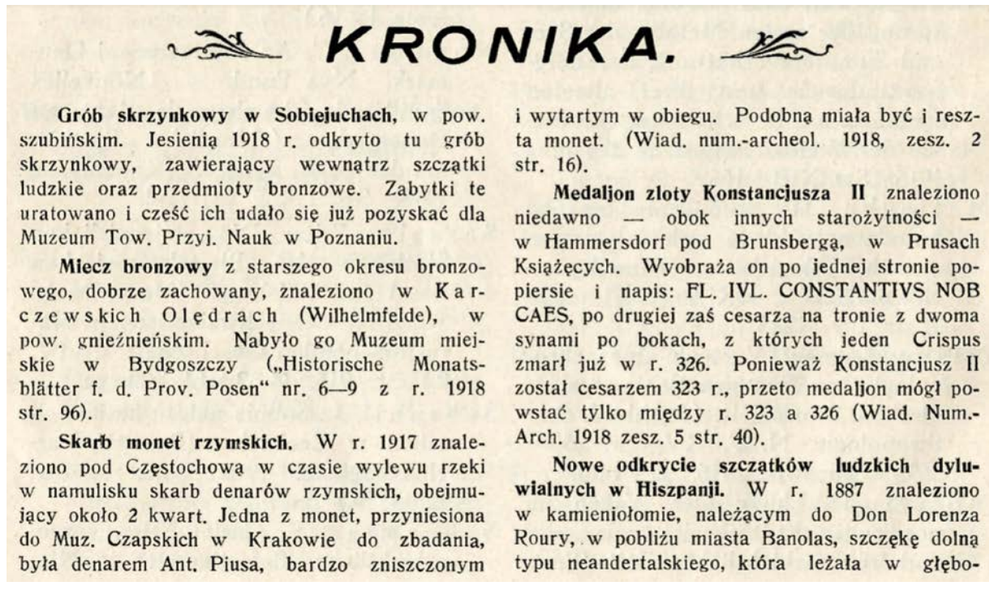
Michał Krueger

Abstract

The aim of this article is to present the documented achievements of Polish archaeologists carrying out research on the earliest history of the Iberian Peninsula. As a result of a library query and community interviews, the main areas of activity of Polish archaeologists over the past decades were located, which were mainly in Galicia and Andalusia. The main centres conducting research activities in the Iberian Peninsula are the University of Warsaw, the University of Łódź, and Adam Mickiewicz University in Poznań. In recent decades, Polish scientific initiatives in the field of archaeology of the Iberian Peninsula have covered various aspects of field and archival research.

Keywords: Iberian Peninsula, Classical Archaeology, history of research

The aim of this work is to summarise the history of Polish research interest in the Iberian Peninsula, with particular emphasis on initiatives undertaken in Poznań at Adam Mickiewicz University (AMU). The basic method used during the work on the referred topic was a library query and community interviews. The analysis covered the most important Polish archaeological journals: *Acta Universitatis Lodziensis. Folia Archaeologica, Archeologia, Archaeologia Polona, Archeologia Polski, Etudes et Travaux, Eurasian Prehistory, Fasciculi Archaeologiae Historicae, Folia Praehistorica Posnaniensia, Polish Archaeology in the Mediterranean, Przegląd Archeologiczny, Recherches Archéologiques, Studies in Ancient Art and Civilization, Światowit,* and *Z Otchłani Wieków*. The following available library materials were also investigated[1]: BA and MA theses defended in the post-war years at the universities involved in the research of the Iberian Peninsula, namely the University of Warsaw, the Adam Mickiewicz University in Poznań, the University of Łódź, and the University of Wrocław. The presentation of Polish scientific activities in Spain and Portugal is chronologically based to highlight the periods of greatest Polish archaeological activity on the Iberian Peninsula.



KRONIKA.

Grób skrzynkowy w Sobiejuchach, w pow. szubińskim. Jesienią 1918 r. odkryto tu grób skrzynkowy, zawierający wewnątrz szczątki ludzkie oraz przedmioty bronzowe. Zabytki te uratowano i część ich udało się już pozyskać dla Muzeum Tow. Przyj. Nauk w Poznaniu.

Miecz bronzowy z starszego okresu bronzowego, dobrze zachowany, znaleziono w Karczewskich Olędrach (Wilhelmfelde), w pow. gnieźnieńskim. Nabyło go Muzeum miejskie w Bydgoszczy („Historische Monatsblätter f. d. Prov. Posen" nr. 6—9 z r. 1918 str. 96).

Skarb monet rzymskich. W r. 1917 znaleziono pod Częstochową w czasie wylewu rzeki w namulisku skarb denarów rzymskich, obejmujący około 2 kwart. Jedna z monet, przyniesiona do Muz. Czapskich w Krakowie do zbadania, była denarem Ant. Piusa, bardzo zniszczonym i wytartym w obiegu. Podobną miała być i reszta monet. (Wiad. num.-archeol. 1918, zesz. 2 str. 16).

Medaljon złoty Konstancjusza II znaleziono niedawno — obok innych starożytności — w Hammersdorf pod Brunsbergą, w Prusach Książęcych. Wyobraża on po jednej stronie popiersie i napis: FL. IVL. CONSTANTIVS NOB CAES, po drugiej zaś cesarza na tronie z dwoma synami po bokach, z których jeden Crispus zmarł już w r. 326. Ponieważ Konstancjusz II został cesarzem 323 r., przeto medaljon mógł powstać tylko między r. 323 a 326 (Wiad. Num.-Arch. 1918 zesz. 5 str. 40).

Nowe odkrycie szczątków ludzkich dyluwialnych w Hiszpanji. W r. 1887 znaleziono w kamieniołomie, należącym do Don Lorenza Roury, w pobliżu miasta Banolas, szczękę dolną typu neandertalskiego, która leżała w głębo-

Figure 1. Fragment of 'Kronika' from the first issue of *Przegląd Archeologiczny*, informing about archaeological discoveries in Spain.

[1] The Adam Mickiewicz University in Poznań (Walkiewicz, 1999, 2004, 2011), The University of Łódź (Andrzejewski, & Barszczak, 2007), The University of Warsaw: BA and MA theses from 2004-2011 (http://www.archeo.uw.edu.pl/zalaczniki/upload881.pdf) (2004-2011), The University of Wrocław: BA theses from 2009-2012 (http://www.archeo.uni.wroc.pl/index.php?sw=3&st=6) and MA theses from 2001-2014 (http://www.archeo.uni.wroc.pl/index.php?sw=3&st=7).

In addition to presenting scholarly initiatives from a historical perspective, this paper also aims to signal the problem of a clear disproportion that characterises Polish Mediterranean archaeology, the main interest of which is the Eastern Mediterranean. Taking into consideration the fact that even globally oriented British archaeology has relatively recently admitted that Iberia remains an unexplored region for European archaeology[2], it seems worth considering a much closer cooperation between Polish, Spanish, and Portuguese archaeologists than that observed at present.

Polish archaeology shows little interest in the Iberian Peninsula within the framework of Classical Archaeology. The interwar period certainly was not characterised by a high degree of interest in the past of the Iberian Peninsula, which does not mean, however, that the archaeological achievements from that area went unnoticed in Poland. Specialist archaeological knowledge from Spain can be found in the first issue of *Przegląd Archeologiczny*, which contains an anonymous note "Nowe odkrycie szczątków ludzkich dyluwialnych w Hiszpanji [A new discovery of human remains from the diluvium in Spain]" (1919, pp. 76-77; Figure 1). The fact that the Iberian Peninsula was not ignored by Polish archaeologists is evidenced by reviews published in *Przegląd Archeologiczny*. Their author was Professor Józef Kostrzewski, who reviewed books on the Aeneolithic (Kostrzewski, 1922/1924, pp. 145-146) and the Megalithic cultures (Kostrzewski, 1925/1927, p. 73) of the Iberian Peninsula.

In the post-war years, there was little interest in the archaeology of the western reaches of Europe. It is very likely that political factors could be behind this state of affairs. Nevertheless, there existed several scientific initiatives related to the Iberian Peninsula. In 1949, the archaeologist from Cracow, Janusz Orłowski, published an article "Wschodnio i południowo-hiszpańska sztuka skalna [Eastern and South-Spanish Rock Art]" in the journal Z *Otchłani Wieków* – the publishing body of the Prehistoric Department of the University of Poznań, and later of the Polish Prehistoric Society. In the same year, in the pages of Wrocław's Archeologia in the "Kronika [Chronicle]" section, there was a report on archaeological discoveries in Spain made by Ludwika Press (1949) concerning the Iberian and Roman cultures. The fifth volume of the same journal contains a laconic overview of the contents of the fascicule *Memorias de los museos arqueológicos provinciales* published in the years 1944-1946, which presents descriptions of the major artefacts from the most important Spanish museums (Lepik-Kopaczyńska, 1952-1953a). The volume also includes a report from the excavations in Barcelona and Merida by Wilhelmina Lepik-Kopaczyńska (1952-1953b), while another author, signed with the initials 'T. W.' wrote a review entitled "Przegląd odkryć archeologicznych w Hiszpanii [Review of Archaeological Discoveries in Spain]" (T. W., 1952-1953). These publications are reports and their aim was to familiarise the Polish research environment with the development of archaeology on the Iberian Peninsula. It is also worth mentioning that as early as the 1950s, a collaboration established between the then University of Poznań (renamed Adam Mickiewicz University after 1955) and the Catalan Archaeological Museum based in Barcelona brought the journal *Ampurias* to Poznań.

[2] The back cover of The Archaeology of Iberia: The Dynamics of Change contains a description of this book that is symptomatic of this science: For many archaeologists, Iberia is the last great unknown region in Europe. Although it occupies a crucial position between south-western Europe and North Africa, academic attention has traditionally been focused on areas such as Greece or Italy. However, Iberia has an equally rich cultural heritage and archaeological tradition (Díaz-Andreu, & Keay, 1997).

Also, in the 1960s and 1970s, some reviewing activities in the field of Iberian archaeology took place: in 1969 Jerzy Wielowiejski, PhD, reviewed a book by Antonio Garcia y Bellido on the Roman camp in Leon, and six years later Professor Anna Sadurska summarised the session of the 6th Congress of the International Federation of Associations of Classical Studies held in Madrid. The report was supplemented by some comments on the most vital archaeological artefacts present in collections of the museums in Madrid (Sadurska, 1975). What is more, an important event was the publication of an archaeological guide by Dr Małgorzata Biernacka-Lubańska entitled *Śladami Rzymian po Hiszpanii* [On the Trail of the Romans in Spain] (1976; Figure 2). The book proves a keen interest in the archaeology of the Iberian Peninsula also among those not professionally involved in this subject.

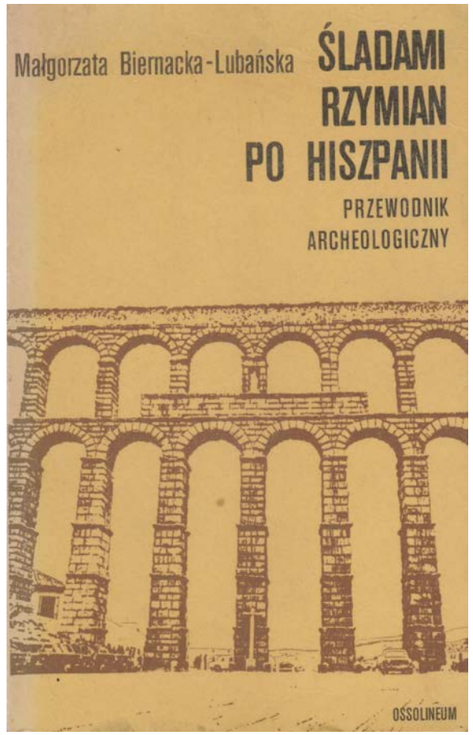


Figure 2. Front cover of the book *Śladami Rzymian po Hiszpanii. Przewodnik archeologiczny* (Biernacka-Lubańska, 1976).

At the end of the 1970s, a large Polish-Spanish scientific undertaking began. On the initiative of the Superior Council for Scientific Research (*Consejo Superior de Investigaciones Científicas*) based in Madrid, excavations of the medieval Mozarabic site of Marmuyas were initiated and lasted from 1978 to 1982. Polish archaeologists were invited by the Spanish, because of their field experience acquired during the Millennium Research Programme in Poland. The head of the Polish team was Professor Lech Leciejewicz. The cooperation resulted, *inter alia*, in the joint publication of the excavation results in *Przegląd Archeologiczny* (Leciejewicz et al., 1985). It was not the only research activity of Prof Leciejewicz in the Iberian Peninsula: in 1988 he was invited as a consultant to a site in San Salvador de Valdedios located in the province of Asturia, and in 1994 he consulted excavations in the town of Purchena in the province of Almeria (Rębkowski, 2012, p. 45).

Also in the 1980s, several joint research initiatives were undertaken, including visits of Polish researchers to Spain (e.g., Prof Aleksandra Wąsowicz participated in a seminar organised by the Department of Greek Archaeology at the Archaeological Museum in Madrid) and Spanish archaeologists to Poland. For example, Beatriz de Griñó Frontera visited Warsaw in 1983, and a year later, the Madrid-based archaeologist, Fernando López Castro, studied at the University of Warsaw in the academic year 1984/85. The fruit of these joint projects and established contacts were publications of issues related to the Iberian Peninsula in Polish scientific periodicals (Bisi, 1983; Olmos & de Griñó, 1985).

In 1986, Professor Jerzy Kmieciński initiated a cooperation between the University of Łódź and the University of Santiago de Compostela, which proved to be extremely important from the point of view of the history of Polish archaeology in the Iberian Peninsula (Grabarczyk, 1995, p. 91). In the subsequent years from 1987 to 1993, a Polish team under the tutelage of Prof Kmieciński participated in excavations of the archaeological site in Castro A Graña and the Roman villa from Agro de Nogueira located in the valley of the Furelos River (Galicia). Surveys and test excavations were also carried out at three other castro sites: San Xiao do Monte, Piñero, and Vilamor (Grabarczyk, 1995, pp. 94-95). A summary of this research was published in three articles (Grabarczyk, 1995; Kmieciński et al., 1991; Kmieciński & Kowalczyk, 1992). The research projects carried out in Spain also resulted in robust scientific exchange. Consequently, in the second half of the 1980s alone, the Institute of Archaeology of the University of Łódź organized two conferences attended by numerous guests from Spain. Didactic activities included lectures given by scholars from the University of Łódź to doctoral students at the Universities of Santiago de Compostela and Orense. The multidimensional activities of Łódź archaeologists was certainly been an inspiration for three students at the University of Łódź, who wrote and defended MA theses thematically related to the archaeology of the Iberian Peninsula (Dembińska, 1996; Siewierski, 2002; Wdowiak, 1996). Finally, the interest in the past of this part of the Mediterranean Sea in Łódź is also reflected in three sessions of the scientific conference Rome and the Iberian Peninsula organised between 2017 and 2021. The series of meetings had an interdisciplinary character and included the presentation of papers from the field of archaeology.

