SPRAWOZDANIA ARCHEOLOGICZNE

Destroyed Polovtsian (Cuman) steles in a park in the city of Izjum. Monuments related to the history of the Polovtsians and their expansion from the Volga to the Black Sea steppes.
Photo by Dmytro Klochko

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Cover: Vessel of Trypillia culture from Bilcze Złote, drawing Andrii Bardetskii

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SOME OF THE ARTICLES IN THIS VOLUME ARE PAPERS FROM THE SCIENTIFIC CONFERENCE "STEPPE INVADERS VS LOCAL RESIDENTS IV-III MILLENNIA BC" (NIEPOŁOMICE, DECEMBER 2-3, 2022), SPONSORED BY THE MINISTRY OF EDUCATION AND SCIENCE

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Destroyed building from the beginning of the 20th century in the village of Drobisheve, Donetsk Oblast.
Photo by Dmytro Klochko

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PREFACE

Texts on the issues of archaeology in Ukraine have often appeared in the „Sprawozdania Archeologiczne" journal. The authors of these papers are Ukrainian archaeologists and researchers from other countries implementing projects in Ukraine. The editors of this volume are also participants in large research programs carried out in cooperation with Ukrainian scientists. Many years of field research have created a strong connection with this beautiful country and, above all, friendships with many archaeologists and other people that we have met in Ukraine. Therefore, it is with desperate sadness, anger and helplessness that we look at the spectacle of a brutal war that has been going on for almost two years, caused by the barbaric aggression of the Russian state. People are dying, cities, landscapes, and treasured testimonies of the past are being destroyed. What's more, our friends are in the middle of these events.

Ukrainians fighting for survival hope that the world will not forget about them. This is one of the reasons why we now want, despite these unfavourable circumstances, to continue our joint studies and conduct research on Ukraine. Volume 75/1 of "Sprawozdania Archeologiczne" is intended to be an expression of this. It presents works related to Ukraine. Several articles are also related to the topic of the Ukrainian steppes – they are a modified version of the presentations at the conference „Steppe invaders vs local residents (4th-3rd millennia BC)", which took place in Niepołomice, Poland (2-3 December 2022).

In particular, we would like to dedicate volume 75/1 of "Sprawozdania Archeologiczne" to our archaeologist colleagues currently serving in the Ukrainian army, sometimes on the front line. First of all, we wish them a victory, the saving of the cultural heritage, and a quick return to peaceful scientific work. We hope that in the near future we will meet at conferences and field studies – in Kyiv, Donetsk, or Mariupol.

Below we have included photos of several archaeologists currently serving in the Ukrainian army. Some of them are the authors of articles published in present volume. Denys Grechko, for example, proofread his text in unfavourable circumstances during his service in the Zaporizhia region.

Stand with Ukraine!

Przemysław Makarowicz, Marzena Szmyt, Piotr Włodarczak

Serhii Sapegin

Denys Grechko

Igor Shevchenko

Andrii Olenych

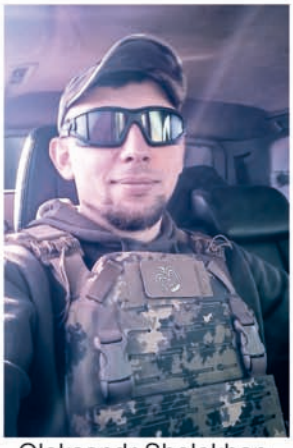
Vladislav Bitkovskyi

Dmytro Chornovol

Mykola Belenko

Mikhailo Potupchyk

Oleksandr Smirnov



Oleksandr Shelekhan

The Mariupol Local History Museum, ruined as a result of shelling by Russian troops in April 2022 and then looted. Before the war, 53 000 monuments from the entire Azov zone were exhibited here, including the famous Mariupol graveyard (Mariupolski mogilnik).
Material published by the Mariupol City Hall on September 2, 2022 (https://novosti.dn.ua/news/330863-opublikovani-foto-zrujnovanogo-armiyeyu-rf-mariupolskogo-krayeznavchogo-muzeyu)

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ARTICLES

Mykyta Ivanov[1]

EARLY METALLURGY OF UKRAINE OF THE LATE 5TH-4TH MILLENNIA BC: AN OUTLINE

ABSTRACT

Ivanov M. 2023. Early metallurgy of Ukraine of the Late 5th-4th Millennia BC: an outline. *Sprawozdania Archeologiczne* 75/1, 13-33.

According to the classical model of the metallurgical raw material supply chain proposed by Eugeniy Chernykh, the Eneolithic and Early Bronze age cultures of Ukraine were completely dependent on imported raw material. It seems that the main supplier of metal, as well as some complete goods during the 5th and 4th Millennia BC, was the '*Carpatho-Balkan Metallurgical Province (CBMP)*' while during the 3rd Millennium BC, the provision chain was reoriented towards the '*Circumpontic Metallurgical Province (CMP)*'. Yet, new discoveries that were made during the 1990s-2020s indicate the need for the amendment of such a model. This is the aim of the current paper. In the following text, the concept of four Ukrainian local metallurgical provinces and two metalworking foci will be introduced. The typology and dating of the recently discovered metal objects as well as metallurgical tools will be provided. The question of the existence of domestic metallurgical raw material deposits will be discussed.

Keywords: Metallurgy, Eneolithic, Early Bronze age, Trypillia, Ukraine
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INTRODUCTION

Copper and bronze are the defining metals of the European Eneolithic and Bronze ages, and in these periods they had significant practical and symbolic value. Effective working tools, deadly weapons, precious jewellery and symbols of power were made of those substances. The worth of these metals was additionally increased due to their unequal distribution in the world. While some areas of Europe and Asia are rich in raw material, others possess little or none. The exchange of coloured metals is often considered to be one of the motives for establishing cross-regional communication networks (Ling *et al.* 2014, 118) evolving at the beginning of the Late Bronze Age into the first world-system. Introduced in 1974 by E. Wallerstein (Wallerstein 1974) and adopted by prehistoric and early historic archaeologists during the late 1970s – early 1990s (Friedman and Rowlands 1978; Kohl *et al.* 1978; Rowlands *et al.* 1987; Bader ed. 1990; Chase-Dunn and Hall 2019), world-system theory proved to be a fruitful methodological framework with major interpretative capabilities. The revelation of exchange relations between communities appeared to be useful not only for the explanation of macro-level dependencies between core and periphery areas but also for understanding the micro-level inequity within communities based on restricted control of imported materials and artefacts (Harding 2013, 379). At the same time, while world-system theory was gaining popularity, certain scholars expressed scepticism and called for a critical examination of the model. W. J. Mommsen, for example, pointed out that inequality of exchange is often taken for granted as a network-inherent property rather than being an archaeologically attested fact (Mommsen 1987, 130). C. Gosden in turn warned that the phenomenon of of ambiguity in the dating of archaeological artefacts as well as fragmentation of quantitative archaeological data may disturb the results of modelling (Gosden 1993, 411). Indeed, in some cases, the foreign nature of certain raw materials may be challenged by a better survey of a region and discovery of previously unknown deposits.

Such is the precedent of Ukraine whose own metallurgical production was overlooked by the Soviet scholars working during the second half of the 20th century. In particular, the famous Russian archaeologist and head of the USSR's only archaeo-metallurgical laboratory specializing in the study of prehistoric use of coloured metals, Eugeny Chernykh, claimed that the Eneolithic and Early Bronze Age cultures of Ukraine were completely dependent on imported raw material (Chernykh 1966, 66). In his conception, the main supplier of raw metal, as well as some complete goods during the 5th and 4th Millennia BC was the 'Carpatho-Balkan Metallurgical Province (CBMP)' while during the 3rdMillennium BC the provision chain was reoriented towards the 'Circumpontic Metallurgical Province (CMP)'. Both provinces represent cross-cultural economic entities covering huge areas of approx.1.3-1.4 million sq. km and 4.5-5 million sq. km accordingly (Chernykh 2008, 38, 41). The relations between cultures constituting the 'metallurgical province' are modelled as a hierarchy where the 'metallurgical focus' is a centre while the 'metalworking focus' is

a periphery. In this model, the Trypillia culture as well as the Late Eneolithic cultures of the Ukrainian steppe were described as ore-free and showing no evidence of local ore smelting. Expressed for the first time in the Soviet scholar's doctoral candidate thesis, the idea reappears in his later works (Chernykh 1970, 24; Černych 1991; Chernykh 1992; 2008, 39; 2014), while also being supported by his colleagues (Ryndina 1970, 22) and quoted by a younger generation of Russian archaeologists (Klimushyna and Tutaeva 2022, 186). The academic influence of Chernykh's model on the perception of Ukrainian prehistoric metallurgy was additionally reinforced by the circumstance that until recent time the English translation of his book published in 1992 was the only comprehensive monograph available for the wide European audience (Chernykh 1992).

Yet, as often happens in archaeology, rigorous fieldwork has revealed new evidence originating from what had formerly been believed to have been a blank territory. As is illustrated by the latest monograph of V. Klochko (Klochko *et al.* 2020), the prehistoric cultures of modern Ukraine were rich in metal objects. The earliest copper objects coming from Ukraine are dated to the end of the 5th Millennium BC which makes them contemporaneous with the Balkan Final Chalcolithic metallurgy (Radivojević and Roberts 2021, 206).

While evaluating the scholarly heritage of the Soviet school of paleo-metallurgical research, it is worth remembering that it was produced within a totalitarian empire and hence was affected by its social and political environment. Aiming to establish complete control over people's thoughts, the Communist Party of the Soviet Union established strict censorship of scholarly works, including archaeological research. While the interpretative application of Marxist-Leninist economic theory was mandatory, the use of other frameworks was denounced or even prohibited. Among suppressed ideologies, one should mention 'bourgeois nationalism'. Starting with the political trials of the 1930s (Mace 1993), the accusation of the spread of bourgeois nationalistic propaganda was frequently used as evidence of anti-Soviet subversion punished in imprisonment or execution. Among many victims of the Soviet regime in the context of the current paper, it is worth mentioning Mykhailo Boltenko, the first excavator of the Usatove culture, who spent the years 1934-1939 in a Gulag camp; Silvestr Mahura – the head of the Trypillia expedition, who was executed in 1938; Todos Movchanivskyi, the scientific secretary of the Institute of the History of Material Culture and the author of a research program into the Trypillia culture, who was executed in 1939. During the 1960s-1980s, the grip of the KGB diminished, yet remained tight. Although physical violence was less common, the discharge of academic positions, publication restrictions, and public critique campaigns sustained the role of governmental thought-control instruments. For example, in 1972 the historian Fedir Shevchenko was suspended from the position of the director of the Institute of Archaeology of the Ukrainian SSR due to the "deviation from the class and internationalistic positions in the interpretation of historical events" (Yaremchuk 2009, 58-60). The same year the famous researcher of the Bronze Age Donetsk Catacombna Culture, Stanislav Bratchenko,

lost his position as the head of the Donetsk archaeological expedition due to his 'nationalistic statements' (Kolybenko 2015, 109). A consequence of the Soviet repressive policy was the reduction of the scholarly talent pool and the emergence of inequality between scholars. While the archaeologists working in national republics, including Ukraine, faced severe obstacles in pursuit of their academic careers, the archaeologists residing in Moscow possessed privileges.

The following paper aims to rework the models of the Soviet time and acquaint the European audience with a modern Ukrainian vision of the history of the earliest metallurgy. The concept of four local metallurgical provinces and two metalworking foci will be introduced. The typology and dating of the recently discovered metal objects as well as metallurgical tools will be provided. The question of the domestic metallurgical raw material deposits will be discussed.

DONETSK METALLURGICAL PROVINCE

Among several Ukrainian early metallurgical foci, the best studied so far is the Donetsk metallurgical centre (Fig. 1: 1). Its history of research begins in 1974 when a young enthusiast from the town of Bakhmut (formerly named Artemivsk or Artyomovsk), Serhiy Tatarinov (1948-2019) presented to the Kyivan Institute of Archaeology evidence of ancient mining activity discovered by him near the villages of Klynovo and Pylypchatyno (Tatarinov 2019, 35). Tatarinov published the first academic papers describing the evidence during the next two years in 1975 (Tatarinov 1975) and 1976 (Kopyl *et al.* 1976). Encouraged by his older colleagues, Dmytro Telehin and Ihor Artemenko, Tatarinov continued his prospecting and was lucky enough to discover several other prehistoric mines near the villages of Midna Ruda, Novo-Zvanivka (Kartamysh) (Tatarinov 1977), Vyskrivskyi, Novo-Otamanske, Pokrovske, Kyslyi Buhor (Tatarinov 1993, 26-30), Hurty and Lozove (Tatarinov 2018, 37, 38). The archaeological excavations of the filling of mines and spoilheaps conducted by Tatarinov provided the scholar with Late Bronze Age pottery, pieces of slag, and fragments of bones and antlers saturated with copper oxides. Also, at the site near the village of Pylypcahtyno, the archaeologist uncovered ruins of the Late Bronze Age ore smelting furnace (Tatarinov 1977, 195). The complete results of Tatarinov's work are presented in three monographs published after the restoration of Ukraine's independence (Tatarinov 1993; 2003; 2018). An unjust fact from Tatarinov's academic biography is the rather late institutional recognition of his input into the early history of paleo-metallurgical research in Ukraine: Tatarinov received the academic degree of candidate of sciences only 30 years after his first major publication in 2006 (Tatarinov 2006). Yet, Tatarinov's contribution as a pioneering scholar who drew public attention to the metallurgical sites of the Donetsk region is significant.

Following Tatrinov's steps, in 1975, the Kyivan archaeologist Sofia Berezans'ka started her own excavation of the Eneolithic to Late Bronze age settlement of Usove Ozero spe-

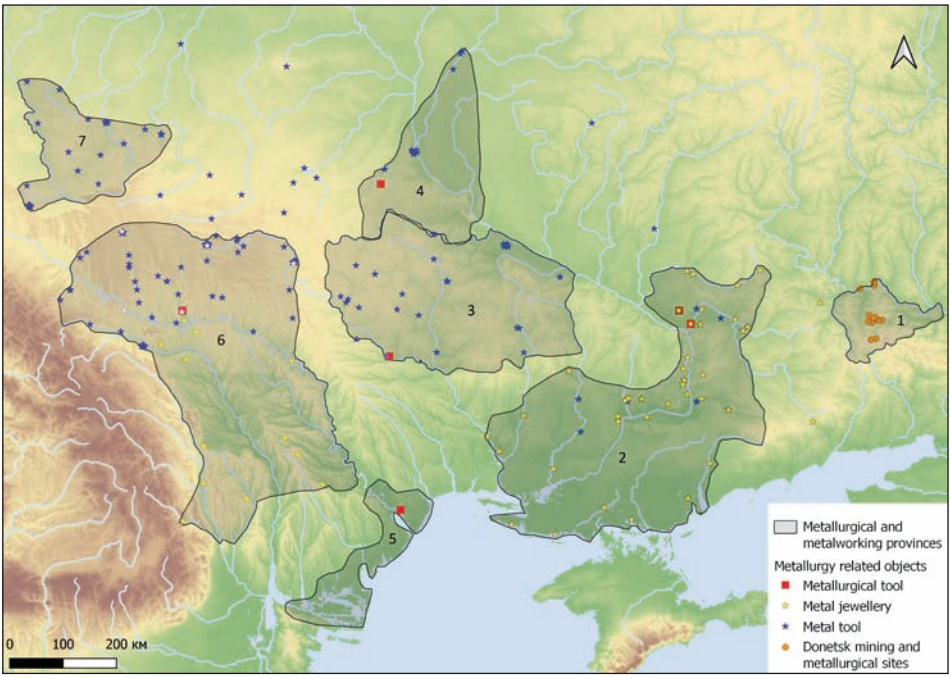

Fig. 1. Ukrainian metallurgical and metalworking provinces of the late 5th – 4th millennia BC. 1 – Donetsk metallurgical province, 2 – Kryvyi Rih metallurgical centre of the Central Ukrainian metallurgical province, 3 – Sabatynivka metallurgical centre of the Central Ukrainian metallurgical province, 4 – Kyiv-Chernihiv metalworking province, 5 – Usatovo metalworking province, 6 – Dnister metallurgical province, 7 – Carpathian-Volhynian Metallurgical province. Map by M. Ivanov

cializing in metallurgical production (Berezanskaya 1990). The site was located around 50-60 km to the north of the mines of the Bakhmut region and could be easily reached by the Siverskyi Donets and Bakhmutka rivers. The cultural deposits of the site consist of four layers. Although the most significant materials originate from the third layer attributed to the Late Bronze age Timber-grave culture (or Srubna culture), materials of Sredniy Stog culture (layer 1), Babyno culture (layer 2) and Bondarikha culture (layer 4) are also present.

The next big field campaign focused on the Bakhmut mines was launched in 1995 by Yuriy Brovender, twelve years after Berezanska finished her work (Otroschenko *et al.* 1997). The archaeological research was implemented step by step and involved the excavation of three underground mine stopes, three open pits, a technogenic (preparation) site and two miners' settlements (Brovender *et al.* 2021, 46). The volume of the copper smelted from the mined ore was measured as well and is evaluated to have reached 700 tons (Brovender *et al.* 2021, 51).

The dating of the earliest metallurgical activity in the Donets area is a subject of debate. While most of the reliable archaeological sources relate to the Berezhnovka-Mayovka Timber-Grave Culture (18/16th-13th centuries BC), we assume that the first episodes of ore smelting happened during the Late Eneolithic. The evidence proving such an early dating is rather new and is not yet known by the wide academic audience. Among the rare examples of Eneolithic metallurgy-related artefacts, one should mention the ore smelting bowl and a metal bracelet made of 2% As-bronze discovered in the cultural layer of the Kleshni-3 site (Telishenko and Brytiuk 2003). The other Eneolithic evidence includes a smelting bowl with drops of slag from the site at Sosnova Roscha and pottery fragments covered with slag from the site of Oleshyn Strumok (Brytiuk 2005, 183).

Further research that could have shed more light on the problem, unfortunately, is impossible. An end was put to archaeological research in the region in 2014 when the Russian Federation launched their military aggression against Ukraine. While combat operations placed archaeological sites at risk of physical destruction, the instalment of pro-Russian puppet regimes of the Donetsk and Luhansk National Republics threatened the personal safety of pro-Ukrainian scholars. Fearing for their lives, most active Ukrainian archaeologists were compelled to leave their homes and move to safer places. In October 2014, the Volodymyr Dahl East Ukrainian National University where Yu. Brovender taught and worked was evacuated from Luhansk to the town of Severodonetsk. The same decision to withdraw was made by the administration of the Vasyl Stus Donetsk National University whose campus has been occupied by pro-Russian combatants since July 2014. The Luhansk archaeologists mentioned above Serhiy Telizhenko and Oleksiy Brytuik also fled – one to Kyiv and the second to Warsaw.

The consequences of the full-scale war started by the Russian Federation on February 24th, 2022 for the paleo-metallurgical archaeology of the Donetsk region are even more devastating. From the very first day, the towns and villages of Donetsk and Luhansk regions bore the brunt of hard battles. Aiming at breaking Ukrainian resistance and spirit, Russian troops have not hesitated to continually target civilian infrastructure and cultural objects. As a result, the towns of Severodonetsk and Bakhmut mentioned above have been destroyed (by the end of August 2022, Severodonetsk had lost around 80% of its buildings while Bakhmut had lost almost 100% by December 9th 2022). The damage to the surrounding natural and historical landscape is also expected to be severe. It may appear turn out that all of the above-mentioned archaeological sites are already lost to science or will be by the end of the war.

DNISTER METALLURGICAL PROVINCE

Unlike the Donetsk and Luhansk regions, the Dnister valley (Fig. 1: 6) drew archaeologists' attention only during the second decade of the 21st century. The first paper expressing an idea of prehistoric usage of the Dnister copper sandstone was published as recent as

five years ago – in 2017 and since then the amount of supporting evidence has kept increasing (Klochko 2017a; 2017b). The available data are associated with the Trypillia culture and relate to all the steps of the metal object's life cycle as reconstructed by B. Ottoway (Ottoway 1994, fig. 1): mining and smelting of sandstone, casting and smithing of metal artefacts, their practical and symbolic use with later deposition in the archaeological context.

The metallurgical raw material deposited in the region is represented by cupriferous sandstones layers of which include such copper ores as chalcopyrite, chalcosine, malachite, azurite, tenorite, and cuprite with a concentration of copper fluctuation from 0.01% to 7-8%. The sandstone distribution area is defined by its origin associated with the river sediments. The northern boundary of the sandstone outcrops extends to near the villages of Zhnyborody, Slobidka, and Koshylivska of the Ternopil region; the western boundary, lies along the river Strypa; the southern and south-eastern boundaries are not yet defined (Syvyi and Kitura, 2020, 104).

The archaeological evidence of prehistoric mining activity happening in the region is represented by rare finds of mining tools among which the Letichiv hoard of the Trypillia culture is the most interesting (Klochko 2017, 235). Discovered in 2005, the hoard included two functional tools and their symbolic representation in the shape of two small copper pendants. Morphologically, the discovered tools are reminiscent of modern pick-axes or mattocks, both used for prying, digging and mining. As for the pendants, while being the symbolic representation of the full-scale instruments they signify the genesis of an independent "miner's identity" happening within the Trypillia society during the mid. 4th Millennium BC manifested through personal adornment.

The processing of raw ore most probably was carried out within the Trypillian settlements, although reliable evidence is lacking. The only smelting facility excavated so far is object No. 2 from the site Kamianets-Podilskyi of the Petrenskaya group (Trypillia CI phase) investigated by D. Chernovol in 2016 (Chernovol 2021, 59). The pit's filling included several items relating to copper casting including around two dozen amorphous copper droplets, a piece of copper wire, and 40 fragments of crucibles some of which were partly slagged (Chornovil 2022, 121, 122). The other evidence is the finding of a copper ingot originating from the Nezvys'ko site (Trypillia BI phase). The metallographic analysis conducted by N. Ryndina revealed that the ingot represents a copper splatter dropped from the crucible (Ryndina 1962).

The large scale of Trypillia copper production is attested by several hundreds of metal objects found within the Trypillia habitation area. According to the most recent figures provided by V. Dergachev and V. Parnov, there are currently 18 hoards of copper adornments known to scholarship (Dergachev and Parnov 2022, 26). The number of jewellery pieces composing the hoard is different and varies from several dozen to thousands. The richest collections so far are the Kamianets-Podilskyi hoard I which included 2050 copper objects with a total weight of 2074 g (Dergachev, 2016, 36), the Condrița hoard which in-

Fig. 2. Examples of the unique copper hammer-axes and pickaxes found in Ukraine.
1 – Vinnytsia region, 2 – Verben, Rivne region, 3 – Vinnytsia region, 4 – Cherkasy region, 5 – Chernivtsi region. Photo by V. Klochko

cluded 544 copper objects with a total weight of 1653 g (Dergachev and Parnov 2022, 7), and the Carbuna hoard which included 444 copper objects (Dergachev 1998, 29). In terms of total metal weight, the volume of known working tools is even greater. The most complete catalogue of Trypillia metal instruments published by V. Klochko (Klochko *et al.* 2020) lists more than 85 copper hammer-axes, flat axes and axe-adzes.

Technologically the metallurgical craft of Trypillia people derives from the artisan tradition of the Eneolithic cultures of Central and Southern Europe. The list of similar artefacts includes axes of Pločnik, Nádudvar, Codor, Ariuşd, Agnita, Mezőkeresztes, Vidra, and Jászladány types, as well as flat axes of Coteana, Cucuteni, Ostrovul-Corbului, Vinča-Altheim, and Remedello-Bytyń types. Yet, despite significant kinship, the Trypillian craft demonstrates several unique features signifying the development of a local system of metallurgical knowledge. Among copper artefacts having no analogies within the Balkan cultures, one should mention flat axes of the Nova Ushytsia type. Composed of almost pure metal (98.26% - 99.74% copper) (Klochko *et al.* 2020, table 4) they were probably cast from the local native copper deposited near the town of Haisyn (Pavliuk and Pavliuk 2009a) and the village of Chemerpil (Pavliuk and Pavliuk 2013). The other unique objects are the copper axes and pick-axes found in the Vinnytsia region (2 items), Cherkasy region, Chernivtsi region and village of Verben (Fig. 2).

CARPATHIAN-VOLHYNIAN METALLURGICAL PROVINCE

The research history of the Carpathian-Volhynian Metallurgical province (Fig. 1: 7) is also rather short and begins with the expedition organized by archaeologist Viktor Klochko and geologist Viacheslav Manichev in 2000-2001 (Klochko *et al.* 2000; 2003). After

the review of historical data from the early 20th century as well as their own field investigation, the scholars identified more than 12 potential deposits of copper-bearing basalts that could have been used by prehistoric people including deposits near villages Rafalivka, Janowa Dolina, Velykyi Mydsk, Dovge Pole, Gutvin, Beresovets, Oleksandria, Gorynrod, Vapnytsa, Rudavytsy, Studny, and Velica Osnytsa. The total reserves of Volhynian raw material are evaluated at 28 million tons of metal while the weight of some of the native copper plates reaches 1 kg. The distinctive features of the native copper in the Volhynian deposits are the increased concentration of zinc followed by the low inclusion of arsenic, cobalt and bismuth.

The earliest metal items found in the region are the hammer-axes of Vidra, Codor, Varna, Pločnik, Agnita and Nádudvar types, as well as flat axes of Coteana type dated approximately to the Trypillia BI phase. One of the Nadudvar type hammer-axes, - an item from the vicinity of the town of Torchyn – was studied for the metal composition and production technology. The spectral analysis conducted by T. Goshko revealed that the item was cast from almost pure copper (99.68%) with little admixture of Pb (0.0002%), Bi (0.035%), Ag (0.05%), Fe (0.15%) and other elements. As a mould, the ancient craftsmen had chosen a container with low heat conduction. After the casting, the axe was heated to a temperature of around 900-1000°C and smithed until the compression degree reached 80-90% (Markus 2009, 137).

The Trypillia BII-CI stage tools documented within the Volhynia region are represented mainly by flat axes of Cucuteni, Nova Ushytsia and Ostrovul-Corbului types. A rare example of an adze-axe found in the region is the Jászladány type item from the vicinity of the village of Lystvyn. The production technology applied in the manufacturing of this axe was in many ways similar to that used in the case of the Nádudvar hammer-axe described above. As a casting alloy, the ancient craftsmen used 1249 g of almost pure copper with little admixture of Pb (0.0001%), Si (0.2%) and other elements. Considering the nature of the eutectics location, T. Goshko suggests that the item was cast in a mould with low heat conduction and later was smithed until the compression degree reached 80-90% (Markus 2009, 138).

During the Early Bronze Age, the exploitation of the Volhynian deposits of native copper was continued by the craftsmen of the Corded Ware Culture who established there their metallurgical province of the Willow leaf (see Klochko and Klochko 2013).

CENTRAL UKRAINIAN METALLURGICAL PROVINCE

Although some scholars scarcely mentioned prehistoric metallurgical activity happening in the vicinity of Kryvyi Rih before (Otroschenkno 2009, 472; Brovender 2019, fig. 1; Klochko and Kośko 2013, 14; Klochko *et al.* 2020, 15, 41) the detailed concept of a Central Ukrainian metallurgical centre had not been developed until the current paper.

Fig. 3. Trypillia BI sites of the Sabatynivka microregion located near native copper deposits of the Chemerpil area. Map after Kiosak and Lobanova 2021, modified by author

The oldest metal objects found in the region so far are the Vidra type axe from the cultural layer of the Trypillia BI site Berezivska HES (Ryndina 1970, 19), a Pločnik type axe (Klochko *et al.* 2020, 12) found near the famous Trypillia BII-CI mega-site of Nebelivka (Gaydarska 2020), the Ariuşd type axes found near the village of Lysianka and within the Orativ district, and a Coteana type flat axe found near the town of Bohyslav.

The raw material used for casting the above-mentioned artefacts was most probably obtained from local deposits of native copper associated with the eastern slopes of the Ukrainian Shield. According to the data of modern geological prospects, the outcrops of

Fig. 4. Ceramic casting mould collected on the surface of the Tripillia BI site Tashlyk. Photo by O. Peresunchak

native copper in Central Ukraine concentrate within the Haisyn area (Pavliuk and Pavliuk 2009a), the Bilyi Kamin structure (Pavliuk *et al.* 2009b), Mohyl'ne area (Pavliuk *et al.* 2009a), and Chemerpil area (Pavliuk and Pavliuk 2013). The latter is of special interest due to its overlap (Fig. 3) with the area of discovery of several metal and metalworking tools. The first is the above-mentioned Vidra type axe from the settlement Berezivska HES (4600-4400 BC), – a site that is also famous for the increased number of small copper items, needles, pins and fishing hooks (Burdo 2015, 18), as well as metalworking instruments: hammers, anvils and abrasives (Tsvek 2005). The collection of metal items from the site Sabatynivka I is less fascinating but still valuable and includes six copper needles (Burdo 2015, 18). The local casting of flat axes is attested by the fragment of clay casting mould (Peresunchak 2019,160) found on the surface of the site at Tashlyk (Fig. 4). Additional evidence of the prehistoric exploitation of the Cemerpil native copper are the results of the composition analyses of alloys. According to E. Chernykh (analyses No. 3798), the mentioned Vidra type axe was cast from almost pure copper with micro admixtures of Ag, Ni and Pb (Ryndina 1970, 19). The same set of admixtures is also present in samples of Chemerpil copper (Pavliuk and Pavliuk 2013, 62). In such a way, the Sabatynivka microregion (Kiosak and Lobanova 2021) demonstrates all the evidence required for the identification of a metallurgical focus: local deposits of raw material, casting and metalworking equipment, and complete metal artefacts. Further research should shed more light on this issue.

At the Trypillia stage CII (3500-3000 BC), the metallurgical knowledge spread further to the east and reached the banks of the river Dnipro. Here, the metallurgical raw material is represented by the deposits of chalcopyrite in the areas of Verkhivtseve, Kruta Balka, Surs'ske, Kremenchuk (Grinchenko *et al.* 2006, 91) and Kryvyi Rih (Berezovsky *et al.* 2021).

Fig. 5. New finds of the Samara type axes discovered in Ukraine. 1-8- Cherkasy region, 9 – Kharkiv region, 10 -Novi Petrivtsi, Kyiv region, 11 –Vinnytsia region. Photo by V. Klochko

The most common metal artefact originating from the Dnipro basin is the copper jewellery found within the kurgan burials of the Serezlievka local group of the Late Trypillia culture. Produced according to the Trypillia technology and fashion, the copper tubes, beads, rings, and spiral pendants played a significant role in the construction and manifestation of the personal identity of the earliest "kurgan peoples". As of today, 19 burials accompanied by copper adornments are known, which constitutes 25% of all equipped graves of the Buh-Dnipro interfluve (Ivanov and Tupciyenko 2022). One of those burials was unusually rich and included a total of 242 copper tubes and rings (Rassamakin 2004, 38).

The cultural transformations happening in Central, Southern and Eastern Europe during the second half of the 4th millennium BC and the transition to the Early Bronze Age are reflected in the transformation of prehistoric metallurgy as well. An important technological innovation of the Central Ukrainian metallurgical centre that was embraced during that time was the adoption of the shaft-hole axes named the Samara type axes (Klochko 2019, 69). Deriving their design from the artefacts of the Kura-Araxes culture, the Samara axes differ in several details including the less distinguished poll (Fig. 5). As of today, 21 Samara type axes are known, 75% of which come from the Right Bank of the Dnipro River. The local production of Samara-type axes is proven by two finds of casting moulds discovered within burials of the Serezlievka local group at Maivka XII, k.2/10 and Sokolove 1/6 (Kovaleva 1984, 36), as well as the use of local pure and sulphide copper for the casting (analyses 1808 and 996 from Klochko *et al.* 2020). The dating of the Samara axes is problematic. As of today, the only available AMS date was obtained from the samples from the Dolynka kurgan burial (Ivanova and Rassmann 2014, 214). Considering the geographic location of the find, the Crimea peninsula, the burial's construction date which fluctuates between 3500-3300 cal. BC, it may serve as the terminus post quem for the spread of Samara axes in Ukraine. At first, the production technology of Samara axes diffused from the south Caucasus to Crimea and later, further north to Central Ukraine. During the Early Bronze Age, the Samara axes transform into Baniabic type axes characteristic of the Yamna and Coțofeni-Kostolac cultures.

KYIV-CHERNIHIV METALWORKING PROVINCE

Considering the typological dating of Pločnik and Ariuşd axes to around 4000 BC, the metallurgical production within the Kyiv-Chernihiv Metallurgical province began in the Trypillia stage BI-II, although the direct contextual correlation between the Trypillia sites and those axes is not yet documented. At stage CII, the metallurgist of the Sofievka (3300-2950 BC) local group of the Late Trypillia culture switched towards the making of items of smaller forms: jewellery, blades and flat axes (Klochko 1995). Morphologically, the Sofievka knives derive their shape from the knives of the Bodrogkeresztúr culture (Kuna 1981, 64, 65; Vajsov 1993, fig. 34), while the axes stem from the Vinča-Altheim metallurgical

Fig. 6. Ceramic casting found near the town of Fastiv, Kyiv region. Photo by V. Klochko

tradition. The evidence of the local production of axes is the finding of several two-part closed casting forms. The first one was made in 1893 by V. Khvoika at the Kyrylivska Hora site situated within modern Kyiv, whilst the second one was made in 2022 near the town of Fastiv (Fig. 6). The most probable source of metallurgical raw material used by the craftsmen of the Sofievka local group is the Skvira deposits (Pavliuk and Pavliuk 2009b) of native copper and copper sandstone located 150 km to the south-west from the closest Sofievka site. At the end of their use, most of the copper items of the Sofievka culture were deposited as grave goods. According to material gathered by V. Klochko, 150 of the 202 known Sofievka metal objects were found within cremation burials (Klochko 1995, 205).

USATOVE METALWORKING PROVINCE

The existence of local metallurgical production within the Usatove culture (3500-3000 BC) is a subject of discussion. While most scholars claim that the famous Usatove daggers are the products of Eastern Mediterranean workshops (Zbenovich 1966; 1974, 119; Ryndina and Konkova 1982; Klochko *et al.* 2020, 40), others suggest their North-Western Pontic origin (Matuschik 1998; Petrenko 2013, 205). The typology of Usatove daggers is also debatable. As of today, at least seven different typological schemes exist, among which the scheme proposed by V. Petrenko is the most detailed one (Petrenko 2013, 204). Reviewing the 16 currently known blades, the scholar divides them into eight types underlining in such a way the uniqueness of their morphology. The production technology of Usatove daggers is rather complex and was mastered during a series of many trials and failures. To avoid the solidification of the liquid metal, the stone mould had to be heated at a temperature of around 300°C. After the casting, the blade of the dagger was heated at temperatures around 400°C but not higher than 450°C and then forged. At the end of production,

the edges of the dagger were also forged, but now while cold (Ryndina and Konkova 1982, 38).The question of the origin of these daggers is additionally entangled by the absence of reliable metallurgy-related evidence. The local deposits of raw material are absent while the only known metallurgical instrument is a ceramic nozzle found within the cultural layer of the Usatove settlement. The other metal items of the Usatove culture include chisels and flat axes.

DISCUSSION

As is demonstrated by the typological analysis of metal artefacts provided above, the earliest metallurgy of Ukraine stems from the metallurgical tradition of South-Eastern and Central Europe. In this regard, the Trypillia culture should be included in the Balkan early metallurgy heartland as it is defined by (Radivojević and Roberts 2021) and should be treated as its equal unit rather than peripheral. The quality and quantity of recently obtained data suggest that the scale of Trypillian metallurgical production was relatively high while the Trypillian craftsmen could produce items of many different types including unique ones.

The earliest metallurgical knowledge came to Ukraine not in isolation but as a part of a wider cultural complex that included advanced agriculture, stockbreeding, high-quality painted pottery, flint processing and social cooperation. While reclaiming new lands, the Trypillia people profited from all of the locally available resources including water, soil, clay, flint, fauna, flora, metallurgical raw materials – native copper as well as copper ores. Moreover, the 'search for metals' could have been one of the motives for further colonization.