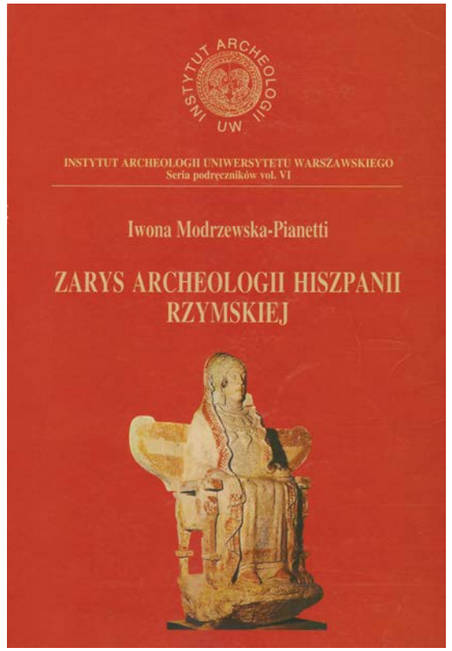


Figure 3. Front cover of the book *Zarys archeologii Hiszpanii rzymskiej* (Modrzewska-Pianetti, 2002).

The University of Warsaw is another important centre for initiatives related to the archaeology of the Iberian Peninsula. Particularly noteworthy are the scientific, didactic, and organisational activities of Professor Iwona Modrzewska-Pianetti, who since the late 1980s has conducted systematic research on the Roman period in the Iberian Peninsula, with particular emphasis on trade and pottery. Among the rich achievements of this researcher, are the first academic textbook on the Roman period in Spain (Modrzewska-Pianetti, 2002; Figure 3) and numerous studies on trade between Iberia and the northern Adriatic coast (e.g., Modrzewska-Pianetti, 1995). Prof Modrzewska-Pianetti is the initiator of didactic and research cooperation with five academic centres in Spain (Modrzewska-Pianetti, 2011, p. 3), as well as the promoter of many BA theses on the archaeology of the Iberian Peninsula,

mainly those relating to the Roman period (e.g., Belicki, 2011; Bernaś, 2007; Janowska, 2007; Karpińska, 2005; Niewiadomska, 2007; Zduńska, 2005), as well as MA theses (e.g., Fortuna, 2007; Janowska, 2009; Jaxa-Chamiec, 2007; Karpińska, 2007; Kędzierski, 2005; Tyszczuk, 2011; Zduńska, 2007). Also, she supervises PhD students specialising in the aforementioned subjects and leads the Roman Provinces Research Group *Hispania*, whose members organise exhibitions, lectures, and scientific expeditions around the Iberian Peninsula. It is worth mentioning that the research headed by Prof Modrzewska-Pianetti carried out a project financed by the Polish National Science Centre in 2016-2019 – *Kontakty handlowe regionu Murcji (Hiszpania) ze światem śródziemnomorskim w starożytności na podstawie źródeł archeologicznych i historycznych [Trade contacts of the region of Murcia (Spain) with the Mediterranean world in antiquity, based on archaeological and historical sources]* (cf. Chołuj, 2018; Modrzewska-Pianetti, 2018; Modrzewska-Pianetti & Molina Gómez, 2019).

However, the activities of the circle centred around Prof. Modrzewska- Pianetti are unique in Poland. At other universities, the interest in the subject of ancient Iberia is not very high. For example, of all the lists of MA theses (available to the author), only one analysed from the University of Wrocław refers to the Iberian Peninsula (Rosińska, 2005).

An important event in the history of Polish-Spanish contacts in connection with archaeology was cooperation between researchers from the University of Szczecin and the University of Granada initiated with the aim to carry out joint research in the town of Madinat Ilbira in Andalusia. This is another example showing that the interest of Polish researchers in the western Mediterranean basin, and on the Iberian Peninsula in particular, is yielding important internationally published scientific results (e.g., Lityńska-Zając & Rębkowski, 2020; Rębkowski et al., 2019).

In the Poznań research centre, changes in favour of the development of interest in the archaeology of the Western Mediterranean have been noticeable for several years. At the Adam Mickiewicz University in Poznań, within the last decade, three researchers have selected the earliest history of the Iberian Peninsula as their main research topic, including Dr María Ruiz del Árbol Moro, Dr Anna Jankowiak, and Dr Michał Krueger.

For three years beginning in the academic year 2012/2013, the position of visiting professor at the Institute of Prehistory of Adam Mickiewicz University in Poznań was held by Dr María Ruiz del Árbol Moro, the author of numerous works on the archaeology of the landscape of the north-western part of the Iberian Peninsula. Dr Ruiz del Árbol Moro also conducted optional classes in Poznań for students of archaeology on the abovementioned issues.

Dr Anna Jankowiak was involved in the programme *Häuser aus Mirobriga* led by Dr Felix Teichner. In 2017, she defended her doctoral thesis under the supervision of Prof. Danuta Minta-Tworzowska entitled *Processes of change in the urban space of the Roman province Lusitania. Architecture, beliefs, worship and ceramic production: Augusta Emerita, Conimbriga and Mirobriga*. Dr Jankowiak also conducted an elective seminar on Iberia in the Roman times.

After completing his doctoral dissertation on the social structure of the Tartessian population, the author of this study together with Spanish archaeologists conducted a surface survey in the vicinity of Setefilla in Andalusia, with aiming to explore sites from the Late Bronze



Figure 4. Preparations for field work by an international team of archaeologists in the vicinity of Setefilla.

and Early Iron Ages (Figure 4). In 2014-2015, he carried out the research project *Early Iron Age in the southwestern Iberian Peninsula: chronology and material culture*. The results of the radiocarbon analysis of burned human bones obtained from the cemetery in Setefilla yielded detailed chronological data of the turn of the Bronze and Iron Ages in the Guadalquivir River Valley (Brandherm & Krueger, 2017).

Currently, a second project entitled *Region of Tartessos in the light of specialist research on pottery*[3] is underway with the aim to explore changes in the production and use of pottery in the south-western Iberian Peninsula from the Late Bronze Age to the end of the Tartessos culture in the 6th century BC. This research uses interdisciplinary methods, including petrographic thin section preparation (Figure 5), scanning electron microscopy, X-ray fluorescence (XRF) (Figure 6), and analyses of organic residues.

The added value of investigation in the field as well as laboratory and archival research is the resultant *Słownik terminów archeologicznych polsko-hiszpański i hiszpańsko-polski [Dictionary of archaeological terms: Polish–Spanish & Spanish–Polish]* (Krueger, 2019) (Figure 7). This publication may help to bring the archaeology of Western and Central Europe closer to Polish and Spanish researchers.

[3] Project funded by the Polish National Science Centre, grant number: DEC-2017/25/B/HS3/00635.

Finally, the scientific interests of the staff of the Faculty of Archaeology of AMU are reflected in the undergraduate theses of its students, six of which discuss the archaeology of the Iberian Peninsula (Antczak, 2020; Gierszewski, 2018; Rybarczyk, 2017; Walkowski, 2019; Wiśniewski, 2016; Włodarczyk, 2015). Undoubtedly, the contribution of the students who prepared their research for publication – who presented during the elective course *Półwysep Iberyjski w epoce żelaza [The Iberian Peninsula in the Iron Age]* and published in the 16th volume of *Wielkopolskie Sprawozdania Archeologiczne* – as well as their considerable assistance in the preparation of the international conference *Interdisciplinary Studies on Pottery from the Iberian Peninsula* (Poznań, June 27-28, 2019) deserves appreciation.

Recent Polish scientific activity in the archaeology of the Iberian Peninsula has covered various aspects of research in the scope of field activities and archival research, although initial interest in ancient Iberia presented by Polish archaeologists was rather incidental until the late 1970s. It was not until the 1980s that ambitious research projects conducted through Polish-Spanish cooperation could be undertaken, involving excavation, surface, and archival studies. It is to be hoped that this established cooperation will continue, and consequently, the Iberian Peninsula – being an integral part of the Mediterranean world – will find a permanent place in the research practice of Polish Mediterranean archaeology.

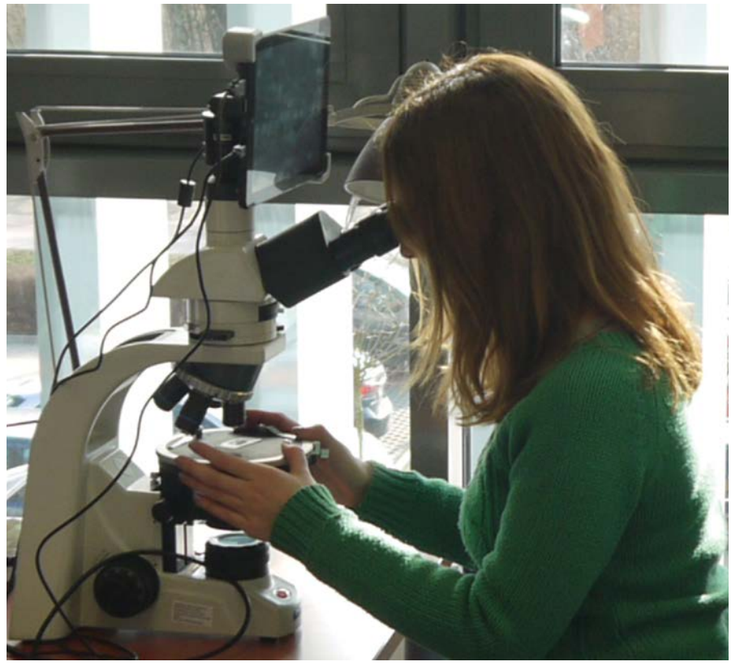


Figure 5. Petrographic analyses of the samples from Andalusia carried out at the AMU Department of Archaeology by Dr Violeta Moreno Megías.



Figure 6. X-ray fluorescence (XRF) spectrometer used for analysing pottery samples from Andalusia.

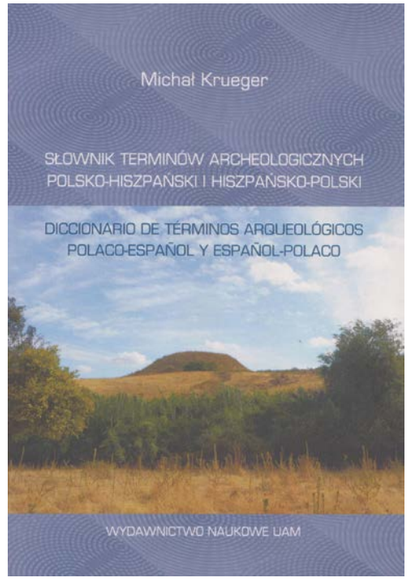


Figure 7. Front cover of *Słownik terminów archeologicznych polsko-hiszpański i hiszpańsko-polski* [Dictionary of archaeological terms: Polish–Spanish & Spanish–Polish] (Krueger, 2019).

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Rock art as a source of contemporary cultural identity: a Siberian-Canadian Comparative Study

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Abstract

This brief article is an introduction to a research project that examines the contemporary re-ception and re-interpretation/re-vitalization of prehistoric rock art and, more specifically, the re/use of rock art motifs by present-day artists in Siberia and Canada. During the second half of the 20th century, new artistic trends emerged in both regions, wherein artists significantly drew upon the heritage of indigenous peoples. In Canada, this phenomenon is mainly connected to works created by First Nations artists, while in Siberia it concerns a broader spectrum of image makers from indigenous and non-indigenous backgrounds. As a result, how the past is drawn upon in these two geographical regions involves differing perspectives, though some common trends can be observed. How do the artists link the past with the present through rock art, and to what extent do the images provide them with a source of identity? These are the questions examined by the project.

Keywords: rock art, identity, contemporary art, Siberia, Canada

Introduction

Rock art is a global phenomenon. Painted and engraved images have been made on rock surfaces throughout human history, from the Upper Palaeolithic to historical and sometimes even quite recent times. In some parts of the world, the temporal spectrum of this tradition is exceptionally spectacular, as is the case, for example, in Australia. There, rock art makers were still creating images into the 20th century. Moreover, it is also there where the unique tradition of periodic, ritual refreshing of images on rocks to keep them alive continued until recently. ‘Keeping the Wandjinas fresh’, the repainting of fading Wandjinas (var. Wanjinas) figures, was a particularly important rite for Indigenous Australians as the paintings were not just ‘representations’ of Wandjinas, but were living beings (O’Connor et al., 2008). The same images could be brought to life many times over the years.

This exemplary 'enlivening' of rock images does not only concern their original in situ contexts, as reusing of rock art motifs can involve different spheres of social life. Obviously, there are many cases that do not carry any deeper meaning (such as decorating everyday objects with formally attractive rock images). However, there also exist adaptations of the imagery to create socially important messages. The new coat of arms of South Africa, in which Bushman/San paintings were used to symbolize a post-apartheid social 'unity in diversity', is one of the most spectacular examples (Smith et al., 2000). Also the 'awakening' of the Namarali, the giant Wandjina figure at the Sydney Olympics opening ceremony in 2000 was a clear expression of respect to the Indigenous Australians and stressed their significance as the original inhabitants of this country (O'Connor et al., 2008). Similar undertones could be found in the use of petroglyph motifs by the national team of Kazakhstan during the Winter Olympics in Sochi in 2014, although this case reflects more the appropriation of the archaeology of the region than a revival of original Kazakh tradition (Rozwadowski, 2014).

Rock art motifs utilized in works of contemporary art represent a special category of this enlivening in their own right. The artists' reasons for drawing upon the imagery are various. The beginning of this phenomenon dates back to the early 20th century and was primarily associated with the discovery of European Palaeolithic cave paintings in France and Spain. It is no coincidence that the artistic movement, or rather the artistic-intellectual project, which emerged in Spain in the 1940s was called La Escuela de Altamira, as Altamira was the *first* cave in which Paleolithic rock art was discovered in 1879. Altamira became for the artists a symbol of 'primeval', 'pure' art, in a time when the source of the original, creative impulse was sought (Fatás Monforte, 2021). 'The desire to return to the cave' (Smolińska, 2012, pp. 111-115), for various reasons, also accompanied the works of Western artists in the second half of the 20th century and even today some contemporary masters, like Miquel Barceló, still find inspiration in the 'cave'.