The localization of previously unnoticed Ukrainian copper ore and native copper deposits suggests that existing models (Chernykh, 1966, 66; 1970, 24; 2008, 39) linking all the Eastern European raw metal to five South-European mines – Ai Bunar, Rudna Glava, Jarmovac, Veliki Majdan, Majdanpek and others may appear unreliable. Instead of modelling long-distance exchange routes, scholars would do better to pay closer attention to how prehistoric communities managed scarce but local resources. Such a notion corresponds with the recent model by Radivojević and Grujić (2018, 120) suggesting the habit of culturally related communities to preserve regional networks of copper prospecting, production and consumption. In such a way, the hierarchical core-periphery model appears irrelevant for the Eneolithic period clearing the space for more horizontal interpretative approaches.

The economic role of copper tools is yet to be discussed. It may appear that the use of copper flat axes and adze-axes was one of the elements that facilitated the high productivity of land cultivation practised by the inhabitants of mega-sites and was necessary for the fulfilment of the demand for wood.

With the disappearance of the Trypillia culture at the end of the 4th Millennium BC, the metallurgical achievements of the Trypillian metallurgists did not vanish. The Trypillian

knowledge about the geographical distribution of metallurgical raw material was inherited by the Early Bronze Age societies of Yamna and Corded Ware cultures who prospected the very same deposits of Kryvyi Rih and Volhynia accordingly. At the same time, metallurgy goes through major changes which coincide with the major cultural and social transformation within the Trypillia culture. The tradition of mega-sites declines, leaving the scene free for less centralized forms of social organization. A new cycle of colonisation begins. Some Trypillia people migrated to the steppe zone which resulted in the emergence of the Usatove and Serezlievka cultures, while others moved to the forest zone which resulted in the emergence of the Sofievka culture. All these new cultural entities are known as the early adopters of significant metallurgical innovations. The Usatove culture is best known for long bronze knives and daggers, the Sofievka culture for copper knives with shorter blades, and the Serezlievka culture is known for the Samara-Baniabic-Novosvobodnaya axes. Quick adoption of the most progressive trends was was probably facilitated by the demands of new social elites whose high social status was communicated through the construction of labour-consuming kurgans and cromlechs (Usatove and Serezlievka cultures), rich sepulchre inventory (Serezlievka and Sofievka cultures), or weaponry (Usatove and Sofievka cultures).

CONCLUSION

Summing up all the above, it can be noted that research into the earliest metallurgy of Ukraine is only beginning. The increasing new evidence is promising, although fragmented and chaotic. The land, previously considered as an 'ore-free' zone, now appears to have been rich in copper and bronze artefacts and raw material veins. Yet, the question of whether the local deposits were used during prehistory remains disputable. On one hand, the archaeological evidence of the prehistoric exploitation of some of the raw material sources mentioned above in the text is yet to be obtained. On the other hand, the usage of scarce yet local resources is a more realistic explanation than the reconstruction of thousand kilometres of exchange networks for the historical period when even the wheel was not yet invented. A final conclusion on this account can be reached only after large-scale physicochemical studies, including analyses of the lead isotope ratios and the chemical composition of both copper ores and copper artefacts found in Ukraine.

As for further research, it should be focused on such activities:

1) Extensive field examination of the Trypillian sites of the Sabatynivka cluster with the appliance of metal detectors and geomagnetic scanners in search of metallurgy-related technological structures

2) Further monitoring of websites and social media for information about new findings of metal artefacts by members of the public (for example, so-called "black archaeologists" with metal detectors) in combination with stricter control over the illicit artefact hunting of archaeological sites.

3) Documentation of the metalwork use ware traces (Dolfini and Crellin 2016) present on the known artefacts.

4) Appliance of the lead isotope analysis which is believed to be the most reliable method of provenance studies (Radivojević *et al.* 2019, 138).

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TRYPILLIA CULTURE POTTERY IMPORTS WITH ATTRIBUTES OF THE LATEST PHASE OF THE TRYPILLIA CII STAGE IN THE FUNNEL BEAKER CULTURE SETTLEMENT ZYMNE, WESTERN UKRAINE

ABSTRACT

Hawinskyi A. and Rybicka M. 2023. Trypillia Culture pottery imports with attributes of the latest phase of the Trypillia CII stage in the Funnel Beaker Culture settlement Zymne, Western Ukraine. *Sprawozdania Archeologiczne* 75/1, 35-49.

When considering Trypillia Culture imports in the pottery assemblage of the Funnel Beaker Culture settlement in Zymne, many scholars have emphasized the significance of this evidence when conceptualizing connections between communities of both Cultures, and also highlight the chronological aspects of the matter.

The available data make it possible to associate pottery assemblage from Zymne with Gordineşti group of the Trypillia CII stage which dates back to the time range from 3300 until 3000/2950 BC and corresponds to occupation phase II of the Funnel Beaker Culture in Gródek.

Keywords: stage CII Trypillia Culture, Funnel Beaker Culture, western Ukraine, Gordineşti group
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INTRODUCTION

In various reports, the finds assemblages from the Funnel Beaker Culture settlements Gródek, Hrubieszów County, and Zymne–Horodysche, Volodymyr-Volynskiy district, have repeatedly been reported to contain pottery finds representing various phases within the Trypillia CII stage (Jażdżewski 1936; 1958; Kowalczyk 1956; 1958; Poklewski 1958; Zakharuk 1955; 1959; Zbenovich 1976; Movsha 1985; Gumiński 1989; Peleschyshyn 2004; Kadrow 2005). Being interpreted as imports, the pottery in question has formed evidence on the basis of which interrelations between communities of the cultures under scrutiny have been interpreted. As far as the assemblage from Gródek, with the artefacts which make it up, turned to be in line with sequential subunits of the Trypillia Culture – Brînzeni and Gordineşti (Gumiński 1989; Zawiślak 2013; Rybicka 2017, 92, 106, 107) – and, at the same time, with a pair of sequential phases of the Funnel Beaker Culture in Gródek itself, then it seems difficult at the moment to explain what precisely the chronological significance of the imports discovered in Zymne can be (Peleschyshyn 2004; Pozikhovskyi 2019).

While considering the issues concerning Zymne, Yuriy Zakharuk (Zakharuk 1959) has argued that the large quantity of painted pottery in the assemblage is so remarkable due to its associations with both the Koshylivtsi Group and the Sandraky settlement and, thus, displays strong relationships between the Trypillia Culture and the Funnel Beaker Culture. A different explanation of the origin of the painted pottery in the Funnel Beaker Culture milieu of the Western Buh region has been offered by Vladimir Zbenovich (Zbenovich 1976), who proposed to attribute it to the Troyaniv–Sandraky–Vykhvatyntsy subunit. Intercultural relationships became a focus of Tamara Movsha's (Movsha 1985) research as well. By taking into account the degree of occurrence of material of the Funnel Beaker Culture in the pottery sample obtained from Zhvanets' attributed to the Brînzeni Group of the Trypillia Culture, she has placed this settlement in the same chronological subunit with Zymne, Lezhnytsya, and Gródek. On the basis of this, Tamara Movsha came to the conclusion that relations between Funnel Beaker and Trypillia groupings would have begun at an early phase of the Trypillia CII stage represented by the Brînzeni Group. According to Mykola Peleschyshyn's ideas, contacts of the Funnel Beaker community of Zymne with those of the Trypillia Culture would have taken place during the Horodsk–Kasperivtsi subunit (Peleschyshyn 2004, 146). Particularly interesting are the interpretations given by Sławomir Kadrow (2005, 13), who considered pottery finds attributed to the latest portion of the Trypillia CII stage with reference to Taras Tkachuk's opinion, who has argued that the black-painted pottery and the globular amphorettes are attributable to the Horodiştea Group, while the vase-like vessels belong to the Horodsk Group. The presence of such pottery and their radiocarbon dating (Bronicki *et al.* 2003; 2004) gave S. Kadrow the basis for shifting the dating of phase II of the functioning of the settlement of the Funnel Beaker Culture at Zymne to around 3050-2600 BC (Kadrow 2005, 13). This researcher

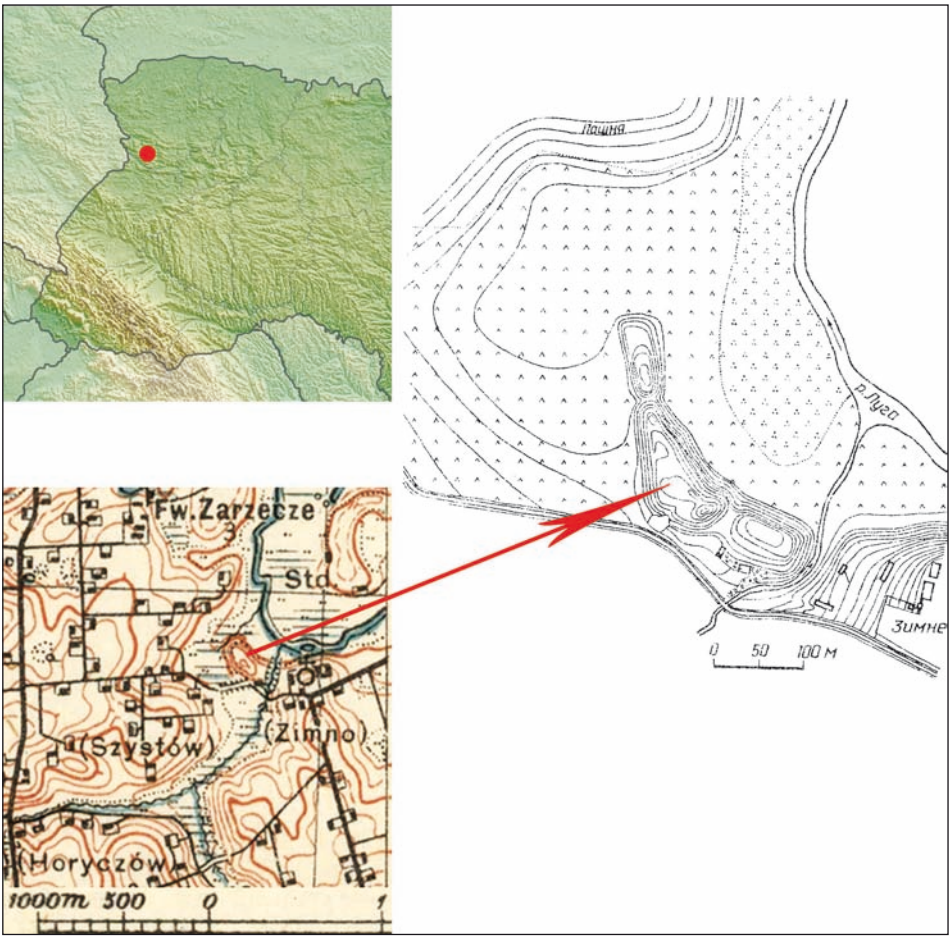

Fig. 1. Zymne, Volodymyr-Volynskyi district (A, B, C).
Geographical location of the archaeological site called Horodysche

also took into account the then-published dating of the Sandraki and Tsviklivtsi sites, which may be referred to the late IV/early III mill. BC and even the first half of the III mill. BC (Rassamakin 2012).

Recently, these conclusions have been called into question (Harper *et al.* 2021; Król and Rybicka 2022; 2023). While introducing the Funnel Beaker record from Lezhnytsya-Chub, we have already launched a discussion around the chronological frames of the phase II in Zymne proposed by Sławomir Kadrow (2005) by dating the Horods'k and Gordineşti Groups within the time range of *c.* 3300-2900 BC (Rybicka *et al.* 2019, 43). It was also underlined that „the published sample of imports from the site of Zymne provides too little of the distinguishing features for the latest stage of the Trypillia Culture in western Volyn'".

In 2017-2019, Gryhoriy Okhrimenko's efforts made it possible to study the artefacts revealed in Zymne in the course of excavations carried out by Yuriy Zakharuk (Zakharuk 1955; 1959), which is now stored in the Volhynian Museum of Local Studies in Lutsk. The Trypillia Culture pottery assemblage which is now available for study consisted not only of pottery of the early Trypillia CII stage previously published by Mykola Peleschyshyn (Peleschyshyn 2004) and later thoroughly described by Oleksandr Pozikhovskyj (Pozikhovskyi 2019) but also pottery sherds representing the latest part of the Trypillia CII stage. We have made a decision to revisit the younger part of the sample with the aim to verify the chronological clues proposed elsewhere for the phase II of the Funnel Beaker settlement in Zymne and, consequently, to update our vision of the connections between the Funnel Beaker and Late Trypillia communities (Kadrow 2005; Włodarczak 2006; Rybicka 2017; Rybicka *et al.* 2019, 43-49; Hawinskyj and Rybicka 2021).

LOCATION OF ZYMNE-HORODYSCHE

The prehistoric habitation site Horodysche ('Hillfort') in Zymne, Volodymyr-Volynskyi district, is situated upon the top of an isolated loess bedrock hill encircled on three sides by the Luha River valley. The terrain is notably exposed, with the difference in levels reaching *c.* 20 m (Fig. 1).

POTTERY

Among the other finds, the excavation units dug by Yuriy Zakharuk and Mykola Peleschyshyn yielded a total of 20 pottery fragments that can be tentatively connected with the latest phase of the Trypillia Culture (Fig. 2). Some of these were collected from burnt daub debris (Fig. 3: 2, 4, 6; 4: 1, 2), some were found in the pit dwelling (Fig. 3: 3) or in the occupation layer (Fig. 3: 5; 4: 4; 5). Without forming a single cluster, they were scattered throughout the site (Fig. 2).

`No sherds were identified in the sample to display a classic tableware technology using desilted clay without additives, to produce uniform, monochromatic fractures of light or dark orange colour (Verteletskyi 2020). Similarly, no sherds of cooking ware were observed made of clay containing mollusc shells and grindstone grit.

The group of pottery attributed to the classic tableware technology consists of some fragments of vessels made of clay with a fine-grained additive. When fractured, they appear to be monochromatic dark orange or pale orange, while their outer complexion is normally pale beige (Fig. 3: 2, 3, 5, 6; 5). Such technology is discernable by the fragments of at least three bowls with their rims slightly bent inwards, their surfaces evenly smoothed, and their bodies decorated with corded wavy motifs (Fig. 3: 2, 6) and furrowed stitches (Furchenstich) (Fig. 3: 5).

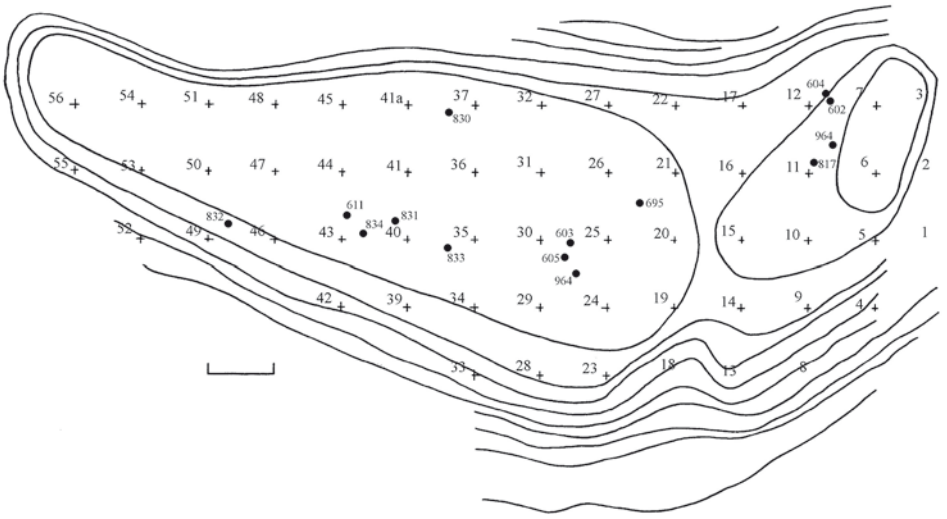

Fig. 2. Zymne, Volodymyr-Volynskyi district.
Spatial distribution of pottery finds attributed to the late Trypillia CII stage

Worthy of note are the fragments of vessels displaying dark colouring when broken, with their surfaces dichromatic or pale brown. The fabric of this pottery consists of clay and fine-grained material. The surfaces of the vessels are slightly smoothed. According to Dmytro Verteletskyi's (2020, 180) classification, the pottery sherds of this kind could be interpreted as detached from bowls with their rims deeply (Fig. 5: 2, 4) or slightly (Fig. 3: 2, 5-6) bent towards the centres of the receptacles. Some pottery sherds may well belong to vases (Fig. 4: 1?, 4). The pottery technology used appears to be similar to that of the Funnel Beaker Culture. The discussed group of pottery also includes fragments (a) of a pot, its fractured surface (Fig. 3: 2, 6) unevenly coloured orange and grey and its outer texture, unsmooth and powdery (Fig. 4: 3); (b) of a short-necked amphora with handles attached to the upper part of its body (Fig. 4: 2).

Some vessels among those mentioned above were ornamented with cord imprints, furrowed stitches (Furchenstich), and flattened knobs. Bowls were decorated with a triple cord motif forming wavy patterns (Fig. 3: 2, 6) or with a pattern built of a horizontal cord imprint combined with a wavy line (Fig. 4: 1). Particularly interesting is the grid/net motif made with cord imprints (Fig. 3: 1). A double segmental furrowed stitches motif is seen just below the rim of a vase, the neck and body of which are separated from each other by encircling paired lines made in the same technique, while the body is adorned with an angular pattern (Fig. 4: 3). Free-standing knobs, it their turn, were applied to the upper part of the body of a pot, wherein they are combined with encircling cord imprint (Fig. 4: 4).

Bowls with rims slightly bent inwards are precisely identified in the samples from western Volyn to mark various phases of the Trypillia CII stage in the area, starting from

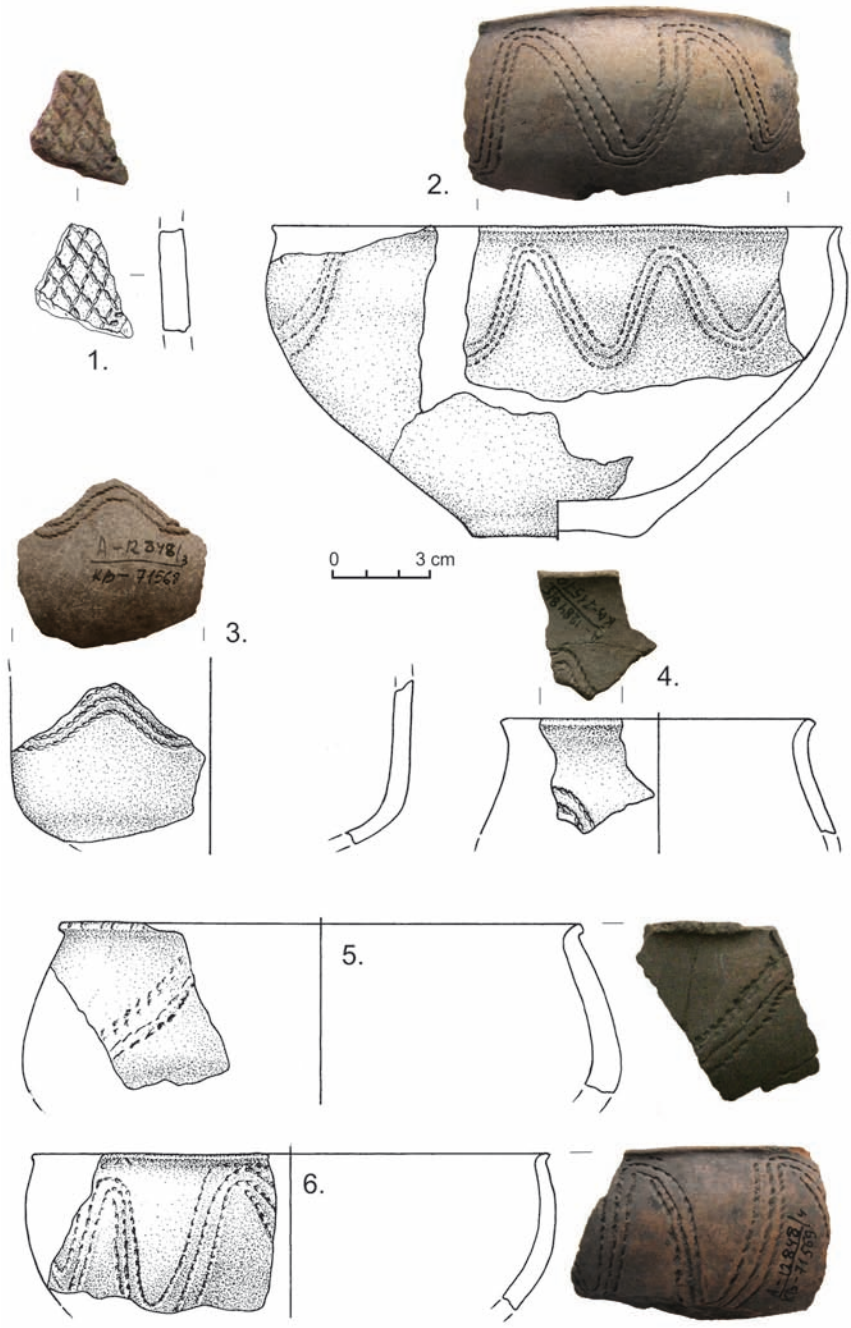

Fig. 3. Zymne, Volodymyr-Volynskyi district. Trypillia Culture pottery finds recovered in the burnt daub debris (2, 4, 6), in a pit dwelling (3), and in the occupation layer (1, 5)

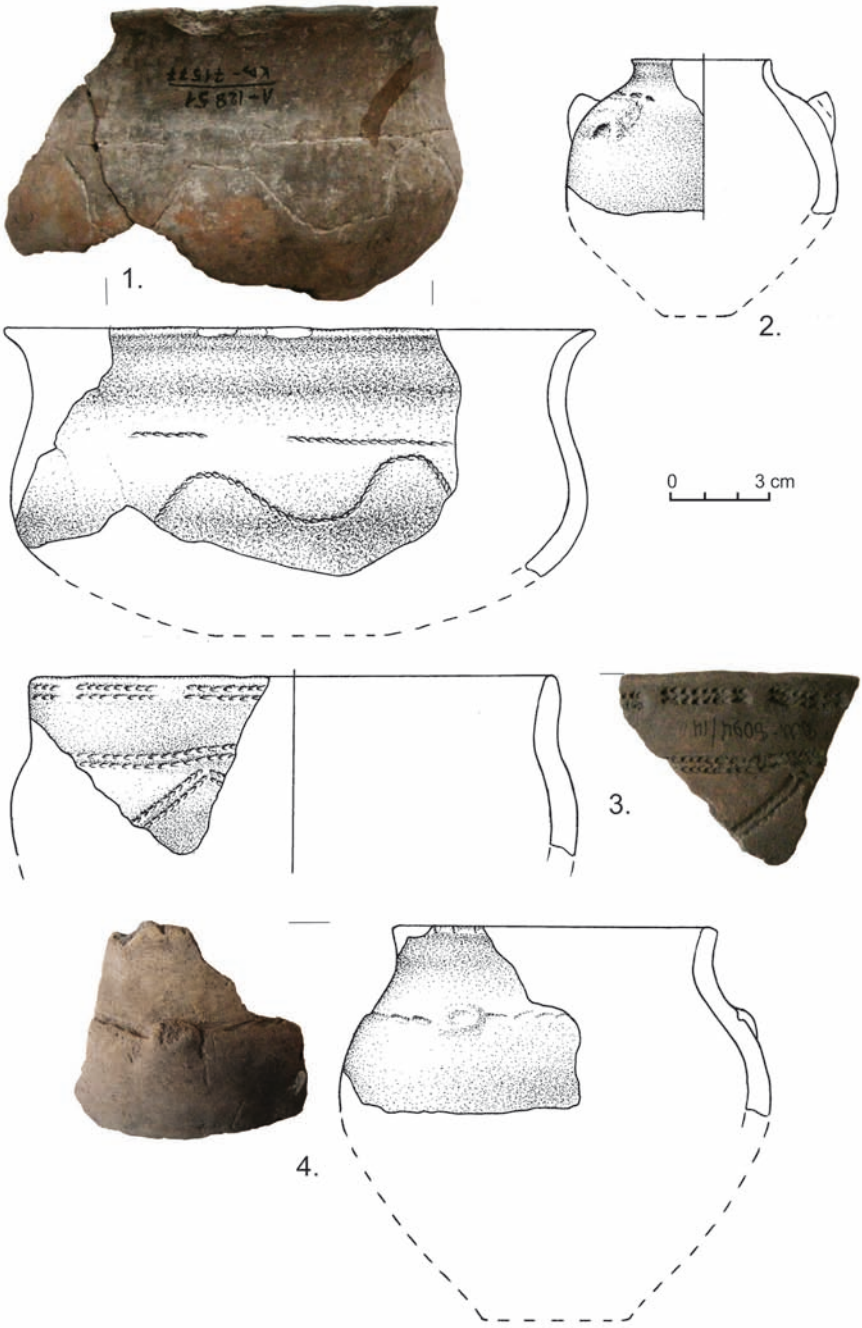

Fig. 4. Zymne, Volodymyr-Volynskyi district. Trypillia Culture pottery finds recovered in the agglomerations of burnt daub (1, 2), in the moat (3), and in the occupation layer (4)

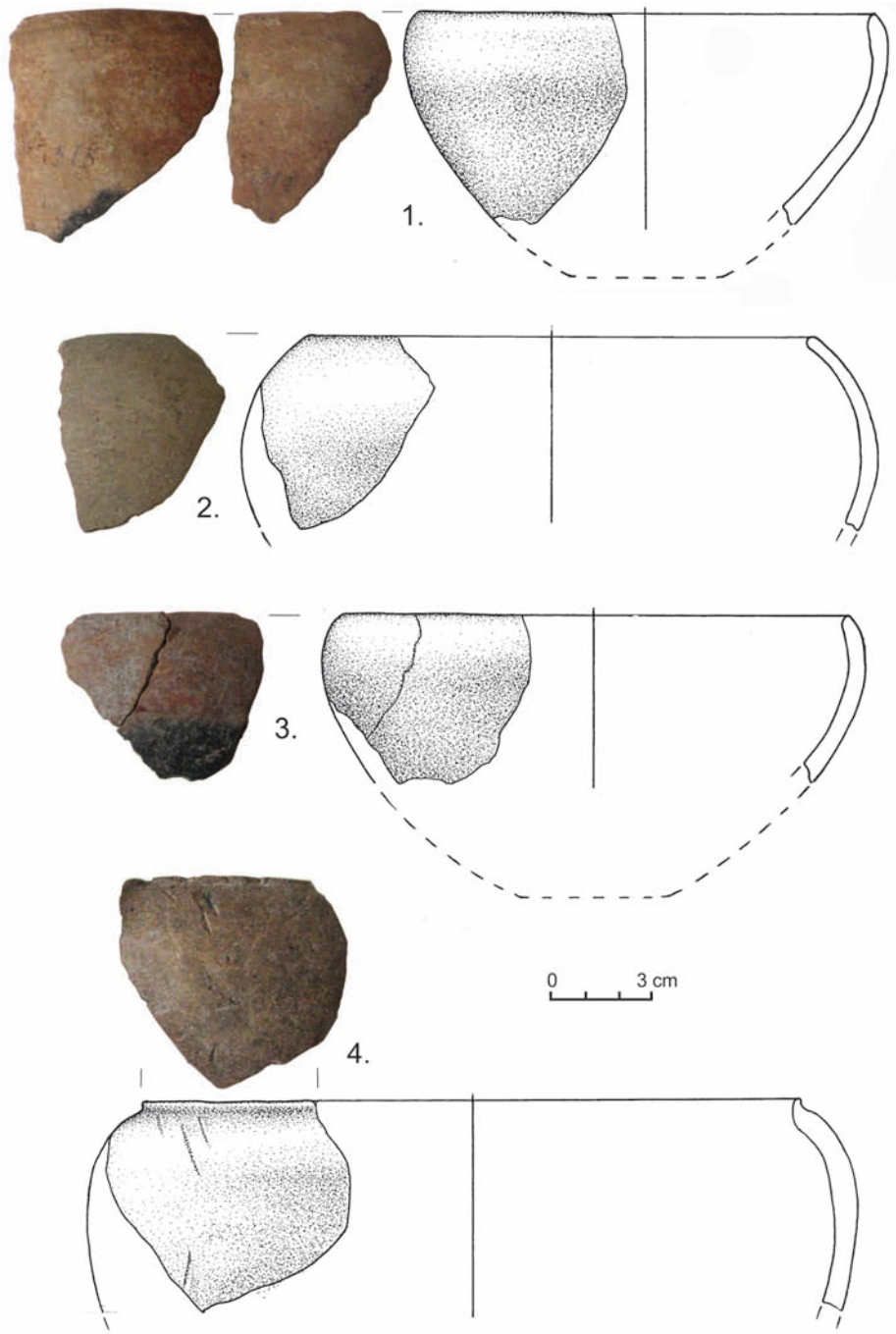

Fig. 5. Zymne, Volodymyr-Volynskyi district. Trypillia Culture pottery finds

habitation contexts like Novomalyn–Podobanka (Verteletskyi 2016a; 2020, fig. 24: 1; 28: 2; 37: 2), Khoriv-Pidluzhzhia (Verteletskyi 2020, fig. 7: 6; 8: 1, 2), Khoriv-Za ozerom (Verteletskyi 2020, fig. 14: 2-5), Kurgany-Dubova (Verteletskyi 2016b; 2020; fig. 56: 1; 57: 10; 58: 1-3, 7, 10-11; 60: 8), and Kurgany-Poliany (Verteletskyi 2020, fig. 70). Basically, these are not the best chronological indicators. However, it is worth noting that the they are present in some quantity in the latest assemblages of the Trypillia CII stage in western Volyn, such as Kurgany-Dubova (Verteletskyi 2016b; Król and Rybicka 2016).

Bowls with deep rims, in their turn, are evidenced by the settlement assemblages from Kurgany-Poliany (Verteletskyi 2020, fig. 69: 5), Khoriv-Za ozerom (Verteletskyi 2020, fig. 14: 1), Kostyanets-Horby (Verteletskyi 2020, fig. 82: 4), and Holyshiv (Verteletskyi 2020, fig. 114: 2), all of the younger phases of the Trypillia CII stage. They are also reported from Zvenyachyn (Verteletskyi 2020, fig. 185: 6, 7; 186: 2), on the Middle Dnister, and Vynnyky-Zhupan (Verteletskyi 2020, fig. 207: 2), in eastern Roztocze as well as from the sites of the Gordineşti Group.

The vases of Zymne are similar to those from various phases of the Trypillia CII stage in western Volyn, starting from sites like Novomalyn-Podobanka (Verteletskyi 2020, fig. 27: 2; 30: 1, 2; 32: 2), Khoriv-Pidluzhzhia (Verteletskyi 2020, fig. 1: 1, 8; 3: 9; 8: 3), Khoriv-Poliany (Verteletskyi 2020, fig. 68: 1-3), Khoriv-Za ozerom (Verteletskyi 2020, fig. 16: 1, 4), and Kostyanets-Lystvenschyna (Verteletskyi 2020, fig. 83: 1, 2); some are known to be found in Zvenyachyn (Verteletskyi 2020, fig. 143: 2; 144: 4), and Vynnyky-Zhupan (Verteletskyi 2020, fig. 202: 4, 5), in eastern Roztocze.

Finally, short-necked amphorettes are represented by settlement assemblages obtained from Nowomłynsk, Kostyanets-Horby (Verteletskyi 2020, fig. 82: 2), Kostyanets-Lystvenschyna (Verteletskyi 2020, fig. 87: 1), Zvenyachyn (Verteletskyi 2020, fig. 186: 3-5; 187: 1, 2), and Tsviklivtsi (Verteletskyi 2020, fig. 189: 8).

Ornamentation is of particular significance when we try and affiliate the late Trypillia part of the pottery sample of Zymne with coeval evidence from elsewhere. Specifically, the grid/net motif was fortunately documented there by a sherd of a vessel (Fig. 3: 1), and it is due to this fact that we can link Zymne with the late Trypillia decorative style of the Kasperivtsi–Gordineşti subunit with the reference to Holyshev (Rybicka 2017; Verteletskyi 2020, 115:2; 117:1-2; 120:5), Kamyanets-Podilskyy (Verteletskyi 2020, fig. 193: 12), Zvenyachyn (Verteletskyi 2020, fig. 161: 1-4; 163), and Sandraky (Videiko 2000, fig. 26: 2), as well as Nova Chortoriya (Videiko 2000, fig. 29: 1, 5), Tsviklivtsi (Verteletskyi 2020, fig. 189: 8), and Mali Virmeny (Verteletskyi 2020, fig. 192: 7-8). It was Oleksandr Pozikhovskyi (Pozikhovskyi 2019) who has accentuated that the fragment from Zymne with a grid decoration could be associated with the Gordineşti phase. It needs emphasizing that in Holyshev, the grid/net ornamental pattern is evidenced to be made by both strokes of paint and imprints of cord (Pozikhovskyi and Okhrimenko 2005; Rybicka 2017). The same motif, yet conveyed other techniques *e.g.* of etching, is specific to Beaker/Baden assemblages in the Polish Lowland (Śrem: Szmyt *et al.* 2021, fig. 4.103: 6; Mrowino: Szmyt and Żurkiewicz

2018, fig. 5.88: 2); such ornamental patterns are normally registered in the contexts of the Baden circle proper (Furholt 2009, Taf. 107; 93; Medunová-Benešová 1972, Taf. 54) as well as in those combining Baden and Funnel Beaker attributes (Cimburk; Furholt 2009, Abb. 111). In Zymne, however, no other direct associations with Baden stylistics were singled out in contrast to Gródek (Gumiński 1989), wherein motifs of incised vertical stripes were noted. The striped motif has its connections with the Baden circle (Furholt 2009) and was effectively observed in some Beaker/Baden assemblages (Kruk and Milisauskas 1981; Rybicka 1995; Szmyt and Żurkiewicz 2018; Szmyt *et al.* 2021). And finally, wavy patterned vessels came from Holyshiv (Pozikhovskyi and Okhrimenko 2005), where the set of Baden attributes compared to those in Zymne is highly variable (Rybicka 2017).

In Zymne, bowls decorated with isolated or multiple corded waves are of special interest. In the Horods'k Group of the Trypillia Culture, exact parallels of wavy decoration have not yet been noted. We can refer to the multiple wavy lines, albeit arranged in a different manner, in the findspots of the Gordineşti Group of the Trypillia Culture like Mereşeuca (Sîrbu *et al.* 2020, fig. 10; 11) and Gordineşti II – *Stînca goală* (house No. 3) in northern Moldova (Sîrbu *et al.* 2023; Król and Rybicka 2023), as well as in youngest phase sites at Polyvaniv Yar (Verteletskyi 2020, fig. 191:20) and Sandraky (Videiko 2000, fig. 25: 1; 27:1, 2). Here, the waves were elements of fairly developed patterns of decorative compositions. The ornamental variety like this has not yet been reported to have exact parallels in the Baden circle. Gh. Sîrbu, D. Król and S. Heghea (2020) argued that the decorative pattern they revealed on the body of the bowl with its rim faceted inwards from Mereşeuca is similar to those of the Złota Culture which dates back to the early centuries of the 3rd millennium BC (Sîrbu *et al.* 2020, 125). It is worth noting that the wavy motif they referred to was an element of highly refined décor applied to spouted vessels of a specific kind; there are no matches in wavy patterns of Złota (Krzak 1970; 1976). Wavy patterns formed by different varieties of cord imprints, furrowed stitches, and lines in relief are occasionally found in Beaker/Baden assemblages in the Polish Lowland (Mrowino: Sikorski 2018, fig. 11.3: 2; Szmyt and Żurkiewicz 2018, 5.76: 2; Śrem: Szmyt *et al.* 2021, fig. 4.19: 5; Radziejów Kujawski, site 4: Rybicka 1995, Plate 23: 13; 25: 5, 8). Meanwhile, they do not provide direct parallels to the ornaments identified in the pottery assemblage of Zymne.