Nevertheless, artistic adaptation of rock art imagery is a much broader topic that extends well beyond Europe. Largely as it is still in a process of unfolding, it is also far from being fully explored. Importantly, although the subject of the contemporary response to rock art is becoming a more noticeable topic in rock art research (Brady & Taçon, 2016), the issue of rock art in contemporary art is rather poorly recognized (Rozwadowski & Hampson, 2021). It is against this background that the project 'Rock Art as a Source of Contemporary Cultural Identity: a Siberian-Canadian Comparative Study' was conceived. The foundation for the project was research conducted over a long period of time in Central Asia and Siberia (e.g. Rozwadowski, 2017, 2018, 2019b) which focused on the prehistoric contexts of rock art. This archaeology-centred research, however, also revealed the compelling story of the 'new life' of rock art in this region of Asia – namely, the unique phenomenon of contemporary Siberian artists reviving prehistoric art, especially in the southern regions. In order to provide a broader context to the Siberian phenomenon, the project compares it with Canadian case studies, where rock art has also become an important point of reference for a group of contemporary artists. In these comparisons, several important questions arise. To what extent are references to rock art in the works of Siberian and Canadian artists embedded in discourses of identity? Are the artists inspired by the rock art images themselves, i.e. by their formal attractiveness, or are the archaeological interpretations of this art and other cultural narratives also important? In search of answers to these questions, the social perception of archaeological heritage and the way it influences contemporary socio-cultural processes is ultimately examined.

Siberian *arché*

Siberian artists refer to rock art, and more broadly to prehistoric art, in rich and varied ways. This phenomenon concerns a large number of artists, so much so that it has been given its own name – Neoarchaic or Archeoart. The latter term in particular reveals the prehistoric basis of this phenomenon. Importantly, Archaeoart is not only about visual references to the archaeological heritage of Siberia, but also conceptual ones and the attempt to visually translate key ideas underlying the Indigenous Siberian perception of the world. In other words, this phenomenon seeks a graphic language able to express Indigenous Siberian ontology and archetypes. The latter often oscillate around the figure of the shaman, the eternal mediator between humans and spirits and a frequent subject in the works by Siberian artists.

Siberian artists explore Siberian *arché* – beginnings, origins – via themes and techniques. Interestingly, some of the artists promoted at Siberian Neoarchaic exhibitions do not have Indigenous Siberian roots. However, it would be hazardous to draw any far-reaching conclusions about the authenticity of their art or see their art in terms of cultural appropriation; almost all were born in Siberia and, although their link with Indigenous Siberia is determined



Figure 1. An example of an Okunevo stela (fragment) from the Tesheba River valley in Khakassia currently in the collection of The Minusinsk Regional Museum of Local Lore of N.M. Martianov in Minusinsk. Height of the whole stone 3 metres (Photo: A. Rozwadowski, with permission of the Museum).



Figure 2. Alexei Ulturgashev (left in the background) and Vitalii Kyzlasov (right) holding a reproduction of an Ulturgashev's painting – see Figure 3. Photo taken in June 2018 at Kyzlasov's atelier in Abakan during an interview with the artists (Photo: A. Rozwadowski).

more by the place in which they live than by their ethnicity, it is also strong and emotional. Most importantly, their artistic explorations of Indigenous Siberianness are mindful, in direct contradiction with 'uncritical appropriation' of the Other.

However, the artistic awakening of the Indigenous spiritual legacy of Siberia is also the domain of native artists. From this perspective the Republic of Khakassia is particularly interesting, as it is the home to several Indigenous Khakass artists including Alexander Domozhakov, Aleksei Ulturgashev, Vitalii Kyzlasov and Georgii Sagalakov. Their art is strongly imbued with motifs from the prehistoric art of the Minusinsk Basin (an important part of the Republic of Khakassia), a region extremely rich in ancient art forms. Some of the most spectacular manifestations of the prehistoric art are anthropomorphic stelae with unusual fantastical faces seemingly emerging from within the stone (Figure 1) associated with the Bronze Age Okunevo Culture (3rd-2nd millennium BC). These Okunevo stelae constitute one of the main inspirations for Khakass artists, for whom they are considered to be a testimony of local heritage and Indigenous traditions (Rozwadowski & Boniec, 2021) (Figures 2 and 3).

Figure 3. Alexei Ulturgashev *Face of God of Ancient Khakass*, 120 x 80 cm, oil on canvas, 2001 (Archive of Sergei G. Narylkov, photo by A. Rozwadowski).

It is in the works of Domozhakov and Ulturgashev that this dimension of identity in the use of the prehistoric art can be particularly well seen. Although it is impossible to derive the Khakass, or pan-Turkic tradition (the Khakass are one of many Turkic-speaking peoples), from the prehistoric Okunevo culture, the emotional connections of the Khakass with that archaeological heritage is strong. To this day, for example, the worship of these prehistoric stone stelae, in which some Khakass see the materialisation of divine beings, has been preserved in their culture. A spectacular example of this is the cult of Ulugh Khurtuiakh Tas (the 'Large Old Stone Woman') involving an anthropomorphic stone stela which was taken away by archaeologists from its original place and moved to the Local Lore Museum in Abakan in 1954. After several decades, it was returned to the Khakass community in 2003 and it continues to be an object of local worship today (Rozwadowski & Boniec, 2021).

Each of the artists associated with the Siberian Neoarchaic movement has developed their own style and strategy of expressing Siberian *arché*. Some of them include motifs of prehistoric art in their works in a relatively explicit manner while also giving them an ethnic flavour. Alexei Ulturgashev (Figures 4 and 5), for example, occasionally supplements prehistoric motifs with old Turkic runes – an action which could be interpreted as ethnic appropriation



Figure 4. Alexei Ulturgashev *Turkic World. Khakassia*, 70 x 90 cm, oil on canvas, 2004. Photo: Dolinin Boris Ven'iamovich and Sergei G. Narylkov, archive of Sergei G. Narylkov. The motif of a horse is derived from petroglyphs in Oglakhty, while the images of dwellings are based on the famous petroglyphs from Malaia Boiarskaia Pisanitsa, Khakassia – see Figure 5.



Figure 5. Petroglyphs in Malaia Boiarskaia Pisanitsa ("Small Boiar Rock Art Site'), Khakassia. They are related to the Tagar and Tashtik era (2nd century BC-2nd century AD). These images of dwellings are very unique in Siberian rock art and it was on these petroglyphs that Ulturgashev drew upon in his painting shown in Figure 4 (Photo: A. Rozwadowski).

of historical legacy by an Indigenous artist. A similar strategy can be found in the art of Arzhan Yuteev, a young artist from Gorno-Altaisk, who intertwines Turkic symbols with prehistoric rock art motifs. This creates a mythical depth to the Turkic tradition in Siberia that extends beyond the origins of the Turkic peoples in Central Asia around the 5th century AD.

Consequently, the utilization of rock art motifs by some artists touches upon more sensitive issues in the postcolonial world of contemporary Russia. In the case of the Republic of Altai, a significant incident occurred in 1993 when a team of archaeologists from Novosibirsk excavated a frozen tomb in the Ukok Plateau of the Altai Mountains belonging to the Early Nomadic Pazyryk culture, ca. 5th century BC. The body of a woman was uncovered and she quickly became known as the Altai Princess and Ochy-bala, the heroine of the Altaic Epic. Just after the discovery, natural disasters hit the Altai region, provoking strong opposition from the Indigenous Altaians to the archaeological excavations (Halemba, 2008). The debate on local people's rights to their heritage that flared up still continues on today. During the writing this article (April 2021), the Indigenous inhabitants of the Republic of Altai sent a petition to the authorities of the Republic calling for immediate action to improve the social situation, an integral



Figure 6. Sergei Dykov with his research sketchbook. One page is dominated by his handwritten renditions of prehistoric art motifs, the other includes Altaian ornamental motifs (Photo: A. Rozwadowski, August 2019).

part of which was the demand for reburying the Princess in the place from which the archaeologists 'took' her away (*Требуем открытого обсуждения…*). This situation has become highly sensitive and complex, both for Indigenous communities and professional archaeologists (Plets et al., 2013). This is both interesting and important since some artists, like Arzhan Yuteev, integrate both prehistoric petroglyphs and the Altai Princess into their art.

Some other artists transform the original prehistoric art forms into new graphic forms. Sergey Dykov, for example, is another master from Gorno-Altaisk and has extensive knowledge of the rock art of Altai and Siberia which he documents in a research diary including archaeological publications as well as his own *in situ* observations (Figure 6). Even though he has this huge documented collection, it would be difficult to find any original forms from the prehistoric art in his works as they are always creatively transformed and rearticulated both in terms of form and content (Rozwadowski, 2021a). Inspirations from rock art in the works of Siberian artists are, therefore, not always overtly traceable by the viewer (Figure 7).



Figure 7. Sergei Dykov *Black Lake*, 90 x 65 cm, acrylic on canvas, 2004. A black boat at the lower part of the picture is reminiscent of Siberian petroglyphs of boats while a red fish is a stylized version of the fish image tattooed on the leg of a Pazyryk ice mummy from the 5th century BC (Photo from the archive of the 'Chronotop' exhibition project, courtesy of Olga Galygina)



Figure 8. Dashi Namdakov's monumental bronze sculpture *Golden Shoria* (2010, length c. 7 meters) located in the town of Tashtagol in Gornaia Shoria. The woman, identified with the guardian of Mount Bulanzhe, sits on a huge elk holding a vessel with a "burning" fire. The massive antlers of the elk are filled with images inspired by prehistoric petroglyphs – see also Figure 8 (Photo: A. Rozwadowski).

It should be noted that the drawing upon of rock art motifs by Siberian artists is not confined to paintings and can be found also in other media. A case in point is the spectacular sculpture *Golden Shoria* (2010) by Dashi Namdakov (Figures 8 and 9), a renowned Buryat artist (also acclaimed in Europe), who invariably refers to the cultural legacy of the Baikal Lake area in his projects. When creating the *Golden Shoria*, he incorporated petroglyph motifs from the Mongolian Altai in the northwest part of Mongolia, which is southwest of Buryatia. This piece, thus, links the Buryats (a Mongol-speaking people who dwell in Siberia) with their pan-Mongolian heritage through prehistoric art from a region of mountains (the Mongolian Altai) that lies within the nation state of Mongolia.

Figure 9. A close-up of one of the elk's antlers of the *Golden Shoria* by D. Namdakov. The image of wheeled vehicle is based on the petroglyphs from Mongolian Altai (in the valley of Upper Tsagaan Gol River – see Jacobson-Tepfer, 2012, Fig. 2f).

Canadian First Nations Image Makers

Surprisingly, many similarities to the Siberian case described above can be found in Canada. Namely, rock art became an important source of inspiration for Indigenous artists and the motifs were introduced into the works of contemporary image makers through the stimulus of 'intertwining' this phenomenon with archaeology. Significantly, a historic incident occurred in the 1960s that involved the collaboration of the Anishnaabe artist Norval Morrisseau, the widely acknowledged pioneer of this new Indigenous art in Canada, with Selwyn Dewdney – then an amateur archaeologist and a pioneer of rock art research and today considered the father of rock art research in Canada. It is worth noting a Siberian counterpart would be Vladimir Kapelko, also an amateur archaeologist and artist, who had a great impact on the work of the Khakass artists and especially Alexander Domozhakov (Rozwadowski & Boniec, 2021).

The origins of this phenomenon in Canada can be seen as early as the 1950s. At this time, First Nations artists chose to introduce their Indigenous perspective to the world of art via a medium that had hitherto been the domain of Western art – painting on canvas. Mary Southcott claims in *The Sacred Art of the Anishnabec* (1985, p. 9) that, no matter what history of the twentieth-century North American art might be written, it would contain no chapter more dramatic than that devoted to the Anishnaabe artists. Confronted with Canada's white society while their culture was on the verge of extinction in the mid-twentieth century, a group of Anishnaabe artists publicly emerged. Consequently, in their struggle to express themselves, they preserved their Indigenous vision of the world through 'Western' forms of art. They developed a unique style that gained the attention of the Western world thanks to its formal originality, but also carried deep cultural meanings known only to members of First Nation communities. This new movement created by Anishnaabe artists simultaneously helped the Western world to recognize their existence and became a key factor in raising awareness of self-identity among First Nations peoples.

Subsequently, by the second half of the twentieth century, the number of artists drawing upon this Indigenous perspective in contemporary art became numerous. Nearly thirty of the several dozen artists were from Manitoulin Island (Lake Huron, Ontario), the place of origin of the second wave of this art movement (Southcott, 1985). For these artists, rock art was a graphic manifestation of the historical continuity of Indigenous culture. For some, rock art provided inspiration for specific motifs or themes that they depicted in their works. Morrisseau, for example, frequently referred to Mishipeshu, an underwater panther (also identified as 'the Great Lynx'), whose best known representation is on the cliffs of Agawa Bay along Lake Superior in Ontario. Some artists have almost literally expressed in their works the importance of rock art as a link with ancestors, like Carl Ray in *The Rock Painter* (1977) or Roy Thomas in *Long Ago* (1993). The references to rock images were, therefore, an important strand to the new Indigenous Canadian art. In retrospect, it can be safely said that it was not just a one-off episode as it has also been taken up by many other contemporary Indigenous artists who today represent a wide spectrum of nations and regions of Canada including Marianne Nicolson in British Columbia (Kwakwa̱ka̱'wakw), Alan Syliboy in Nova Scotia (Mi'kmaq) or Jane Ash Poitras (Cree) and the late Joan Cardinal Schubert (Kainai) in Alberta.

What distinguishes the Canadian context from the Siberian one is its strong commitment to the process of awakening Indigenous cultural identity. Unlike in Siberia, in Canada this art has always been created by the First Nations. Both geographical contexts, however, share common features, and one of them is a strong reference to shamanism. Norval Morrisseau was considered by some to be a shaman and he often referred to himself as a shaman. There were indeed good reasons for this, as in his youth he had experienced several visions that are common to Native American ritualism, including vision quests. He was also healed of a serious disease by a medicine-woman (cf. the Siberian shamanic illness complex) and, during another visionary experience, Morrisseau encountered Manitou who chose him to be an artist (Sinclair & Pollock, 1979). This is analogous to how spirits choose people to become shamans in Siberia.

Shamanism and rock art are themes that the Indigenous Canadian artists followed and continue to follow (Rozwadowski, 2019a). In terms of rock art, the rock paintings of the Canadian Shield were particularly important for the Anishnaabe artists, while for others rock images located in regions where they lived or to which they were culturally related took precedent. Jane Ash Poitras and Joane Cardinal-Schubert, for example, held the rock art of the Great Plains in particular importance, especially images from the site of Áísínai'pi (Writing-on-Stone) in southern Alberta, which they personally visited (Rozwadowski, 2019a; MacRae, 2021). Writing-on-Stone is not only one of the largest concentrations of rock art in Canada, but also a place where the tradition of making images on rocks continued up to historical times, with the last documented episode dating to 1924. It was then that Bird Rattle came to Áísínai'pi to visit the site as a sacred place of his people. There he created several images on the rock surfaces accompanied by special rites (Klassen et al., 2000). This importantly demonstrates the religious dimensions of this site as well as other rock art sites in North America. Many of them were places of vision quests, liminal places where the ordinary world intertwined with spiritual reality (Klassen, 2005). Thus, not only is the pictorial aspect of rock art attractive to contemporary artists, but its significance is equally determined by cultural context.

Rock art images are one of many symbols of the long-lasting traditions of the First Nations. Hence, in the art of Indigenous Canadian masters not only motifs from their native lands can be found, but also from other places of America. This is the case, for example, with the art of Jane Ash Poitras, for whom rock art became the symbol of Americanness as well as global Indigenousness. This can be seen in her acknowledgements of the rock paintings of the Indigenous Australians (the same Wandjinas mentioned at the beginning of this article, see Rozwadowski, 2021b). Her references to Australian rock art, it should be noted, stem from her personal journey to Australia; her works drawing upon both this and American rock art evoke personal experiences. Art for Poitras is not just the expression of ideas, it is above all an engagement with tradition, as evidenced by her participation in sweat lodge and peyote rituals (Gee, 1989). Parallels can be drawn to moments of rock art creation documented in North American ethnohistorical sources, testifying that they were linked to similar rituals (McCleary, 2016, pp. 96-102).



Figure 11. Petroglyph depicting a shaman, Oglakhty in Khakassia. This petroglyph inspired A. Domozhakov to paint several pictures, one of which is shown in Fig. 10 (Photo: A. Rozwadowski).

Closing remarks

The project outlined in this article is still very much work in progress. Some avenues of research are based on archival sources accessed thanks to cooperation with museums and galleries, like The Khakass National Museum of Local Lore in Abakan, The Museum of Locale Lore in Minusinsk and the Bearclaw Gallery in Edmonton, while others are the result of meetings and interviews with the artists and other representative individuals (i.e. curators of museums, art galleries) (Figures 2 and 6). Moreover, an important aspect of the Siberian part of the project is also the documentation of the art of some selected artists, such as Alexander Domozhakov (Figure 10), whose art has yet to reach a wider audience. Thus, the project focuses not only on a critical analysis of the use and reuse of rock art in contemporary art, but also on documenting certain aspects of Siberian Archaeoart which remains practically unknown outside of Siberia.



Figure 10. Alexandr V. Domozhakov Shaman 4, 80 x 94 cm, oil on canvas, 1990. Courtesy of Olga Akhremchik (Photo: A. Rozwadowski).

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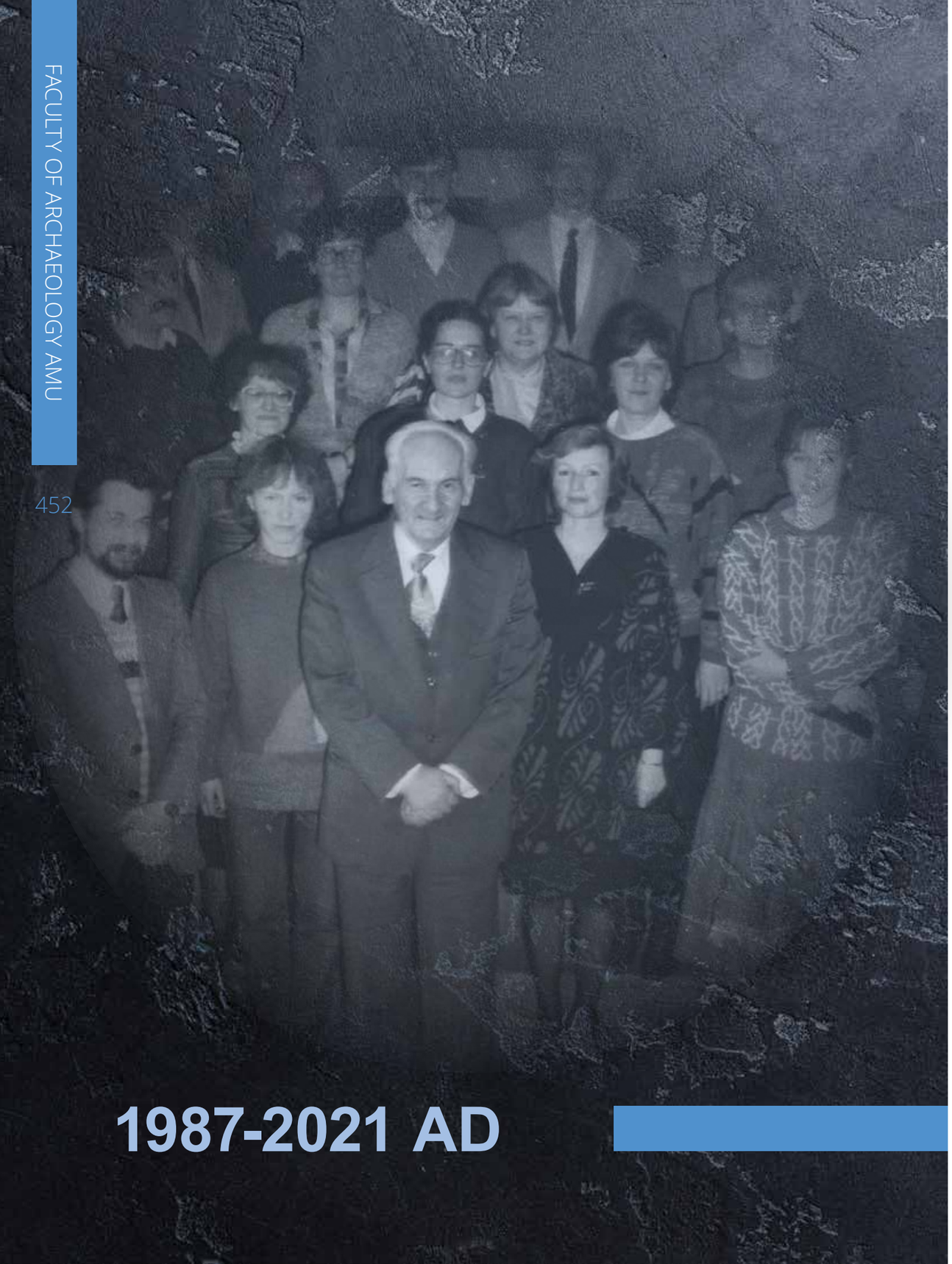
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Are we where we wanted to be? Modernist tendencies versus the postmodern reality of archaeology. Some remarks on the methodology of archaeologists at Adam Mickiewicz University in Poznań

Danuta Minta-Tworzowska

Abstract

This article attempts to define the place where the Poznań University's methodology of archaeology finds itself. The question contained in the title – a are we where we wanted to be? – requires an answer that considers the extent to which the modernist assumptions of archaeology, in which we grew up, have been fulfilled, and to what extent we function in the postmodern world. The article presents the rationale for this methodology, showing some variation in the views of its representatives, starting with the founder of the school, Jan Żak, through his students to the next generation. Recognizing the polyphonic nature of this scholarship, an attempt was made to group these studies into specific issues, which are: reflection on the methodology and theory of archaeology; its inspirations and proposals; relations between theory, methods, and practice; issues of archaeological sources as ones reflecting methodological discussions in the diachronic approach; the past explored in the present; emerging fields of research such as landscape studies; and social archaeology, initiated at Adam Mickiewicz University with the work of Ciesielska on social theory. For many years, the concept of social archaeozoology has also been developed, and studies on memory, identity, children and childhood, among others, have been conducted. The broadening of research fields is an unquestionable achievement of the postmodern (post-processual) as well as post-postmodern reorientation, marking the world in which we function.

Keywords: methodology, theory of archaeology, postmodern

Introduction

This article is an attempt to give an answer concerning the main features of the methodology and theory of archaeologists from Adam Mickiewicz University (AMU) in Poznań. It is most difficult to make such a diagnosis internally (cf. an attempt at such a diagnosis: Minta-Tworzowska & Pawleta, 2013). Therefore, some inspiration in this regard was an external diagnosis in the form of an article by Henryk Mamzer from 2020 entitled "»Mowa obrończa« metodologii archeologów Uniwersytetu im. Adam Mickiewicza w Poznaniu [Defence Speech: Methodology of Archaeologists of Adam Mickiewicz University]", in which the author outlined the main directions of research of these archaeologists, dealing with the discussed subject matter as fundamental in their scientific research (Mamzer, 2020, pp. 110-148)[1]. The use of the metaphor "defence speech" is telling, but it is about presenting the rationale of this methodology and not the colloquial understanding of defence. Mamzer tried to integrate the different, polyphonic views into a certain whole, which gives a broader view of the issue. Knowing the research temperament of Mamzer, it is not difficult to guess that his considerations were deepened by a wide philosophical and anthropological reflection, in the context of which he outlined the elements of this methodology.

This article is more relational in nature, although it does not shy away from the necessary reflection. The set of issues that can be identified are primarily the methodology and theory of archaeology, the issues of archaeological sources, and the past in the present.

Methodology and theory of archaeology – internal inspirations (methodological Poznań school) "supported" by external (particularly Anglo-Saxon) inspirations Methodology of archaeology



Figure 1. Professor Jan Żak, 1976 (Photo: Franciszek Lachowicz).

The work of archaeology methodologists at AMU is characterized by the above mentioned diversity, but concerns the reflection on archaeological theory and methodology initiated by Jan Żak in his efforts to go beyond the positivist (i.e, inductionist, experimental) model of archaeological knowledge (Żak & Minta-Tworzowska, 1987) (Figures 1, 2). In this respect, the academic archaeology of Poznań represented one of the few centres in Poland developing this subject. Professor Żak researched subjects archaeology addressed in the 1970s and 1980s, namely the ethnogenesis of the Slavs, their settlement, and especially their continuation/discontinuation (Żak, 1985; 1985a). He was also interested in the identity of archaeology and its place among other

[1] As H. Mamzer pointed out, this is an expanded version of that delivered in 2019, for the 100th anniversary of archaeology at Adam Mickiewicz University in Poznań.



Figure 2. Professor Jan Żak in the office at Collegium Novum – 1978 (private archive).



Figure 3. Professor Jan Żak receives the Order of Polonia Restituta - October 14, 1978 (private archive).

humanities (Żak, 1966, pp. 69-75), as well as the reflection of prehistoric people – a perspective with which he was ahead of his time (Żak, 1974/1975) (Figure 3). Applying the humanistic interpretation, he noticed fundamental differences in the thinking and perception of the world by prehistoric and modern people, showing how internal contradictions led to changes. He viewed consciousness as a reflection of the conditions of human life and as a regulator of this life. Thus, consciousness in Żak's view means knowledge, magic, religion, and ancestral-tribal ideology. In this way, he not only built a model of human reflection, but he accomplished part of this idea; he created a model of consciousness of Palaeolithic societies of the Mediterranean zone, describing it as naive-naturalistic (Żak, 1974/75). Thereby, he demonstrated a different model of practicing archaeology.

Professor Żak's students, and then the next generation of researchers, tried to seek an answer to the question asked recently and *explicitly* by Mamzer (2020) – why do we need the methodology and theory of archaeology? Representatives of academic archaeology have tried to show the indispensability of the theory of archaeology; referring in the 1980s to our indigenous theories (e.g., what the methodological school of Poznań offered), linked to the idea of archaeology as a historical science, and later, from the 1990s and especially after 2000, to broader solutions borrowed from world science (e.g., Minta-Tworzowska, 2017).

The output of AMU archaeologists, which was noticeable, as it were, from the very beginning, gets divided into two different methodological stances (humanistic and one with a natural science inclination), although both were shaped as part of the methodological school of Poznań, created by Jerzy Kmita, Leszek Nowak, and on the grounds of archaeology – Jerzy Topolski. The supporters of these new archaeological views were Jan Żak[2] in the Poznań centre and Stanisław Tabaczyński in Warsaw (Figure 4).

[2] In 1982, Professor Jan Żak established the first and only Department of History and Methodology of Prehistory at a Polish university at the Institute of Prehistory (1982), which ended its formal existence when the Faculty of Archaeology of Adam Mickiewicz University was established (2019) without an internal structure. Its activities and work, including the building of an archaeological methodological Poznań school, were devoted to a publication entitled *Archeologia – paradygmat – pamięć* (Minta-Tworzowska & Rączkowski, 2001).

Figure 4. Professor Jan Żak, 1974
(Photo: Franciszek Lachowicz).

Figure 5. Photo from the hall of Collegium Novum from the celebration of the 65th Birthday of Professor Jan Żak with employees and students, 1988 (Photo: Andrzej Pniak).

The methodological school was followed by the alumni of Prof Żak, working at AMU, namely Danuta Minta-Tworzowska, Włodzimierz Rączkowski, and Arkadiusz Marciniak (Figure 5). In this spirit, although already with an attitude proper to Western European archaeology, Michał Pawleta (2016) and Lidia Żuk (2019) also write their works.

The fundamental understanding of the methodology of archaeology by AMU archaeologists was in line with the theses of Jerzy Kmita, the founder of the methodological Poznań school, namely, that it is “how particular research activities should be performed [...] in order to obtain the most cognitively valuable results possible” (Kmita, 1977, p. 112). In other words, it is about the rules of research procedure and theories leading to appropriate cognitive effects (Kmita, 1971). Methodology, according to Kazimierz Ajdukiewicz (1985a, p. 334 et seq., 1985b), Jan Woleński (1996, p. 242), and Stefan Amsterdamski (1983), is even a humanistic discipline, working to understand and explain how science functions (here: archaeology, prehistory, protohistory). That is, methodology can be understood, to quote Mamzer (2020), “not only as a retrieval from chaos. It is an orderly unification of something that was not uniformity” (p. 123), with “chaos” used as a metaphor. This understanding of methodology is clearly found in the work of AMU archaeologists, and it is not surprising that I am also an advocate, since

I have studied topics from the role of Pierre Teilhard de Chardin's original historiosophy in building archaeological foundations (Minta-Tworzowska, 1986), to research showing the role of classification and typology in archaeology as a manifestation of assumed theories (Minta-Tworzowska, 1994; 2000a).

Of similar nature are considerations and reflections on the topic of prehistoric and ancient art by Ewa Bugaj (2018) and prehistoric art by Minta-Tworzowska (2018). We put archaeological data, observable in the course of fieldwork as well as subsequent analysis, in order by means of specific terms. We place these data into analytical schemes; that is, we order them in our own way, which may be different from that of other researchers. However, granting the products the character of art and noticing the symbolic aspect, not only in my opinion, testifies to a certain research attitude, especially to the assumption that language and culture play a fundamental role in building images of the world and thinking about it.