In the finds assemblage from a settlement of the Funnel Beaker Culture of Pawłosiów, site 52, Subcarpathian voivodeship, a bowl was also distinguished, the shape of which corresponds to the vessels discovered in Zymne. It is decorated with a similar motif to those described above, made with a furrow stitch (Rybicka *et al.* 2014; Rybicka 2017, fig. 72: 2). It is technologically distinct from the pottery of the Funnel Beaker Culture. It probably represents an eastern "import". The settlement at Pawłosiów is dated to the period 3600-3400/3300 BC (Rybicka *et al.* 2014). Similar ornamental arrangements can also be found in the Globular Amphora Culture (Szmyt 2004, fig. 6).

CHRONOLOGICAL CONSIDERATIONS

Most of the distinctive pottery forms in the analyzed sample circulated throughout the Trypillia CII stage in western Volyn. The exception are bowls with their rims deeply bent inwards as well as short-necked amphorettes, which can be associated with the latest phase of the Trypillia CII stage. It is, however, the corded ornamentation, and especially the grid/net motif, which may serve as perfect chronological indicators, since they are regularly observed in the Kasperivtsi–Gordineşti subunit which dates back to the latest centuries of the 4th millennium BC (Diachenko and Harper 2016). The grid/net motif is also immanent in the pottery sample of Holyshiv, some 30 km east of Zymne. The ^{14}C dates recently derived from samples from Holyshiv can be fitted into the time subunit c. 3100-2950 BC (Harper *et al.* 2021; Król and Rybicka 2022, 25). Trypillia Culture pottery finds from Holyshiv are associated with the Gordineşti Group. It is generally linked with its time range, c. 3300-3000/2950 BC (Król and Rybicka 2022; 2023). The grid motif is one of the attributes of the Beaker/Baden assemblage in Mrowino, with the dates around 3300-3100 BC (Furholt 2009, 202, 203; Goslar *et al.* 2018, fig. 16: 2; 2021, 503). According to M. Furholt's (2009) inferences, the settlements like Śrem, Radziejów, and Opatowice, where the grid ornamental pattern is usual, may be well fitted into the subunit 3350-3100 BC. There are corded wavy lines among attributes of the settlement pottery samples in the Kasperivtsi–Gordineşti subunit as well, which, naturally, fit the actual time range of the Gordineşti Group.

CONCLUSIONS

When considering Trypillia Culture imports in the pottery assemblage of the Funnel Beaker Culture settlement in Zymne, the majority of scholars have emphasized the significance of this as evidence for conceptualizing connections between communities of both Cultures, while also highlighting the chronological aspects of the matter (Zakharuk 1959; Zbenovich 1976; Kadrow 2005). Particularly significant in terms of the chronology of the Funnel Beaker phases in Zymne and Gródek is their correspondence to the latest phases of the Trypillia CII stage. The available data make it possible to associate the above-mentioned sample from Zymne with that particular subunit of the Trypillia CII stage which dates back to the time range from 3300 until 3000/2950 BC (Król and Rybicka 2022; 2023) and corresponds to the occupation phase II of the Funnel Beaker Culture in Gródek (Włodarczak 2006). In the sample from this site, attributes of the Gordineşti Group are represented and display parallels to those registered in Holyshiv (Gumiński 1989; Rybicka 2017, fig. 76: 6-9; Verteletskyi 2020).

It must be emphasized, however, that the pottery sample in Zymne displays the lack of wide-mouthed bowls (a.k.a. faceted bowls), while in Holyshiv, which is known to contain

attributes of the Gordineşti Group, this kind of bowl is regularly represented (Rybicka 2017; Verteletskyi 2020).

In the case of Gródek, the published vessels do not raise any doubts that they can be attributed to the Gordineşti Group and may reflect contacts with nearby Trypillia Culture settlements of the Holyshiv Type. Until recently, it was difficult to seek such relations in the case of the settlement in Zymne. Admittedly, not all of the above-mentioned stylistic parallels can be directly associated with the assemblages of western Volyn' representing attributes of the Gordineşti tradition. Nonetheless, the available dates of the Gordineşti Group and the settlement in Holyshiv within the time range *c.* 3300-3000/2950 BC (Harper *et al.* 2021; Król and Rybicka 2022; 2023), as well as the presence of similar attributes in Holyshiv and Zymne, may suggest that both in Zymne and Gródek, these attributes may serve as evidence of contacts between their inhabitants and Late Trypillia groupings of the Holyshiv Type who lived in close proximity.

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WAS GORDINEŞTI II–STÎNCA GOALĂ ABANDONED DUE TO CULTURAL CHANGES OR ENVIRONMENTAL IMPACTS? THE CASE OF THE LATE TRYPILLIA SETTLEMENT IN NORTHERN MOLDOVA

ABSTRACT

Rybicka M., Wacnik A., Pokutta D., Kittel P., Okupny D., Król D., Sady-Bugajska A., Pankowski W., Sîrbu G., Makohonienko M. and Słowiński M. 2023. Was Gordineşti II–Stînca goală abandoned due to cultural changes or environmental impacts? The case of the late Trypillia settlement in northern Moldova. *Sprawozdania Archeologiczne* 75/1, 51-75.

This study aims to provide information on cultural and environmental factors influencing the development and decline of the Late Trypillia settlement at Gordineşti II–Stînca goală. The discussion is based on the results of archaeological excavations, non-invasive surveys (magnetometric and GPR), as well as radiocarbon, macroremains, palynological, archaeozoological, and isotopic analyses. All data suggests that Gordineşti II–Stînca goală consisted of at least 15 lightweight constructed dwellings. It was a small settlement existing *c.* 3300-2950 BC. Its inhabitants were oriented to cereal cultivation and livestock husbandry, using available areas with fertile soils. The livestock were well-fed.

However, the location of the settlement on a highly exposed outcrop probably did not facilitate the use of the flowing water of the nearby Racovăţ River. The rock underlying the site would have made digging the wells a very tough task. Hence, the water access problem may be one of the factors that made life inconvenient at the Gordineşti II-Stînca goală settlement.

Keywords: radiocarbon, palynology, stable isotopes, animal management, Late Trypillia, Gordineşti Group
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INTRODUCTION

In 2016-2021, archaeological excavations and non-invasive surveys were carried out on the eponymous settlement for the Gordineşti Group of the Late Trypillia Culture at Gordineşti II–Stînca goală in northern Moldova. Until recently, it was difficult to unequivocally establish the period during which the population of this group existed in this area and western Ukraine since the available radiocarbon dates were differing widely, either pointing at the last centuries of the 4th millennium BC (Diachenko and Harper 2016, figs 2 and 3) or the early half of the 3rd millennium BC (*e.g.* Sandraky; Tsviklivtsy; Rassamakin 2012). Additionally, many scholars have already pointed out that some of the dates are questionable (Harper *et al.* 2019; Rassamakin 2012; Król and Rybicka 2022). Hence, one of the objectives of this project was to determine the chronology of the settlement at Gordineşti II–Stînca goală as well as the length of its occupation. Of particular importance was determining the spatial arrangement of the Gordineşti II site (Rybicka *et al.* 2023) and subsistence strategies used by its inhabitants. Another interesting issue was answering the fundamental question – why was the site abandoned? Was this due to cultural or environmental causes? The explanation of the issues listed above – and covered below – are expected to launch verification of various hypotheses proposed by pertinent publications discussing changes in population and economy in the Dniester-Prut interfluve at the end of the 4th millennium BC (Rassamakin 2013).

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GEOGRAPHICAL LOCATION OF THE SITE

The Gordineşti II–Stînca goală site is located in the southern part of the Medobory (Toltry) Hills in northwestern Moldova (48°08'24.25" N; 27°09'34.58" E), some 9 km east of the Prut River and *c.* 48 km south of the Dniester River (Fig. 1). The settlement occupies one of the limestone hills roughly oriented N and S. The wedge-shaped, extensive, and flat hilltop is oriented SE and NW and is some 500 m in length and c. 100-120 m in width. The terrain is surrounded to its south, west, and north by the deeply incised valley of the Racovăţ River – a right-bank tributary of the Prut River. The promontory's maximum absolute elevation reaches 215 m a.s.l., whereas the Racovăţ River valley floor is between 140 and 130 m a.s.l. (Fig. 2: 1-3). The average river channel inclination is 0.4°.

GEOGRAPHICAL DESCRIPTION OF THE SITE

The Medobory (Toltry) Hills are a narrow ridge of Miocene reef limestone hills, running north and south for some 300 km across Ukrainian Podilla and northern Moldova (*e.g.*, Korolyuk 1952; Górka *et al.* 2012; Brusak and Moskaluk 2016). The Racovăţ River valley surrounding the site is an active gorge with highly inclined (up to 40-50°) rocky slopes (Fig. 2: 1-3). However, in the northern part of the site, fragments of a river terrace occur on both sides of the channel. The terrace is formed by two main units: fluvial deposits in the bottom part and loess deposits with buried soils strongly transformed by slope processes in the upper part. The fluvial unit is composed of imbricated gravels of channel lag deposits covered with a thin layer of overbank alluvia. The fluvial deposits are overlain by a sequence of loess layers with buried soils. These loess units contain Middle and Upper Palaeolithic ecofacts and artefacts of the Mousterian and Early Aurignacian complexes (Borziyak 1984). The upper cover of loess with gravel originates from redeposition by slope processes, possibly deposited between *c.* 26 and *c.* 17 k.y. BP according to the regional sequence elaborated by Haesaerts *et al.* (2003). The uppermost loess cover was deposited between 15 and 10 k.y. BP according to Haesaerts *et al.* (2003). The chronology of slope-aeolian deposits demonstrates that the alluvia of the river terrace were accumulated in the older part of the Weichselian (Valdai) Glaciation Period. This suggests that the fragments of the terrace in the Racovăţ River valley should be associated with the first (Skulyansk) terrace in the Prut River valley related to the first (Parkan) terrace in the Dniester River valley (*cf.* Gozhik and Chetlyga 1964; Bukatczuk *et al.* 1983; Lukina *et al.* 1985). All these terraces share similar lithology and chronology as well as elevation above the valley floor: the surface of the Racovăţ River terrace is elevated *c.* 10 m above the valley floor and up to 150 m a.s.l. The incision of the Prut River channel – and that of the Racovăţ as well – is principally related to the tectonic uplift of fragments of the Moldavian Plateau (Bobok 1980; Lukina *et al.* 1985; Matoshko *et al.* 2004, see also Perşoiu *et al.* 2017).

Fig. 1. Gordineşti II–Stînca goală. Site location on the map of Europe

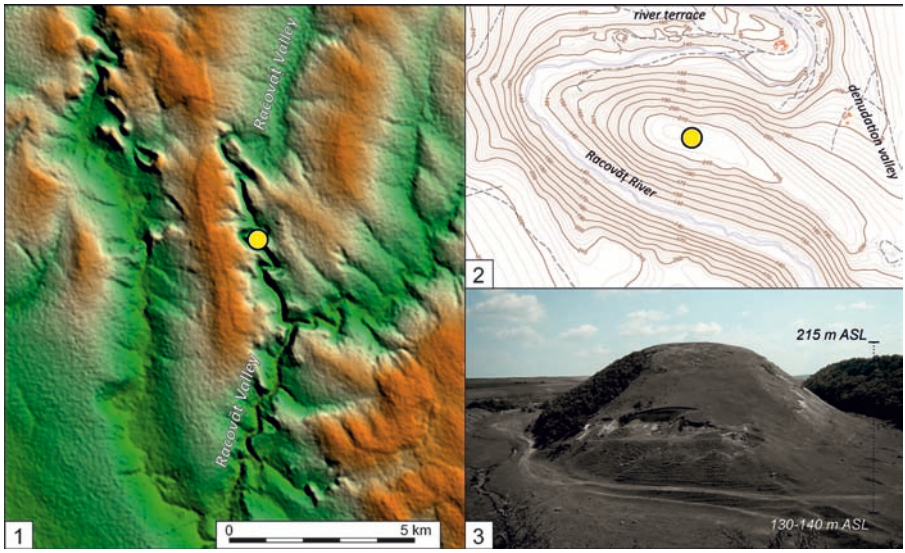

Fig. 2. Gordineşti II–Stînca goală. Site location. 1 – elevation model of the Racovăț River valley; 2 – topographic map (https://geoportal.md/); 3 – view from the west. Photo D. Król

The development of the Racovăţ River valley began in the Middle Pleistocene (Adamenko *et al.* 1997). The higher river terrace, buried by loess deposits, stretches to the east of the site. The elevated surface occupied by the site is a part of the upland zone formed by reef limestone overlaid with weathering-derived clay and loess partly redeposited by slope processes. In the Gordineşti II site area, limestone is encountered at between 30 to 50 cm in depth. To the east of the area of the site, the uppermost layer is constituted by a loess cover with a thickness of up to 1 m and with well-developed black soil. This sequence is similar to that found at the uppermost part of the river terrace. In the elevated areas of the plateau east of the Gordineşti II site, the unit of Lower-Sarmatian limestone is covered by Upper-Sarmatian clays. On the left bank of the Racovăţ River valley, Pliocene sands and silts are found related to the 7th-10th Prut River terraces (Gozhik and Chetlyga 1964; Bukatchuk and Burdnko 1973; Lukina *et al.* 1985; Adamenko *et al.* 1997).

SPATIAL ARRANGEMENT OF THE SETTLEMENT

The spatial arrangement of the prehistoric settlement in Gordineşti II–Stînca goală was studied using traditional archaeological methods such as field surveys and excavations, as well as active non-invasive geophysical prospection namely magnetometric surveys (Przybyła *et al.* 2017) and three-dimensional ground-penetrating radar investigations (3D GPR) (Rybicka *et al.* 2023, figs 3, 7, and 8). Excavations were used to explore three dwellings previously localized either during a basic field survey (House 1; Sîrbu and Król 2021; 2023), by magnetometric prospection (House 2; Sîrbu and Król 2023), or through 3D GPR investigation (House 3; Sîrbu and Król 2023). Neither magnetometric nor 3D GPR methods provided a sufficiently precise image as to how the settlement was arranged and how many dwellings there were within it, but general pointers as to the locations of single structures were only obtained (Przybyła *et al.* 2017; Rybicka *et al.* 2023). Therefore, it was not possible to establish the details of the settlement's layout. Nevertheless, these results sufficed to estimate the occupied area at about 3 ha, enclosed by a ditch-rampart system on its eastern side. The non-invasive research methods have shown that dwellings were located along the north and southern sides of the promontory, its central part being left empty. The three houses (nos 1-3) subjected to excavations were located near the southern edge of the site (Rybicka *et al.* 2023, fig. 3).

Owing to the fact that Houses 2 and 3 were identified inside a concentration of dipolar magnetic anomalies (Fig. 3; Przybyła *et al.* 2017), it was decided to analyze the spatial dispersion of those anomalies and develop a hypothetical model for potential locations of other houses. The Kernel Density Estimation (KDE) algorithm was used for this purpose (Rybicka *et al.* 2023, fig. 11). The generated model suggests that the settlement structure in Gordineşti II–Stînca goală may well have an oval shape (Figs 4 and 5), the fact also being

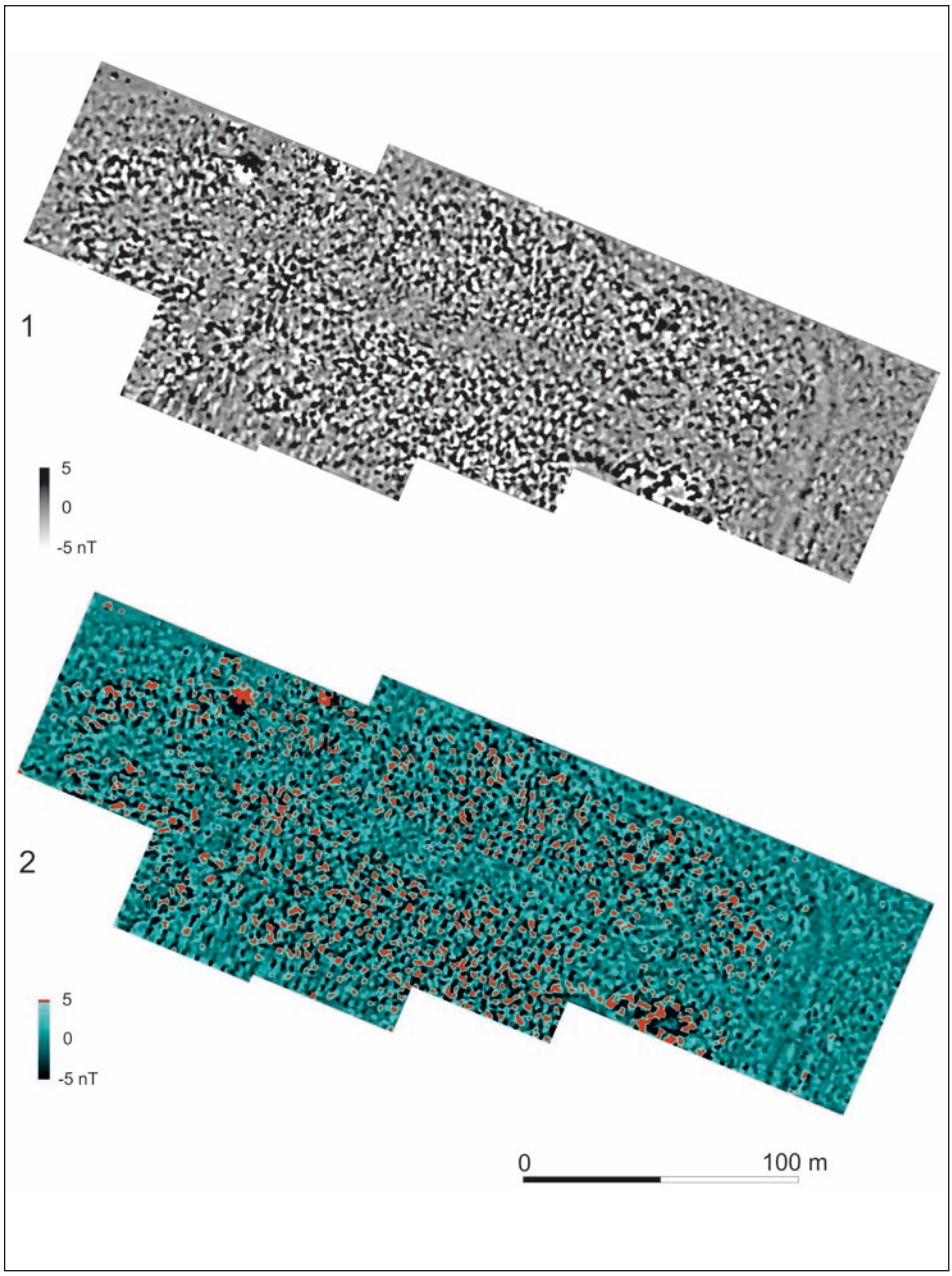

Fig. 3. Gordineşti II–Stînca goală.
Magnetometry image of the site. 1– in the range of −5/5 nT in the greyscale; 2– in the range of −5/5 nT in the colour scale, the highest values are highlighted.
After Przybyła *et al.* 2017, 53-54, figs 3 and 4

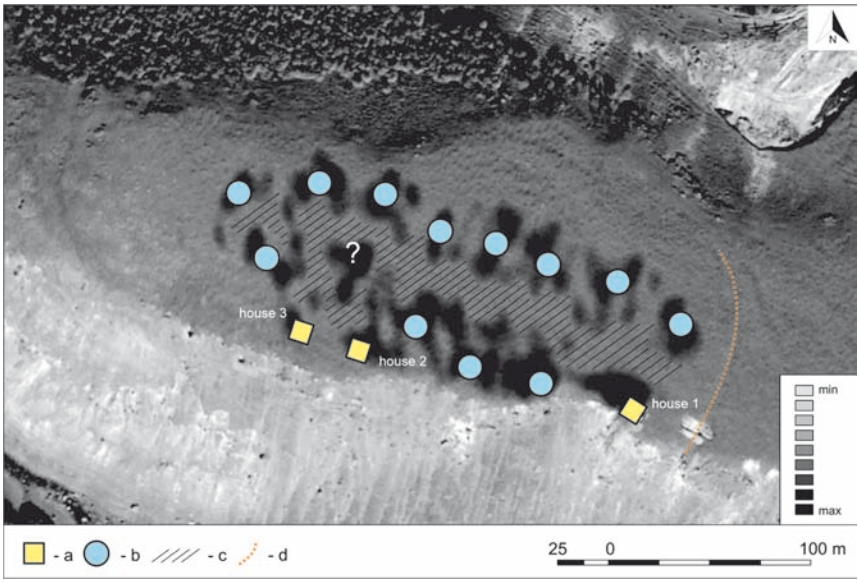

Fig. 4. Gordineşti II–Stînca goală. Site's spatial organization model based on KDE-analysis.
a – excavation units (Houses 1-3); b – hypothetical houses; c – open space courtyard; d – ditch-rampart system. After Rybicka *et al.* 2023; modified)

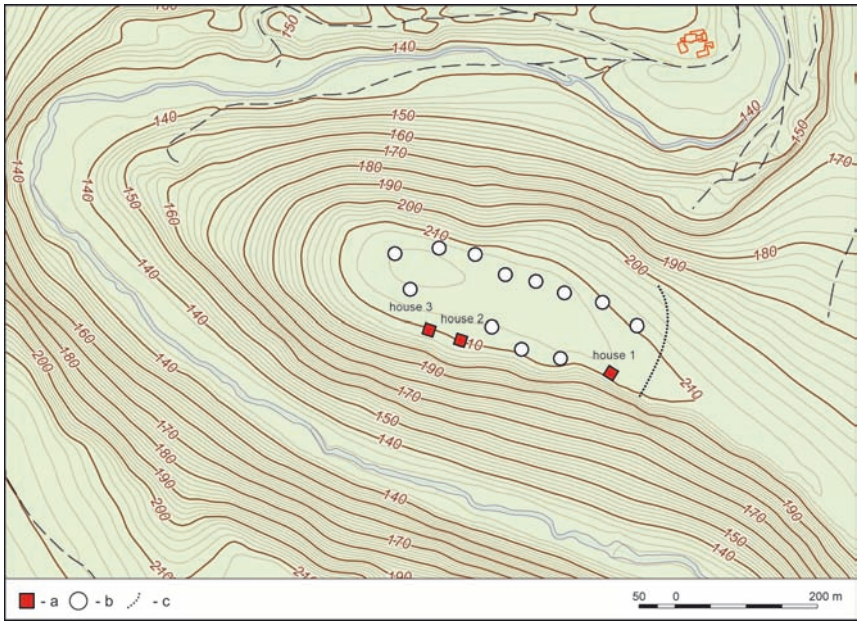

Fig. 5. Gordineşti II–Stînca goală. Site's spatial organization reconstruction.
a – excavation units (Houses 1-3); b – hypothetical houses; c – ditch-rampart system

suggested by magnetometric research (Przybyła *et al.* 2017, 58). On the basis of these analyses, it was estimated that the settlement could have consisted of at least 15 houses (Figs 4 and 5; Rybicka *et al.* 2023).

DWELLINGS AND THEIR EQUIPMENT

The discovery of postholes and daub fragments with imprints of wattle may suggest that the three excavated dwellings were of lightweight construction (Fig. 6; Sîrbu and Król 2021; 2023). They were supported by the poles and their walls were wattle and daub. The rectangular structures were quite uniform in size (no. 1– *c.* 11.2 × 10.4 m; no. 2 – *c.* 10 × 8 m) and alignments: no. 1 – NE and SW; nos 2 and 3 – SE and NW). Each of these structures had its own hearth. The wide dispersion of flakes and chips of flint in various parts of the houses and their surroundings may suggest that there were, however, no areas evidently

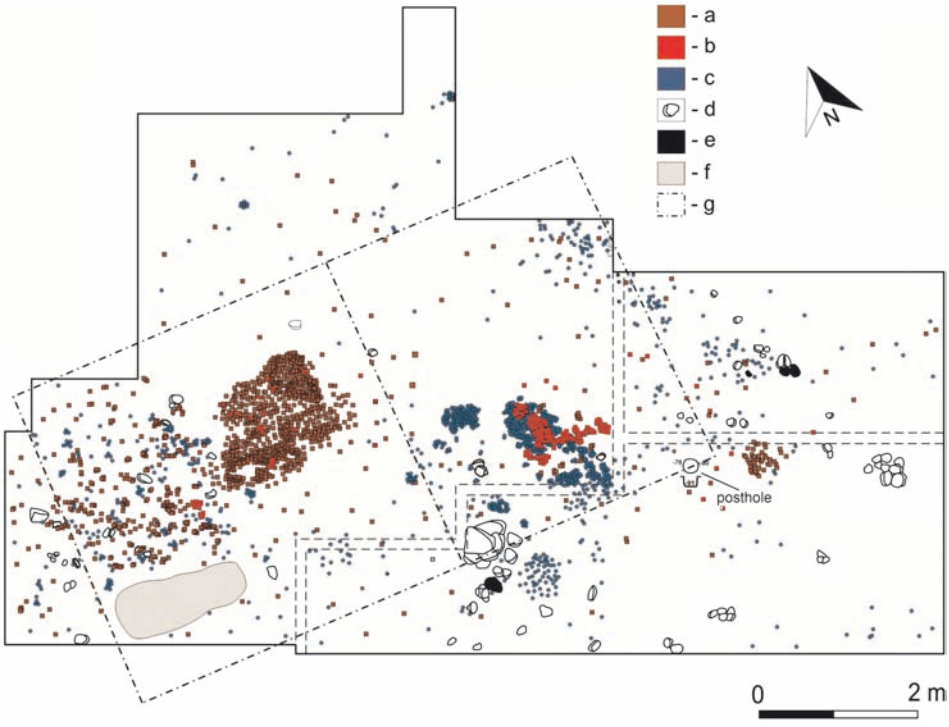

Fig. 6. Gordineşti II-Stînca goală. The house no. 1: a – burnt daub fragments (wall), b – burnt daub fragments (floor), c – pottery, d – stone, e – granite stone, e – limestone pavement, d – schematic delimitation of dwelling. After Sîrbu and Król 2021; 96, fig. 2; modified

specialized in flint knapping (Sîrbu and Król 2021; 2023). All the dwellings and their surroundings contained numerous spindle whorls and loom weights. No clearly defined areas for weaving were identified though. Such dispersion of finds indicates the lack of areas dedicated to specific tasks and is suggestive of *ad hoc* use of habitable interiors and their vicinity (Sîrbu and Król 2021; 2023).

The tableware in various site contexts turns out to be highly uniform in terms of stylistics and morphology, while cooking ware displays a restrained and simple manner of ornamentation (Sîrbu *et al.* 2019a; Sîrbu *et al.* 2019b; Sîrbu and Król 2021; 2023). The number of pottery sherds found in individual dwellings is roughly equal. Neither houses nor their surroundings were revealed to contain special concentrations of tools and utensils (Sîrbu *et al.* 2017; Sîrbu *et al.* 2019a; Sîrbu *et al.* 2019b; Sîrbu and Król 2021; 2023).

CHRONOLOGY ISSUES

At present, we possess 12 radiocarbon dates for three Gordineşti II–Stînca goală dwellings (Fig. 7). These dates have been obtained by the AMS method from selected organic remains taken from habitation levels. Four dates for House 1 were derived at Poznań

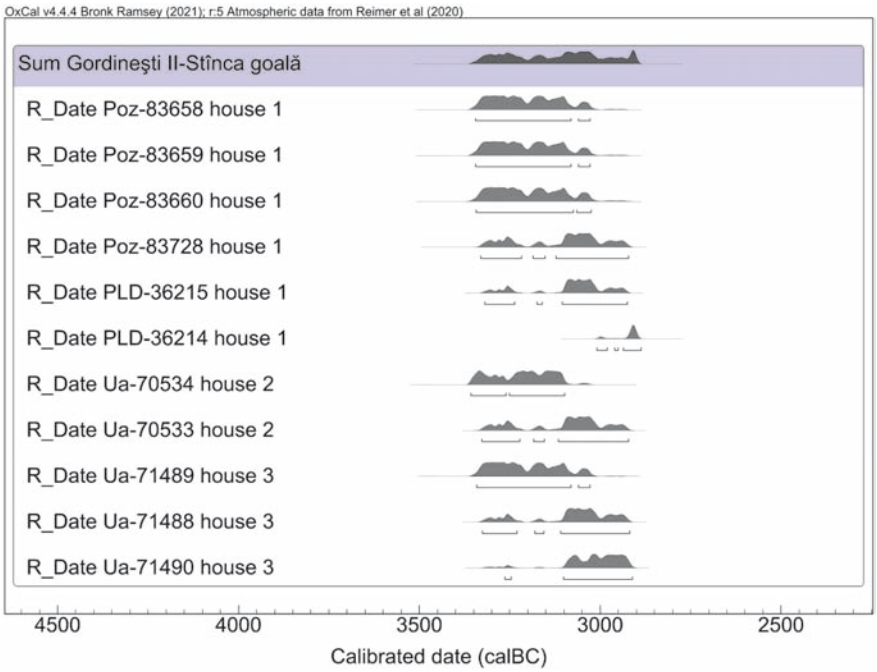

Fig. 7. Gordineşti II–Stînca goală. List of radiocarbon dates

Radiocarbon Laboratory and two more at the Japanese Paleo Lab Co; three of them come from animal bones and three from charred wheat grains discovered in the southern section of the dwelling (Rybicka *et al.* 2020; Sîrbu *et al.* 2020; Król and Rybicka 2022; 2023). In turn, all dates for Houses 2 and 3 come exclusively from animal bones and were derived by the Radiocarbon Laboratory at Uppsala University. Judging by variously modelled (through Bayesian and other statistical analysis) radiocarbon dates, House 1 was occupied c. 3300/3250–2900 BC (models using an outlier date – PLD-36214 4315±20) or 3300/3250–3000/2950 BC (without this debatable date) (Król and Rybicka 2022, 18-21; 2023). Absolute dates for Houses 2 and 3 appear to correspond with those for House 1 (Fig. 7). Hence, the conclusion is that all three researched dwellings could have been used in pretty much the very same period. What is crucial is that no artefacts from any cultural group other than the Late Trypillia Gordineşti Group were unearthed.

MACROSCOPIC REMAINS OF CULTIVATED PLANTS

The archaeobotanical analysis provides evidence for the cultivation of grain crops by the local community of Gordineşti II–Stînca goală and sheds light on the taxonomic spectrum and size diversity of individual taxa represented in each individual house (Sady-Bugajska 2023). In House 1, charred kernels of emmer wheat (*Triticum dicoccon*) and wheat (*Triticum* sp.) were identified, and fragments of kernels of otherwise unidentified grains (Cerealia indet.) are represented. In the organic admixture to the daub, some imprints were observed and identified as vestiges of hulled wheat emmer (*Triticum dicoccon*) and einkorn (*Triticum monococcum*). The cultivation of barley is suggested by a kernel imprint (*cf. Hordeum vulgare*).

The burnt daub of House 2 contained hollow imprints of hulled wheat – emmer and einkorn (*Triticum dicoccon*, *Triticum cf.*, *monococcum*), with the former predominating (Sady-Bugajska 2023). Some imprints were classified broadly as those left by hulled wheat – either einkorn or emmer (*Triticum monococcum* vel *dicoccon*) or simply *Triticum* sp. Most vestiges were categorised as grains and/or as unidentified grasses (Cerealia indet./ Poaceae indet.).

In the case of House 3, the analysis of the burnt daub from the central hearth produced interesting results. The discernable morphological features – imprints of ears – were used to identify remains of hulled wheat – mostly emmer (*Triticum dicoccon*) and einkorn (*Triticum monococcum*). Imprints of kernels which could not be further identified were classified broadly as wheat (*Triticum* sp.) or cereals (Cerealia indet.). Identically, as in the above-described materials, the most numerous imprints on the daub of House 3 were those of cereal chaff (Sady-Bugajska 2023).

MACROSCOPIC REMAINS OF WILD PLANTS

A highly salient fact is the presence of macroscopic remains of plants in soil/sediment samples taken from dwelling interiors (Sady-Bugajska 2023). In the debris of all three houses, charcoals of ash-wood (*Fraxinus excelsior*) and cornel seeds (*Cornus mas*) were found. Furthermore, examined samples from dwellings contained a charred oak acorn (*Quercus* sp.). A charred fragment of maple wood (*cf. Acer* sp.) was identified. Seven fragments of charcoal found in House 2 were classified as coming from deciduous trees (Sady-Bugajska 2023).

Furthermore, remains of feather grass (*Stipa* sp.) were found in all three huts, plus a single imprint of a corn-cockle diaspora (*Agrostemma githago*) was evidenced. Other diasporas, probably from brome grass (*cf. Bromus* sp.), were also recorded (Sady-Bugajska 2023).

REMAINS OF LIVESTOCK AND WILD ANIMALS

Livestock animals consisted of both mobile species like cattle (*Bos taurus*), sheep (*Ovis aries*) and goat (*Capra hircus*) as well as pig (*Sus domesticus*) (Croitor and Sîrbu 2017; 2019) – the last species not so suitable for being driven in migrations (Albarella *et al.* 2011; Mileto *et al.* 2018). It was possible to fully identify bone fragments found in House 1 and its vicinity (Croitor and Sîrbu 2017; 2019). Most of them were from cattle, yet with high shares of sheep and – less so – goats (Croitor and Sîrbu 2017; 2019). Bones of wild animals were also found to represent red (*Cervus elaphus)* and roe deer (*Capreolus capreolus*), whose habitats are mostly broadleaf and mixed woods and thickets.

VEGETATION IN THE AREA OF THE GORDINEŞTI II–STÎNCA GOALĂ SITE DURING THE OCCUPATION OF THE LATE TRYPILLIA CULTURE

According to Bohn *et al.* (2004), the main type of vegetation that would potentially emerge if the region was to be completely abandoned by humans would be broadleaf forest communities consisting of *Carpinus betulus*, *Quercus robur*, *Q. petrea*, *Tilia cordata*, *T. tomentosa*, *Fraxinus excelsior* and *Fagus sylvatica*. The river valleys are suitable for development of riparian forests with *Q. robus*, *Ulmus laevis*, *U. minor*, *Fraxinus*, as well as willows (*Salix alba*, *S. fragilis*) and poplar (*Populus alba*, *P. nigra*). Not far from the Gordineşti II settlement, to its south-east and south-west, the land would be re-occupied by forest-steppe-type vegetation. The European forest-steppe ecotone represents a mosaic landscape of open and wooded patches extending from the Carpathian to the Ural Mountains.

Fig. 8. Sediment sampling sites in the vicinity of Gordineşti II–Stînca goală in 2019 (http://www.etomesto.com)

The history of vegetation of the studied area in the Holocene to date has not been subject to many studies and our knowledge about it is definitely incomplete.