Along with the opening of archaeology to the anthropological perspective of practicing it, there was a clear thirst for solutions from world of science (albeit often creative ones), including an inclination towards external inspirations, mainly Anglo-Saxon, sometimes German or French. An example is the monumental volume edited by Stanisław Tabaczyński, Arkadiusz Marciniak, Dorota Cyngot, and Anna Zalewska from 2012 entitled *Przeszłość społeczna. Próba konceptualizacji [Social Past: An Attempt at Conceptualisation]*, in which AMU archaeologists made a significant contribution. The theory of Polish archaeology is seen almost exclusively as one borrowed from the outside, which is probably an oversimplification and not entirely legitimate. Anglo-Saxon archaeology can be seen similarly – it borrows theses from philosophy, cultural anthropology, and other disciplines. Certain ideas have been around for a long time and the activities of philosophers, methodologists, and theoreticians of a given science notice them, "extract" them from the world, name them, and define their place and function.

Without going deeper into the reasons why archaeology (and Polish science as a whole) succumbs to Western pressure, I will refer to the words of Kmita (2015), who wrote "blocking the thinking is conditioned by the permanent association of what is modern with what is 'foreign'" (pp. 101, 102). Modernity, unfortunately, has determined this unequivocally. Native thought has no chance of legitimizing knowledge, while the "running for points" that excessively promotes works written in foreign languages in foreign journals or publishing houses has determined this definitively and rather for a long time. In very simple terms, let us assume that archaeological research is interdisciplinary. Archaeology is not alone in drawing a variety of inspirations, but it is more about its own theories, which would be developed within archaeology itself, regardless of whether native or external. I have described this relationship elsewhere as a community of inspirations on the one hand, and a distinctiveness of traditions in practicing archaeology on the other (Minta-Tworzowska, 2002). This is why some scholars want archaeology to be the anthropology of prehistory, but anthropology first and only later prehistory (Kowalski, 2015, p. 143), and propose cultural studies archaeology. Others believe that it should be linked to historical sciences, while still others to cultural/social anthropology. This does not change the fact that, for example, Ian Hodder (1990-1991) believes that archaeology is simply archaeology.

Personally, I think that scientists' dreams of building "universal" knowledge at the interface of disciplines (e.g., archaeology and nature), which face enormous difficulties, should be tempered. First, there is no universal terminology because of the logical incomparability of the concepts used by various disciplines. The second difficulty is the relative incomparability of stages, phases of development of a given discipline (e.g., the positivist and anti-positivist stages "speak" different languages). Finally, there is also a clear distinction of archaeologists' statements about the past as formulated in the subject language, while ways of reflecting on the past require a distance from that language (they require a metalanguage). I wrote about methodological inspirations of this kind in my work on Pierre Teilhard de Chardin, whose historiosophy determined his views on archaeology, and who created new terms intended to be "universal", linking all knowledge. Also, in subsequent works I continued to express quite consistently the opinion that this was not possible, although from today's perspective it can be very tempting (Minta-Tworzowska, 1986; 1991, p. 234; 2014), which is reflected in a publication with the telling title *Współczesne oblicza przeszłości* [Contemporary Faces of the Past] (Marciniak et al., 2011).

After 1989, the theory and methodology of Polish archaeology opened up to everything the West offered. I think, however, that the foundations of Kmita's and Topolski's thought have remained, but the issues or considerations currently considered by archaeologists, and which new inspirations open up novel fields of research, have broadened. Anticipating a bit the conclusion, I think that the successive research directions in archaeology first of all have widened its research field, and this is their main merit. However, the specificity of the methodology of Polish archaeology has largely disappeared, as has that of others, due to the phenomena that occurred after 2000. I put it as a dilemma "between the community of inspiration and the distinctiveness of archaeological traditions" (Minta-Tworzowska, 2002).

Theory

What generally follows from methodological assumptions is assumed theory. Theory can be understood mainly as a way of thinking about the past, although sometimes also as a way of constructing images of the past. It is also noticeable that American and English sciences have been at the forefront of theory and proposing new solutions. I think it is legitimate to refer to Matthew Johnson's thesis that "we are all theorists" (Johnson, 2013, p. 25) and therefore, in his view, there is no need to talk about the necessity of theory because we all use it, whether we are aware of it or not. So then, what is the problem? Some archaeologists "push" this fact out of their consciousness, showing off an anti-theoretical attitude in extreme cases and a reluctant attitude in milder ones. Theoretical standards in Polish archaeology have received much attention in attempts to diagnose them (Minta-Tworzowska & Raczkowski 1996; 2007). Following Kmita, and especially Topolski, we assume the primordiality of theoretical knowledge vis-à-vis empirical knowledge, which resounds unambiguously especially in the works of Rączkowski, particularly in *Archeologia lotnicza* [Aviation Archaeology] (2002), but also in Marciniak (2012a; 2012b; 2012c) and Pawleta (2016). I myself have also written in the spirit of the indispensability and primordiality of theory in any archaeological research, including in relation to the application of classification, or typology (Minta-Tworzowska, 1994, p. 14), and whether contemporary archaeology "needs" theory (Minta-Tworzowska, 2015a).

Theory versus research method and practice

A topic that has been tackled in different ways depending on methodological orientation was the relation: *theory vs. research method and practice.* Noteworthy is the work of Włodzimierz Rączkowski's on theory in archaeologists' practices, which he related to non-invasive methods, especially aerial photography. The scholarship of Rączkowski and his students is mainly oriented towards interpretation, and the article entitled "Interpreting Archaeological Features on the Wieprza River Floodplain, West Pomerania, Poland" (Banaszek & Rączkowski, 2019) is a meaningful proof of this. Recently, an article by Rączkowski (2017b) entitled "Praktyki badawcze archeologów: kilka refleksji o wykorzystywaniu metod nieinwazyjnych [Archaeological Research Practices: Some Reflections on the Use of Non-invasive Methods] has been published, in which, once again and emphatically, the author indicates what a momentous role methodological foundations play in interdisciplinary research, a role to which the method of aerial photo interpretation pretends to play. The author shows that even opening up to western science has not changed much in Polish archaeology and states that:

without knowledge of the basics of aerial archaeology, it is an activity that does not provide any information that would add anything to the knowledge of the past. In fact, observing common practices related to the use of drones, one can get the impression that the patterns developed in the 1930s are still dominant. The question of the lack of critical reflection remains relevant (Rączkowski, 2017b, p. 330).

The narrative of Rączkowski's subsequent important works on the use of aerial photographs for various landscapes, including historical cities, is built around these relations of theory, method, and practice and argues with the visualisations made based on them (Rączkowski, 2017c, 2020b). The author does not shy away from discourse built around metaphors, which he relates to the relationship between theory, method, and practice in settlement studies or landscape studies. He uses the metaphors of the "anatomy of emptiness" (Kolenda & Rączkowski, 2018), "river and quagmire" (Rączkowski, 2018), and the "power or misery of visualization" of remote sensing data (Rączkowski, 2020b).

These themes are linked directly to a broader question concerning modes of representation in archaeology (Marciniak, 2012b) and related dilemmas. Practical application was found in these considerations, which, as I mentioned earlier, aimed at combining the humanistic plane with the natural science inclination, as evident in Marciniak's work on research at the Neolithic settlement at Çatalhöyük (Düring & Marciniak, 2005; Marciniak, 2013; 2015b; Marciniak et al., 2015). The above studies of Neolithic society at a unique archaeological site, combined with the search for theoretical and methodological solutions, allowed that author to develop a model of research in Polish archaeology, which he describes a*s social zooarchaeology,* and constitutes an original scientific achievement (Marciniak, 2005; 2006; 2011; 2015a; Marciniak & Pollard, 2015; Marciniak & Tabaczyński, 2017).

Changes in terms of theory are more frequent than one would expect. These will be illustrated below, using the example of a specific issue that is strongly embedded in the orbit of interest of Poznań University archaeologists, namely the archaeological source/fact.

Problems of archaeological sources

The source as a cultural construct

It seems that all the problems outlined above are focused as if through a lens by the subject matter of methodological considerations concerning the so-called archaeological sources, present in the deliberations of academic archaeologists, especially its humanistic option. The use of the terms source, archaeological source, archaeological record, and archaeological fact is value-laden rather than objective, as archaeological practitioners would like to believe. The latter, heavily tainted by the objectivity of cultural-historical archaeology, would like to approach sources as "hard" facts whose inductive generalisation is supposed to lead to "true knowledge" (i.e., that based on the thesis that only facts exist). One may consider this thesis outdated and refer to the title of Johnson's chapter "Zdrowy rozsądek to za mało" (2013, p. 21), a theory is needed. This does not change the fact that archaeological sources, although created by the researcher (Rączkowski, 2002, p. 13) are the essence of archaeology. I devoted my attention to the problem of the archaeologist's interference in the meaning of the source also in the article "Jerzego Topolskiego koncepcji źródeł historycznych a ujęcia źródeł archeologicznych [Jerzy Topolski, the Concept of Historical Sources and the Approach to Archaeological Sources]" (Minta-Tworzowska, 1998), and especially in the text entitled "Człowiek i rzecz w perspektywie archeologicznej, czyli rzecz w perspektywie antropocentrycznej [Man and Thing in the Archaeological Perspective (i.e., the Thing in the Anthropocentric Perspective]" (Minta-Tworzowska, 2011). In them, I point to the unambiguous "entanglement" of material products in our human perception, in our culture, which has shaped certain norms and values. Marciniak takes a slightly different approach to the problem of source material in his book *Archeologia i jej źródła. Materiały faunistyczne w praktyce badawczej archeologii [Archaeology and its Sources: Faunal Materials in the Research Practice of Archaeology]* (1996), indicating the so-called objectivising planes that define the limits of interpretation proper to the humanities. In any case, on the basis of sources, as Minta-Tworzowska and Pawleta (2013) write, conclusions and interpretations concerning prehistory are made and oriented "here and now" by conceptual schemes, thus having little to do with induction. Therefore, the basic activity of the archaeologist is their ordering, or classification, to which the monograph entitled *Klasyfikacja w archeologii jako sposób wyrażania wyników badań, hipotez oraz teorii archeologicznych [Classification in Archaeology as a Way of Expressing the Results of Research, Hypotheses and Archaeological Theories]* (Minta-Tworzowska, 1994), among others, is devoted. In addition, it should be borne in mind that classification using the criterion of similarity and difference is also dictated by the valuing modern concept – the idea of progress/regress, or the concept of change. The idea of progress combined with the passage of time thus forms the basic core of the concept of ordering material sources. This is how I see the mechanism of constructing the "reality" of the past, controlled by the nineteenth century idea of nationalism, a "reality" which is not considered to be constructed in research practice. It is then difficult to say that we are dealing here with what results from sources and placing this result over conceptualisation.

The archaeological source, in the view of Rączkowski (2011) as well as myself (Minta-Tworzowska 1998), can be reduced to the cultural character of the source, which is also in line with the views of Kmita and Pałubicka (1992; cf. also Mamzer, 2020). Therefore, a metho-

dological perspective is all the more important to approach sources and show what they "do not say". Referring to the significant statement of Rączkowski (2011), it should be assumed that "the archaeological source ceased to be the starting point of the research procedure and began to serve the verification/testing of hypotheses. [...] is the result of the archaeologist's decision, giving meaning to the object. It is the archaeologist who brings the source to life" (p. 30). Similar in tone is my thesis that "it is the archaeologist who determines what is an artefact, an ecofact, a source, and what is not. It is he or she who creates the source" (Minta-Tworzowska, 2011, p. 46).

Natural science inclination

The clearest representative of the natural science inclination among the methodologists of archaeology at AMU is undoubtedly Arkadiusz Marciniak (2005; 2006; 2011). The question arises whether it occurs at the level of methods or the subject of archaeological research. Following his views, he tries to combine the research procedure of humanities with that used in natural sciences (i.e., the assumptions of post-processual archaeology with processual ones). Marciniak tends to combine humanistic archaeology with the so-called "archaeological sciences". It is visible in his work on faunal material (Marciniak, 1996) or those concerning human-animal relations in the Neolithic Age (Marciniak, 2006). Marciniak's aim is to integrate, methodologically and theoretically, archaeology as a science of culture with *the archaeological sciences* deriving from exact sciences and natural sciences (Marciniak, 1996, p. 33). On the one hand, Marciniak tries to weaken the formalism of processualism, and on the other hand, he aims at limiting relativism as the main feature of post-processualism. Sources in this connection take on the character of "data" are largely objective, although in some sense culturally marked (Marciniak, 2013; 2020).

As one might think, this manifests the intention for humanistic analysis to reach an appropriate level, similar to that of the natural sciences. These are rather echoes of the Enlightenment "dream" of combining realism with what culture offers. This continues in the contemporary current of "the return to things", described as the new materialism, or new positivism. It should be noted that contemporary Western European archaeology is strongly united with everything offered by *the archaeological sciences*, although at the same time it prefers post-structuralism or Peirce's theory of signs when applied to archaeological analyses.

Summary

In my opinion, it is worth realizing that signs and symbols free themselves and us from the realism of a processual, naturalistically inclined archaeology. Moreover, realism obscures non-utilitarian, symbolic content, far more important in culture than anything else (cf. Mamzer, 2010; 2011; 2020). Therefore, realism gives an inappropriate ("false") image of the world, stripped of the properties of culture. I have tried to capture the most important approaches to archaeological sources and their conceptualisations, seeing in them a kind of "three worlds" – positivist, processual, and post-processual – and recently perhaps a fourth one: post-post-processual.

In my work, I made early references to Peirce's theory of signs in terms of its application to archaeological sources (Minta-Tworzowska, 2000a), which is a consequence of my acceptance of the primacy of "cultural spectacles" in our construction of knowledge (more on this later on). Of course, this is not the only way, although it is "dictated" by contemporary tendencies, as indicated by the works of Rączkowski (2002) and Marciniak (1996), who present their original thoughts on archaeological sources.

Past-presence relationships in the aspect of the modernisation of the world and what comes after modernism

Let me start by saying that, as it seems, we have always been (post) modernists. Why? Once controversial topics, ranging from the fluidity of meanings, through the agency of material culture, essentialism, and so forth, are now fully "tamed" due to archaeologists' awareness of their own functioning within a global, ideologized, heterogeneous, capitalist-economy, multicultural world, shaping our view of how we see and represent the past. And, above all, in the various discourses against exposing and valuing some social groups and marginalising others. This heterogeneity and polyvocality are not just an invention of postmodernism, although in processual archaeology it was assumed, as if in the background, that it might not apply to pre-modern societies, especially prehistoric ones.

We have also come to terms with the thesis that the present gives meaning to the past, because it is in the present that the past is "constructed". The methodologists of AMU are part of the reorientation of thinking, referred to as the "linguistic turn", which is present in the work *Archeologia lotnicza. Metoda wobec teorii [Aviation Archaeology: Method Against Theory]* by Rączkowski (2011), in which he writes about post-processual change as a new research perspective. My chapter entitled "Kwestia przełomu metodologicznego w prahistorii i archeologii polskiej [The Question of A Methodological Breakthrough in Prehistory and Polish Archaeology]"(Minta-Tworzowska, 2000b) is also of similar significance, as are the articles by Marciniak (2012a; 2012b; 2012c), and the previously cited edited volume by Tabaczyński and colleagues (2012). In my opinion, it is all about "discovering" that the cultural factor (the aforementioned "cultural spectacles"), and not just a cognitive attitude, influence the recognition of whether a given utterance in a given language is true or not (the semantic definition of truth). This idea is clearly brought closer by Mamzer (2020) writing that "[...] a sentence uttered in one language may be false in another" (p. 134).

This is why the work of the AMU archaeology methodologists is oriented towards *interpretation.* They are deeply convinced that it is important to give sense to the most ancient history, since it cannot be "discovered" because the past reality has passed. For this reason, the perspective of the prehistoric world is not only about experiencing it through objects from the past discovered "here and now", but above all about building a conceptual apparatus, or research procedure, and choosing a narrative language. And for this, a methodology is needed. Thus, the understanding of an archaeological source appears to result from the epistemological perspective (the theory adopted), but also from the perspective of contemporary history and culture (Mamzer, 2000). This is related to Richard Rorty's thesis (1996) that "[t]he world

does not speak. Only we do" (p. 22). Similarly, facts do not speak, therefore sentences about the past have a value-laden character. Accordingly, a constructivist approach should be adopted by pointing out that the symbolic sphere of these archaeological sources is also important (Minta-Tworzowska, 2011; cf. Marciniak, 2013). Clearly constructivist in nature and oriented towards humanistic interpretation, are the works authored/co-authored by Rączkowski (2018; Banaszek & Rączkowski, 2020; Kolenda & Rączkowski, 2018), opting for post-processualism.

The world of post-processual or even post-post-processual archaeology is already taken for granted by Pawleta (2016), Żuk (2019), and a whole group of the younger generation of archaeologists fascinated by the theory and methodology of archaeology in its different varieties. This is expressed in their completed PhD theses, and some in their habilitation theses, among which of note are Łukasz Banaszek, Adriana Ciesielska, Mariusz Drzewiecki, Patrycja Filipowicz, Maksymilian Frąckowiak, Paweł Kasper Hanus, Anna Jankowiak, Grzegorz Kiarszys, Dawid Kobiałka, Mikołaj Kostyrko, Przemysław Krajewski, Magdalena Matczak, Paweł Polkowski, Michał Sołtysiak, Rafał Zapłata and a number of others.

And I think it is not about the obvious variability of views on archaeology and the role of theory and research methodology, but about the context that surrounds us, as a kind of "frame". We experience the world through relationships between things, in a particular time and space, and the human being is only one of these entities. In this sense, this external context shapes the vision of tasks, goals, and possibilities for us as archaeologists. By contrast, the "spectacles" of our culture make our view of reality subjective, shaped by human mentality. They depend on our views, but we can only use them within a certain "framework". Assuming that modernism has shaped us, this would be the "spectacles"; however, the present reality in which we function is this "framework", shaped by relations between people and things, "trimming" our modernist hopes of, for example, the existence of objective truth, but opening us up to other, new possibilities and fields of research.

Moreover, it may still be possible to convince oneself that processual archaeology is one that seeks "truth"; however, post-processual archaeology it is much more difficult, as it is diverse, multi-voiced, and therefore incoherent. It does not contain, like a "toolbox", ready-to-use solutions, and one instead has to work hard to create such tools on their own. This is not to say that processual archaeology offers "simple" solutions. Lewis Binford or David Clarke themselves wrote works with complex solutions, not trying to simplify archaeological issues by force and instead did quite the opposite (Binford, 1978; Clarke, 1968). In the 1980s and 1990s, a debate about processualism swept through archaeology, especially regarding what was coming up as a reaction to it, offering the relativism that was feared most. In archaeology, postmodernism was combined with post-processual archaeology (Bintliff, 1991; Hodder, 1990; 1991; Shanks & Tilley, 1992; Urban & Schortman, 2012; and in Poland: Marciniak, 2012a; Minta-Tworzowska, 2000c; Rączkowski, 2011), although this relativism loomed large even in the minds of the proponents of change, who had some concerns whether it would not lead them one step too far.

The postmodern reorientation, as it is defined by Anna Pałubicka (2018) among others, seems to favour five basic themes in contemporary archaeology: (a) the relativisation of truth, knowledge, and meaning; (b) the fragmentation of grand narrative; (c) the relationship between agency and discourse; (d) pluralism, polyphony, and heterogeneity; and (e) different rhetoric and writing styles. Above all, it broadens the field of research to further include new or previously marginalised topics.

A particular work that addresses the issues of contemporary times (those that I describe as post-processual and post-post-processual) is Pawleta's original 2016 work *Przeszłość we współczesności. Studium metodologiczne archeologicznie kreowane przeszłości w przestrzeni społecznej [The Past in the Present: A Methodological Study of the Archaeological History Created in Social Space]*. In it, the author unequivocally advocates the idea of the past as "belonging" to the present. Hence, this work redefines the place of archaeology today in the era of creating images of the past not only for other archaeologists, but for a wide social audience. The past, including the prehistoric past, is not only perceived, but made present and experienced. And historical culture as a key to this understanding also allows us to understand contemporary phenomena such as reconstructions, exhibitions, and archaeological festivals. Mamzer (2020) refers to Pawleta's formulation of "the past in the present" as "counteracting the forgetting of tragic past events [...]" (footnote 14). Pawleta's work also takes into account the extremely positive values that the past has passed on to the present. It is the past that matters for contemporary times, even such distant ones as those of prehistoric or early medieval periods.

An important place in this aspect, but also as a research field, is occupied by critical reflection on the management of archaeological heritage, especially its dissemination and publicisation. Finding invigorating inspiration in what is referred to as public and community archaeology (Pawleta, 2020), it seeks to identify the fields where the importance of archaeology, its role in the creation of social identities, and the need to protect archaeological heritage or to raise awareness about the need for community participation in this task can be highlighted. Starting from the recognition of the key role of the presentation and interpretation of heritage sites in the context of their protection and conservation, it refers to issues such as full-scale archaeological reconstructions, archaeological festivals, historical re-enactments, archaeological museums, archaeological tourism or the commercialisation of archaeology, and archaeological knowledge (Pawleta, 2019). These elements, with the right balance between accessibility and preservation in line with the paradigm of sustainable development, undoubtedly have an impact on highlighting the social utility of archaeology. This is contained in responding to socio-cultural demands for the images of the past it creates, social expectations of the discipline, as well as archaeology's ability to respond to the challenges of the modern world and participate in social dialogue (Marciniak et al., 2018; Pawleta, 2017; 2019; 2020).

Another new research field that has opened up with post-processualism in archaeology is the *discourse of memory.* The considerations of Żuk (2015; 2019) concerning the relation of the archaeological landscape (understood as a palimpsest) to memory, are part of this. The author referred in her study of memory in general to the work of the German archaeologist and historian Jan Assmann, and especially to his predecessor Maurice Halbwasch. In line with Assmann, she identified memory with cultural transmission, aimed at preserving cultural continuity through the transmission of a specific body of knowledge from one generation to the next (Assmann, 2008; Ingold, 2003). Żuk focuses on how the actualising role of memory, social memory, and commemorative processes are relevant to the research practice of archaeology as connecting to the materiality of memory sites. Linking monuments with memory is a result of the author's assumption that by constructing permanent forms (prehistoric) communities expressed a desire to permanently transform space and inscribe in it the meanings important

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for it in a way that imposes interpretation on subsequent generations (Żuk, 2015; 2019). I have also devoted some attention to the issue of memory in the context of archaeology, especially its "social record" and the construction of "sediments" of identity in the form of graves, or rather ancient cemeteries (Minta-Tworzowska, 2013; 2015b). Above all, however, Pawleta (2015) has written in a similar vein as Żuk, but with reference to stone circles in Pomerania as "places of memory".

The study of the category of *the child and childhood*, initiated within the framework of post-processual studies in archaeology, is also an important strand of the developed interests. It is still a relatively new issue in Polish archaeology, possessing, however, quite a large heuristic potential. The issues addressed include a reflection on the reasons for the marginalisation of this issue in archaeology to date. As a consequence of the imputation of certain anachronisms surrounding the child and childhood, contemporary images of the child and childhood have been unreflectively translated by archaeologists into the past, resulting in dated depictions that obscure the active role of children in the past or their proper place in the life of past societies (Pawleta, 2004; 2009; 2013).

Attempting to answer the question posed

Given what has been written so far, the answer to the question of whether we are where we wanted to be – and more importantly, whether we are still there – in terms of the methodology and theory of archaeology, turns out to be ambiguous, unless we answer that we have always been post-modernists. By doing so, we would deny the modernist dream of "real" knowledge. It can be argued that reality is dynamic and that there is no fixed point in it where the world could stop and where it would make sense to attempt such an answer. However, every diagnosis requires that we stop for a moment, or at least pay more attention than usual "to something", and in this sense an attempt can be made to answer the above question. It sounds natural, but it is stretched between the modernist dream of scientific truth and the postmodernist, far-reaching reflection of that dream. Therefore, despite its apparent obviousness, the answer is not simple, although we are aware that we are not "out there" in the ordered world of modernist science. The present dilemmas of knowledge are much more difficult to solve.

Archaeological concerns about post-processualism, especially regarding relativism, resulted in the fact that in 2009-2011 some archaeologists began observing clear symptoms of another turn, that of "post-postmodernism". In archaeology, this takes the form of an ontological turn towards things in the form of post-humanist materialism (Olsen, 2013; Olsen et al., 2012), and which finds particular expression in the idea of the so-called symmetrical archaeology (Minta-Tworzowska, 2020), but also in neo-Darwinism. Bjørnar Olsen, on the basis of "the return to things" or in "defence of things", attributes agency to things. He postulates that the focus should no longer be on how people use material objects, but on how they enable people to do so because of their properties and affordances (Olsen, 2013; Olsen et al., 2012).

Is this return to things a return/retreat of archaeology to the times of positivism, albeit in a "new" version devoid of anthropocentrism? Or is it a chance to turn away from everything Western? It is also not difficult to notice the significant differences between the representatives of the turn towards things and the AUM archaeologists who follow them: some perceive them in a network of connections and entanglements, others in categories of material agency, while still others in categories of ontologies of objects. Therefore, the question to be addressed is whether the radicalism of postmodernism (i.e., this sometimes-extreme relativism) is challenged in the new interest in materiality (Minta-Tworzowska, 2020). Postmodernism regards considerations of meaning as relative, while new materialism sees them as the result of entanglement in networks of relations between people and things (Fahlander, 2012). In retrospect, it is quite apparent that each of the theoretical turns in archaeology broadened its field of research, rather than being an explicit negation of previous theories or methodologies. This is also how I see the methodology at AUM – it was first modernized under the influence of the Poznań methodological school of Kmita and Topolski (1978; 1998) and, to a lesser extent, Nowak, especially with regard to the intersubjectivisation of knowledge, to move from its ideas to the post-processual stage. So, by what has post-processualism expanded this field? Mainly, as it seems, by social themes and the social functions of archaeology – in particular the five themes cited above – but above all by the complex issues of archaeological heritage and the role of the past in the present, as emphatically demonstrated by Pawleta (2016).

By contrast, almost everyone agrees that contemporary archaeology is less concerned with positioning individual archaeologists in processual, post-processual, or post-post-processual terms, and more concerned with issues that have emerged from modernity, such as agency, neomaterialism, archaeological heritage, providing theory to fieldwork, post-colonialism, feminism, and so forth. This does not change the fact that the postmodern critique in archaeology has stimulated it to reflect anew, to look for solutions, but certainly already in a "post-Latour" world that describes the prehistoric in terms of "redistribution", the reassembly of the social, but in terms of "rhizome", "entanglement", in proliferating "networks" between artefacts, landscapes and people. Although the undeniable problem is that the world in constant becoming and the cardinal question is: can anything be captured within it as a case study? As Fahlander (2012) writes, the "death" of postmodernism is exaggerated and postmodernism is doing well, and some postulates of post-postmodernism can be treated as an intergenerational discussion. This by no means changes the fact that it is the result of a postmodern discussion, even if we cannot exactly define it. To avoid certain pitfalls, archaeologists have addressed theoretical issues, the history of archaeological thought, heritage management, contemporary museum education, and archaeological practice.