The character of vegetation was in large part identified through palynological research. To date, the closest palynological sequence was the Orhei profile from Moldova, north of Chişinău (today in the steppe zone) (Kremenetskiy 1991; Kremenetski 1997; 2003) and (more distant) sites in southern Ukraine: the Dovjok swamp, Kardashinski swamp (Kremenetskiy 1991; Kremenetski 1995) and Nebelivka (Albert *et al.* 2020), as well as those from the Romanian Carpathians: Călimani Mts (Fărcaş *et al.* 1999), Bardău (Fărcaş *et al.* 2009), and Poiana Ştiol (Tanţău *et al.* 2011; Gałka *et al.* 2017). Palynological data from the Orhei site points to the presence of broadleaf forests mixed with steppe areas during the

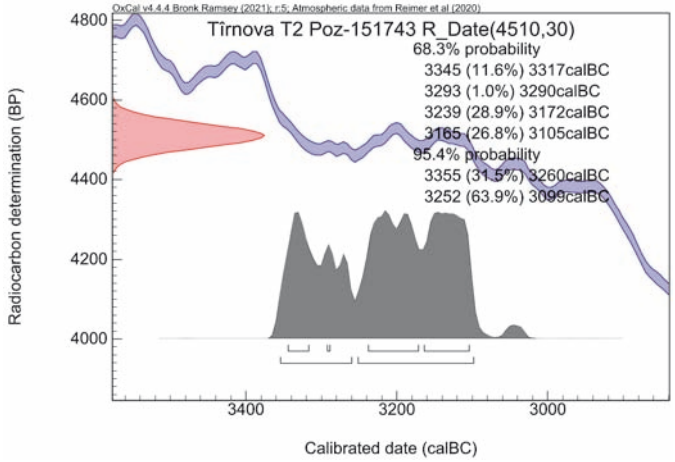

Fig. 9. *Tîrnova* T2 profile. Radiocarbon date

Atlantic and early Subboreal Periods as well as major changes in vegetation cover beginning around *c.* 5500 cal. BP (≈3550 BC) and associated with the growing relevance of open herbaceous plant communities (Kremenetski 2003). In Harper's (2019) opinion, Trypillia Culture tribes had spread across most of the contemporary forest-steppe zone. The link between Trypillia settlements and this vegetation type seems to be corroborated by the currently sparse palynological data from southern Moldova and Ukraine (Pashkevich 2003; Pashkevich 2005; Pashkevych 2012; Kremenetskiy 1991; Yanushevich *et al.*1993). The location of the Gordineşti II–Stînca goală site, on a well-drained limestone ridge surrounded by the steep-sided gorge of the Racovăţ River valley was not favourable for the formation of deposits preserving pollen from the period of the Trypillia settlement up to our times. The sediment profiles containing microremains of plants were located by a team headed by Piotr Gębica (Rzeszów University) near Tîrnova (48°11'25.8"N;27°10'53.1"E) and Trinca (48°12'45.72"N;27°8'9.84"E) in northwestern Moldova (Fig. 8). Palynological analyses and radiocarbon dating showed that only a few pollen grains from a period close to the Gordineşti II–Stînca goală occupation were preserved solely in the older part of the Tîrnova T2 profile. The taxonomic composition of the pollen spectrum dated by AMS ^{14}C (Poz-151743; using a charred fragment of *cf. Quercus* to 4510±30 BP; 3355-3099 BC – 95.4% probability range; Fig. 9) includes pollen from Scots pine *Pinus sylvestris*, European spruce *Picea abies* and oak (*Quercus* sp.); from herbaceous plants only pollen from Cichorioideae and *Aster* type was identified. Such data are, naturally, insufficient to draw conclusions concerning the character of vegetation cover. However, looking at the macroscopic finds of wood from *Quercus* sp., *Acer* sp., *Fraxinus excelsior*, indeterminate deciduous taxa (Dicotyledones indet.), as well as charred *Cornus mas* seeds and *Quercus* sp. acorns, and the presence of oak pollen in the T2 profile, we may assume that the aforementioned

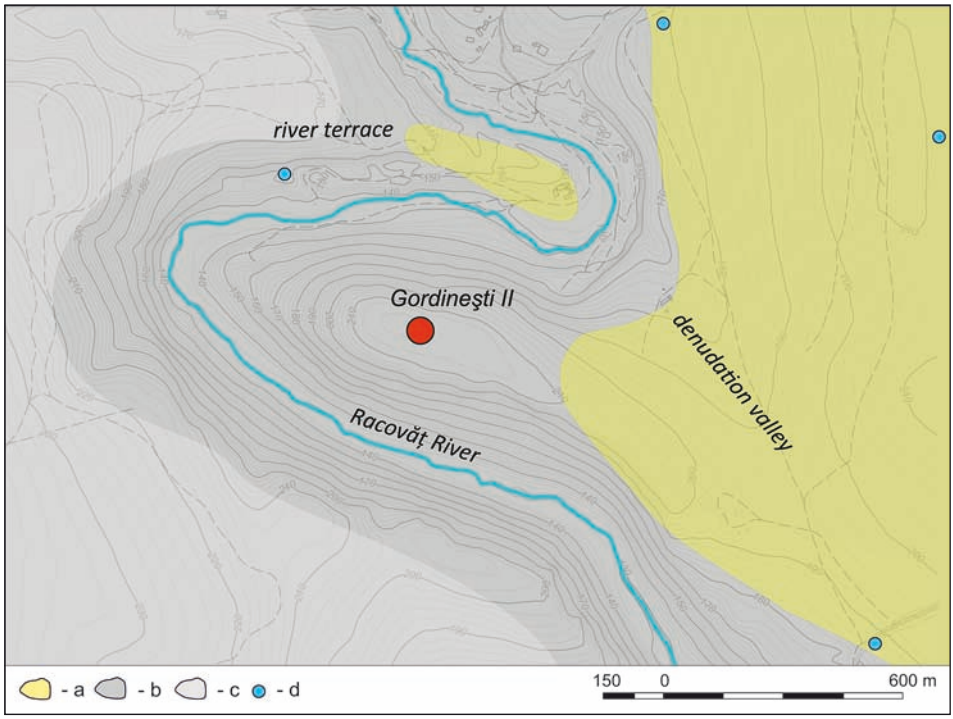

Fig. 10. Gordineşti II–Stînca goală.
Soil and water conditions in the vicinity of the site. a – loess soils; b –rendzina soils; c – sierozem soils; d – springs

trees – probably part of oak or broadleaf forests, grew in the neighbourhood of the Gordineşti II–Stînca goală site.

In spite of the studied area's belonging, according to Bohn *et al.* (2004), to the deciduous forests zone, we may speculate that in the early Subboreal Phase of the Holocene local relief, with its limestone foundation and low groundwater level, may had been favourable to a more open type of vegetation, closer in character to the forest-steppe.

It is possible that the hilltops and dry slopes with strongly mineralised soils were covered by a mosaic of vegetation types comprised of patches of dry grasslands with *Stipa* sp., *Bromus* sp., and possibly representatives of Cichorioideae and *Aster* mixed with patches of dry open woodland composed of various species of *Quercus* sp. with admixtures of – at the very least –*Acer* sp. and *Cornus mas*. One should note that even today oak forests of Moldova and south Ukraine include certain floral elements typical for the sub-Mediterranean Zone in the western Pontic Region, such as the aforementioned *Cornus mas* (Bohn *et al.* 2004; Goncharenko *et al.* 2020). The presence of charred remains of feather grass *Stipa* sp., a plant typically found in forest-steppe and steppe areas, points to

the existence of patches of open, dry areas covered with dry grasslands. Such grasslands require much sunlight, very dry and warm habitat, and poor soils (Zarzycki *et al.* 2002). *Fraxinus excelsior* probably grew in humid terrain depressions, in gullies with fertile soils underlain by clay or loess redeposited by slope processes. An issue yet unanswered is the degree of forest cover.

During the site's occupation, at least the following types of cereals were cultivated: *Triticum monococcum*, *T. dicoccon*, and *Hordeum vulgare*. These plants are highly suitable for primitive agricultural practices and well adapted to the existing climate (Pashkevych 2012; Lityńska-Zając and Wasylikowa 2005). The fields, as indicated by archaeobotanical research, attracted weeds such as *Bromus* sp. or *Agrostemma githago*.

In the vicinity of Gordineşti II–Stînca goală, good edaphic conditions propitious for grain crops are provided by soils accounting for over 30% of the area in a 1 km radius around the settlement (Fig. 10). Such a distance is considered to produce optimal effectiveness of grain farming (Flannery 1976; Pelisiak 1985; 2003; Kruk and Milisauskas 1999; Rybicka 2004). Inside this radius, we find loess-based soils, particularly to the east of the site, where chernozem has emerged. To the west of the settlement, on the right bank of the Racovăţ River, there is an extensive area of sierozem soil (Fig. 10). In the area occupied by the settlement, a rather thin layer of rendzina soils lies on top of Miocene limestone. Such soils are considered unsuitable for farming practices of that time (Kostrowicki 1973).

LOCAL ISOTOPIC ECOLOGY: AN OVERVIEW

Over the last 20 years, analysis of natural variations in stable isotope ratios ($^{15}N/^{14}N$, $^{13}C/^{12}C$) has revolutionized our view on animal trophic ecology. The stable isotope approaches, particularly those of nitrogen and carbon, may provide a number of potential advantages and have already enhanced our understanding of trophic structure and dynamics of ecological communities, such as the one located in the Edineţ region, as well as ontogenetic shifts in consumer diet. Stable isotopes offer three potential advantages in terms of food web analysis; firstly, the $\delta^{13}C$ and $\delta^{15}N$ ratios in animal tissue represent the integration of carbon and nitrogen over a prolonged period (integration of different functions and environmental events over time periods); secondly, they are based on assimilation rather than ingestion (measurement of the effective use of food); and third, they can be measured using comparatively small samples. In addition to time-integrated trophic information, isotope signatures have the potential to simultaneously capture complex interactions, including trophic omnivorous, and to track energy or mass flow through ecological communities.

Isotopic and elemental analyses have been executed within the scope of this project, and the data will be published in a separate paper. Here we will briefly summarize the results of isotopic analysis. The methodological principles have already been published

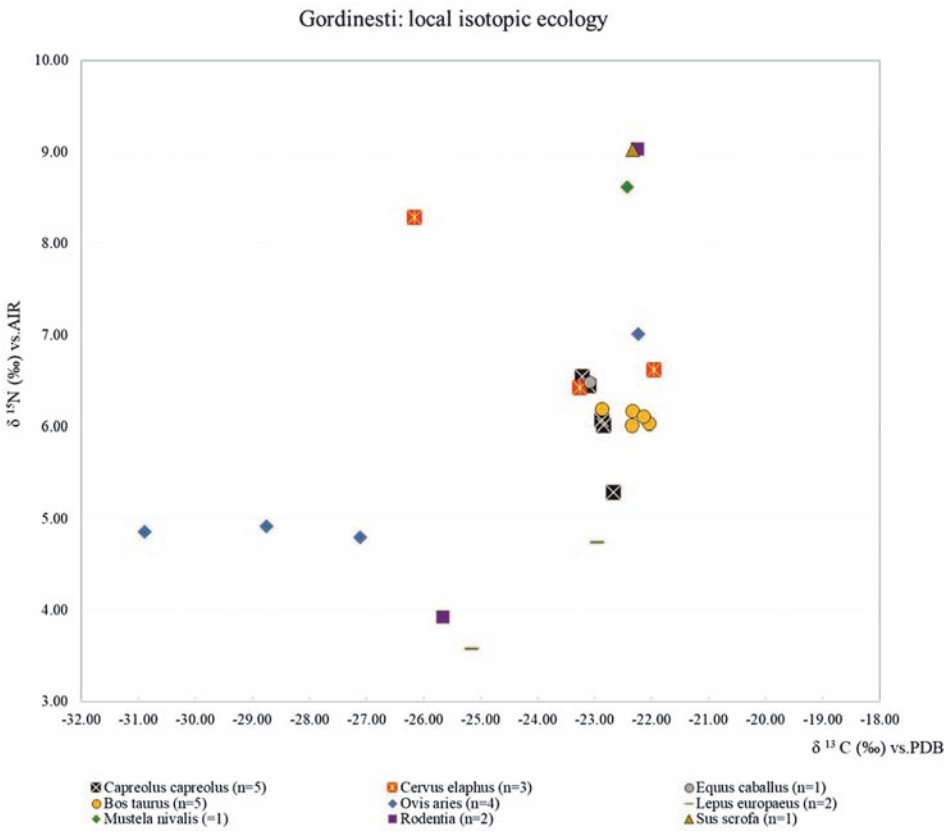

Fig. 11. Gordineşti II–Stînca goală. Local isotopic ecology

(Schoeninger and De Niro 1984; Ambrose 1993; Sealy 2001; Lee-Thorp *et al.* 1989; Grupe *et al.*1997; Katzenberg and Harrison 1997; Chenery *et al.* 2010; Evans *et al.* 2009).

The radiocarbon dating of organic materials from Gordineşti II was carried out on the basis of 12 samples from various backgrounds: $^{87}Sr/^{86}Sr$ isotopic analysis (137 measurements including baselines), $^{13}C/^{15}N$ dietary analysis (25 measurements), and trace elements analysis (As, Hg, Cd, Ba, Y, and a few others; 990 measurements). The analyses were carried out in collaboration with several laboratories in Poland and Sweden. Based on the available data, we can briefly characterize local isotopic ecology in Gordineşti. Unfortunately, the volume of bone remains from the settlement is limited; we do not have any human remains at all, and the animal bones are generally poorly preserved. However, skeletal remains of both wild (*e.g.*, red deer, weasel, rabbits, and rodents) and domesticated animals (cattle, several sheep, a horse, and a pig) were collected. The results of the $^{13}C/^{15}N$ analysis are shown in the diagram (Fig. 11).

The area of Gordineşti is fairly typical for the broader landscape of the Edineț region in northern Moldova, so we may apply our isotopic data to a broader region. This particular location suffered from deforestation, land degradation, and gradual aridification over centuries, and those global processes are visible in general carbon and nitrogen pool data obtained from the faunal sample. The diagram displays three clusters of isotopic data. Interestingly, the upper cluster includes a pig, a sheep, a wild weasel, and a red deer; the first two may have been non-local livestock brought by humans, while the other two may eventually represent migratory animals hunted down in the local forests by the inhabitants of Gordineşti II–Stînca goală. These data clearly indicate a foreign biome. The central cluster of the diagram is made up of the majority of samples, especially those of cattle (*Bos taurus*, marked in yellow). The last cluster comprises several samples of *Ovis aries* from Gordineşti II.

This brief overview enables us to formulate a series of fundamental observations. First of all, we find no evidence for use of manure or natural fertilizers at the Gordineşti II site. Secondly, we can also observe certain elements of livestock management techniques, for example, the diet of cattle and wild deer do not vary massively, both those animals occupying the same ecological niche. On the other hand, the isotopic data for sheep may signalize deliberate segregation from cattle by farmers. As both cows and sheep consume grass, the inhabitants of Gordineşti II–Stînca goală were trying to avoid food competition between them. Intensive sheep farming could be devastating for the biomass of local pastures and meadows, and in Gordineşti II we can see farmers keeping their cattle separated from sheep and goats. The final observation concerns rodents (mice and rats) who lived in the village; their diet indicates both scavenging and feeding on organic waste and represents a typical herbivore subsistence. It seems feasible that some vermin-attractive granaries existed there, but also a large volume of organic garbage accumulated all around the houses to attract synanthropic animals such as mice.

A SITE ABANDONED DUE TO CULTURAL OR ENVIRONMENTAL CAUSES?

Various geophysical prospections and the GIS KDE analysis have led to the conclusion that the Late Trypillia Culture settlement in Gordineşti II–Stînca goală was oval-shaped, with a central courtyard, probably empty and the settlement area was limited by a deeply incised river valley (Figs 4 and 5). To date, none of the surveys have identified a dwelling being situated in some sort of undeveloped area, so the houses were placed close to the natural edge of the raised area of terrain. The dwellings are located at some distance from each other. The site consisted of at least 15 houses (Rybicka *et al.* 2023). Accepting such premises provides us with an image of a small settlement inhabited by a small community.

The principles followed in dwelling use and their internal arrangement were quite uniform, and the same also applies to the stylistics of the pottery (Sîrbu *et al.* 2017; Sîrbu and

Król 2021) and bone tools (Pankowski 2019; 2023). This indicates that there was no disruption of cultural norms inside the Gordineşti II community. As we have already mentioned elsewhere, all three excavated dwellings date back to the same period. Radiocarbon dating does not identify the real length of their use, but there are relatively low levels of waste inside and around the dwellings, which may suggest a short time of occupation.

The use of the same pattern of dwelling arrangement and similarity of finds from both house interiors and their surroundings may suggest that the cause for site abandonment was not some sort of cultural change, for instance, as an effect of the impact of other human groups. Nor were any vestiges found of any social crisis stemming from, for example, an external threat. It is difficult to unequivocally determine whether the role of the rampart and ditch was as a defence against human attack or protection of livestock from predators.

Hence, in the absence of any clear evidence of a cultural crisis that could explain the site's abandonment, perhaps it was due to some economic or environmental reasons that it was no longer occupied.

Results of analysis of plant macroremains, animal bones and stable isotopes provide a record for a precursory overview of human activity at the Gordineşti II–Stînca goală settlement area. During the site's occupation, the cultivation of crops was of major importance. The samples of *Triticum dicoccon* and *Triticum monococcum* identified on the premises of all examined dwellings (Sady-Bugajska 2023) indicate that wheat was the primary grain type in the diet of the inhabitants of Gordineşti II–Stînca goală. It is not easy to assess the relevance of barley, which was represented by grains found inside all dwellings, yet in smaller numbers. The site is surrounded by fertile loess-based soils, favourable for the cultivation of grains (Fig. 10).

The diet was supplemented by meat, both from farm and wild animals (Croitor and Sîrbu 2017; 2019). Analysis of isotopes sheds some light on the husbandry techniques used. Sheep and goats were kept apart from cattle to avoid competition for their main source of food, *i.e.*, herbaceous plants. Cattle may have been grazed on the flat areas east and north of the settlement; sheep could have been grazed in a variety of grasslands down the valley and inside the settlement (Fig. 12). Intensive grazing of small ruminants can be destructive for forests and shrub communities, but it can also have a positive effect on the maintenance of meadows and pastures (Moinardeau *et al.* 2020). However, it is not easy to determine the herd size of various animal species that were bred in the Gordineşti II–Stînca goală settlement. The predominance of sheep bones among the finds near House1 is admittedly not direct proof of intensive ovine husbandry (*cf.*, Kruk 1980, 293-294), but may suggest that this species was important for the economy of Gordineşti II–Stînca goală; sheep not only provided meat for food but also wool for textiles as is evidenced by numerous finds of spindle whorls and loom weights.

Research to date has not revealed any buildings or spaces which may have been used to winter farm animals. The reason could be the current stage of exploration of the site, or

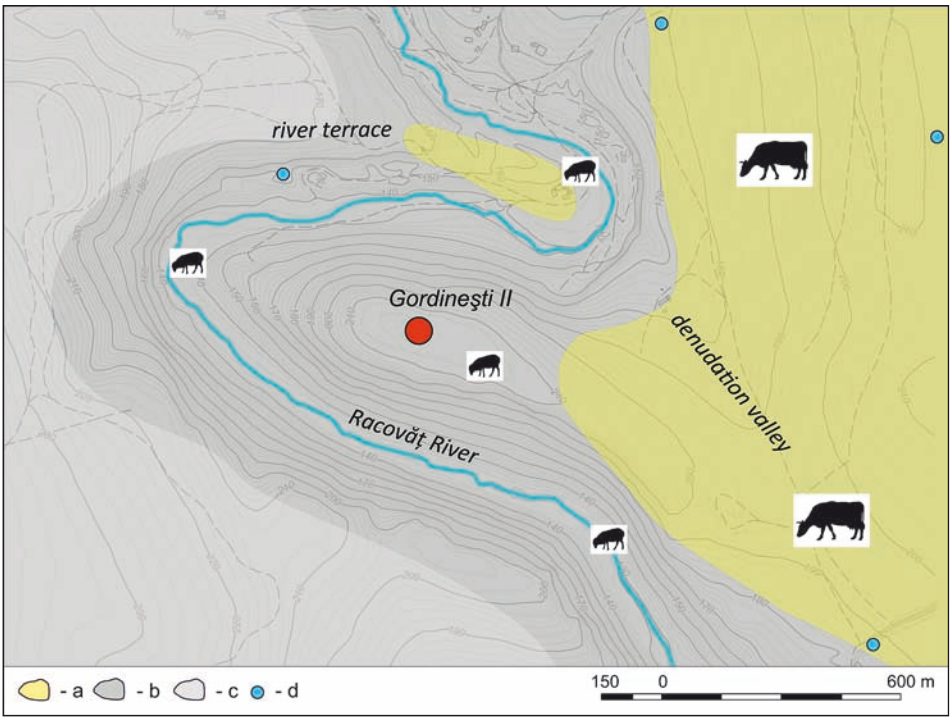

Fig. 12. Gordineşti II–Stînca goală. Possible areas for grazing animals. For further explanation see Fig. 10

this could be resulted from the character of site sediments, which are not conducive to the preservation of vegetation macroremains; these are found chiefly inside dwellings in the context of burnt daub clusters.

The inhabitants of these 15 – or a few more –houses could not have been many. They managed to grow crops and graze animals around the village, thus providing food for themselves. It was probably not a food crisis that led to the abandonment of Gordineşti II–Stînca goală.

A major hindrance for the inhabitants, particularly in winter, was limited access to stable sources of water, a commodity required in large quantities for animal husbandry (Kruk 1980, 316, note 40; Gillis *et al.* 2022). The Gordineşti II–Stînca goală settlement being located on a steeply sloped hilltop raised over 80 m above surrounding terrain made drawing water from the Racovăț River, or from springs, very difficult (Figs 2: 1-3; 5 and 10). No presence of wells inside the settlement has been recorded; also, the rock underlying the site would have made digging them an exceedingly difficult task. It may be carefully surmised that it was precisely this environmental factor – water access – which may have led to the abandonment of Gordineşti II–Stînca goală after a short period of occupation. Obviously,

to verify this suggestion, detailed environmental research should be undertaken to determine at least the approximated water conditions (deficiencies, fluctuations, *etc.*) at the end of the 4th millennium BC in the vicinity of the settlement. Another possible explanation for the lack of evidence of its long-term occupation could be its function as a subsidiary settlement dependent on the central one (*cf.* Moszyński 1953; Szmyt 2004). Sadly, we cannot confirm this suggestion at present because the settlement model (pattern) of the Late Trypillia communities of the Gordineşti Group is still poorly understood (Kobyliński 1988).

Acknowledgements

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INTRUSIONS OF THE STEPPE POPULATION INTO THE BALKAN-CARPATHIAN REGION IN THE EARLY BRONZE AGE: FACTORS AND ASPECTS

ABSTRACT

Ivanova S. 2023. Intrusions of the steppe population into the Balkan-Carpathian region in the early Bronze Age: factors and aspects. *Sprawozdania Archeologiczne* 75/1, 77-114.

The Budzhak culture of the Northwest Pontic region is a part of the Yamna cultural-historical area. Its social hierarchy and the identification of "ritual groups" within it provide important evidence when considering intrusions of the steppe population into the Balkan-Carpathian region. Certain elite grave goods are often associated with individuals buried in certain positions that allow the identification of "ritual groups". One of these is characterized by supine inhumation with flexed legs, arms stretched along the body. These had high social status in the context of the Budzhak culture and they are the ones that were widespread in Europe.

In addition to the well-known Danubian route, other paths from the steppe to the west can be considered (Carpathian-Transylvanian and Prut-Dnister routes). The principal aim of the movement to the west was probably to obtain metals, which could be exchanged for salt from the estuaries of the Northwest Pontic area.

Keywords: Budzhak culture, Yamna culture, social structure, exchange, metals, salt
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1. INTRODUCTION

Many years of excavations of Yamna (or Pit Grave) culture burial mounds in Central and Southeastern Europe have uncovered many secrets, but also raised many questions. These are the main ones:

Where did the population of the Yamna culture come from?

What was the purpose of their migration?

What were the interrelations between the natives and the newcomers?

To find the answers we must look into a particular region and the special archaeological culture, associated with the Yamna cultural-historical community. The Northwest Pontic region stands out as a special geographic region and was the territory of the Budzhak culture during the Early Bronze Age (Fig. 1).

The westward movement of the Yamna culture population has attracted the attention of many researchers. This topic became especially popular in the context of genetic studies of recent years (Allentoft *et al.* 2015; Haak *et al.* 2015; Mathieson *et al.* 2015), which revived the theories of Gordon Childe and Maria Gimbutas (Childe 1926; Gimbutas 1956). In this article, the Yamna culture was assigned a main role in the formation of Central European Bronze Age cultures, primarily the Corded Ware culture (CWC).

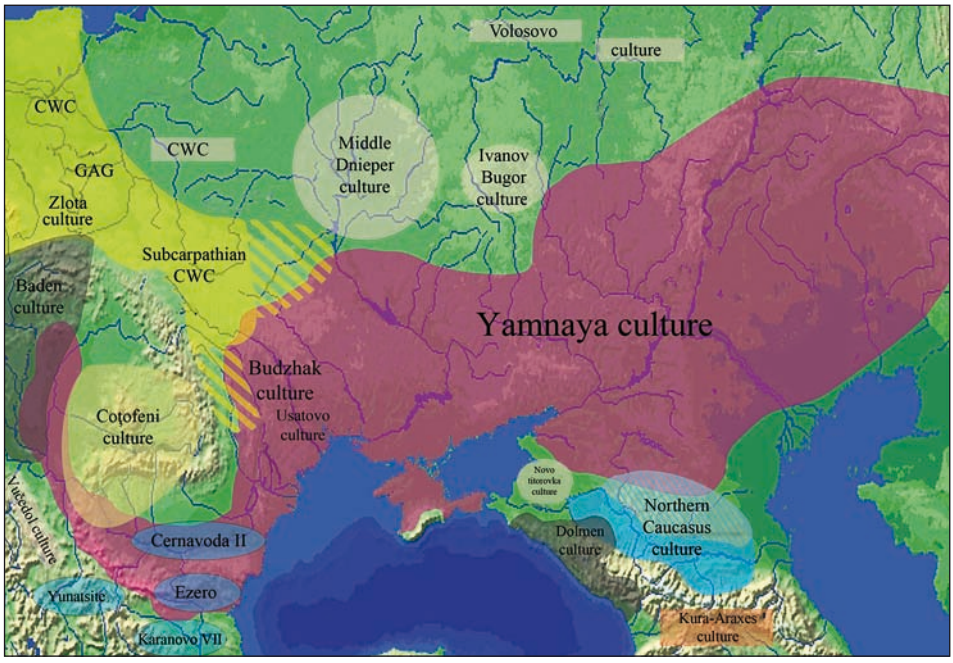

Fig. 1. Yamna cultural-historical area and the surrounding cultural environment. After Bruyako and Samoilova 2013, 346, map 2

Nikolay Merpert (1974) marked the Volga-Ural region as the territory of the Yamna culture formation. However, the data from radiocarbon studies indicate the simultaneity of the remains of this culture in both the eastern and western parts of its area (Chernykh and Orlovskaya 2004, Frînculeasa 2021, 152). The Ural group of the Yamna culture, despite many years of research, counts only 162 burials originating from 152 kurgans (Morgunova 2014, 36), which is not comparable with the thousands of burials from other territories. The possibility of human dispersal from this region to the vast steppe territories is therefore questionable. In addition, the antiquity of the Yamna burials of the Volga-Ural region is somewhat artificial: Russian scientists include the Repin culture as the first stage of the Yamna culture, but Ukrainian scientists separate it from the Yamna culture.

New radiocarbon analyses of the burials of the Repin culture and the site of Khutor Repin itself have, however, shown that this culture is not as ancient as previously assumed: it existed in the diapason *c.* 3400-2900 cal BC (Kuznetsov 2013, 13, 14). These dates are synchronous with some dates of burials of the Yamna culture from other territories, including the Northwestern Pontic region (Ivanova 2021, 67, 68, tabl. 2.1). Besides, there are no pre-Yamna kurgans in the Volga-Ural region, and they could be one of the components of the Yamna culture burial rites. However in the Black Sea steppe, there are known Eneolithic kurgans and the evolution of pre-kurgan structures that marked flat graves (Rassamakin 2011).

Thus, the chronological priority of the Volga-Ural region ("Samara Yamna") and the early formation of a kurgan rite here have not been confirmed. These data may indicate an independent formation of the Yamna culture in the Black Sea steppe and the possibility of advancement of the Yamna/Budzhak population from the steppe to the west at an early stage.

Soon after the publication of the articles of geneticists and archaeologists related to the question of the spread of Yamna, their conclusions were analyzed and quite reasonably subjected to extensive criticism (Klejn 2017, and others). Over time, the database of geneticists changed and was refined. The proponents of the 'massive Yamna invasion' abandoned this concept and recognized the horizontal genetic kinship of the population that emerged in pre-Yamna times. It was postulated that the people of the Yamna culture were not ancestors but relatives ("cousins") of the CWC people (Heyd 2022), and that the relationship between East and West in the Eneolithic and Bronze Age was bilateral, not unidirectional (Heyd 2023). Thus, in this context, the controversy between genetics and archaeology is over, and the theory of the " massive Yamna invasion to the West" can take its place in the section of historiography.

In my opinion, the westward movement of the steppe population (starting in the Eneolithic) was not the conquest of new territories or the destruction of the agricultural civilizations of Europe and the subjugation of peoples. It was a trade colonization, with the gradual building of trade and exchange relations and trade networks that covered significant territories. We can speak of two main results of this process:

1) a change in the cultural context of the Balkan-Carpathian region associated with the population from the Black Sea steppe;

2) the formation of a special Budzhak culture as a part of the Yamna culture (cultural-historical community).

In this light, the Budzhak culture was a "link" between the Yamna culture and the local population of Europe, and the territory of the North-West Black Sea region was a kind of "bridge" between East and West (Manzura 1993). In my opinion, it is the Northwestern Pontic region that was the territory from where the movement of the population from the area of the Yamna cultural-historical community to South-Eastern and Central Europe took place, and this is confirmed by archaeological data. "The Danube Route" has long been known and relatively well studied (Włodarczak 2010, *et al.*). Besides this, there are possible advances westward through Transylvania, along the rivers Someş, and Mureş, and along the Dnister-Prut direction to the Northwest (Ivanova and Voitovych 2021, 58).

The Budzhak culture in the context of the Yamna cultural and historical community: historiography. Nikolay Merpert identified graves of the Northwest Pontic region as a specific cultural variant of the Yamna cultural-historic community (Merpert 1974). Later on, Leo Klejn referred them to a distinct "Nerushay culture" (Klejn 1975), which Ivan Cherniakov renamed into the "Late Yamna Budzhak culture" (Cherniakov 1979). Other researchers also suggested their own names, but the term introduced by I. Cherniakov, in its various versions (Budzhak culture, Budzhak culture variant, Budzhak culture group) proved to be the most commonly used. Some archaeologists do not agree with the status of the Budzhak culture in the Yamna cultural-historical area context, they define this society as a "cultural variant" (Merpert 1975; Yarovoy 1985; Dergachev 1986, 2021). However, the eminent archaeologist, anthropologist and archaeological theoretician Leo Klejn has studied the concept of "archaeological culture" in various theoretical aspects, having devoted a part of his monograph to this phenomenon (Klejn 1991). The expert's opinion should be decisive; moreover, he did not change his view on the existence of this special culture in the Northwest Pontic region until the end of his life (Klejn 2016).

In our view, the specificity of the Budzhak culture was manifested already at its formation stage, which allows synchronizing it with the Yamna cultural-historical region in general: 3100-2200 cal BC and not only with the late Yamna period. The Budzhak culture conforms to the basic criteria allowing its definition as an "archaeological culture":

"Archaeological cultures came out of the need to connect together different elements of the archaeological record... Defining 'culture' is an important step in undertaking archaeological research. Any thorough study of a particular culture first has to determine what that culture contains – what particular time period, geographic region, and group of people make up that culture. The study of archaeology has many accepted definitions of particular cultures, but recently these accepted definitions have come into question. As archaeologists try to define cultures, they also seek to define the components of culture... The identification of archaeological cultures constitutes the recognition (empirically more

than systematically) of interconnections in material culture through space and time whose implications are not well understood" (Roberts and Vander Linden 2011, 1-3).

The Northwest Pontic stands out as a special geographical region. Its eastern boundary is the Southern Bug River, and its western boundary is the Prut and Danube rivers. The southern border is the Black Sea, and the northern border is the forest steppe zone. Two stages in the genesis of the Budzhak culture can be identified: the early and the late, with the boundary within the range of 2600/2500 cal BC. To date, almost 600 Eneolithic and Early Bronze barrows have been excavated in the Northwest Pontic region; about 3000 burials of the Budzhak culture have been found. It is significant that 75% of the barrows were built by the Budzhak people themselves, while in other cases they used Eneolithic or Usatove burial mounds (Ivanova 2021, 44, 45).

V. Dergachev (2021) wrote that the people of the Budzhak/Yamna culture lived exclusively in the interfluve of the Dnister and Prut (or in the Carpathian-Dnister region) and almost did not inhabit the territory between the Dnister and the Southern Bug (Dergachev 2021). However, almost all the kurgans of the Northwest Pontic region were excavated in locations of future construction sites – building of gas pipelines, irrigation systems for fields, automobile roads and so on). These construction works were concentrated in the southern part of the region, especially in the south between the rivers Danube, Prut and Dnister. The archaeological map of the Northwest Pontic was therefore determined not by the real situation in antiquity, but modern economic necessity. The military topographic maps of European Russia (such as Shubert's 3-verst; 1:126,000 scale series produced in the late 1800s – *Free Map*: *Starovynni karty Ukrayiny*) indicate thousands of mounds were located between the rivers Dnister and Southern Bug. In the steppe zone between the Southern Bug and the Dnister, according to my calculation, there are more than 5,800 burial mounds on these maps (Ivanova 2022). Between the rivers Prut and Dnister 6290 mounds are known (Topal 2022). Consequently, there is no reason to say that only the Carpathian-Dnister area was inhabited by Eneolithic and Bronze Age population.

2. PEOPLE OF THE BUDZHAK CULTURE AS THE LOCAL INHABITANTS

Before considering the relations between the locals and newcomers in the European context, it is necessary to introduce the main characteristics of the Budzhak culture, paying special attention to the social structure. This aspect is undoubtedly crucial when studying the migrations of the ancient populations. It is known from ethnological and anthropological data that in some cases certain ethnic or social groups specializing in exchange obtained certain advantages in social development and were distinguished by wealth (Shnirelman 1986, 341-344). For example, the Novodanylivka/Suvorove group is known to have participated in the exchange of prestige goods with the population of the western

territories (Telegin 1991). In my opinion, there is also an elite group in the Budzhak culture (Ivanova 2000; 2001; 2003), and it is this group that advanced into the Balkan-Carpathian area in order to establish trade relations.

2.1. The main characteristic of the Budzhak culture

Traditionally, components of funeral rites are divided into three groups associated with numerous elements: grave construction, mode of the burial and grave goods.

Grave construction. Budzhak burial mounds are round or oval in shape. Several forms are known, ranging from a single mound to multilayered structures, when subsequent barrow layers were erected above a new grave in the same mound. Among the elements of the kurgan architecture there are ditches, cromlechs, stone facing of the mound. Burial chambers are both simple ground graves and with ledges (Fig. 2: 3, 6). The graves are most often rectangular, some of them have a wooden or stone covering (Fig. 2: 1, 3, 4). Anthropomorphic stelae can also serve as a covering. About 30% of the graves are made with a ledge. A ledge grave is a complex construction of two vertical pits: the first pit is larger, dug out first and another pit is dug in it, for the dead. Among the elements of the funerary ritual are the wooden wagons near or inside the burial (Fig. 2: 6). The location of the burials on the circumference of the mound, can often be seen, and it is associated with the ideas that ancient people had about the movement of the celestial bodies (Dvorianinov *et al.* 1981).

Mode of burial: positions of the buried person. Some researchers trace fractional gradation within these variants – about 50, combining them into five groups (Yarovoy 1985). Others merge them into three groups: on the back, on the right side on the left side, or even into two poses: supine, and on the side (Dergachev 2021; Topal 2022). Thus, five main body positions of the buried person can be identified (Fig. 8: 2).

(1) supine inhumation with flexed legs, arms stretched along the body (Fig. 2: 1) (57.2% of graves)

(2) semi supine, bent to the right (Fig. 2: 2), the left arm bent at the elbow, the hand by the pelvis, stomach or chest; the right arm stretched along the body (16.3%);

(3) semi supine, bent to the left (Fig. 2: 3), the right hand placed by the pelvis (13.1%);

(4) crouched on the right side (Fig. 2: 4), with different positions of arms (7.3%);

(5) crouched on the left side (Fig. 2: 5), with different positions of arms (6.1%).

Importantly, four of these variants are combined into two groups with symmetrical skeletons, forming “binary oppositions” (2-4 and 3-5 variants); only the first variant has no symmetrical counterpart. Binary oppositions are systems of binary signs created in human consciousness; their set is the most universal means of describing the semantics of the world. On the basis of the choice of binary features, universal sign complexes are constructed; this way of classifying the world determines all behaviour of members of archaic collectivities, and above all, the ritualized behaviour (Toporov 1982, 24, 25). In the Budzhak

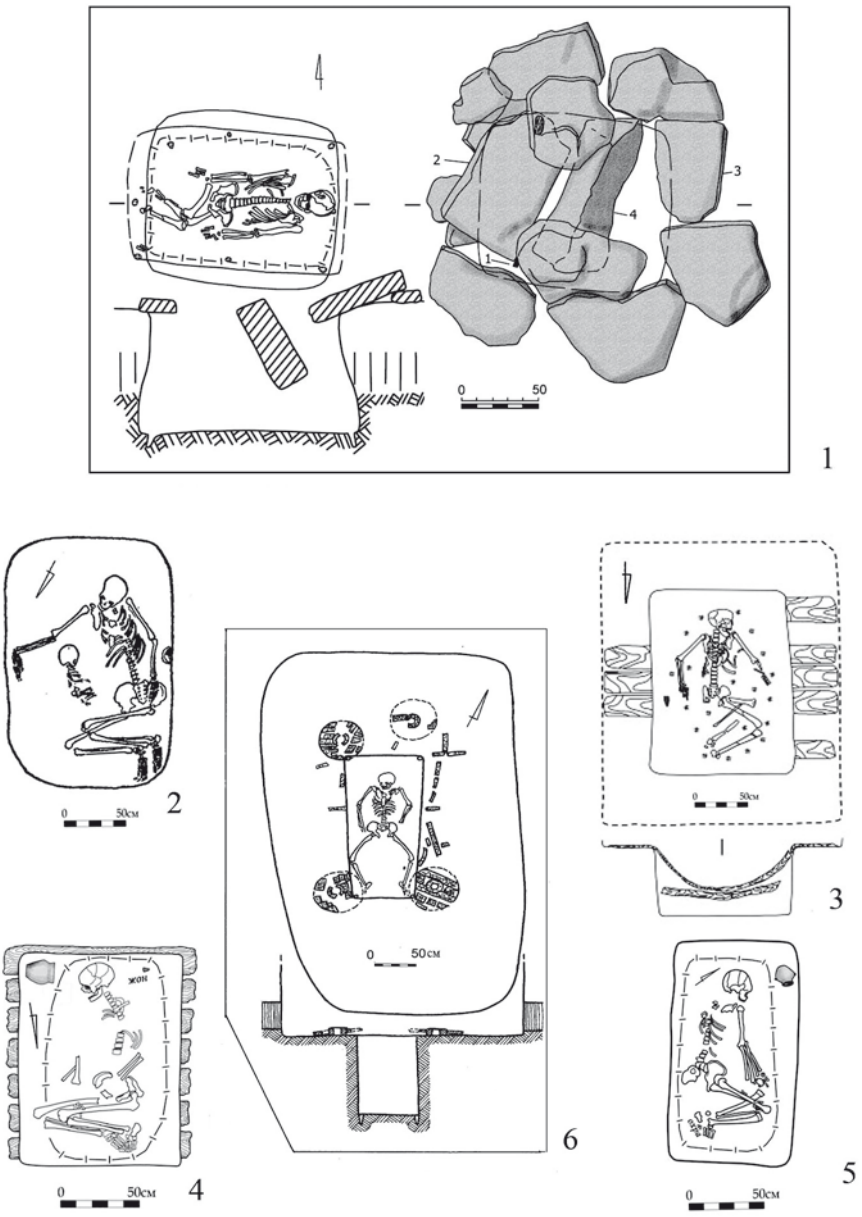

Fig. 2. Positions of the buried individuals inside the grave pits
1 – Tuzly 2/3 (after Razumov *et al.* 2015, 337, fig. 8); 2 – Nerushay 9/9 (after Yarovoy 1985, 71, fig. 14: 4); 3 – Cimișlia 6/9 (after Popovici and Ciobanu 2021, 189, fig. 47: 1); 4 – Semenivka 1/5 (after Subbotin *et al.* 2017, 28, fig. 7: 5); 5 – Semenivka 2/6 (after Subbotin *et al.* 2017, 34, fig. 11: 4); 6 – Novoselytsia 19/16 (after Subbotin *et al.* 1995, 85, fig. 28: 1)

Table 1. Distribution of male, female and children burials by ritual groups

Sex/Age	Quantity	1		2		3		4		5	
		Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Men	138	86	62,4	17	12,3	21	15,2	9	6,5	5	3,6
Women	66	29	43,9	14	21,2	7	10,6	5	7,6	11	16,7
Children and teenagers	40	23	57,5	5	12,5	5	12,5	2	5,0	5	12,5

culture binary oppositions are not associated with gender differences, as it is fixed in other cultures, (for example, in the CWC). In the 138 burials of the Budzhak male individuals where the buried position is preserved, 26 are buried on the right side and the same number on the left. Among the 66 of the Budzhak female individuals, in 19 graves they were buried on the right side and in 18 graves on the left (Table 1). There is no correlation between placing the buried individuals on the right or left side and the age of the dead (Ivanova 2001, 214, tab. 7). Meanwhile, individual categories of grave goods (some types of vessels and jewellery) correlate, more or less clearly, with certain positions of the body, this fact allowing E. Yarovoy to identify "ritual groups" (Yarovoy 1985, 95). There are no strict boundaries between the distinguished groups. It is possible to speak about the predominance of certain features of ritual or artefacts in these groups. Thus, wagons, anthropomorphic stelae, silver jewellery, copper tools are more often found in the burials of the first ritual group (with supine inhumation with flexed legs). Kurgan construction (first or next layers) is more often associated with this group. This group is also more often associated with vessels that reflect links with other cultures (beakers, ascoi, amphorae). In other groups (2-4), with the buried person, crouched on the side, copper jewellery predominates over silver jewellery. Almost all finds of the form of pottery labelled the " Budzhak jar" are associated with these groups. These aspects will be discussed below.

Grave goods. There are several categories of funerary inventory.

The pottery (about 500 intact and restored vessels) comprises over 40% of the total number of finds. The pottery of the Budzhak culture has strong differences from other regions (Fig. 3; 4). Some of the vessels of the Budzhak culture have analogies in the pottery of the Early Bronze Age cultures of Central and Southeastern Europe.

The production technique used to make the vessels was a traditional one: handmade, with admixtures of limestone or sand, with the surface treatment with a tool like a putty knife, tufts of grass. The colour varies from rose and yellow hues to dark-grey. The surface of some types of vessels is covered with slip. The main kinds of vessels are pots (Fig. 5: 1-5), amphorae (Fig. 5: 6-9), amphora-like vessels (Fig. 5: 10-14), "Budzhak jars" (Fig. 5: 15-17), beakers and beaker-like vessels (Fig. 5: 20-24), cups (Fig. 5: 18), bowls (Fig. 5: 19) askos-type pots (Fig. 5: 25-27). Round-bottomed vessels (Fig. 5: 1), jugs (Fig. 5: 28, 29) and some other types of vessels were less common (Fig. 6).

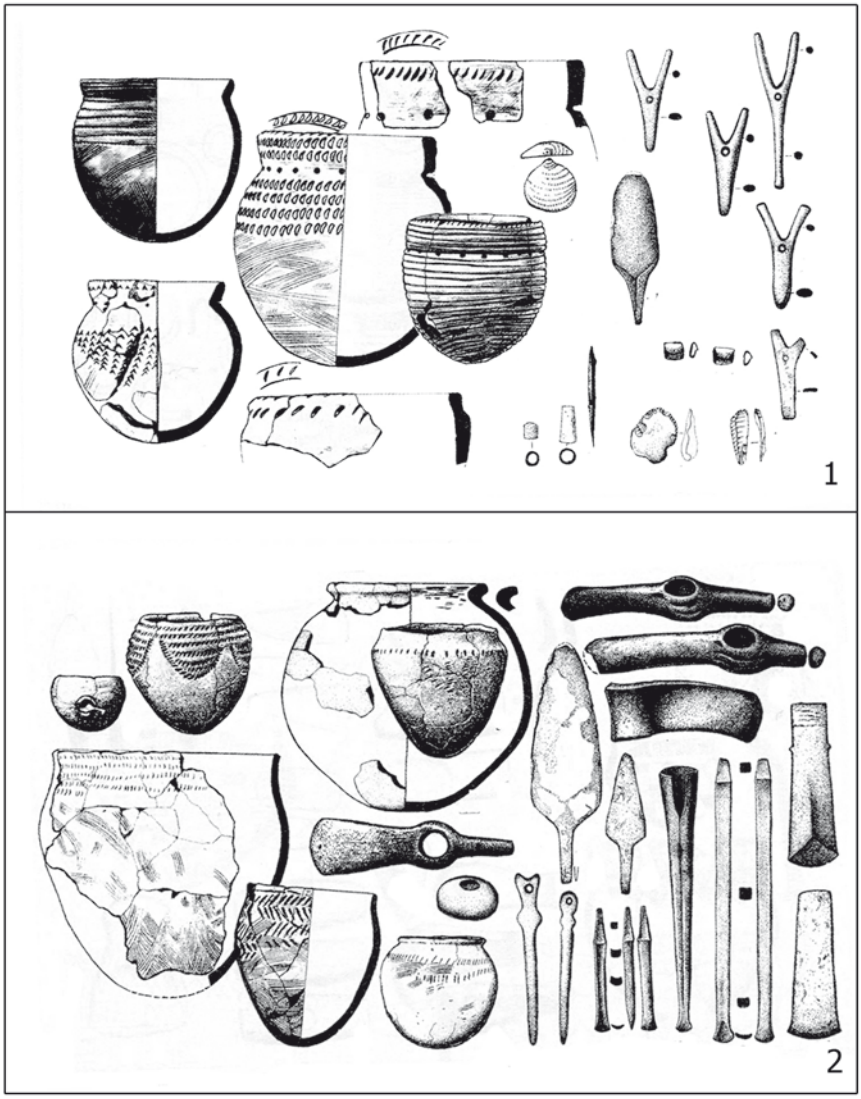

Fig. 3. Main characteristics of the Yamna culture of the steppe Urals: early (1) and late (2) stages. After Bogdanov 2004, 278, fig. 92

The specificity of the Budzhak ceramic complex is the predominance of flat-bottomed pottery. Some types of pottery are characteristic only of the Budzhak/Yamna culture and are not known in other regions of the Yamna culture: "Budzhak jars", amphora-like vessels, ovoid amphorae, beakers, ascoi. Some of them are imports (for example, ovoid amphorae, some vessels of the Globular Amphorae culture, ascosa), others are imitations (for

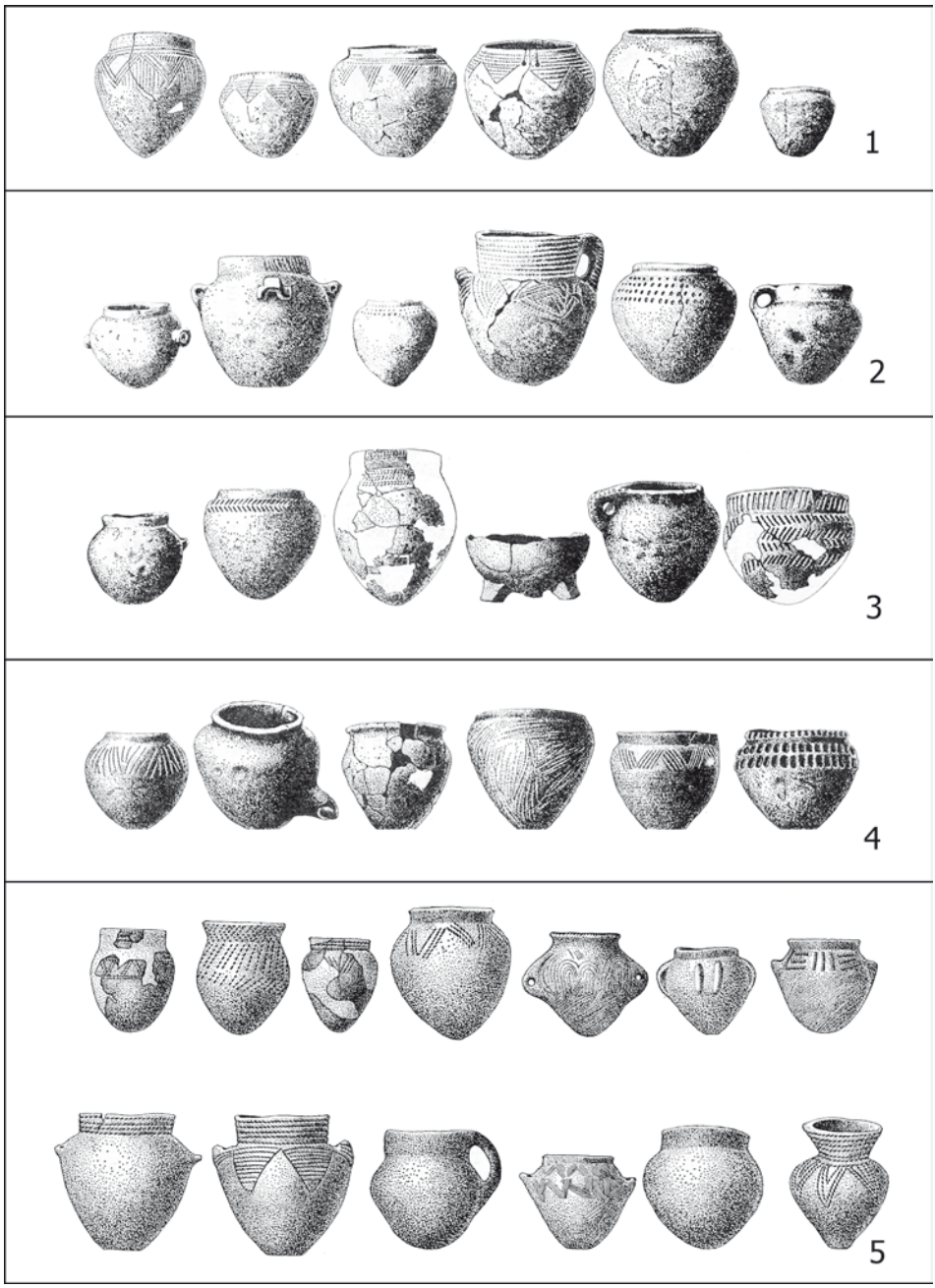

Fig. 4. Main types of pottery of the Azov-Black Sea steppes Yamna culture: 1 – Seversky Donets region; 2 – Azov region; 3 – Steppe Dnipro region; 4 – Middle Dnipro region; 5 – Bug-Ingul region. After Shaposhnikova 1985, 344, fig. 97; 346, 347, fig. 98

Fig. 5. Main types of Budzhak culture pottery: 1 – Dalnyk 1/3; 2 – Taraclia II, 10/9 (after Sava *et al.* 2019, 363, fig. 11: 6); 3 – Gradeshka I, 5/12; 4 – Sychavka 1/10; 5 – Petrodolinske 1/4; 6 – Taraclia II, 10/19 (after Sava *et al.* 2019, 364, fig. 12: 5); 7 – Glinoe, Sad group, 1/15 (after Sinika *et al.* 2016, 61, fig. 36); 8 – Gradeshka I, 5/11; 9– Cazaclia 3/13 (after Sava *et al.* 2019, 367, fig. 15: 5); 10 – Tatarbunary 1/2; 11 – Efimivka 2/14; 12 – Semenivka 14/5; 13 – Plavni 5/3; 14 – Gradeshka I, 5/2; 15 – Plavni 15/5; 16 – Sergyivka 11/7; 17 – Sychavka 1/15; 18 –Novogradkivka 1/10; 19 – Kholmske 2/8; 20 – Gorodne III 1/16; 21 – Bashtanivka 7/12; 22 – Trapivka 6/20; 23 – Gluboke 2/8; 24 – Dyvizia II 2/5; 25 – Matroska 1(after Bruyako and Samoylova 2013, 260, fig. 12: 5) 26 – Ciumai 1/11 (after Ciobanu *et al.* 2016, 34, fig. 110); 27 – Kubey 21/5; 28 – Taraclia II 17/6 (after Sava *et al.* 2019, 366, fig. 14: 1); 29 – Strumok 1/3.
Photo by S. Ivanova, except where noted

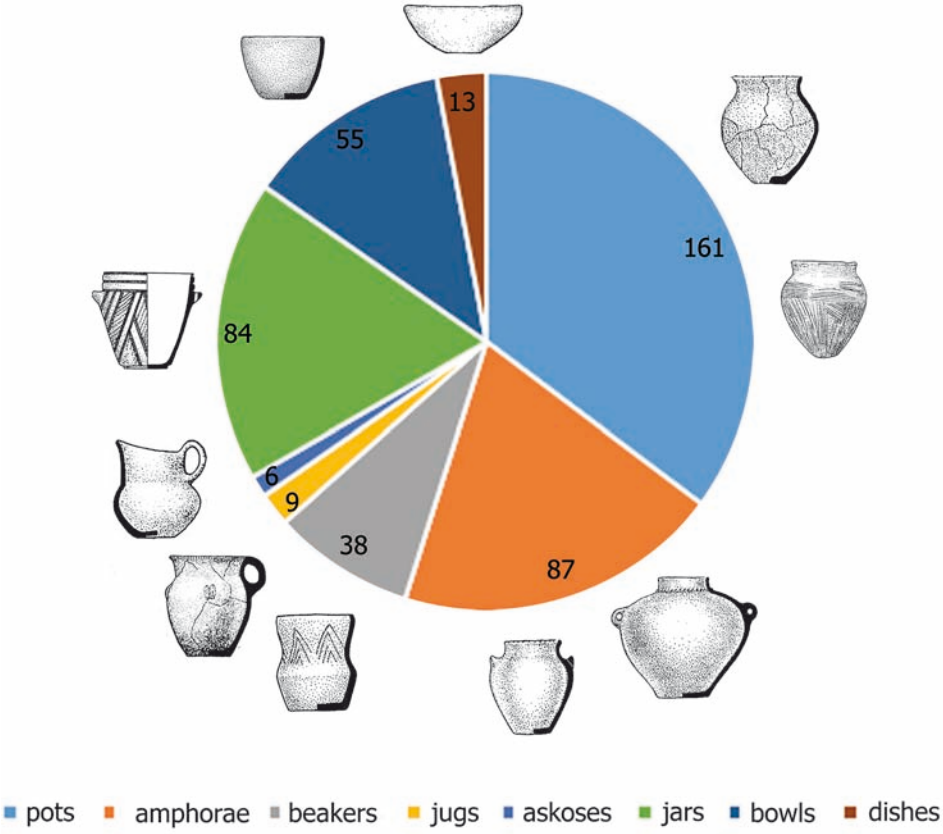

Fig. 6. Ratio of the main types of Budzhak culture pottery

example, beakers). It is the "Budzhak jars" and amphora-like vessels that are specifically Budzhak types of pottery.

The other categories of grave goods are made of various materials and have different purposes: tools, weapons, ornaments, *etc.* (Fig. 7). The number of artefacts and their ratio in the burials, where the positions of the buried person can be identified, are shown in Table 2. The list below indicates the number of samples, not the number of burials: two or more copies of such artefacts are sometimes found in one burial.

Weapons:

flint: axes (10), arrowheads (29; only 6 examples were in the grave inventory, the rest were the cause of injury or death), spearheads (5);

stone: battle-axes 10 whole examples, 11 fragments and 4 workpieces), axe-hammers (2), mace (1), bolas (2);

bone: arrowheads (6; 5 examples were inventory, and 1 was the cause of injury or death)

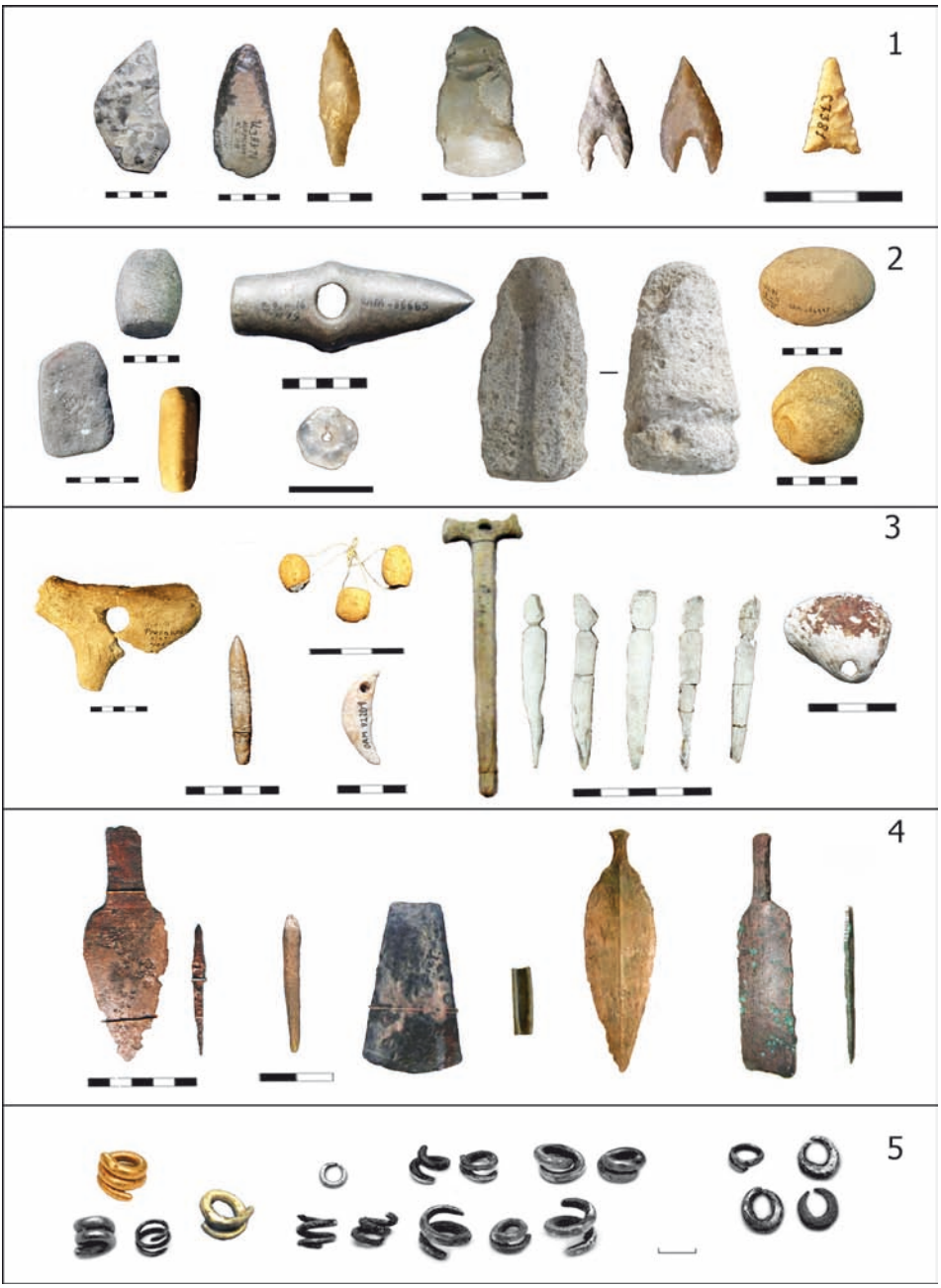

Fig. 7. Tools, weapons, and ornaments of the Budzhak culture:
1 – flint artifacts; 2 – artifacts of different types of stones; 3 – artifacts of bone, teeth and shell; 4 – artifacts of copper; 5 – artifacts of gold and silver. Photo by S. Ivanova, except where noted

Table 2. Comparison of artifacts found in different ritual groups

Artifacts	Known positions of the buried	1	2	3	4	5
Flint tools	46	19 (41.3%)	15 (32.6%)	5 (10.9%)	3 (6.5%)	4 (8.7%)
Stone tools	40	26 (65.8%)	7 (17.1%)	3 (7.3%)	1 (2.5%)	3 (7.3%)
Bone tools	11	7 (63.6%)	–	2 (18.2%)	1 (9.1%)	1 (9.1%)
Copper tools/ weapons (knives and awls)	24	14 (58.3%)	1 (4.2%)	4 (16.7%)	2 (8.3%)	3 (12.5%)
Copper weapons (axes)	3	2		1		
Flint and bone weapons	21	3 (14.3%)	2 (9.5%)	5 (23.8%)	3 (14.3%)	8 (38.1%)
Stone weapons	14	4 28.7%	1 7.1%	6 42.3%	1 7.1%	2 14.2%
Ritual artifacts	52	37 (71.2%)	5 (9.6%)	3 (5.8%)	2 (3.8%)	5 (9.6%)
Silver, copper, bronze ornaments:	105	49 (46.7%)	15 (14.3%)	25 (23.8%)	3 (2.8%)	13 (12.4%)

Tools:

flint: knives (14), burins (4), perforators (2), scrapers (19), sickles (2), saw (1), borer (1), chisel (10);

stone: polishers (6), pestles (15), grinders (27), grain grinders (6), arrow-making tools (3);

bone: hoes (5), perforators (6), polishers (2);

copper: flat axes (3), awls (14), knives/daggers (16).

Ritual artefacts:

bone: pipes (15), animal astragals (33; 16 of them are burnished), amulet (1), human bone flute (1), hammer-headed pins (3);

wood: painted sticks (about 90);

stone: ochre shredders, made of half axes (5).

Ornaments:

gold: spiral hair rings (5 or 7 cases, depending on the cultural attribution of the complexes by different researchers);

silver: spiral hair rings (112), round hair rings (4), Zimnicea type hair rings (5), ring (1); round bead (1); round silver plate with two symmetrical holes around the edge (1);

copper/bronze: spiral hair rings (15), rings, tubular beads for bracelets and necklaces (87), flattened beads for bracelets and necklaces (18); bracelets (4), rounded plaques (3); rings (3);

lead: ring (1);

bone: beads (30);

animal teeth: necklaces and bracelets (89);

Unio shells: necklaces (3);

amber: beads (1).

Among the metal artefacts, ornaments predominate in the quantitative aspect, but tools and weapons have more weight. Some items may be multifunctional, being weapons and tools. So, copper artefacts of large size and heavy weight (weapon and tools) amount to 33 samples; 129 silver ornaments, 130 copper ornaments and 5 gold ornaments are known. The weight of weapon and tools is not specified in the publication, but the size of the items suggests a large weight. The weight of silver hair rings from the collection of Odessa Archaeological Museum and other locations is most often 0.5-2-3 grams, sometimes less than 0.5 gram or more than 3 grams (Ivanova 2021, 290, 291, tabl. 5.2).

In general, we note a rather small number of burials with weapons as grave inventory – 24, or 1.1%. At the same time, it is more often found in the burials of elderly people, while the cause of death is the weapon in the burials of men 25-45 years old.

The tools are associated with the burial of adults and children over the age of 7.

Silver spiral pendants in the Northwest Pontic region are found in 6 children's burials, 5 men's, 1 woman's, the rest of the burials are adult without sex determination (Ivanova 2001, 238, Table 22). Copper spirals are found in 2 women's burials, 3 children's burials, in the remaining adult burials the sex is undetermined.

2.2. Social aspect

In the 1970s, there were changes in the theoretical direction of archaeology, sometimes called the "revolution in methodology". Formally, they were connected with funerary archaeology, but in reality, during this period a new branch of research – socio-archaeology – began to form. Its goal was to reconstruct the social structure of ancient societies according to the funerary rites. The leaders of this direction were Arthur Saxe, Lewis Binford and Joseph Tainter. They began to develop methods that would allow sociological information to be extracted from patterns in manipulations of the deceased and final disposition of the dead.

In accordance with the processual theory during the 1970's, A. Saxe hypothesized that mortuary practices were deeply interrelated with the sociocultural system of society. The social structure of society is reflected in funeral rites, and the peculiarities of the funeral ritual provide important information about social status, social role, and social position occupied by the deceased during their life (Saxe 1970).

L. Binford supplemented Saxe's hypothesis with his ideas. In his opinion, the indicator of a person's position in the social hierarchy is the amount of effort (energy expenditure) to build a grave structure and conducting funeral rituals. In turn, we can determine these efforts by analyzing various aspects of the burial rite, the complexity and size of the grave, the richness of the funerary inventory (Binford 1971, 23). Binford argued that "the heterogeneity in mortuary practices which is characteristic of a single sociocultural unit would vary directly with the complexity of the status hierarchy, as well as the overall organization of society with regard to membership units and other forms of solidarity" (Binford 1971, 14-15).

According to J. Tainter, funerary rite is the concept of effort devoted by other community members in order to build a grave structure and organize funeral ceremonies (Tainter 1975).

Vadim Masson came to the conclusion that ritual traditions are mediated by ideological conceptions of a society, which are influenced by two factors – ethnic characteristics and social relations (Masson 1976, 149).

Researchers have subsequently developed these approaches in relation to their research. I have also devoted several articles and a monograph to this issue. In my opinion, the starting point for reconstructions of various social structures can be the notion of "invariant nucleus" which can be distinguished within the framework of any funeral ritual. Determining the differences from it, and identification of their character can serve as a source of constructing a model of social structure based on the data of funeral rites. This way is indicated by the development of various concepts within the framework of different trends in this direction (Ivanova 2001).

In the context of this article, Kristian Kristiansen's consideration of the role of elites in ancient societies is of interest: "during the Bronze Age a complex pattern of cultural distribution emerge. While earlier research mapped such distributions in an attempt to characterise cultures – and sometimes succeeded – there remained a large number of unexplained distributions which did not 'fit'. By applying a theoretical framework of social institutions and their different roles in reproducing society it is possible to link together these regional and interregional distributions into a single historical framework of interacting elites, where ritual chiefs, warriors and traders played different yet complementary roles" (Kristiansen 2010).

2.3.1. Features of Budzhak culture social analysis

When analyzing funeral rites it is necessary to consider the role of the ideological factor in the formation of the funeral complex, its semantics as well as the social factor. Grave complexes of the Budzhak culture were classified by me using statistical methods. To determine the "average burial" of the Budzhak culture, I used the methodology of Vladimir Gening and Victor Borzunov (1975) to identify general and particular features of the funerary

ritual, allowed the characterization of the model of the "average burial". Deviations from it are various and may be connected with different aspects, reflected in the funerary ritual and grave goods. The amount of work needed to construct a funerary complex can be deduced from the size and complexity of a grave and a burial mound. According to the results of the comparison, efforts devoted in order to build a grave were divided into several groups of features: 1) the presence of the barrow (the first barrow or the following layers), 2) the presence of a ledge, 3) the parameters of the grave pit. The presence, or absence, of selected mortuary practices (such as a wooden wagon, anthropomorphic stone stelae, cromlechs, ditches, "houses of the dead" inside the grave) could also be useful. Funerary equipment is an indicator of the social role of the deceased in society, so diversity or "richness" of inventory also has to be seen as a social attribute.

2.3.2. Symbolism of the mound and social status

A kurgan is first and foremost a sacred complex associated with the spread of the new worldview in Europe. A kurgan is a symbol of the World Mountain; the Mountain is often perceived as an image of the world, a model of the Universe, in which all the basic elements and parameters of the cosmic device are reflected. The mountain is at the centre of the world – where its axis (axis mundi), connected the upper and lower worlds, passes (Toporov 1980, 311-315). Not every member of society is worthy of a mound/World's Mountain. In the Budzhak and other "kurgan" cultures, there are "main burials" over which a mound was built, but other persons were buried in the already built mound. Some of the them were covered by a new mound, a new layer. At the same time, flat burials have been found, located near the mounds or at some distance. The same kinds of burials are known in the Budzhak and Catacombna cultures (Bruyako and Agulnikov 2017), Babyno and Sabatinivka culture (Bruyako and Rossohatski 2000).

The construction of the mound demonstrates the great efforts of society to build a burial complex. Irina Alekseeva counted how many days were spent on the construction of different barrows in the Northwest Pontic region, based on the building standards of ancient Sumerians. For example, Barrow 1, near the village of Chervonyi Yar, Kiliya district, was 2.8 m high, 19 m in diameter, the volume of earth was 264 cubic meters. Its construction would have required the work of 25 men for 4 days. Its main burial was covered with a limestone slab weighing about 1 ton. The nearest quarry is 5 km away, and it would have taken 16 men four days to transport the slab. The cromlech that surrounded the mound consisted of 34 stone slabs, weighing about 500 kg each. Their transportation would have required the work of 25 men for 38 days (Alekseeva 1992, 103-105).

These data indicate the high social status of those persons for whom the mound was built. Undoubtedly, all the burials made in the already built barrow are later than the first burial. At the same time, they can be relatively synchronous and sometimes form common complexes with the main burial. In addition, we do not know reliably the scale of the so-

called “stratigraphic step”, that is, the period of time that passed between the construction of the different layers of the barrow. The chronological gap between the main graves and those dug into the barrow may not be large. Few barrows have radiocarbon dates for all or more layers of the mound. Sometimes these stages of mound construction occur within 1 or 2 generations. The construction of barrow groups, where the barrows are not far apart from each other, is not due to a lack of space in the barrow. A new mound was built for the person to whom it was due by their social status. A new earthen layer in the mound may have been made for one dead person, but often the layer in the mound is associated with a group of dead. And this is no random occurrence, the burials in this group were placed in a circle and all the dead in these graves are oriented with their heads clockwise or counter-clockwise.

Society always has a choice whether to build a new barrow, to make a burial in an already built barrow, or if it would be a flat burial near the barrow. This choice is determined by the social status of the deceased. There are primary burials in some barrows that are made later than the ones dug in the upper layers of other barrows. The design of pits with ledges (vertical double pits) is also considered a social feature, they demonstrate more efforts (energy expenditure) than standard burials (Kovaleva 1984, 71).

2.4. Ritual burial groups in the Budzhak culture as an element of social structure

Using E. Yarovoy’s classification and his division of five ritual groups of graves (Fig. 8: 1), I analyzed them from the point of view of social stratification, not only from the chronological position, and came to the conclusions set out below.

Different ritual groups have their own special features of funerary rites and inventories. Undoubtedly, the distribution of the inventory by groups as well as its presence or absence is also subject to certain rules. Nevertheless, more often this manifests itself as a tendency, a predominance in one of the groups rather than the presence of rigid rules and boundaries. It is especially important to take into consideration the position of the buried person on the right or left side. Therefore mixing binary positions (right – left) and binary ritual traditions into a common “group of bent on the side” as some researchers do (Dergachev 2021; Topal 2022) is just as unacceptable as mixing all the letters from several sentences in an incorrect text and building certain hypotheses on that.

Some categories of grave goods and the level of effort devoted in order to build the burial (high or low) correlate with the five ritual groups, and the location on the right or left side makes a difference (Yarovoy 1985). Different positions of the buried person are related to the reflection of the social structure of the society in funerary rites. Different ritual groups (distinguished taking into account the pose of the buried person and the inventory) probably represent different social strata within the Budzhak culture society.