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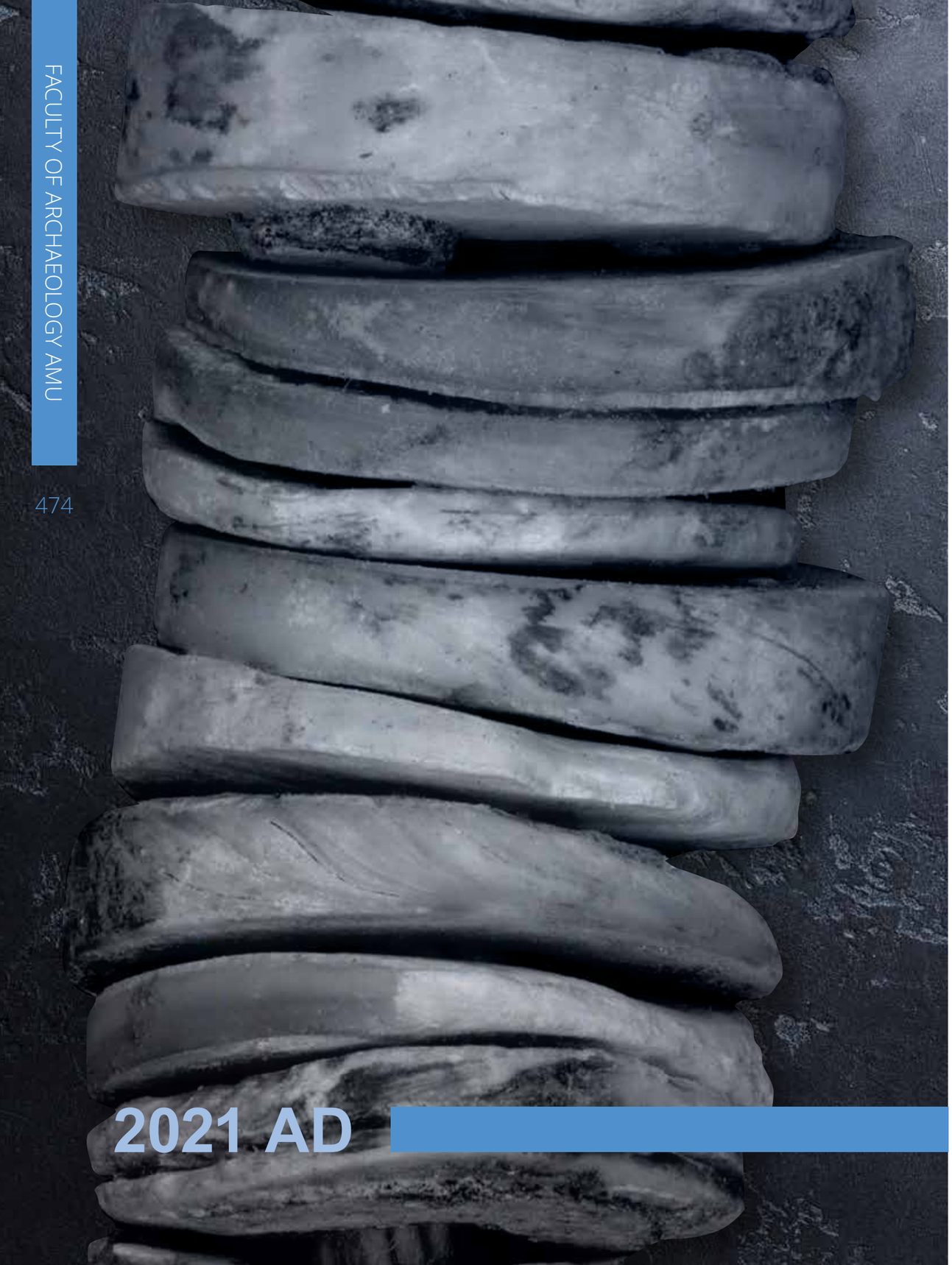
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Archaeology under a microscope: research at the ArchaeoMicroLab of the Faculty of Archaeology Adam Mickiewicz University in Poznań

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Abstract

This article presents the newly established ArchaeoMicroLab – the Laboratory of Microscopic Analysis in Archaeology – in the Faculty of Archaeology at Adam Mickiewicz University, its equipment, and the scope of research carried out in this facility. Microscopic analyses are essential research tools used in archaeology for examining artefacts and traces of their use, organic remains, pigments, and many other objects. The use of high magnification enables researchers to capture interesting details that are not visible at the macroscopic level. The article discusses different categories of artefacts, samples and the possibilities of their examination in the laboratory.

Keywords: Microscopic analyses, Microwear analysis / Traceology, Organic residues, Ornaments, Pottery, Stone Tools

Introduction

Archaeological research is, above all, exciting but also involves tedious field work. It is obvious to researchers that what they can see at an archaeological site is only a fragment of the discovered and documented past. What is invisible to the naked eye is often discovered in laboratory conditions through samples collected in the field or artefacts and materials submitted for further detailed analyses. Microscopy is currently a very important research tool used in archaeology and environmental archaeology to examine both archaeological artefacts and plant or animal remains. The aim of various microscopic techniques is to obtain enlarged images of small objects or relevant details. They make it possible to observe and obtain information about the shape, size, structures, microstructures, and texture of the objects or samples under

analysis. The ArchaeoMicroLab in the Faculty of Archaeology at Adam Mickiewicz University is outfitted with all of the equipment necessary to perform these important analyses and facilitate the preliminary selection of materials or their preparation as samples for further analyses, including chemical analyses such as FTIR (Fourier-transform infrared spectroscopy), XRF (X-Ray Fluorescence), or GC/MS (gas chromatography – mass spectrometry), isotopic analysis, and many others.

Microscopes used in archaeology

Depending on the type of radiation and the imaging method used, two basic types of microscopes can be distinguished. These are optical and electron microscopes (Bartoszek & Rosowski, 2017). The ArchaeoMicroLab of the Faculty of Archaeology primarily uses various types of optical/digital microscopes (Figure 1A). In addition, the study of artefacts uses an Image Dimension Measurement System, the use and potential of which in archaeology are presented in this paper.

Optical and digital microscopes are primarily used to identify the material under examination, including its characteristics and morphology, and to compare examined objects and previously prepared samples and microscope slides. These techniques are used to observe micro-traces on the surface of the studied objects, to perform use-wear analyses, and to detect residues present on the objects or traces resulting from taphonomic processes. Modern microscopes allow for efficient documentation of objects observed at a micro-scale in the form of digital images and for making precise measurements.

The Keyence VHX-6000 and VHX-7000 digital microscopes in the presented laboratory allow high-resolution images of analysed objects to be obtained. The Keyence VHX-6000 microscope has a magnification of 1000x, while its successor, the Keyence VHX-7000, provides magnifications of 2500x. An additional component – the 4K CMOS sensor – not only ensures high image quality, but also permits High Dynamic Range (HDR) image recording. Specimens can be viewed in both reflected and transmitted light. The VHX-7000 microscope can be tilted

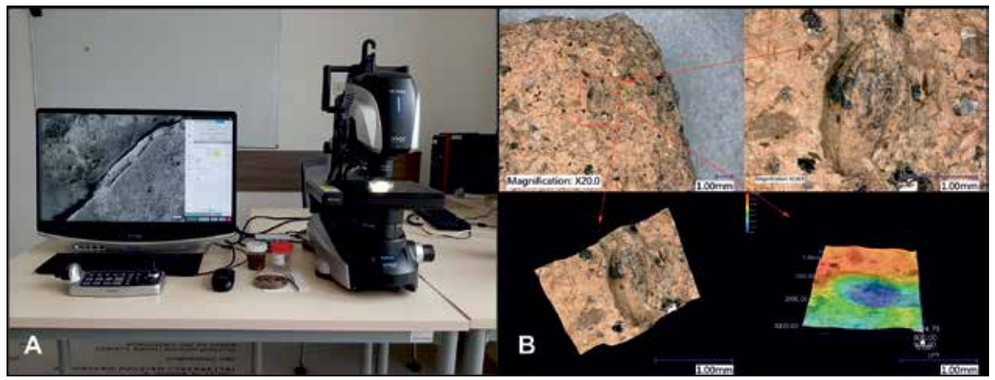


Figure 1. A. The Keyence VH-7000 digital microscope in the ArchaeoMicroLab; B. Negative impression of grain on pottery (versions 2D and 3D).

in the horizontal axis and positioned at the proper angle to examine the sample, while the VHX-6000 model allows the camera to be removed from the tripod and placed over the object. This is very useful for examining larger objects that do not fit on the microscopic table.

The Nikon SMZ 445 stereo microscope is a basic optical microscope that allows samples to be observed in reflected light. The ranges of possible magnifications are 10x, 15x, and 20x with 0.8x-3.5 zoom magnification. It is equipped with a LED ring light. Thanks to its small size, the microscope is very handy, but its low magnification capacity permits only the initial observation and verification of examined samples and objects such as small remains of plants and animals (i.e., negative impressions of grain, impressions of fabric on pottery, traces of residues of organic substances on artefacts) or the selection of samples for further analysis.

The Nikon Eclipse LV150 metallographic microscope allows the examination of opaque samples in reflected light using bright field imaging mode. It is equipped with four Plan Fluor objective lenses at magnifications of 5x, 10x, 20x, and 50x. These provide a flat image and sharpness across the field of view – both in the centre and at the edges. Metallographic microscopes are used primarily in materials science to study the structure of metals and their alloys, microcracks, and so forth. In the ArchaeoMicroLab, they are used for studying traces formed on flint tools, bone tools and ornaments as a result of their use (i.e., usewear analysis).

The Keyence IM-7000 Image Dimension Measurement System permits non-contact measurement of objects and is designed for very high accuracy. It is mostly used in measurement laboratories and the engineering industry. In the ArchaeoMicroLab, it is used to measure many objects at the same time with even dimensions, such as coins and beads made of various materials.

The scanning electron microscope uses an electron beam to create an image and allows the structure of the object under study to be examined at the atomic level. The surface, a small area of the test object or sample, is scanned line by line with the electron beam. As a result of the interaction of the beam with the sample surface, the electron signals collected by the detectors are transformed into images displayed on a monitor screen (Bartoszek & Rosowski, 2017). Importantly, SEM ensures higher magnifications and a more detailed topographic analysis. It is more and more often used in artefact studies and analysis of various archaeological samples. Therefore in January 2022 a Scanning Electron Microscopy Tesca Vega 4 GMU will be added to the laboratory.

Selected archaeological artefacts seen through the lens of a microscope

Pottery

Pottery is the most common find at the majority of archaeological sites. Its history dates back to the Palaeolithic [2.6 million years ago (mya) to 10,000 BC] and the oldest products date back to 13,000 BC (Imamura, 1996). It is a basic tool for determining the taxonomic and chronological affiliation of the discovered assemblages. The basic research carried out in relation to pottery is the recognition of its manufacturing technology, its micro- and macro-morphology, as well as ornamentation. When it is not possible to make absolute determinations of the age of

a settlement, pottery permits details of its chronology to be established and identifies potential contacts with other communities or the presence of possible imports (Kozłowski et al., 2014). For this purpose, fracture and thin section analyses are used, which serve to identify admixtures tempering the clay, study the composition of the clay, and determine its provenance (Figure 2A). Ornaments made on the outer and inner surfaces of pottery (Figure 2C) can additionally be filled with an incrustation – usually a white substance. Microscopic observation of the substance at high magnification is the first method used to identify the type of material from which it was made, such as bone, antler or shell (Kos et al., 2015; Figure 2B).

Moreover, pottery can be a valuable source of information concerning grains used by people living in a given settlement. For this purpose, negative impressions of grains (Figures 1B and 2D), leaves, or stems are taken and, if their characteristics are preserved, an archaeobotanist determines the family or the species to which a given plant belongs. The walls of a pottery vessel may also contain preserved impressions of cloth used for rubbing and in this way smoothing out its surface or on which the vessel was placed on the potter's wheel (impressions on the bottom of the vessel). Other things to find on the surface of vessels are organic residues in the form of tar (as a result of making ornaments, repairing vessels by gluing

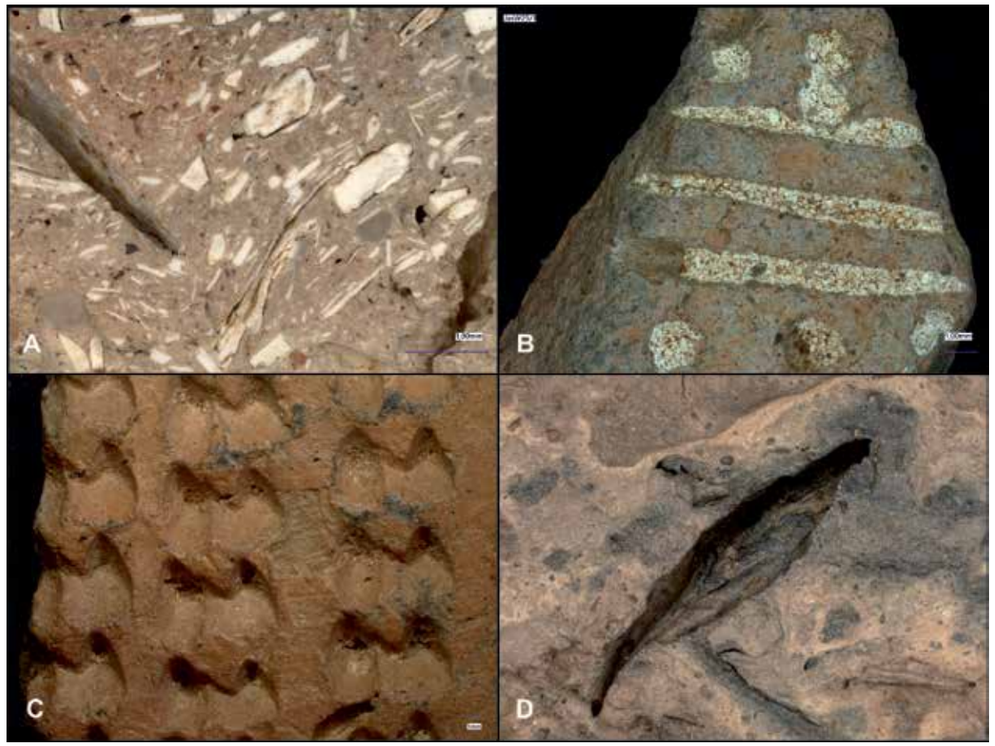


Figure 2. Pottery: A. Pottery section (Kopydłowo, Site 6); B. Pottery with incrustation (Kiełczewo, Site 45); C. Ornament on pottery (Kiełczewo, Site 45); D. Impressions of grains on pottery (Żuławka Mała, Site 1).

the cracked walls or ears, or sealing the walls) as well as organic residues (crusts). These types of residues are usually dark in colour, but their precise identification is only possible using physicochemical methods and/or scanning electron microscopy (e.g., tar, food remains – for the presence of characteristic phytoliths) (Kubiak-Martens et al., 2015).

Flint and stone artefacts

Flint and stone tools occur equally as frequently at sites as pottery. For hundreds of thousands of years, along with organic materials such as bone, antler, and wood, they were the only materials the *Homo* species used to make tools. The oldest are dated at around 2.6 mya and are associated with the development of *Homo habilis* in Africa (Rozmus, 2020).