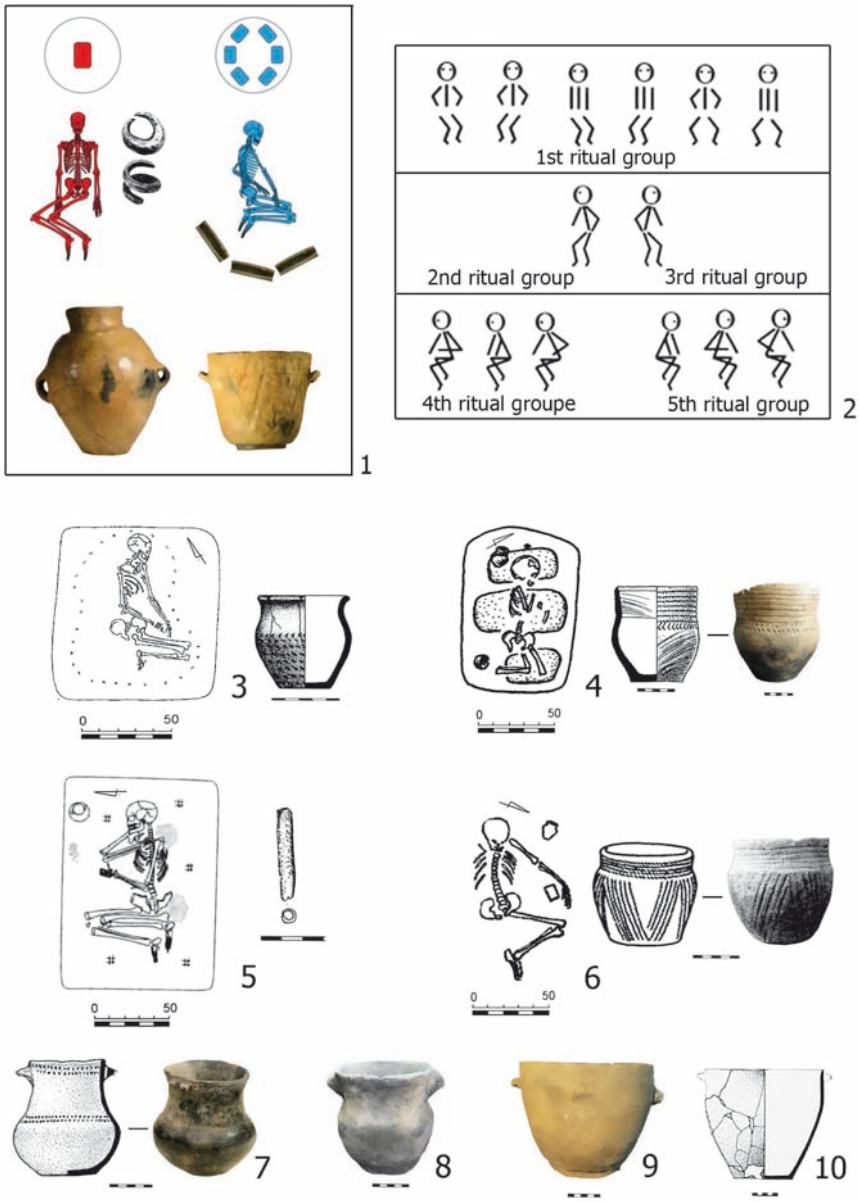

Fig. 8. Positions of the buried individuals inside the grave pits, some burials and pottery:
1 – incorrect classification (after Topal 2022); 2 - correct classification (after Yarovoy 1985, 39, fig. 2, reduced); 3 – Sărăteni, 3/14 (after Levitsky *et al*. 1996, 134 fig. 30: 1,2); 4 – Trapivka 6/20 (after Subbotin *et al.* 1995, 50 fig. 16: 1,3; photo by S. Ivanova); 5.7 – Taraclia 14/16 (after Sava *et al.* 2019, 263 , fig. 34: 7, 8; photo by S. Ivanova); 6 – Bashtanovka 7/21 (after Shmagliy *et al*. 1970, 78, fig 58: 3; 79, fig. 59: 5); 8 – Dzynilor 9/12, photo by S. Ivanova; 9 – Bashtansvka 4/25; 10 – Kostolac horizon at Vučedol, vessel from pit 60 (after Balen 2005, 38, fig. 2: 6)

Table 3. Comparison of ritual characteristics revealed in different ritual groups

Characteristics of funeral rites	Known positions of buried individuals	1	2	3	4	5
Wooden wagons	16	13 (81.3%)	1 (6.2%)	1 (6.2%)	1 (6.2%)	–
Anthropomorphic stelae	47	32 (68.1%)	4 (8.5%)	5 (10.6%)	2 (4.3%)	4 (8.5%)
Stone cists	10	–	1 (10%)	3 (30%)	–	6 (60%)
"Houses of dead"	100	82 (82%)	13 (13%)	5 (5%)	–	–
Ditches	21	18 (85.7%)	3 (14.3%)	–	–	–
Cromlechs	10	7 (70%0	–	–	–	–

Effort devoted to build a grave structure

E. Yarovoy analyzed the elements of the barrow construction for different ritual groups of the Budzhak culture, considering only those burials where the position of the deceased is fixed. In total, he assessed 262 grave and 1558 burials (Yarovoy 2000, 138, 145). According to his calculations, 823 persons were buried on their backs, barrows were built for 190 of them, and new mound layers were built for 112 of them. Thus, in this ritual group, 36.7% of the deceased are associated with mound construction. Among the right-side position (second and fourth ritual groups), 17% of the buried are connected with barrow/layers building, and only 4% of the left-side position (third and fifth ritual groups). Burials without barrows have been found in small numbers so far, and they included the dead of the second and fifth ritual groups.

Therefore, it is in the first ritual group that a significant number of burials with a high level of labour intensity (more efforts, energy expenditure) is observed. These are burials of higher than average size, burials with ledges, cromlechs, ditches, burials for which a barrow or the following layers were constructed.

Prestigious artefacts

The most prestigious finds are concentrated in the first ritual group – first of all, almost all wooden wagons, silver jewellery (hair rings), large metal artefacts (axes, knives, awls), imported vessels (amphorae, beakers). In the other ritual groups small copper/bronze ornaments, sometimes silver, were found. They are much smaller in weight, and in number, compared with those metal artefacts found in burials of the first group.

Researchers note that metal mainly functioned in the socio-prestigious sphere and was available to only a few people. In socially differentiated societies metal was usually under the control of the "nobility", monopolized largely its use (Avilova 2007). Hair rings were

prestige goods during the Early Bronze Age, being meant only for a restricted number of persons (Preda 2015, 22). The differences in the types of ornaments (and differences in the types of their metal) in different ritual groups can be compared with the data of ethnology: in societies where there is social stratification, there were differences in clothing, decorations, types of weapons, *etc.* in different social strata. Ethnic identity of people can be revealed by their jewellery. Jewellery is worn not only for adornment, but also to publicize an association or identification with a cultural group or a set of beliefs (Golani 1988, 269). Clothing or jewellery are typical visual indicators of social class (O'Guinn *et al.* 2015, 196).

Analyzing these data, we can conclude that the persons to whom the burials of the first ritual group belonged were at the top of the social hierarchy of the Budzhak society.

The archaeological material does not allow for the interpretation of ritual groups solely in chronological terms. The primary burials (for the first or subsequent mounds) are distinguished by the level of labour invested in the burial process, and therefore, they can be associated with the social status of the buried persons. The posture of the buried persons and their orientation can reflect not a chronological aspect but rather a social or ethnic differentiation. The various stratigraphic positions of burials within mounds (including different postures of the buried persons) were more likely related to social rather than chronological aspects. The stages of mound construction, the placement of a grave in a specific sector, and the positioning of the deceased followed the traditions of a specific human collective.

Researchers of burial practices suggest that both the plan layout and the sequence of mound construction, their configuration, and sizes adhere to specific rules, where the chronological aspect is just one among many others (for example: Ochir-Goriaeva 2018, *et al.*). The burial ritual reflects the social differentiation of the Budzhak society. This manifested on various levels and in different structures: both in the existence of distinct population categories with varying social positions and in the hierarchy of social and ritual groups. Many elements of the ritual are connected precisely to the social stratification of society rather than chronological stages: they are existing simultaneously in the same time and place. The construction of the mound as a sacred complex was governed by specific rules and limitations that influenced the stratigraphy of each mound. Explaining existing differences solely from a chronological standpoint is an oversimplification. Rejecting a comprehensive consideration of various factors (social, ethnic, symbolic, *etc.*) in favour of chronology leads to an insufficiently accurate interpretation of archaeological material and incorrect reconstructions.

2.5. The chronological aspect

The chronological aspect also matters when comparing ritual groups. Are they chronological? Is the first ritual group replaced at a later stage by others (2-5)? There are some arguments in favour of this not being the case.

1. Radiocarbon dates show that in the early stage of the Yamna culture there are burials where the dead lay on their sides (groups 2-5). At the same time, at the later stage there are buried on their backs (group 1) In general, burials of the first rite group have dates ranging from 3500-3120 cal BC to 2290-2140 cal BC. Burials of the 2nd-5th rite groups have dates in the range from 3500-3100 cal BC to 2200-1970 cal BC. Hence, they are simultaneous (Ivanova 2021, 67, 68, tab. 2.1). Probably at the early stage we can talk about a significant predominance of people associated with the burials of the first ritual group. However, it is wrong to deny the existence of the graves with the buried individual laid on their sides at the early stage: in other regions of the Yamna culture this rite dominates in the early chronological period. As an example, we can cite data on the burial of the Yamna culture of the Volga-Ural region. The first funeral rite, characterized by the position of the dead in the posture on the right side, placed in pits of simple construction, appeared in the Ural region at the early stage A (3300-2900 BC) and existed until the Poltavka culture time including (Morgunova 2014, 77, 191).

2. There are known situations of burial of the dead in the same grave, but in different positions (for example, Subbotin *et al.* 2017, 33, fig. 10; Sava *et al.* 2019, 44, 254, fig. 25: 2). There are also known burials of different ritual groups in the same kurgan layer. This may indicate their contemporaneity (Ivanova 2021, 86, fig. 2: 14).

3. Among the burying on the side groups there are burials with early stage ceramics, such as Taraclia 2, 14/16, with a vessel of Coţofeni culture (Fig. 8: 3), Sarateni 3/14 (Fig. 8: 5, 7), with vessel of Cernavodă 2 type, Trapivka 6/20 (Fig. 8: 4), with beaker of early stage CWC *etc.* These cultures cannot be synchronized with the late stage of Budzhak/Yamna culture, *i.e.* the second half of the 3rd millennium BC. There are also burials of first ritual group with a late type of vessel, for example, Bashtanivka 7/21 (Fig. 8: 6).

The burial of the Yamna culture Porohy 2/6, with the deceased on the left side (5th ritual group) was excavated in Vinnytsia region, near the Northwest Pontic. An amphora was found in the burial, and in terms of form, ornamentation and technology it corresponds to the forms of the older phase of the CWC (Harat *et al.* 2014, 84-86; Włodarczak 2014, 364).

4. "Budzhak jars", which are supposedly attributed to the late stage, have prototypes in the European cultures or cultural groups of the early stage (Kostolac, Orlea-Sadovets), thus we can assume their early appearance in the Budzhak culture (Fig. 8: 9, 10). Moreover, there are radiocarbon dates for burials with "Budzhak jars", relating to the first half of 3000 BC, that is, to the early stage of Budzhak culture (Ivanova 2021, 222, fig. 4: 22). This type of pottery is associated with burials where the deceased lies in the position "bent over on his side".

5. The supine inhumation with flexed legs and burials crouched on the side are known in the Eneolithic; the data of barrow stratigraphy indicate their simultaneous existence (Berestnev 2005, 110; 111, fig. 7). Finds of copper ornaments in the form of tubes are also

known in the Eneolithic (Rassamakin 2004), they are more often found in so-called "late" burials, with the dead bent over on their side. There is reason to believe that the Yamna culture developed on the basis of the Eneolithic horizon, and it was different in different regions. The Eneolithic (Proto-Budzhak) horizon was also present in the Northwest Pontic region (Ivanova 2015). The perception of funerary traditions (different positions of the buried) and artefacts (copper and silver ornaments) occurred in the early stage of the Budzhak Yamna culture formation. Therefore, the different ritual traditions could have had a simultaneous existence in the Budzhak culture, just as it was in the Eneolithic period. Probably, the first ritual group prevailed in numbers already at the early stage and had a small chronological priority.

3. PEOPLE OF THE BUDZHAK CULTURE AS NEWCOMERS

In the opinion of the author, the intrusions into the Balkan-Carpathian region originated from the Northwest Pontic region. This is indicated by several facts. For example, some vessels of the Budzhak culture have analogies in the pottery of the Early Bronze Age cultures of Central and Southeastern Europe. In addition, in the Dobrudja (Dobrogea) region, typical Budzhak pottery and wooden wagons were found. The fact that the Northwest Pontic region is located nearer to the Balkan-Carpathian area than other regions of the overall Yamna culture, is also important.

What was the aim of migration? What was the cause or causes of the successive migrations of the Yamna culture and what was their general character – violent or peaceful? Some archaeologists support the concept of Maria Gimbutas (Haak *et al.* 2015; Allentoft *et al.* 2015). But there are other views, for example:

1. A socio-economic model based on the introduction of the key innovation 'wheel and wagon' against the background of climate and ecological change, *i.e.*, decreasing precipitation and steppe aridisation. Their constant search for green pastures for the well-being of their animals, as their major source of subsistence, subsequently forced them westwards (Heyd 2021).

2. Chiefs decide on, and charismatic leaders direct, migrations of whole segments of a society at times of crises, with rising levels of conflict and pressure from neighbours (Anthony 2020).

3. Exploitation of secondary animal products was a key driver of the expansions of Eurasian steppe pastoralists by the Early Bronze Age (Wilkin *et al.* 2021).

4. The asppearance of an 'ideology of travellers' in 3rd millennium BC Europe (Wentink 2020).

3.1. The routes of migration

There could be several interrelated routes out of the Budzhak culture area: the Danubian route; Carpathian-and-Transylvanian route; Prut-and-Dnister route.

The Danubian route is well known (Fig. 9). It passes north and south of the Lower Danube, through the territory of modern Romania and Bulgaria, to Serbia.

The Carpathian-and-Transylvanian route passed through the crossings of the Prut and Siret rivers and through the eastern Carpathians (Fig. 10). By this route, and along the rivers Someş and Mureş, the people of the Budzhak culture would have crossed into Transylvania and in the Great Hungarian Valley. "The discoveries offer the opportunity of also including the Romanian Banat and western Transylvania regions into the Yamna territory. It is important to underline that the present sites from this area assigned to this culture are connected to the Lower and Middle Mureş valley indicating that this river is, most likely, the pathway towards Transylvania" (Diaconescu 2020, 44).

The Prut-and-Dnister route (Fig. 11). In the Northwest Pontic region are known barrows of the Budzhak culture, located along the Prut and Dnister rivers, linking the steppe with the forest-steppe. Excavations of the Ukrainian-Polish Expedition near Yampil (Vinnytsia

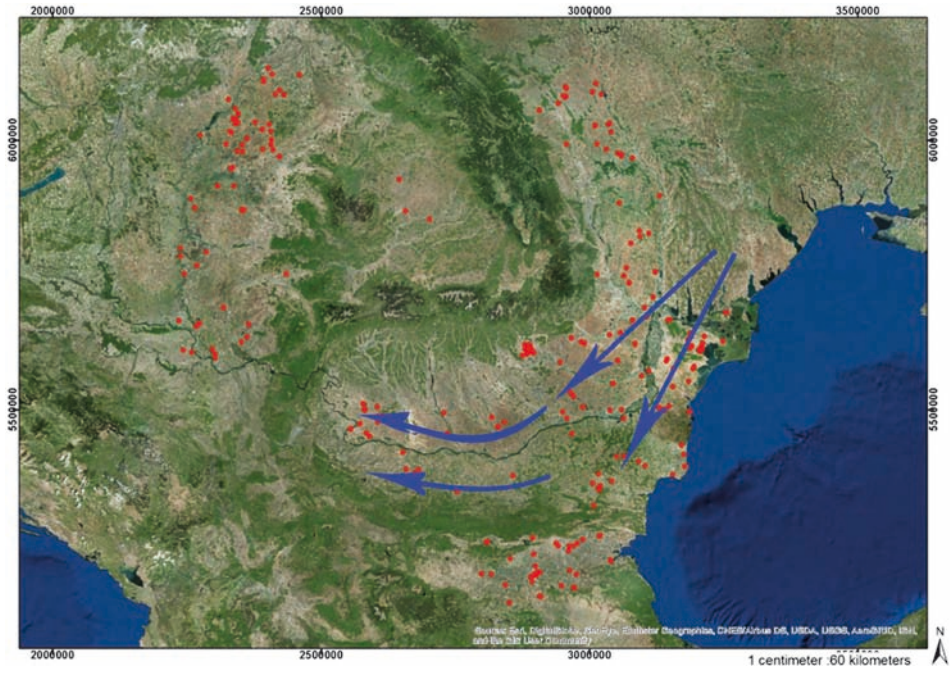

Fig. 9. The Danubian route of people of the Budzhak culture.
After Heyd 2021, path indicated by the author

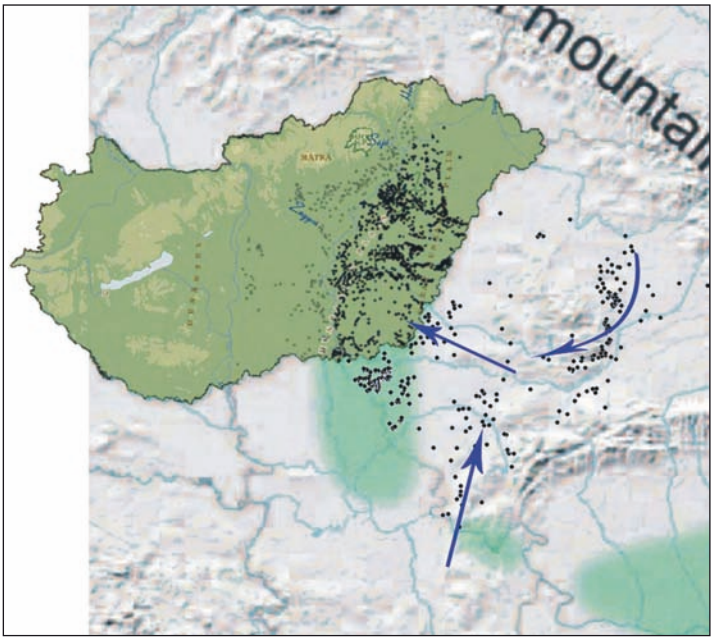

Fig. 10. The Carpathian-and-Transylvanian route of people of the Budzhak culture. After Diaconescu 2020, path indicated by the author

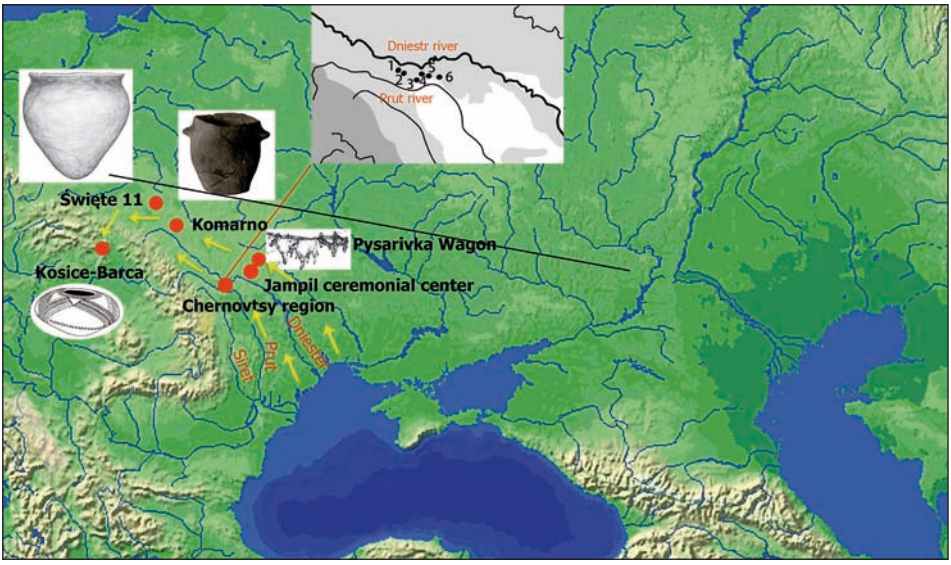

Fig. 11. The Prut-and-Dnister route of people of the Budzhak culture

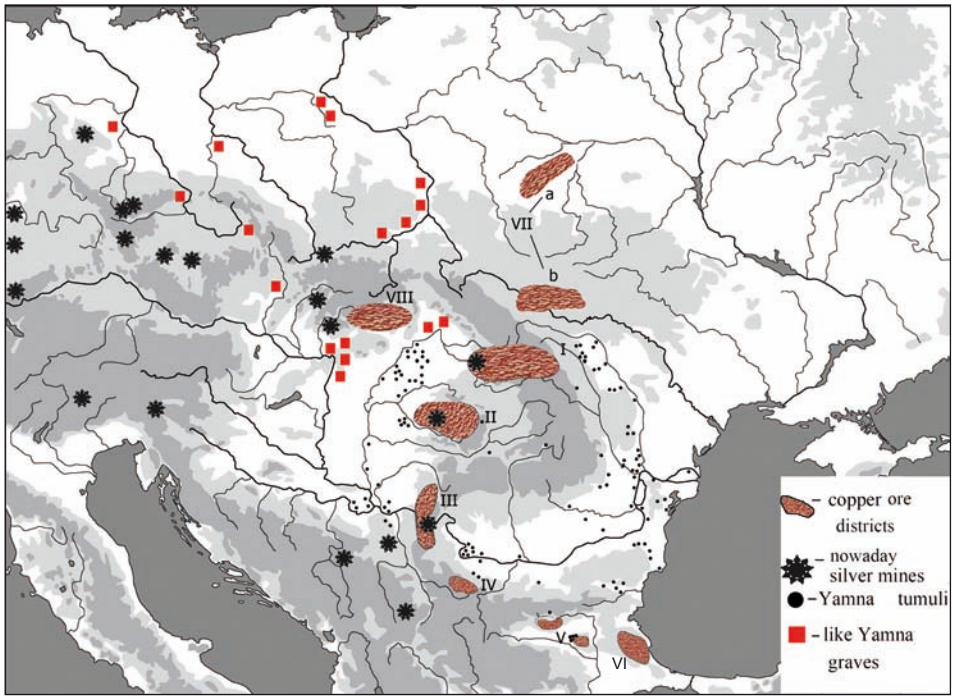

Fig. 12. Budzhak (Yamna) burial mounds and mining regions
(after Chernykh 1976, 18, fig. 2; Klochko 2004, 220, fig. 1; Pernichka *et al.* 2016, 66, fig. 14)
I – Northern part of the Eastern Carpathians (the regions of Baia Mare, Rodna, Southern Bucovina); II – Western Romanian Mountains (Apuseni; Metaliferi and Bihorului ore regions); III – Banat, Bor, Vidin group; IV – Vratsa district; V – Upper Thracian group; VI – Strandja; VIIa – native copper in Volhynia; VIIb – cuprous sandstones; VIII – Slovakian Ore Mountains

region) have allowed Piotr Włodarczak to identify not only a cultural and social centre, but also a special Podillia type of the Yamna culture (Włodarczak 2014). Not far from Yampil (about 20 km away), in the Pysarivka 6 burial mound, was found a burial (number 2), with a wooden wagon and silver spiral hair rings, as in the burials of the Budzhak culture (Harat *et al.* 2014, 142-147). On this way northwest, we see a group of burial mounds in the south of the Chernivtsi region.

Landmarks marking the way westward, north of the Carpathian Mountains, are much less pronounced. The burials, which can be associated with the Yamna culture, are very few. One of them is the Komarno mound near the city of Lviv. The vessel from this has analogies in the Budzhak culture (Ivanova and Voitovych 2021, 64). In Święte, Poland, a ritual complex was found with a combination of traits that can be associated with the CWC, Yamna culture and Catacombna culture (Olszewski and Włodarczak 2018). However, the vessel of Yamna culture was connected not with the Northwest Pontic region, but

with the territory between the Dnipro and Southern Bug rivers. Burial mounds of the Budzhak culture (or Yamna culture) north of the Carpathians are not known. But near the Slovak Ore Mountains, in the settlement of the Late Baden culture of Kosice Barca was found a vessel that has analogies in the Budzhak culture. Jozef Vladar (2008) explains the appearance of several vessels decorated with corded ornament as a reflection of Yamna culture traditions.

3.2. The aim of migration

In the view of the author, the aim of the migration of the Budzhak people was not to find new pastures, but to obtain access to metals. Aridization of the climate had expanded the areas of steppes, important for pastoralists. It also contributed to the expansion of the road network. Mapping of Yamna culture burial mounds in the Balkan-Carpathian region shows their location near metal deposits. Analyses of some copper products from the Black Sea steppes indicated a predominance of western Balkan-Carpathian metallurgical contacts (Ryndina and Degtiareva 2018). For the Budzhak culture, copper from the Carpathian basin, and arsenic bronze from the centre of Ezero – is expected.

Borislav Jovanovic considers that the fashion for silver in the Balkan-Carpathian region was brought by the Yamna culture. With the disappearance of the Yamna culture, silver disappears as well (Jovanovič 1993). According to Alin Frînculeasa and Mădălina Frînculeasa, hair rings, both silver and gold, appear in the Western Pontic region in the horizon that precedes the Yamna burials, both in Romania and Bulgaria (Frînculeasa and Frînculeasa 2022, 253-255). B. Jovanovic suggests that the silver came from the mines of Laurion (southern Attica) and Sifnos (Cyclades). However, it is possible that the nearby ore zones of the Balkan-Carpathian region (Transylvania, Bor-Majdanpek mining district, Carpathian Mountains) were used, but special analyses are needed to determine the source of this silver. The Budzhak culture is the leader in the number of silver ornaments in the whole area of the Yamna culture. Probably, people of the Budzhak culture brought metals to the Northwest Pontic region and also transferred it to the east.

Surveys have demonstrated that there were forests in the Neolithic (Duffy 2010). Deforestation is associated with the increase in metal production in the Copper and Bronze Age. In the Neolithic, 85% of the Hungarian Plain was covered by oak-beech forests; willow and poplar grew near marshes and lakes. Nowadays, this is 17%. Natural conditions have changed mainly as a result of human activity, although climatic fluctuations may also have played a role. Deforestation is associated with the increase in metal production in the Copper and Bronze Age, which is impossible without the availability of fuel (Duffy 2010). There are no deposits of important natural minerals in the Great Hungarian Valley. Despite this, already in the middle of the 3rd millennium BC the territory of the Great Hungarian Valley was the most highly developed in the Carpathian basin, and in the Late Bronze Age here is formed one of the most significant metallurgical centres in Europe. Raw materials

for bronze foundries were imported, and it is quite natural – it is much more rational to transport ore than wood.

Genetic analysis of the remains from barrows in the Great Hungarian Valley showed that some of the dead were locals and some were newcomers (Gerling *et al.* 2012). They had grown up in the Apuseni, Western Romanian Mountains, two hundred kilometres away from the Great Hungarian Valley. These mountains are rich in metals, and it was copper that these people might have transported to the Great Hungarian Valley for pre-firing and smelting. The inhabitants of the Apuseni Mountains (maybe from the Slovak Ore Mountains as well) travelled about 200 km to the forests of the Great Hungarian Valley. With a wagon speed of 2 km per hour and driving 10 hours a day, the route would take 10 days. For example, the population of the Zrubna (Timber Grave) culture (Late Bronze Age) brought metal for smelting from the Kargaly mine for a distance of four hundred kilometres. The forests near the Kargaly mines were destroyed in the Early Bronze Age (Avilova 2007, 40). Therefore, the distance of two hundred kilometres does not look difficult. Metal could also be brought to the Great Hungarian Valley for smelting from the Slovak Ore Mountains.

Production of copper and bronze within the Yamna culture, according to Evgeny Chernykh, was associated with two metallurgical centres: the Southern Ural and the Lower Dnipro regions. The Southern Ural metallurgical centre's distribution area included the Southern Urals, Lower Volga, and Middle Volga areas. The activities of the Southern Ural metallurgical centre were influenced by the Caucasian metallurgical centre, primarily the Maykop culture. Additionally, there were connections with Transylvanian centres through the intermediation of steppe and more western population (Chernykh 1992, 85). It has also been revealed that the establishment of an independent metal production centre in the Southern Ural was linked to the penetration of technological innovations from the Trypillia culture area (Ryndina and Degtiareva 2018, 342).

The distribution area of the second metallurgical centre encompassed the Lower Dnipro regions of the Northern Black Sea area (Chernykh 1992, 85). Specifically, the Lower Dnipro centre was connected to the Caucasus (Ryndina and Ravich 2012, 9-12). However, some researchers suggest the possibility of utilizing copper sandstone ores from the Donbass region by the Yamna culture inhabitants (Brovender 2016, 8-9).

Recent studies have confirmed the connection of metallurgists in the Northwestern Pontic region with Western, rather than Eastern, sources of metals.

Analytical research on the non-ferrous metals of the Yamna culture of Ukraine was conducted by Natalya Ryndina and Anna Degtiareva. Their work involved methods such as spectral analysis, X-ray spectroscopic microanalysis, and metallographic analysis. "The received results confirmed by morphological and typological characteristics of tools allowed us to classify the North Black Sea centre of metal production as metalworking with the leading western Balkan-Carpathian direction of metallurgical contacts" (Ryndina and Degtiareva 2018, 317). N. Ryndina identifies the Usatove metalworking centre, which

exhibits specific features. At the same time, certain Trypillia technologies were also preserved (Ryndina 1993).

The metalworking traditions of the Early Bronze Age in the Northwestern Black Sea region are based on a combination of two schemes: one rooted in Trypillia (cold hardening) and the other an innovation (hot forging). Both schemes are present among the Budzhak and Usatove populations. The development of these traditions occurred through mutual penetration and interaction, with the more advanced Usatove tradition playing a leading role. It is possible that the second tradition emerged directly in the Northwestern Pontic region, particularly among the Budzhak population (Kamenskiy 1990, 252). In our view, it is possible to speak of a unified Northwestern (Usatove-Budzhak) metalworking centre, whose traditions and schemes intertwined and were used in both the Usatove and Budzhak contexts. This centre has its peculiarities: while other metal processing centres of the Circumpontic metallurgical tradition show no connections to the technologies of the preceding Balkan-Carpathian metallurgical province, the population of the Northwestern Pontic region continued the development of traditions from the previous stage while also demonstrating certain innovations.

In this context, it is significant that only in the Usatove and Budzhak cultures of the Northwestern Black Sea region during the Early Bronze Age do we observe a concentration of silver artefacts – in contrast to synchronous cultures not only in the Pontic Steppe but also in the Carpathian-Balkan area.

Only a few findings from Budzhak burials have undergone spectral analysis, revealing an elevated copper concentration ranging from 1 to 10% (Olgovskiy 1988; Ryndina and Degtiareva 2018). It is possible that silver for these adornments was extracted from polymetallic (copper-silver) ores known in ore sources of Southeastern Europe.

The distances also support contacts with metallurgical centres in the Balkan-Carpathian region, not others. For instance, from the Northwestern Pontic region to the Kargaly mine is approximately 2,500 km, to the mines in the Caucasus around 1,500 km, and to mines near Nova Zagora (Bulgaria) and Roşia Montană (Romania) around 850 km.

3.3. Trade and change

The last aspect to be discussed is what product the Budzhak culture could have given in exchange for metal. In the opinion of the author, it was salt. The Northwestern Black Sea coast is a unique geographic region with many salty estuaries. Collecting salt in these places is not technically difficult. People do not need wood to boil the salt brine, nor do they have to build underground mines to extract the salt (Ivanova 2010a; 2010b).

Salt is the most specific object of the few group of minerals that was exploited by humans in the Chalcolithic and Bronze Age. Unlike items made of metal, stone, flint and clay, it could not function as a long-term artefact. In addition, there are different types of salt extraction, not all of which can be identified by archaeological methods.

Salt production in ancient Europe was an important and well-developed industry. Processing methods varied across the continent according to local resources and possibilities. Evaporation using briquetage was the commonest, but mining or quarrying rock salt is known too. One of the richest areas for salt is the Carpathian zone. In the results of fieldwork in Romania a technique using wooden troughs and wattle-framed ponds was investigated. Researchers have suggested that a form of open-cast mining was employed, the troughs used to assist breaking up the rock salt surface, and perhaps also to facilitate concentration of brine. So far, this technique is known only from Transylvania and western Ukraine (Harding 2018, 323; Kavruk *et al.* 2023, 633, 634).

In a few areas of Europe salt extraction under the influence of solar evaporation was practiced. The Northwestern Black Sea region is one of them.

A considerable number of salt lakes and limans (lagoons) are spread along the Black Sea coast. Their number, size and salinity varied greatly during the Holocene due to the regressions and transgressions of the sea level. These phenomena gave rise to the vast solonchak soil deposits in the area, rich in halophytes. Written sources witness a substantial salt production in the North-Pontic area, as well as long-distance salt trade, starting in the Greco-Roman period through to the beginning of the 20th century. Ethnography reveals an intense exploitation of the solonchaks for herding. Although there is no explicit archaeological evidence for salt production in this area, some scholars, on the basis of historical analogies and circumstantial archaeological data, suggest that saline lakes, limans and solonchaks have been extensively exploited as early as the 5th Millennium BC (Kavruk *et al.* 2018, 893, 894).

Written sources of the 19th century describe in detail salt extraction in the Northwest Black Sea region. Primitive extraction methods may well be extrapolated to earlier eras, including the Early Bronze Age. The dating of eustatic oscillations and the salinity of the Black Sea, which affects the salinity of its estuaries, are of importance in the context of the work. The "New Black Sea stage of the Black Sea transgression" correlates with the Bronze Age. The analysis of malacofauna from the sediments indicates the stage of increased (compared to the present) salinity of the of the Black Sea (Konikov 2007). Consequently, the population of the Early Bronze Age could collect salt, which crystalised in estuaries under the influence of natural conditions (solar evaporation).

In the Middle Ages, salt from the North-West Black Sea coast was transported long distances. The earliest written information about salt production in the North-West Black Sea region dates back to the 16th century. This is a treaty between the Polish king Sigismund and the Tatar khan Sagib-Girey (1540), where Sigismund reserves the right to take salt from the lake lying in the vicinity of Khadzhibey (near modern Odessa) and export it to Poland after paying a duty (Pilipchuk 2016, 495).

Apollon Skalkovsky described salt collection on the estuaries of the Northwestern Black Sea region. Usually, the salt collection took place in August; workers in wooden wagons drove into the reservoir, breaking salt layers with their wheels. The salt was then loaded on

the wagons with wooden forks or shovels (Skalkovskiy 1853, 491-506). The Kuyalnik salt estuary was the most famous, from where salt was imported not only to the depths of present-day Ukraine, but also to Western Europe. Salt was also extracted from other estuaries and salt lakes in the Northwestern Black Sea region and Crimea. Salt was transported by wagons; one wagon carried about 800 kg of salt (Skalkovskiy 1853, 82).

In the south of the Northwest Pontic region, there is a concentration of burials with all prestigious artefacts, such as metal goods, wooden wagons, imported vessels (Ivanova 2021, 300-302, fig. 5: 9-5.11). Also, most of the burials with pottery of different types are associated with the southern territory (Yarovoy 1985, 92, fig. 23). This situation can be explained by the economic factor: it is in the south that there are limans where salt can be extracted.

Also in the south is the most famous and convenient crossing of the Danube (Orlovka), which opened the way to the west, giving the possibility of exchanging salt for metals (Ivanova 2022). This area was probably a kind of "free economic zone" with certain attractors. It is interesting that in the Urals region barrows, including those with weapons and prestigious metal artefacts, are concentrated near the Sol-Iletsk salt deposit and not near the Kargaly copper mine.

The burials of the first ritual group with prestigious artefacts are found in this zone, and it was the elite of the Budzhak culture who made these burials. They were the ones who moved westward, engaging in exchange and trade, establishing relations with the local population and building trading networks.