In the case of flint and stone artefacts, it is vital to identify the type of raw material from which they were made. This is of great importance for the study of interactions among prehistoric communities and the identification of possible imports via determination of the provenance of the raw materials. For this purpose, microscopic images of thin sections can be used. Another equally important task is to determine the function of a tool based on observations

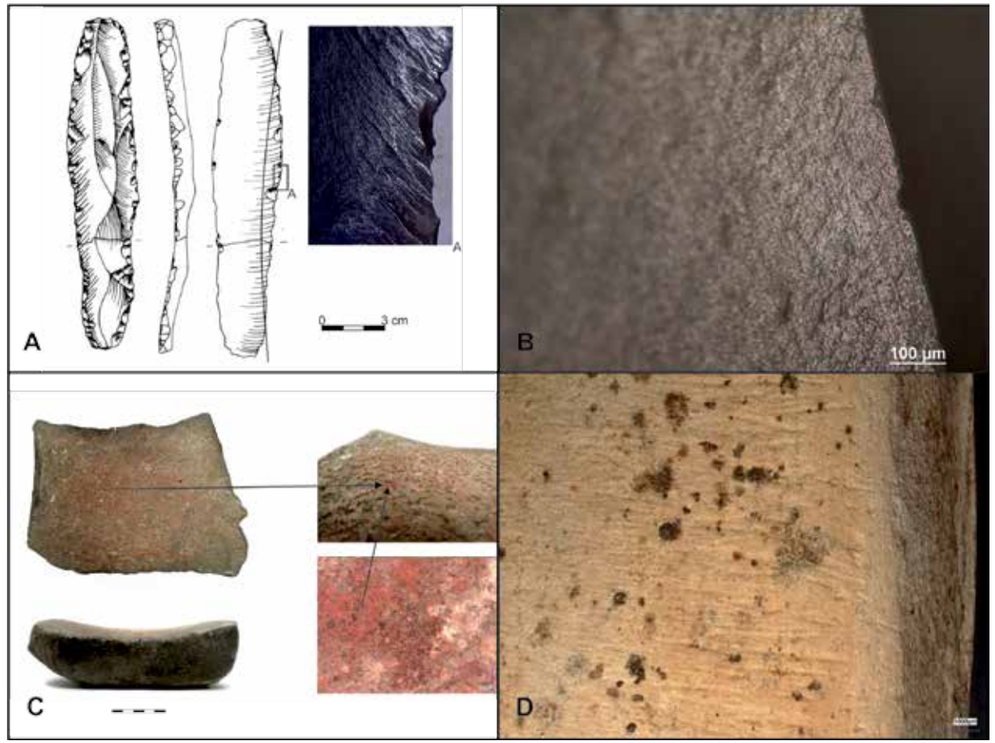


Figure 3. Stone tools: A. Blade with sickle gloss (Jasienica Sufczyńska, Site 5); B. Blade with traces of use (Lubrza, Site 10; metallographic microscope); C. Palette for grinding dyes (Przemęczany, Site 13) – Photo by P. Rutkowska, I. Sobkowiak-Tabaka; D. Whetstone with traces of use (Jasienica Sufczyńska, Site 5).

of characteristic use wear traces (Figure 3A). Such traces are analysed mainly using metallographic microscopes (the domain of microwear analysis; Figure 3B). Observations of such traces on flint tools make it possible to determine what the analysed tool was used for, such as processing hard materials (i.e., bones, teeth, and antlers), harvesting plants, cutting meat, and so forth (Małecka-Kukawka, 2012). Similar studies can be carried out with regard to other stone tools (Figure 3C).

Ornaments

Ornaments usually represent small personal items, such as decorations of clothes and the body made of a variety of materials such as shells, bones, stones, minerals, and metals (Bar-Yosef Mayer & Choyke, 2017). In addition to their purely decorative function, ornaments have always played a significant role in human non-verbal communication (Sommer, 2003). For example, they could symbolize the manifestation of membership in a particular social group, emphasize the gender distinction, age or social status of an individual, and carry certain meaning or indicate the way of life of people in the past. In archaeological research, they are distinguished as an extremely diverse group of artefacts that constitute an engaging research material. Knowledge about ornaments facilitates understandings of technological progress, changes in the function of these artefacts, and the way they were used. This also informs about their circulation and trade contacts and evidences the relations that existed between human groups (Baysal, 2019).

Detailed analyses of unearthed ornaments consist first of identifying the raw material from which they were made, which is directly connected with the identification of the sources of their acquisition (Figure 4A, B, and D). Microscopic identification is carried out not only on the raw material itself but also on any microscopic traces indicating the production methods used, the tools employed, and how they were used (i.e., how the ornaments were worn). Recently, thanks to appropriate treatment of these materials at archaeological sites (i.e., no washing or cleaning and securing the ornaments together with the sediment for further exploration in the laboratory) and microscopic analyses (i.e., optical, digital, or with the help of SEM) it is possible to more effectively identify the remains of organic materials preserved on ornaments from, for example, burial sites. These are mostly residues of plant and animal fibres in the interiors of beads (old strings or threads) and on the external surfaces of ornaments that used to be

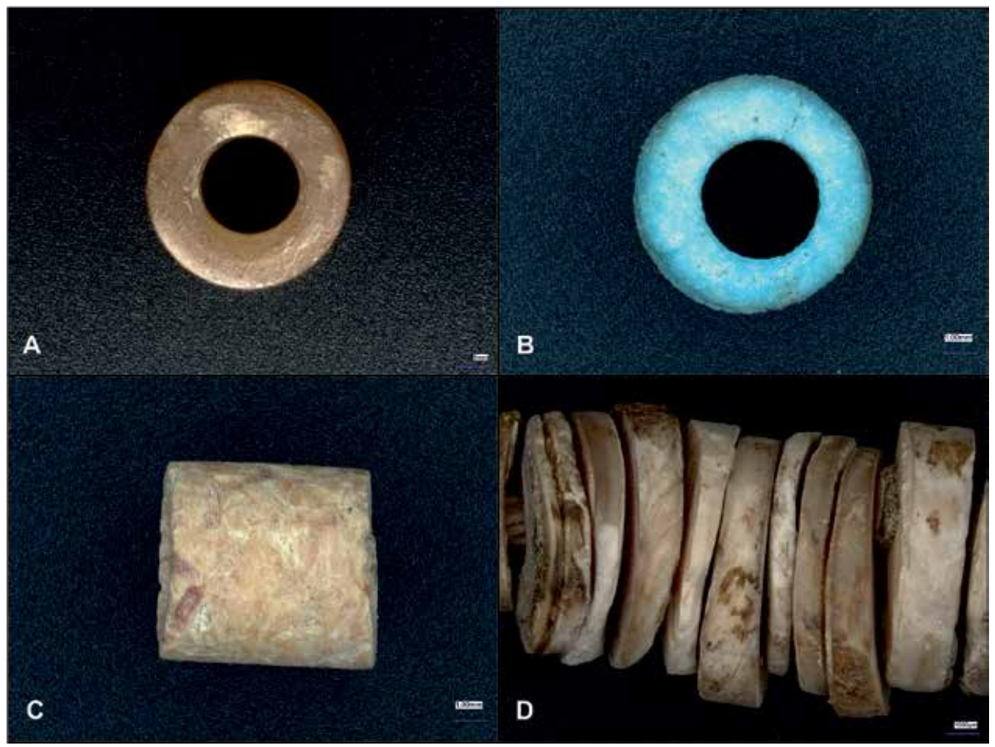


Figure 4. Beads: A. Belemnite bead (Szarbia, Site 9); B. “Faience” bead (Szarbia, Site 9); C. Bone bead with clear remains of red powder (Żerniki Górne); D. Fragment of bracelet made of *Unio sp.* shell (Szarbia, Site 9).



Figure 5. Plant and animal fibres discovered on artefacts: A. Wool fibre on a copper ornament fragment (Stryjów, Site 30); B. SEM image of a wool fibre on a copper artefact (Photo: M. Mrozek-Wysocka); C. and D. Remains of a plant-based cord in the interior of a shell bead (Krzyżanowice Dolne, Site 81).

elements of textiles (Figure 5). This also applies to trace microscopic amounts of pigments/dyes preserved on artefacts and not visible to the naked eye (Figures 3C and 4C). The analysis of such materials would be impossible without access to a microscope, which permits both the observation of the object on desired levels of magnification and illumination, and ongoing digital documentation of the observed images.

Working on large collections of multi-element ornaments (necklaces, bracelets, waistbands, and diadems) often consisting of hundreds of similar or even identical beads is greatly facilitated by using the Image Dimension Measurement System to obtain the necessary measurements, schematic drawings, and contemporaneous comparisons of the examined elements. An additional advantage of this method is that measurement does not involve contact, which in the case of fragile and small elements eases the work without taking the risk of damaging the artefacts (Figure 6).

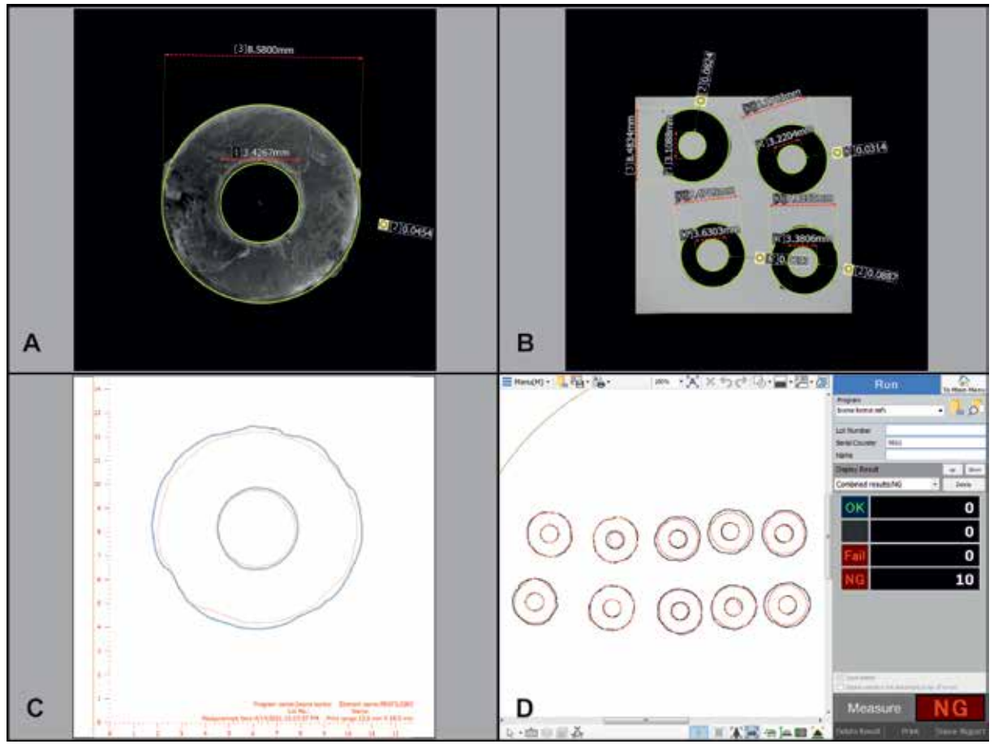


Figure 6. Exemplary measurements of shell beads taken from an ornament performed using the Image Dimension Measurement System A. Measurement the diameter of the bead and of its perforation; B. Simultaneous measurement of four disc beads; C. Measurement of the bead outlines; D. Combined results of the beads' measurements.

Palaeobiological samples and microscope slides

The digital microscope in the ArchaeoMicroLab is also applicable for analyses of palaeobiological samples (Figure 7). With its magnification and the possibility of observation in reflected and transmitted light, it is easier to select, observe, identify, and document remains obtained from palaeobiological samples. These represent macroscopic plant and animal remains observed in reflected light (e.g., bones, mollusc shells, or fish scales; Figure 7D). In transmitted light and using high magnifications of up to 2500x, it is possible to examine slides of, for example, pollen or phytoliths obtained by chemical treatment of soil samples and stone or flint tools (Figure 7A and B). Phytoliths are silica formations, occurring in some plant cells. Moreover, they are found inside dental calculus, organic residues on pottery or flints, inside pottery and daub, and also on surfaces of flints and stones (Cabanes, 2020). Phytolith analyses make it possible to study ancient diet, plant domestication, and crop processing, and applies to non-dietary uses of plants such as for fuel, determination of the spatial arrangements of plant use at archaeological sites, and the identification of ancient field systems (Ryan, 2014).

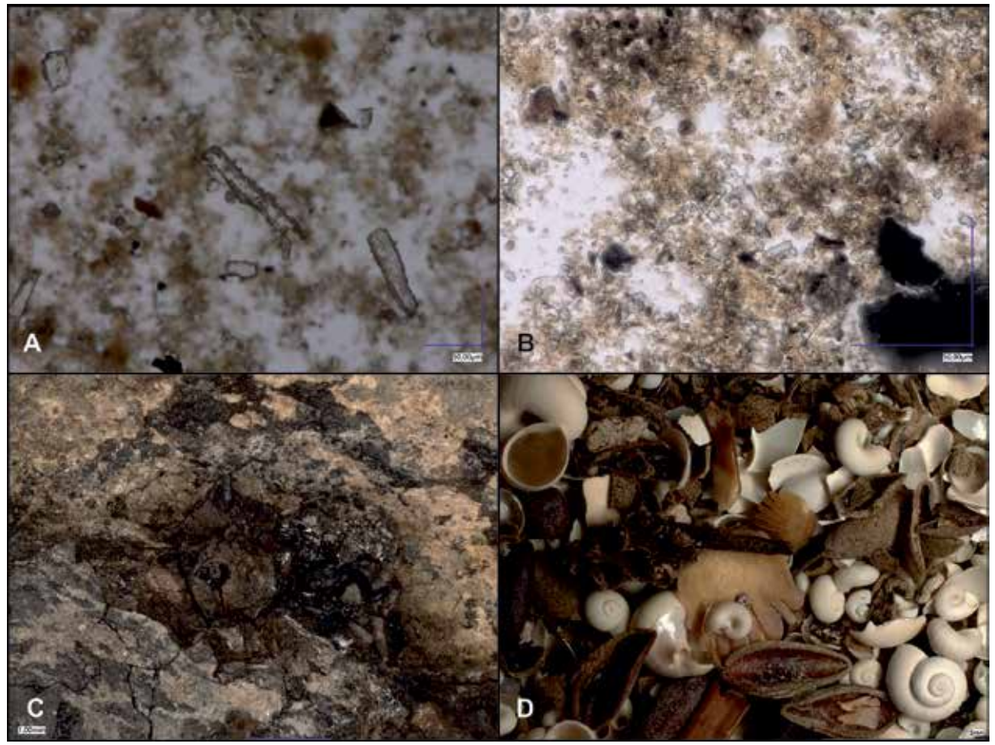


Figure 7. Exemplary photos of samples and slides observed in reflected and transmitted light: A. Slide – phytoliths; B. Slide – phytoliths; C. Organic residue (crust) on pottery (Nowa Wieś, Site 11); D. Palaeobiological remains from the peat bog in Nienawiszcz AZP Nos 47-28, Sample No 2.

Conclusions

The presented examples of imaging and digitally measuring archaeological artefacts are just an outline of the possibilities that exist in the use of microscopy in archaeological research and the direction of research development in the newly established ArchaeoMicroLab. The presented microscopic analyses of archaeological artefacts certainly do not exhaust the topic, but they are intended to show the great research potential of microscopic analyses and their application in examples of current research conducted in this laboratory. The authors of this text hope that micro-archaeological analyses in the laboratory of the Faculty of Archaeology of the Adam Mickiewicz University will develop in various directions through work on the projects carried out by the researchers from both the Faculty of Archaeology and other research units. On an ongoing basis, over the course of subsequent research and projects, a comparative collection of various materials (including contemporary ones) and their microscopic documentation in the form of digital photos are being created. The present authors intend to make them available in the future in the form of a digital database of the ArchaeoMicroLab. The current direction of research that is planned concerns primarily the analysis of archaeological artefacts made of various materials and the identification of micro-traces and organic residues (both plant and animal).

The equipment of the ArchaeoMicroLab is also intended to be used for training the undergraduate and graduate students of the Faculty in the microscopic techniques employed for archaeology and to encourage them to actively participate in the projects and analyses conducted in the Laboratory.

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