4. CONCLUSIONS

There was a peaceful relationship between the population of the Budzhak culture and the local population of the Balkan-Carpathian area, based on productive economic communications. This is indicated by two factors: The first factor is the only single finds of weapons in this burials of the Balkan-Carpathian area (Frînculeasa 2020). The second factor is the perception of the local pottery traditions and their transfer to the homeland (in Northwest Pontic) as imports or imitations. There was the colonization of territories, with a gradual advance to the west, the organization of factories for trade and exchange with the local population, to obtain metals - in the form of ingots and in the form of products. In the pottery assemblage of the Budzhak culture there are not only imported vessels from the West, but also numerous imitations: for example, some beakers of CWC, a very crude imitation of the beaker of the Coțofeni culture (Fig. 8: 7) in the grave Dzinilor 9/12 (fig. 8: 8) or GAC in Novoselytsia 2/13 *etc.* This may indicate the duration of peaceful contacts and the perception of the traditions of the local population in the new territories. Indirect confirmation of my assumption is the penetration to the Balkan and Carpathian region of the population that was at the top of the social hierarchy of the Budzhak culture. It was not an

invasion of the "Budzhak horde" but a peaceful penetration of the trading elite of the Budzhak culture. Pottery and metal show that the term from sociological science "pendulum migrations" can be applied to the migrations of the Budzhak Yamna culture to the West. The exploration of new territories can be considered colonization rather than conquest or invasion. The population that went westward returned, building a trade network ("metal-salt") that linked the Black Sea steppes and the Balkan-Carpathian area.

The main participants in the trading network of the Yamna culture society were the population of the Budzhak culture. They were the "connecting link", and the territory of the Northwest Pontic region was a kind of "bridge" between east and west.

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BURIALS OF THE CORDED WARE CULTURE WITH OCHRE IN THE UPPER DNISTER REGION

ABSTRACT

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This paper considers burials of the Corded Ware Culture (CWC) with ochre in the Upper Dnister region. Tigher concentration of these graves was recorded on the right bank of the Dnister river, within the Drohobych Upland. It has been established that now about 30 burials, in which this mineral substance was found, have been found in this territory. The ochre was deposited both inside the burials and on the original ground level under the barrow mounds. It was observed that the body of the deceased was covered with ochre, or it was placed as separate lumps inside the burial. It is noted that the remains of wooden structures in the form of flooring and ceilings are often present in burials with ochre. It was determined that burials of the CWC with ochre in the Upper Dnister region date to the period of the first half of the 3rd millennium B.C. and are related to influences from the environment of the Yamna culture.

Keywords: Corded Ware culture, Yamna culture, ochre, burial, wooden construction
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INTRODUCTION

The presence of ochre in burials of the Corded Ware culture (CWC) in Western Ukraine is a regional feature of this culture in the Upper Dnister region. In our opinion, its presence in funerary sites has not been sufficiently studied, and it is usually only mentioned briefly in publications (Sveshnikov 1974, 29, 30). No attention has been paid to the comparison of the presence of this mineral substance with discovered burial goods, structural features of burial constructions, *etc*.

So far, there are more than fifty researched barrow grave fields and individual mounds of the CWC in the Upper Dnister region, among which the presence of ochre is attested in ten. It is recorded in Bolekhivtsi, Velyka Ozymyna, Dashava, Kolpets, Koropuzh, Kulchytsi, Nyzhni Hai, Krylos (two sites), and Pidhoroddia (Fig. 1). In the Upper Dnister region, the first burials with ochre were researched by T. Sulimirski (Sulimirski 1968, 125, 131, 138), Yaroslav Pasternak (Pasternak 1936, 132; 1978, 70; Sveshnikov 1949, 151), and Markian-Ores Smishko (Śmiszko 1933, 24). In the second half of the 20th century, ochre was found during research in Kulchytsi conducted by Petro Zavada (Sveshnikov 1974, 30) and Igor Sveshnikov (Sveshnikov 1970, 3-4), as well as during the work of the latter in Bolekhivtsi (Sveshnikov 1977, 7-9, 13, 16; 1978b, 20-22). Only one grave field, where ochre was found was explored during the early 21st century – in Nyzhni Hai. It was researched by participants of the Ukrainian-Polish archaeological expedition Jan Machnik, Dmytro Pavliv and Volodymyr Petehyrych (Machnik *et al*. 2011).

During the study of the mapping of the sites where this mineral substance was found, it is noticeable that most of them are located quite compactly, in the territory of the right bank of the Dnister river within the borders of the Drohobych Upland (Kulchytsi, Velyka Ozymyna, Bolekhivtsi, Kolpets and Nyzhni Hai – Fig. 2: 1-5). The highest elevations on the territory of this Upland are recorded on the watershed areas of the Carpathian foothills (600-700 m above sea level), and the lowest – at the junction with the Upper Dnister basin (300 m above sea level). The relief is characterized by a strong dissection of the terrain. A dense network of smaller valleys in the form of gullies and ravines is superimposed on the main structure of the valleys, and floodplain strands str*et*ch along the riverbeds (Łanczont and Hołub 2011, 164-166).

At a rather significant distance from the cluster of grave fields with ochre burials, three more barrow grave fields are located on the right bank of the Dnister river (Dashava, Krylos). The grave field in Dashava is located closer to the Drohobych Upland than the two grave fields in Krylos and is located in the territory of the Morshyn Upland (Fig. 2: 6), which covers a relatively small area to the southeast of the Stryi-Zhydachiv basin, to the north from the Carpathians and the west from Svicha river in the form of a narrow strip oriented to the northeast (Kravchuk and Zinko 2018, 73, 74, fig. 1). The grave fields in Krylos are localized within the boundaries of the Prylukvynska Upland, which are bounded by the Limnytsia and Bystrytsia-Solotvynska rivers (Fig. 2: 7, 8). The interfluve of these

Fig. 1. Burial of the CWC with ochre in the Upper Dnister region. Illustrated by M. Voitovych

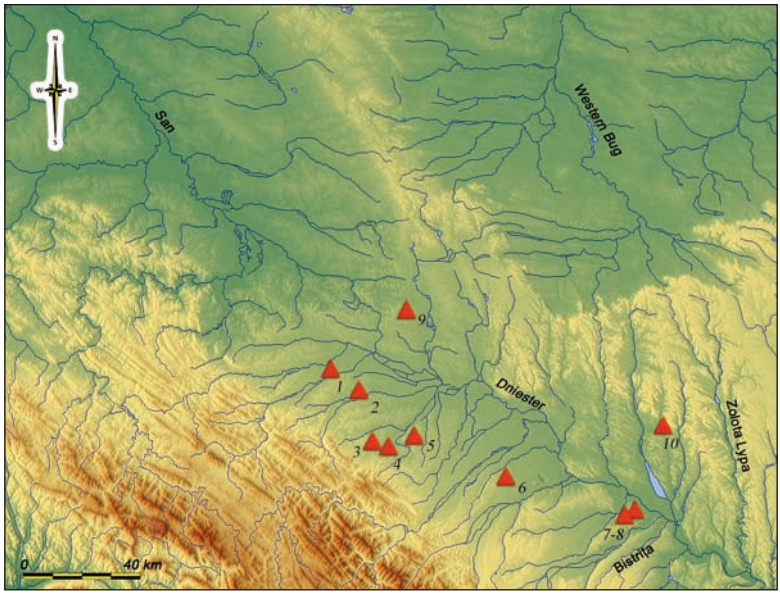

Fig. 2. Location of barrow grave fields of the Corded Ware culture with ochre in the Upper Dnister region: 1 – Kulchytsi, Sambir district; 2 – Velyka Ozymyna, Sambor district; 3 – Bolekhivtsi, Drohobych district; 4 – Kolpets, Drohobych district; 5 – Nyzhni Hai, Drohobych district; 6 – Dashava, Stryi district; 7-8 – Krylos, Ivano-Frankivsk district; 9 – Koropuzh, Lviv district, 10 – Pidgoroddia, Ivano-Frankivsk district. Illustrated by M. Voitovych

rivers is characterized by significant elevations, the axis of which runs along the Halych-Maidan line (Tsys 1962, 173).

Ochre was found twice on the left bank of the Dnister river. In the first case, it is evidenced in the eastern part of the San-Dnister Uplands (Koropuzh – Fig. 2: 9), which is characterized by the spread of glacial and hydro-glacial forms of relief and covers the main central part of the San-Dnister interfluve with the Main European watershed (Kravchuk and Zinko 2018, 71, fig. 1). In the second case, it is found in a grave field in Pidhoroddia (Fig. 2: 10), located in the territory of Opillia between the Gnyla Lypa and Narayivka rivers, which is characterized by a hilly landscape (Herenchuk and Koinov1973, 8). The grave field in Pidhoroddia covers the most eastern position together with the cluster of barrows in Krylos among the group of barrow burials with ochre in the region.

In the Upper Dnister region, this mineral substance was discovered under twenty-seven barrows. This does not include the barrow grave field in the "Glyna" Place in Krylos since archaeological materials and scientific documentation from the unpublished studies of Ya. Pasternak have not survived. It is only known that the presence of ochre was evidenced here (Sveshnikov 1949, 151). It is not clear how many of the examined barrows (four were excavated) contain it. The presence of ochre was confirmed in two out of three researched barrows in Nyzhni Hai (Barrows 8 and 10; Machnik *et al*. 2011, 96, 116), as well as in seven of eleven excavated barrows in "Mohylky" Place in Kulchytsi (Barrows 1-4, 7, 8 and 12; Sveshnikov 1970, 3, 4; 1974, 30; Sulimirski 1968, 136). A much larger amount of ochre was recorded in the barrow grave field in Bolekhivtsi. There, it was present in eight of the twelve investigated barrows (Barrows 2, 3, 5, 7, 9, 10, 13 and 14; Sveshnikov 1977, 7, 9, 13, 16, 17; 1978b, 18-22).

Under the mounds of the barrows, ochre was found both at the level of the ancient surface and within the burial pits.

BURIALS WITH OCHRE

Ochre within the grave pits was recorded twenty-six times. It was used for covering the bodies of the deceased or placed near them. However, first, we have to give a general description of the burial pits researched under the mounds of the burial pits.

Under the mounds of the barrows, which differ from each other by their parameters (diameter – 10-40 m and height 0.4-3 m), there is an elongated-oval, rarely rectangular, burial pit with parameters from 0.7 × 0.4 to 2 × 1.7 m dug into the ancient soil, sometimes into the bedrock, mainly in the central part of the barrow. Constant values for the depths of burial features are not observed. In some cases, they are barely dug into the ancient soil (Bolekhivtsi, Barrows 2, 9; Kulchytsi, Barrow 7; Nyzhni Hai, Barrow 10, Features 4 and 6) in others – 0.6-0.8 m deep (Bolekhivtsi, Barrows 10 (Burial 2) and 13 (Burials 1 and 2), Velyka Ozymyna, Barrow 2; Kolpets, Barrow 2; Koropuzh; Kulchytsi, Barrow 2). Instead,

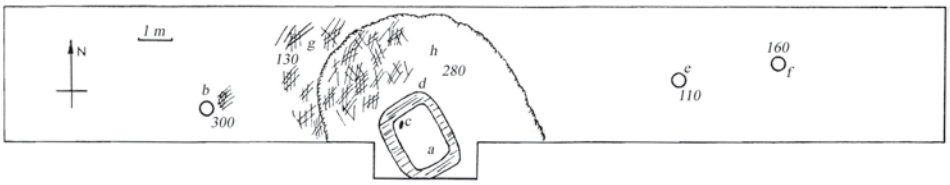

Fig. 3. Kolpets, Drohobych district. Plan of the Barrow 2: a – shaft grave; b – broken vessel; c – flint axe; d – imprints of oak logs covering the shaft grave; e, f – odd potsherds; g (crossed) – an area within which lay scattered lumps of charcoal, small flint chips and a few odd potsherds; h – area seemingly covered by a layer of logs; numbers indicate the depth (in cm) at which the objects were found. After Sulimirski 1968

the spatial orientation of the graves according to the cardinal directions is more constant. Thus, about two-thirds of the burials are oriented along the northeast-southwest line. Less often – west-east (Bolekhivtsi, Barrow 13, Burial 1; Koropuzh; Kulchytsi, Barrow 7; Nyzhni Hai, Barrow 10, Feature 6) and northwest-southeast (Bolekhivtsi, Barrow 2; Kolpets, Barrows 2 and 5 – Table 1). There are no burials with the north-south orientation of the graves.

Within two barrow grave fields, in burials with ochre, the fact is recorded that the burial pits were covered with wooden flooring, which is striking in size. For example, such a burial was researched under Barrow 2 in Kolpets. The remains of a floor with a diameter of 7-8 m made of oak logs, which was located in the central part of the barrow, were found above the burial pit (Fig. 3). Under it was a rectangular burial 1.7 × 2 m in size, traced at the original ground level. The walls of the pit are also overlaid with wood. The skeleton of the buried person was not preserved. Pieces of red ochre were found at the bottom of the feature. Near the burial (close to the southern corner) lay a flint axe with a lenticular cross-section, which has not survived (Sulimirski 1968, 133).

The remains of even larger flooring, which overlapped two burials, were discovered in Barrow 13 in Bolekhivtsi. It was represented by a dark-brown layer 5 cm thick. It was recorded over an area of 8.5 × 12 m in size. Besides, in Burial 1 under the flooring, the remains of some wooden construction were also found (Fig. 4). That burial was dug into the level of the ancient surface and bedrock to a depth of 0.6 m from the level of its discovery. It has a rectangular form with bevelled edges of 0.6 × 1.8 in size and is oriented along the east-west line with a deviation to the southeast and northwest. Also, across the long walls of the burial pit, two half-round stains remained from the wooden pillars. From the south, they protrude to 0.18 m beyond the burial and are located at an equal distance from the western wall (0.4 m) and from the first and second pillars. Three well-traced pillars were 0.22 m in diameter. The fourth one was ruined by a foxhole. On the flat bottom of the pit, in its western part, two concentrations of red ochre were found (Fig. 5: 1). No skeleton or grave gods were discovered there (Sveshnikov 1978b, 19, 20).

Remains of wooden structures were also found in other areas. Taking into account the peculiarities of the source base, it is not always clear what kind of structures were built. For

Table 1. Ochre in burials of Corded Ware Culture of the Upper Dnister region

No	Name of the site, No of barrow/ burial	Diameter of the barrow (m)	Height of the barrow (m)	Location of the burial	Form of the burial	Size of the burial (m)	Depth of the burial (m)	Orientation of the burial	Posture of the skeleton	Location of ochre in the burial	Remarks
1	Bolekhivtsi, bar. 2	14	0.45	center	elongated-oval	1.2×0.9	~ 0.2	northwest-– southeast		on the bottom, the northeast part	ochre is found on the level of the ancient horizon
2	Bolekhivtsi, bar. 3	20	0.66	center	elongated-oval	1.32×0.7	0.4	northeast – southwest		on the bottom, a larger concentration in the western part	ochre imitated the position of the deceased crouched on the side
3	Bolekhivtsi, bar. 5	20	0.86		-	-	-	-	-	-	ochre on the level of the ancient horizon in the central part
4	Bolekhivtsi, bar. 7	28	0.86	center	elongated-oval	1.9×1.2	0.35	northeast – southwest		on the bottom, sporadically, a larger concentration in the northwest part	walls of the burial are burnt
5	Bolekhivtsi, bar. 9	16	0.32	center	elongated-oval	0.65×0.95	0.25	northeast – southwest		several pieces on the bottom, larger concentration in the northwest part	vessels with ochre in the burial

6	Bolekhivtsi, bar. 10. b. 2	40	1.25	center	elongated-oval	1.05×1.75	0.6	northeast – southwest		western part	ochre on the level of the ancient horizon in the central part of the barrow, remains of wooden construction
7	Bolekhivtsi, bar. 13, b. 1	24	1.57	periphery	rectangular	1.8×0.6	0.6	west – east		two spots on the bottom in the southwest part	three concentrations of ochre on the level of the ancient horizon near the burial I, remains of wooden construction
8	Bolekhivtsi, bar. 13, b. 2	24	1.57	periphery	elongated-oval	1.73×1.05	0.6	northeast – southwest		southwest part	
9	Bolekhivtsi, bar. 14	36×42	1.26	center	elongated-oval	unclear outline				among the infill	
10	Velyka Ozymyna, bar. 2	21	0.6	center	rectangular	1.9× 0.85-1.1	0.6	northeast – southwest	crouched on the right side, head to the southwest	skeleton covered by a layer of ochre	individual pieces of ochre were discovered near the chest and scull, remains of wooden construction
11	Dashava, bar. 1	22	0.7								individual pieces of ochre on the level of the ancient horizon
12	Kolpets, bar. 2	28	3	center	rectangular	1.8×1.3		northwest – southeast		individual pieces on the bottom	remains of the wooden construction

No	Name of the site, No of barrow/ burial	Diameter of the barrow (m)	Height of the barrow (m)	Location of the burial	Form of the burial	Size of the burial (m)	Depth of the burial (m)	Orientation of the burial	Posture of the skeleton	Location of ochre in the burial	Remarks
13	Kolpets, bar. 3	18	1	center						individual pieces	
14	Kolpets, bar. 5	30	0.5	center	rectangular	2×1.7	0.75	northwest – southeast		individual pieces on the bottom	ochre, remains of wooden construction
15	Kolpets, bar. 7	20	0.8	center	rectangular	1.8×1.2		northeast – southwest		individual pieces on the bottom	
16	Koropuzh	26	1	center	rectangular	1.9×1	0.8	west – east	crouched on the right side, head to the west	skeleton covered by a layer of ochre	remains of the wooden construction
17	Krylos, bar. 1 (Dibrova Place)									skeleton covered by a layer of ochre	
18	Kulchytsi, bar. 1	27	1.5	center	rectangular	1.7×0.8	0.55	northeast – southwest	crouched on the right side, head to the southwest	skeleton covered by a layer of ochre	more intensely applied on the head
19	Kulchytsi, bar. 2	28	0.6	center	rectangular	2×1.2	0.65	northeast – southwest		southwest part	remains of the wooden construction
20	Kulchytsi, bar. 3	24	0.5								pieces of ochre on the level of the ancient horizon

21	Kulchytsi, bar. 4	20		center	oval					presence of ochre	
22	Kulchytsi, bar. 7	10	1.4	periphery	rectangular	0.9×0.65	0.16	west – east	crouched, head to the west	skeleton covered by a layer of ochre	
23	Kulchytsi, bar. 8									individual pieces of ochre	
24	Kulchytsi, bar. 12	13	0.64	periphery	rectangular	1.7×1	0.45	northeast – southwest	crouched, head to the southwest	skeleton covered by a layer of ochre	
25	Nyzhni Gai, bar. 8, ob. 4	15×16.7	0.7	center	rectangular	1.1×0.65	0.25	northeast – southwest		individual pieces of ochre on the bottom	wooden construction?
26	Nyzhni Gai, bar. 10, ob. 4	14×16	0.4	periphery	rectangular	1.1×0.5	0.1	northeast – southwest		several individual pieces of ochre in the northeast part	
27	Nyzhni Gai, bar. 10, ob. 6	14×16	0.4	periphery	rectangular	0.7×0.4	0.1	west – east		individual pieces of ochre in the central and northwest part	
28	Pidhoroddia, bar. 1									skeleton covered by a layer of ochre	more intensely applied on the head
29	Pidhoroddia, bar. 2									skeleton covered by a layer of ochre	more intensely applied on the head

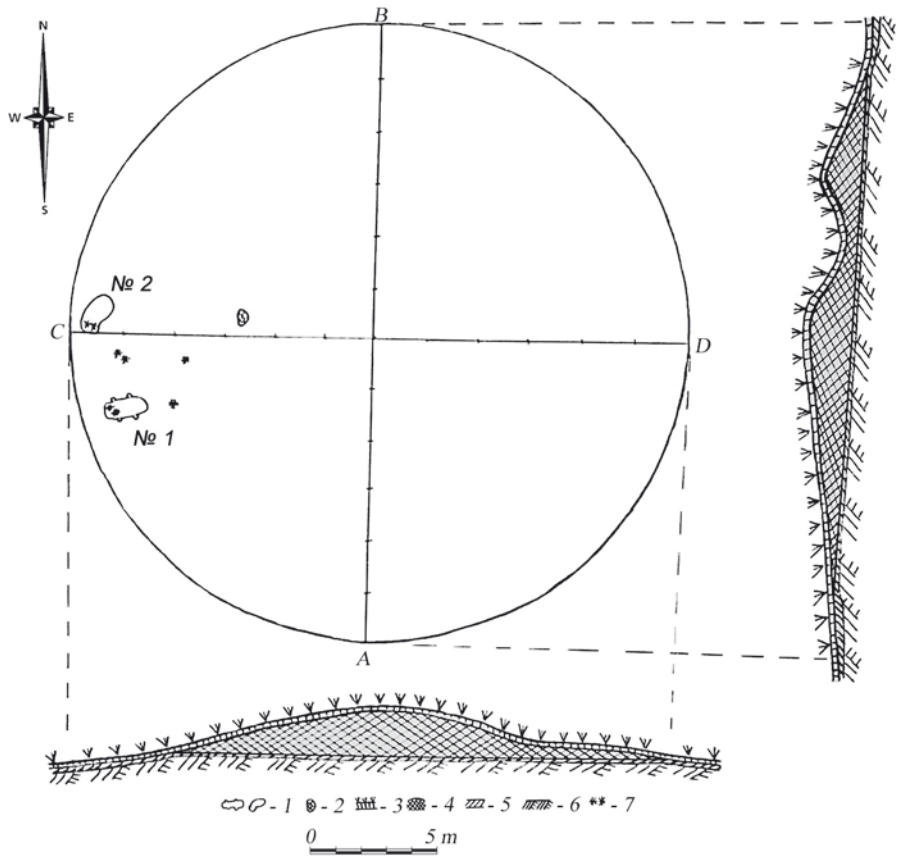

Fig. 4. Bolekhivtsi, Drohobych district. Plan and profiles of Barrow 13.
Legend: 1 – Burials 1, 2; 2 – hearth; 3 – modern horizon and humus; 4- Barrow mound; 5 – ancient humus; 6 – bedrock; 7 – ochre. After Sveshnikov 1978

instance, we know that a layer of oak logs was recorded in Barrow 2 in Kulchytsi at a distance of 0.1 m from the bottom of the pit (Sulimirski 1968, 136). It is not clear whether the bottom of the burial was covered with these oak logs, or they were the remains of the floor that fell on the bottom of the burial. Several burials are known, the bottom of which was paved with oak logs, and the same coverage was on their top (Bolekhivtsi, Barrow 10, Burial 2; Koropuzh; Sulimirski 1968, 125, 126; Sveshnikov 1977, 17-19).

Among the graves with wooden structures, there are also ones with walls covered with wood. In particular, the grave from Barrow 5 in Kolpets is also overlapped by oak logs from above (Sulimirski 1968, 135). The presence of a wooden structure in Feature 4 of Barrow 8 in Nyzhni Hai, is testified by the depressions in the bottom of the pit near its walls on the northern and eastern sides with a width of 5-10 cm, 10-15 cm deeper than the pit's bottom.

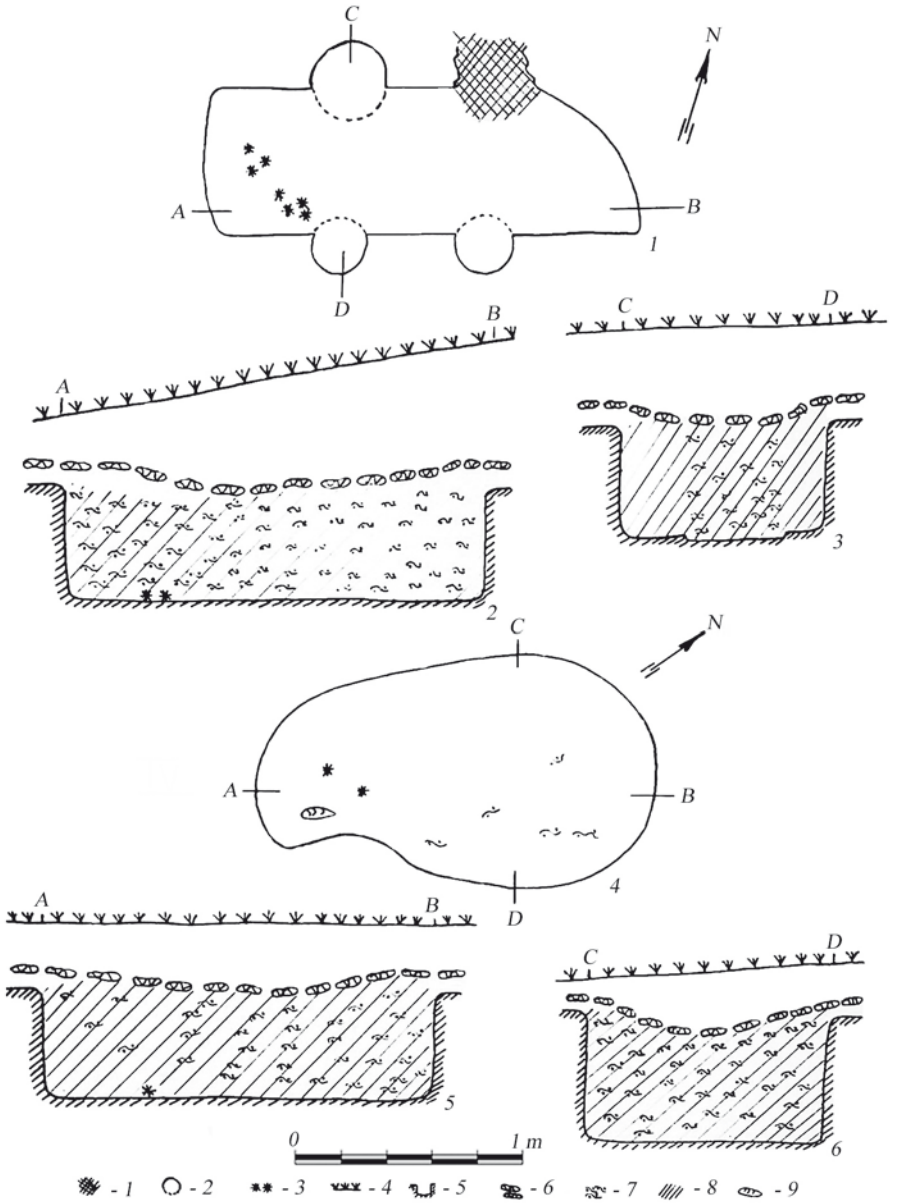

Fig. 5. Bolekhivtsi, Drohobych district. Plan and profiles of the burials of Barrow 13.
Legend: 1 – plan of Burial 1; 2, 3 – profiles of Burial 1; 4 – plan of Burial 2; 5, 6 – profiles of Burial 2.
Legend: 1 – foxhole; 2 – traces of pillar; 3 – ochre; 4 – modern surface; 5 – outlines of burials; 6 – traces of wooden covering; 7 – charcoal; 8 – in-fill of burials; 9 – sharpening stone.
After Sveshnikov 1978

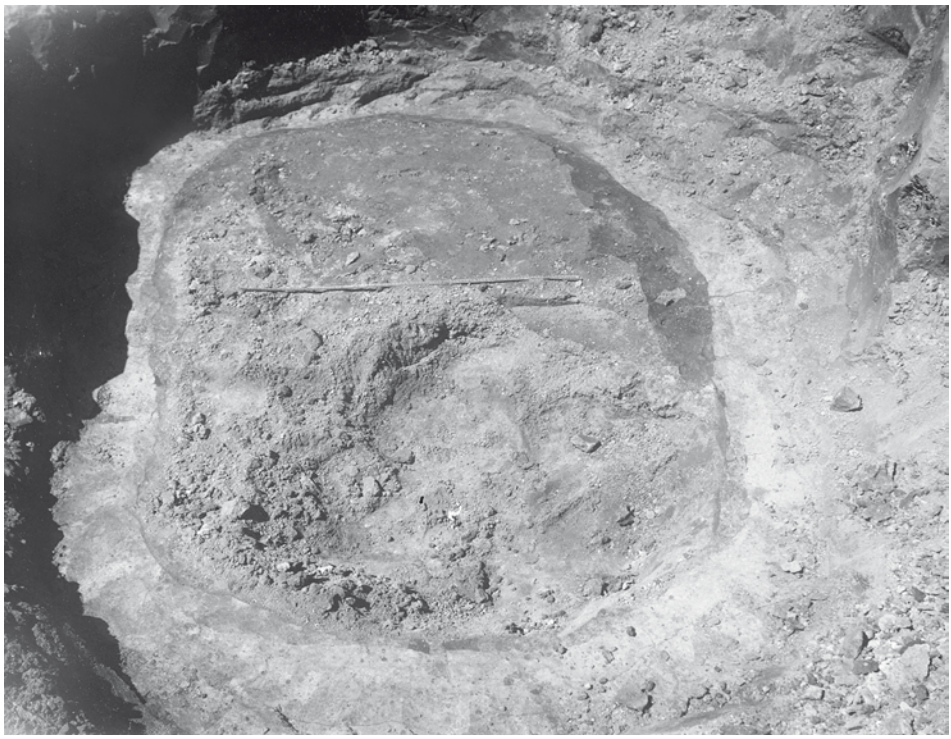

Fig. 6. Kulchytsi, Sambir district. Burial from Barrow 4 on the level of its discovery. Photo by Ya. Pasternak (Scientific archive of the Department of Archaeology of the Ivan Krypiakevych Institute of Ukrainian studies of NAS of Ukraine)

They were probably grooves in which the planks located along the burial walls were inserted (Machnik *et al*. 2011, 62, figs 14-15).

It can be assumed that the oval-shaped burial pit from Barrow 4 in Kulchytsi could also have been covered with wood. This fact is indicated by the darker colour of the in-fill at the edges of the feature at the level of its discovery. Unfortunately, the results of the studies conducted by Y. Pasternak have not been published yet. We managed to identify in the archive of the I. Krypiakevych Institute of Ukrainian Studies of the National Academy of Sciences of Ukraine two photos that show this burial during its discovery and after removal of the in-fill from it. In one of the photos, we can see that the darker spots along the walls of the pit in some places reached a width of up to 0.2 m, and on one of the sides of the burial, there are traces of at least three split logs (Fig. 6), which by their appearance similar to the structural features of funerary features from the barrows in Bykiv, Bihiyivka Place (Machnik *et al*. 2006, 280, 281; fig. 1; foto 10; Machnik *et al*. 2009b, 292, 293; Czopek *et al*. 2016, 328-330).

An interesting construction of a burial pit was researched in Barrow 10 in Bolekhivtsi. Three burial pits were discovered there, that probably belong to adult persons. Such an assumption can be made based on the rather large sizes of these pits (1.0 × 1.65; 1.05 × 1.75; 0.8 × 1.4 m). However, ochre was found in Feature 2, where the grave was surrounded by a heap of bedrock clay, under which, at a small distance from the long walls of the burial, wooden logs were laid in parallel (one on either side). At a depth of 0.3 m from the bottom of the burial pit, a layer of rotten wood was found, which originally covered the burial, but over time it collapsed into the pit`s in-fill. The same layer was found at the bottom of the pit (Fig. 7: 3, 7). Its thickness may indicate that it represents the remains of wooden planks placed lengthwise on the long sides of the pit, and in its central part, they were located across. Several pieces of red ochre were lying on wooden planks near the western corner of the burial. No such structure is witnessed in the two other burials, so Burial 2 was probably the central one. It is also located closest to the center of the mound (Sveshnikov 1977, 17-19).

It is worth noting that in the Upper Dnister region, a heap of bedrock clay around the burial was witnessed only three times – Kulchytsi, Barrow 12; Bolekhivtsi, Barrow 10; Nyzhni Hai, Barrow 7 (Voitovych 2020b, 139). Among these burials, in addition to the one from Bolekhivtsi, described above, ochre was found in the middle of the burial in Barrow 12 in Kulchytsi (Sveshnikov 1970, 2-4).

An unusual discovery was made under the mound of Barrow 7 in Bolekhivtsi. This is the only researched burial of the CWC in the Ukrainian Subcarpathian region, where the walls and bottom of the burial pit were burned into a pink colour. In general, the walls of this burial are much harder than the surrounding ground. The in-fill consisted of saturated black soil with pieces of charcoal and ash. Near the northeastern edge of the burial three larger pieces of charcoal – the remains of a burnt pillar and a plank (deck) were recorded. The bottom of the burial is covered with a layer of ochre (however irregular). Its larger concentration was found near the southwestern edge. No traces of skeleton or grave goods were found (Sveshnikov 1977, 15, 16).

Now let us consider how exactly the ochre got into the burials. It should be recalled that we are dealing with a source base formed from half a century to a century ago (except the research conducted in Nyzhni Hai). Therefore, it is quite difficult to separate bits of information and systematize them. Additional inconvenience is caused by the absence, in most instances, of preserved skeletons. Generally, in five cases it is noted that the deceased lay in a crouched position in the middle of the grave (Velyka Ozymyna, Barrow 2; Koropuzh; Kulchytsi, Barrows 1, 7, 12). Among them in three cases was indicated that the skeleton lays on its right side – Velyka Ozymyna, Barrow 2; Koropuzh, Kulchytsy, Barrow 1 (Sulimirski 1968, 125, 136, 138; Sveshnikov 1970, 3, 4; 1971, 64). Also, in three instances, the head of the deceased was directed to the southwest (Velyka Ozymyna, Barrow 2; Kulchytsi, Barrows 1, 12), less often to the west (Koropuzh; Kulchytsi, Barrow 7; Sulimirski 1968, 125, 136, 138; Sveshnikov 1970, 3, 4; 1971, 64).

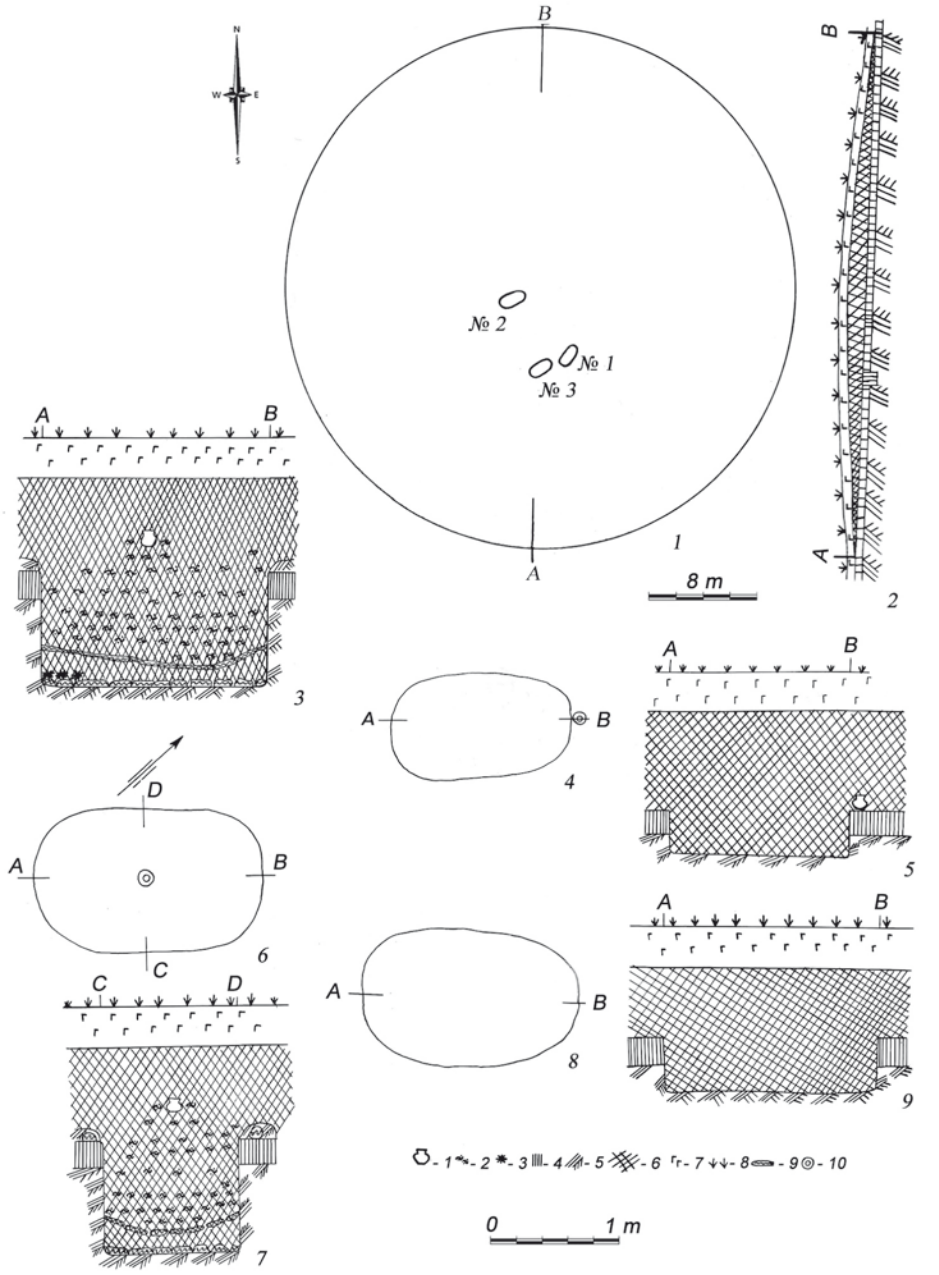

Fig. 7. Bolekhivtsi, Drohobych district. Plan of Barrow 10 (1), stratigraphic profile (2), plans and profiles of the burial of Barrow 1: 3, 6, 7 – Burial 2; 4, 5 – Burial 3; 8, 9 – Burial 1. Legend: 1, 10 – ceramic ware; 2 – pieces of charcoal; 3 – ochre; 4 – loam soil; 5 – bedrock; 6 – infill of burials; 7 – humus; 8 – level of modern surface; 9 – pieces of wood. After Sveshnikov 1977

More often can be noted that the skeleton is covered with a layer of ochre (Bolekhivtsi, Barrow 3; Velyka Ozymyna, Barrow 2; Koropuzh; Kulchytsi, Barrows 1, 7, 12; Pidhoroddia, Barrows 1, 2; Sulimirski 1968, 135, 136, 138, Sveshnikov 1970, 3-4; 1974, 30; 1977, 9; Pasternak, 1978, 70). For example, in Barrow 12 in Kulchytsi, the bottom of the pit was covered with a thick layer of ochre, which repeated the pose of the buried person. The deceased was lying with his head directed to the southwest. His left hand was placed across the abdomen, and the right hand was bent at the wrist and directed to the right shoulder (Sveshnikov 1970, 3, 4). It seems that often the whole body of the buried person was covered with ochre. Moreover, it is emphasized that ochre was more intensively applied to the skulls of the deceased (Kulchytsi, Barrow 1; Pidhoroddia, Barrows 1, 2; Sulimirski 1968, 136; Pasternak 1978, 70). We can assume that the head of the deceased from Barrow 7 in Bolekhivtsi was also covered with ochre more intensively because I. Sveshnikov noted that relatively more remains of ochre were found in the southwestern part of the grave (Sveshnikov 1977, 16).

In some graves, the ochre was found only on one side of the burial, most likely, in the place where the head of the buried person was placed. It is most often recorded in the western part of the grave: Bolekhivtsi, Barrow 3, 10 (Burial 2), 13 (Burial 1, 2); Kulchytsi, Barrow 2; Nyzhni Hai, Barrow 10 (Burial 6; Sulimirski 1968, 136; Sveshnikov 1977, 9, 19; 1978, 20, 21; Machnik *et al*. 2011, 116). Separate pieces of ochre were also found in the burials. In this form, it was discovered in a barrow grave field in Kolpets (Barrows 2, 3, 5, 7; Sulimirski 1968, 133-135) and Nyzhni Hai (Barrow 8,Feature 4; Barrow 10, Features 4 and 6; Machnik *et al*. 2011, 62, 96, 116). As a result of the identification of the mineralogical and chemical composition of four samples of ochre obtained from the Barrows in Nyzhni Hai, it was established that its main component is hematite formed by the process of purposeful heating of ochre, which led to the appearance of a red colour (Ratajczak and Sala 2011, 188, 189). Ochre of the same colour was discovered in Barrow 1 in Krylos (Pasternak 1936, 132). In the burial in Koropuzh, yellow and red ochre is present (Sulimirski 1968, 125).

In two cases, ochre was placed in a ceramic vessel as a gift for the buried person. A small bowl discovered by P. Zavada in Barrow 7 in Kulchytsi was filled with it (Sveshnikov 1974, 30). In another case, recorded in Barrow 9 in Bolekhivtsi, we know that ochre was found in the form of separate pieces at the bottom of the burial pit, and its greater concentration was discovered above and below the remains of a poorly preserved ceramic vessel, of which only several fragments survived. According to I. Sveshnikov, this small-sized vessel was decorated with a horizontal impressions of a thin cord and a band of triangular notches (Sveshnikov 1977,17).

Unfortunately, in some cases, there is only a brief note that a burial with ochre had been found (Krylos, Barrow 1; Kulchytsi, Barrow 4; Pasternak 1936, 131, 132; 1937, 251). In the case of Barrow 8 in Kulchytsi, we find out about the presence of ochre from the metrical documentation which accompanies the artefacts from this Barrow, stored in the stock

collection of the Department of Archeology of the I. Krypiakevych Institute of Ukrainian Studies of the National Academy of Sciences of Ukraine. It says that this material and clods of the earth with ochre are from the grave in Barrow IV (numbering of the barrow by P. Zavada).

INVENTORY OF BURIALS

Graves of the CWC in the Upper Dnister region are in most cases quite poor. The same trend is observed in burials with ochre. Only 17 of them were accompanied by grave goods. Two Barrows in Pidhoroddia are not included here. The researcher of this site gives information that fragments of unornamented vessels, flint and stone axes were found inside the burials, but without specifying what exactly was found in each burial (Pasternak 1978, 70). Only in Barrow 3 in Kolpets, was the burial accompanied by ceramic ware together with stone and flint items. Tadeusz Sulimirski provides information that three vessels decorated with a cord that could not be restored (a cup, a bowl, and a ladle), a flint knife, and a battle ax made of lime sandstone were discovered here (Sulimirski 1968, 133). In the other two cases, vessels accompanied by stone or flint items were discovered in the graves. Thus, a ceramic vessel from Barrow 7 in Kulchytsi was found together with a chisel made of sandstone (Fig. 8: 1-4; Sveshnikov 1974, 30) and a flint knife was discovered inside the burial in Koropuzh together with a clay amphora (Sulimirski 1968, 125).

In two of the three burials in Nyzhni Hai (Barrow 8, Feature 4, Barrow 10, Feature 6) one goblet was placed in each (Machnik *et al.* 2011, 74, 116). One vessel that could not be restored came from the burial of Barrow 9 in Bolekhivtsi (Sveshnikov 1977, 17). At the same grave field, several small fragments of ceramic vessel were found in the burial of Barrow 14 (Sveshnikov 1978b, 22). In another case, a clay amphora stood near a burial pit (Kulchytsi, Barrow 2; Sulimirski 1968, 136).

In Burial 2 of Barrow 13 in Bolekhivtsi, a grinding stone, most likely made of sandstone pebble, was found. It was recorded in the southwestern part of the grave together with two pieces of red ochre (Sveshnikov 1978b, 21).

Objects made of flint, as a gift to the deceased, were discovered in graves much more often than stone artefacts. Three graves contain one axe each. Moreover, one of them is rectangular-sectioned (Kulchytsi, Barrow 1), and two are lenticular-sectioned (Kolpets, Barrows 2 and 5; Sulimirski 1968, 133, 134, 136, fig. 15: 14). A lenticular axe from Barrow 5 in Kolpets was found together with a flint knife (Sulimirski 1968, 134). Another knife made on a blade of Turonian flint from the Volhynian region was found inside the burial of Barrow 2 in Bolekhivtsi (Sveshnikov 1977, 7; pl. 13: 10). Two scrapers that came from the grave of Barrow 4 in Kulchytsi were deposited in the Museum of the Shevchenko Scientific Society in Lviv (Pasternak 1937, 251).

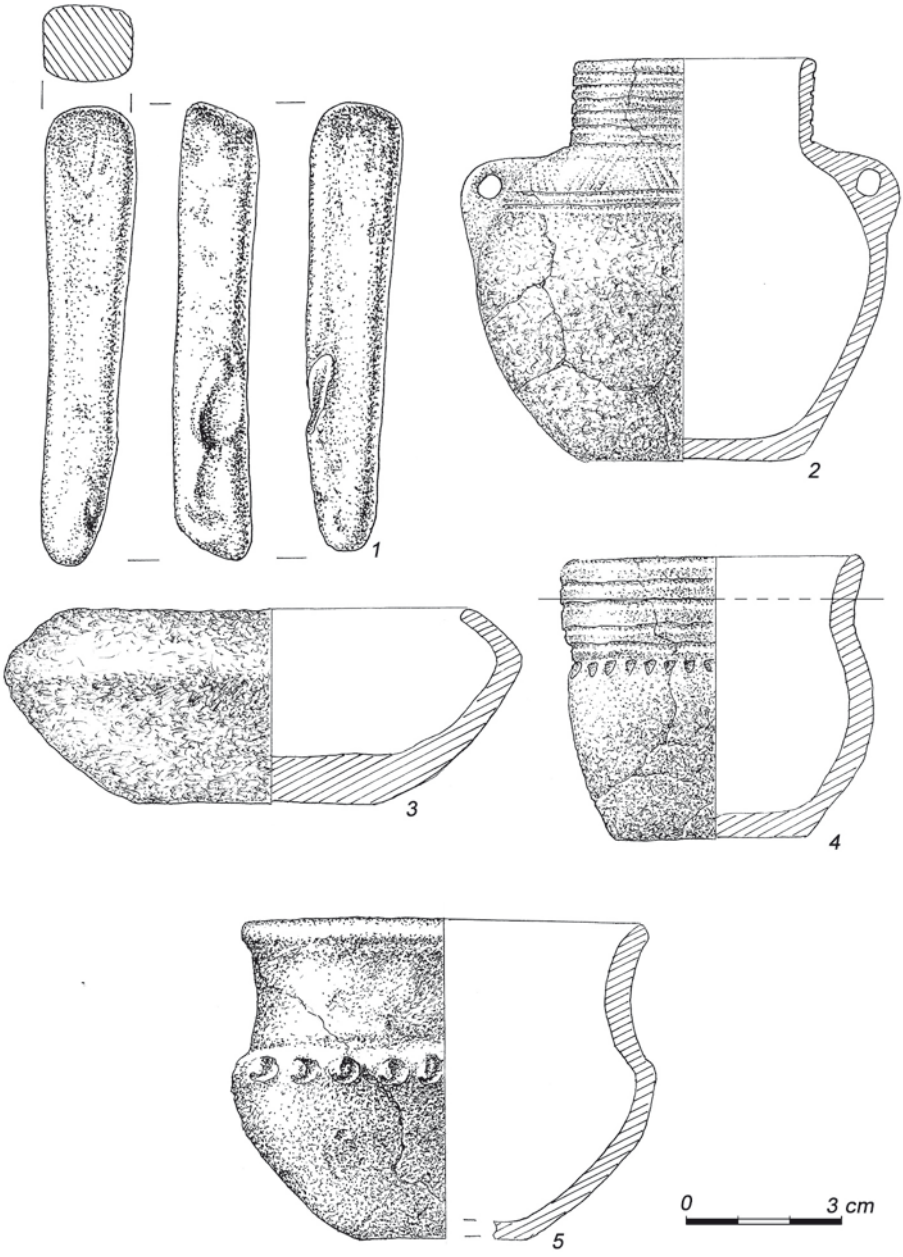

Fig. 8. Kulchytsi, Sambir district. Ceramic (2-5) and stone (1) items from Barrows 7 (1-4) and 8 (5). Illustrated by M. Voitovych

OCHRE AT THE ORIGINAL GROUND LEVEL

Ochre at the level of the ancient surface is witnessed six times. In three of them, it was also found inside the burials researched there (Bolekhivtsi, Barrows 2, 10 and 13). That gives us a reason to associate its presence here with these burials and indicate certain rituals during the burial. In particular, the ochre in Barrow 10 in Bolekhivtsi was found in the central part and is located closest to Burial 2, inside which it is also present (Sveshnikov 1977, 19, 20). It is interesting that in Barrow 13 it was found in three concentrations and placed around Burial 1. The accumulations of ochre were 5-10 cm in diameter. The first was placed at a distance of 1 m to the east of the burial, the second – 2.5 m to the northeast, and the third – 2 m to the north (Sveshnikov 1978b, 20).

A different situation can be seen under Barrow 3 in Kulchytsi. Here, at a distance of 3 m to the southeast, a burial pit without a preserved skeleton was discovered. However, it had

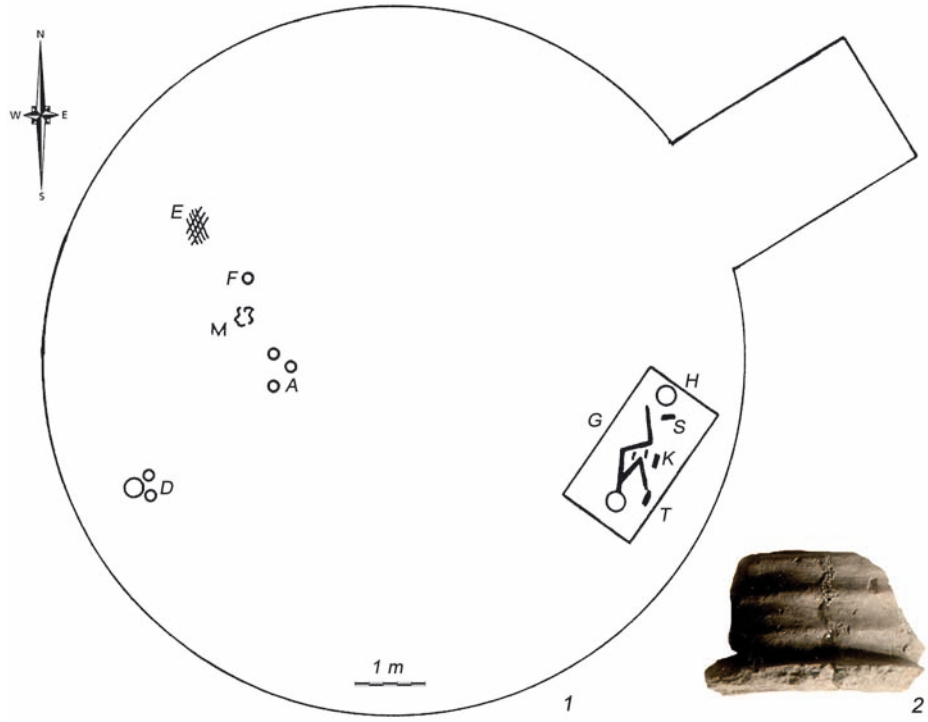

Fig. 9. Kulchytsi, Sambir district. 1 – Plan of Burial 3 (legend: A, D, F – fragments of amphorae, found at different depths in the barrow mound and ancient horizon; E – charcoal; G – burial; H – goblet; K – two flint arrowheads and scraper; S – flint axe; T – damaged perforated stone axe); 2 – amphorae rim sherd from the eastern part of Barrow 3 (by 1 – Sulimirski 1968; 2 – Scientific archive of the Department of Archaeology of the Ivan Krypiakevych Institute of Ukrainian studies of NAS of Ukraine)

a fairly rich accompanying inventory consisting of a clay goblet with a rounded bottom, flint arrowheads, a side-scraper, a flint axe, and a stone axe. No traces of ochre were found in the burial (Fig. 9: 1). On the other hand, in the western part of the mound, large pieces of it were found, which were between the fragments of ceramic vessels originating from the amphora and the remains of charcoal (Sulimirski 1968, 136, Plan 30: 1). During the work with archival materials, it was possible to find a photo with an image of the neck of an amphora originating from this accumulation (Fig. 9: 2). The ornamentation of this find in the form of three horizontal grooves attracts attention. It represents the manner of decoration of the early CWC products (Młodkowska-Przepiórowska and Włodarczak 2011, 202). It is most likely that in the place where the ochre and the remains of the broken amphora were found, there was a burial, the traces of which could not be found. Instead, the discovered burial in the eastern part of the mound should be dated no earlier than the middle of the 3rd millennium BC, and it was dug into a much earlier mound of the CWC. Such assumptions are due to the presence in the burial of flint arrowheads, an axe with a lenticular cross-section, and a goblet with a rounded bottom which is more similar to the later products (Voitovych 2012, 151; 2016, 97-99).

In two cases where ochre was discovered at the level of the ancient surface, no remains of skeletons or burial pits were found (Bolekhivtsi, Barrow5; Dashava, Barrow1). Under the mound of Barrow 5 in Bolekhivtsi, red ochre in the form of several pieces was found at a distance of 0.9 m to the southwest of the centre of the barrow. Also, at the original ground level, in several places, there were accumulations of charcoal and small fragments of ceramic ware, brick-coloured on the outside and black on the inside (Sveshnikov 1977, 13). A similar situation was observed under Barrow 1 in Dashava, where pieces of ochre, small fragments of ceramic vessel, and a flint flake were found at a distance of 5 m from the centre (Sulimirski 1968, 130). It is not clear whether the ochre in these two barrows indicated the presence of a burial, which was not dug into the bedrock and due to the peculiarities of the local ground was not traced among the immediate environment, or whether we are dealing with a symbolic burial – a cenotaph.

CHRONOLOGY OF BURIALS WITH OCHRE

It is quite difficult to date burials with ochre, considering the lack of absolute dates obtained by exact methods. The only ^{14}C date made for Barrow 7 in Bolekhivtsi, given the time of the dating conducted, is significantly outdated (2640±105 BP) and needs to be reinterpreted in the direction of increasing the age (Sveshnikov 1978a, 46). Samples of charcoal from Nyzhni Hai that were collected and sent to the Conventional Carbon Dating Laboratory in Kyiv were irretrievably lost (Machnik *et al.* 2011, 7). Thus, burials with ochre can be dated only by the typological comparison of the obtained materials from burials, primarily, from the territory of Central-Eastern Poland (Machnik *et al.* 2009a; Włodarczak 2006).

However, even with the comparison of the small amount of material that we have, we can assume that the ochre in the burials of the CWC north of the Carpathian mountains was used for a long time, and possibly during the whole period of existence of this culture. However, the latter suggestion needs to be verified by the following studies. The earliest burials (phase I), which are associated with the pan-European horizon, and in which ochre was found, are represented by Barrows 7, and 8 in Kulchytsi (Machnik 1979, 55; Jarosz 2012, 324, 325). In Barrow 7, two of the three indicators (amphora and cup), which belong to the early phase of the CWC, were found inside the grave. Regarding Burial 8, we doubt whether the amphora and the small pot originate from the same grave. It is not indicated on the last ceramic vessel (Fig. 8: 5) that it was discovered exactly in the burial, as it is noted, for example, on the inventory from Barrow 7. Information with a detailed description of Barrow 8 has not been preserved, but in the source where the items are published is noted, without further detail, that there was an amphora and a pot from a Barrow (Sveshnikov 1974, fig. 6, 4, 6). Features of the ceramic body, surface treatment, and shape of vessels are not typical for ceramics of the CWC. It is most likely that there is an intrusive, much later burial here.

Other amphorae (Kulchytsi, Barrow 2, 3; Koropuzh; Figs 10 and 11) found in barrows with ochre should be dated to the II phase of the development of the CWC in Sub-Carpathian region, which P. Jarosz dates to the second quarter of the 3rd millennium BC (Jarosz 2011,

Fig. 10. Koropuzh, Lviv district. Remains of amphorae in the burial.
Photo by T. Sulimirski (Scientific archive of the Department of Archaeology of the Ivan Krypiakevych Institute of Ukrainian studies of NAS of Ukraine)

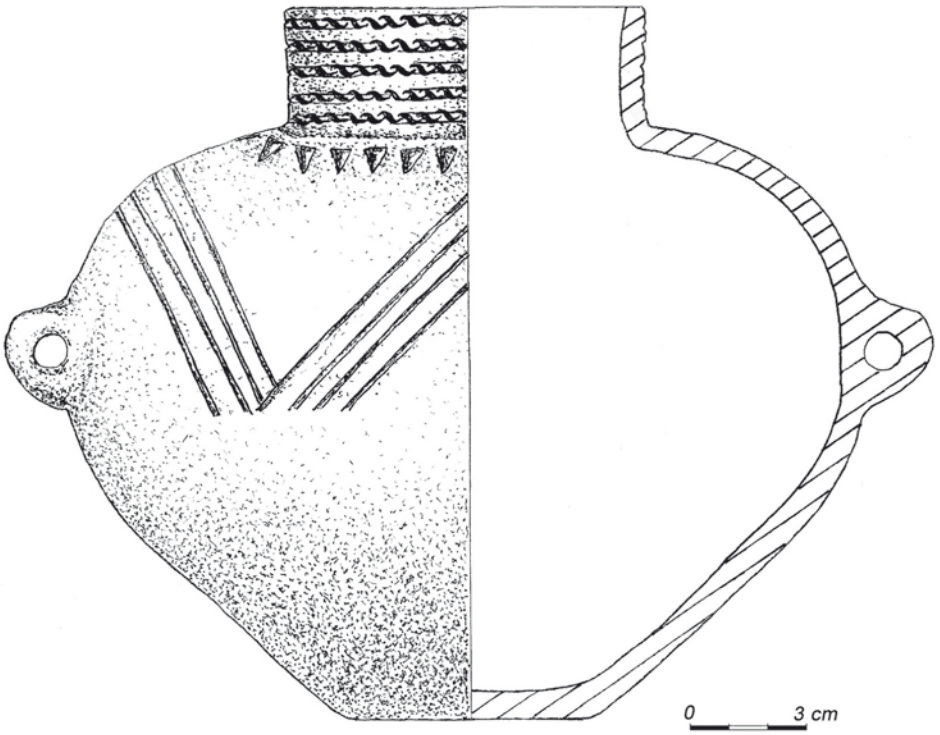

Fig. 11. Koropuzh, Lviv district. Ceramic amphorae from the grave. Illustrated by M. Voitovych

268). Researchers date the goblet from Barrow 8 in Nyzhni Hai to the middle of the 3rd millennium BC and associate it with influences on ceramic production of the Middle Dnipro culture (Machnik *et al.* 2011, 106).

Findings of flint axes with a lenticular cross-section, which were discovered inside two graves in Kolpets, help to establish the relative chronology of some burials with ochre (Sulimirski 1968, 133, 134). J. Machnik defines such finds as type III according to his classification (Machnik 1966, 46). Type III axes were included in the burial inventory of the Sokal group of the CWC (Koman 1997, 39, fig. 3: 5; Machnik *et al.* 2009a, 26, 27, 46, 50, 91, 94, figs 13: 5; 35: 1; 68: 1). In one of the barrows researched there, two flint axes with a rectangular cross-section were found together with a lenticular one (Hubinek, Site no. 4, Barrow 1, Feature 2; Bagińska 1998, 69, 75, fig. 5: b-d). Such observations confirm the fact that flint axes with a rectangular cross-section existed for a certain time in parallel with lenticular ones (Dobrakowska and Włodarczak 2018, 157). All studied burials, where lenticular objects were found, date from the middle of the 3rd millennium BC (Machnik *et al.* 2009a, 203, 206, 208, 230). It seems impossible to date other burials due to the absence of grave goods, or the lack of detailed descriptions and items from these graves.

DISCUSSION

Currently, ochre has been found only exceptionally in barrow burials in the Upper Dnister region. However, it should be pointed out that there are practically no known flat graves of the CWC here, and (except two burials in Berezets) most of those discovered are related to the late period of the culture (Voitovych 2020a, 79–83). It is difficult to determine whether this situation is due to insufficient knowledge of the sites of the CWC in the Upper Dnister region or rather indicates the «unpopularity» of this type of burials compared to barrows. The current source base indicates that the scheme of burial customs that existed on the territory of Central-Eastern Poland, did not appear here or exist in a mixed form. There, the custom of raising barrows gradually disappears in the CWC environment and has a new development in the Komariv culture (Makarowicz 2011, 150-155).

In the Kraków-Sandomierz, Lubaczów, and Podillia groups, there is practically no evidence of the custom of covering the dead with ochre. An exception is the niche burial researched in Koniusza (Tunia 1979, 50). Also, another one, in which ochre is present, origins from the territory of Sokal Ridge (Machnówek; Włodarczak 2014a, 331). On the other hand, a few more burials where ochre was used are known in the Middle Dnipro culture (Buniatian 2007, 43; 2008, 6). Thus the largest number of graves with this natural mineral paint (six cases) was discovered in upright burials (Buniatian 2005, 28). In burials of Globular Amphora culture there are a few more (Kolodiazhne, Skolobiv, Ostrog, Kikova I, Suyemtsy II, Zavadyntsy; Sveshnikov 1983, 13; Szmyt 2010, 29). However, the number of these burials is not proportionate to the Upper Dnister burials. In general, ochre is characteristic of the Yamna culture (Shaposhnykova 1971, 268, 272).

The presence of ochre in the burials of the CWC should be associated with the influence of the steppe. In addition, one of the routes of penetration of the population of Yamna/Catacombna cultures into Central Europe passed through the territory north of the Carpathian mountains (Włodarczak 2014b, 11, fig. 2). Of course, there are not so many marker finds that duplicate this path, but they exist anyway. First of all, this concerns one of the excavated burials in Święte on the San River (Kośko *et al*. 2012, 67, 68; Olszewski and Włodarczak 2018, 35-41) and the burial under a mound in Komarno (Ivanova and Voitovych 2021, 63). In the latter, a ceramic vessel typical of the population of the Yamna culture from the Northern Black Sea region was found. This find indicates which population migrated to Central Europe (Ivanova and Voitovych 2021, fig. 5).

Influences on the funeral rite can also be traced. In addition to ochre, a third of the burials contain the remains of wooden structures. Moreover, wall-facing is rare. As we can see from the presented examples, the bottom of the grave was mostly lined with wood or covered with it. And in some places, traces of flooring and covering have been preserved, as in Burial 2 of Barrow 10 in Bolekhivtsi. It is interesting that in this burial the covering was made in the direction of the longer walls of the grave (Sveshnikov 1977, 19). In this way, the central burials of the Yamna culture were covered (Ivanova 2021, 46). Only on the

territory of the Upper Dnister region was recorded the fact of additional covering of graves with wooden flooring, the sizes of which exceeded several metres. And in the case of Barrow 13 in Bolekhivtsi, two burials were covered with flooring (Sveshnikov 1978b, 21).

I. Sveshnikov, the researcher of the site in Bolekhivtsi, noted that in the local funeral rites significant influences from the Northern Black Sea region, in particular, can be traced (Sveshnikov 1978a, 47), and it should be noted that this is in an area where organic remains are poorly preserved. However, the archaeologist did not publish the results of these works, except short theses about research in Bolekhivtsi (Sveshnikov 1978a, 45-47). Therefore, the presence of wooden flooring in the burials of the CWC has remained outside the attention of researchers.

CONCLUSIONS

During the analysis of burials with ochre, it was observed that wooden structures in the form of flooring or ceilings are often found in such graves. The latter are impressive in size. Ochre is recorded both on the original ground level and inside burials. Despite the poor state of the source base, it can be safely asserted that the body of the dead was covered with this mineral substance, and its separate lumps were placed nearby, sometimes inside ceramic vessels. On the body of the dead, as we can conclude based on preserved skeletons, its greater concentration is recorded on the head. Therefore, we assume that in burials where no bones have been preserved, the presence of ochre in the graves indicates the orientation of the head according to the cardinal directions.

On the basis of the facts mentioned above, we consider that the custom of covering bones with ochre in the burials of the CWC in the territory of the Northern Sub-Carpathian region existed from the time of the appearance of the first sites of the CWC until the middle of the 3rd millennium BC. It is difficult to say whether ochre was used in later burials since the source base does not indicate this yet. We associate the presence of ochre in the burials of the CWC in the Upper Dnister region with the influence of the population of the Yamna culture, where its presence in burials is typical.

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FOLLOWING THE TRACES OF THE EARLIEST CORDED WARE IN MORAVIA AND STEPPE ELEMENTS IN ITS CONTENT

ABSTRACT

Peška J. 2023. Following the traces of the earliest Corded Ware in Moravia and steppe elements in its content. *Sprawozdania Archeologiczne* 75/1, 141-174.

The earliest Corded Ware is very poorly represented in Moravia (several type A, Moravian-type, hammer-axes, settlements with the so-called Wellenleistentöpfe: Olomouc-Slavonín, Horní lán) and the situation is not much better even in the earlier Moravian Corded Ware Culture (MCWC) period (the Palonín settlement, graves at: Dub nad Moravou, Hradisko u Kroměříže, Němetice). Among the local MCWC (over 90%; 2700/2600-2400/2200 calBC) we find a number of components linking this to Eastern Europe both in the burial ritual (grooves around graves, internal construction, burials in the frog position, graves of metallurgists) and in the material content (daggers/razors with a tang, hammer-shaped pins, a beaker decorated with a cord and a fishbone motif) with numerous analogues in the Yamna and Catacombna cultures of the Carpathian, Balkan and northern Pontus.

Most surprising is a group of MCWC graves with grooves at the bottom, interpreted as burials on all-wood four-wheeled ceremonial wagons with direct counterparts in the Maikop, Yamna, and Catacombna cultures of eastern Europe.

Keywords: Moravia, Moravian Corded Ware Culture, Eastern European elements, Yamna culture, Catacombna culture, wagon burials

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INTRODUCTION

Since the origin of the Corded Ware civilization in Eastern Europe is generally accepted, the range of Eastern elements in its content in Moravia is not surprising. The question remains, however, as to which part of them can be associated directly with the steppe elements appearing in the interior of Europe at the beginning and during the 3rd millennium BC.

At the turn of the Late and Final Eneolithic, several cultures with different origins appear in the field of Moravian prehistory (Postbaden Jevišovice Culture, Bošáca, Globular Amphora Culture, Makó/Kosihy-Čaka?, Strachotín-Držovice horizon) (Fig. 1). The relationships to the earliest Moravian Corded Ware Culture (MCWC) are particularly evident in the late phase of Jevišovice Culture with a noticeable interference of the Coţofeni III and even more Livezile cultures from western Transylvania (air distance 450 km) in the period 2780-2560 calBC (Peška 2011; Ciugudean *et al.* 2022). To these is added a specifically equipped skeletal burial of a young child (Kroměříž 3 – Miňůvky) in a large grave pit with a double-sided decorated lublan bowl and an askoid jug (Peška 2011, fig. 1). We are able to map the path of the shift of part of the population across Eastern Slovakia in the Late Baden environment (Zemplín, Spiš, Šariš: Horváthová and Chovanec 2006), but also, for

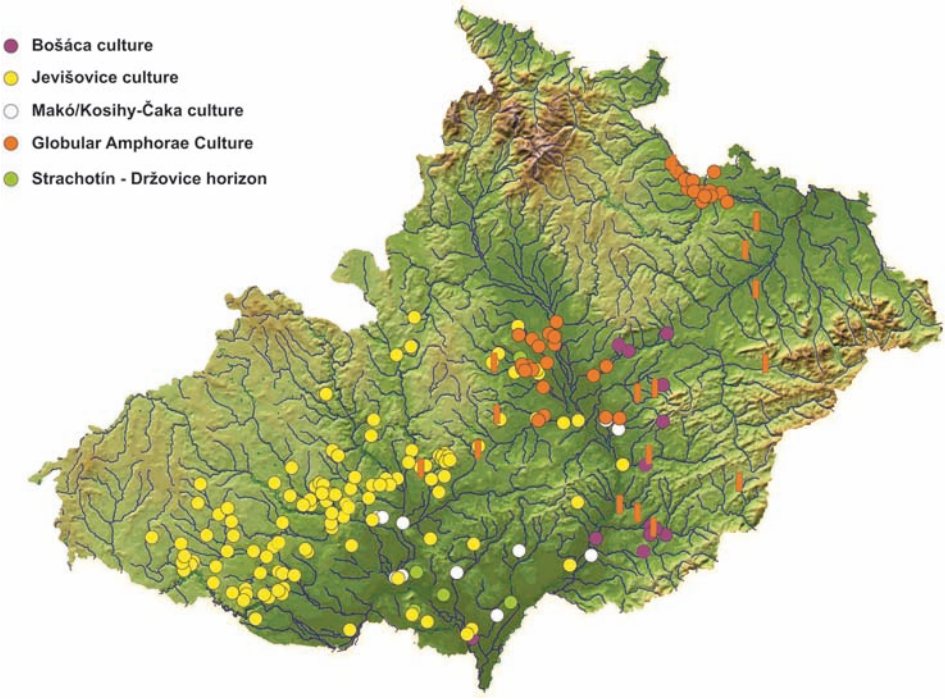

Fig. 1. Map of cultural representation of the Late Eneolithic period in Moravia. Map by P. Grenar

example, by material and a cremation (?) at Trebatice in via SW Slovakia (Němejcová-Pavúková and Klčo 1986), and echoes can even be seen in the content of the Řivnáč culture in Central Bohemia (Zápotocký and Zápotocká 2008, fig. 65: 171, 172; tab. 34: 1; 78: 2). Important is the fact that this happened in the period 3000/2900-2800/2600 calBC, which is the time of the ongoing invasion of the holders of the Yamna culture (Yamna Culture) into the interior of Europe (Ciugudean *et al.* 2023). The relatively strong settlement at the end of the Jevišovice Culture may then account for the absence or only sporadic presence of the earliest and earlier CWC in Moravia.

THE EARLIEST CORDED WARE IN MORAVIA

The earliest corded ware according to the traditional Buchvaldek classification – find group I (FG I) – is very poorly represented in Moravia and is represented by finds of A-type hammer-axes, or Moravian type with the possibility of a longer lifetime (graves of local development: Velešovice I, 1985, H 1, Vážany nad Litavou), coming mostly from isolated finds (Fig. 2). The easternmost evidence of the A-horizon settlement are fragments of

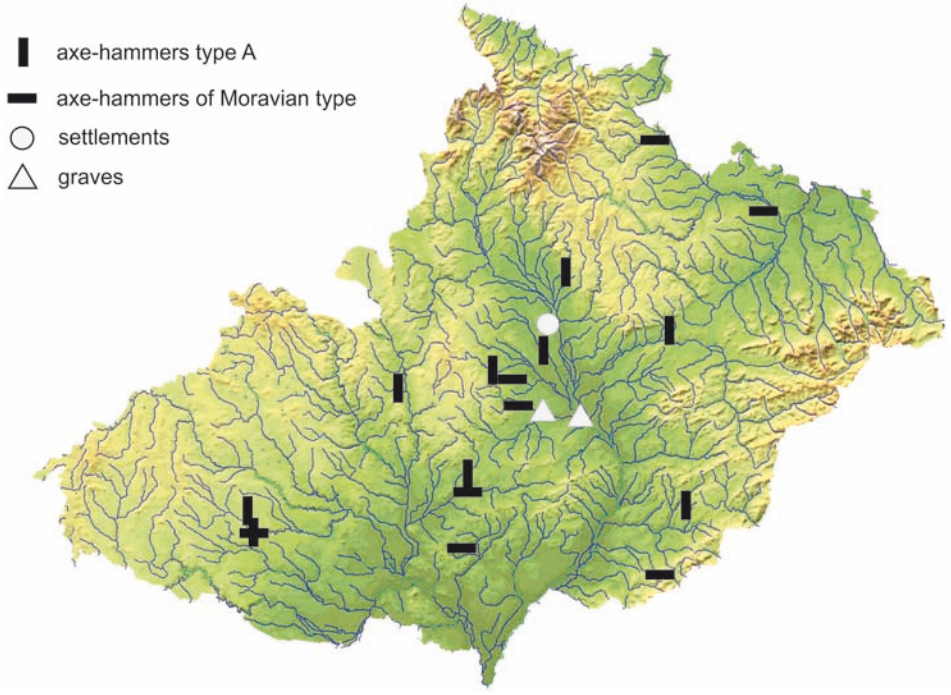

Fig. 2. Map of Moravia with distribution of A-type hamer-axes, Moravian-type hamer-axes, earlist settlements and graves of the MCWC. Map by P. Grenar

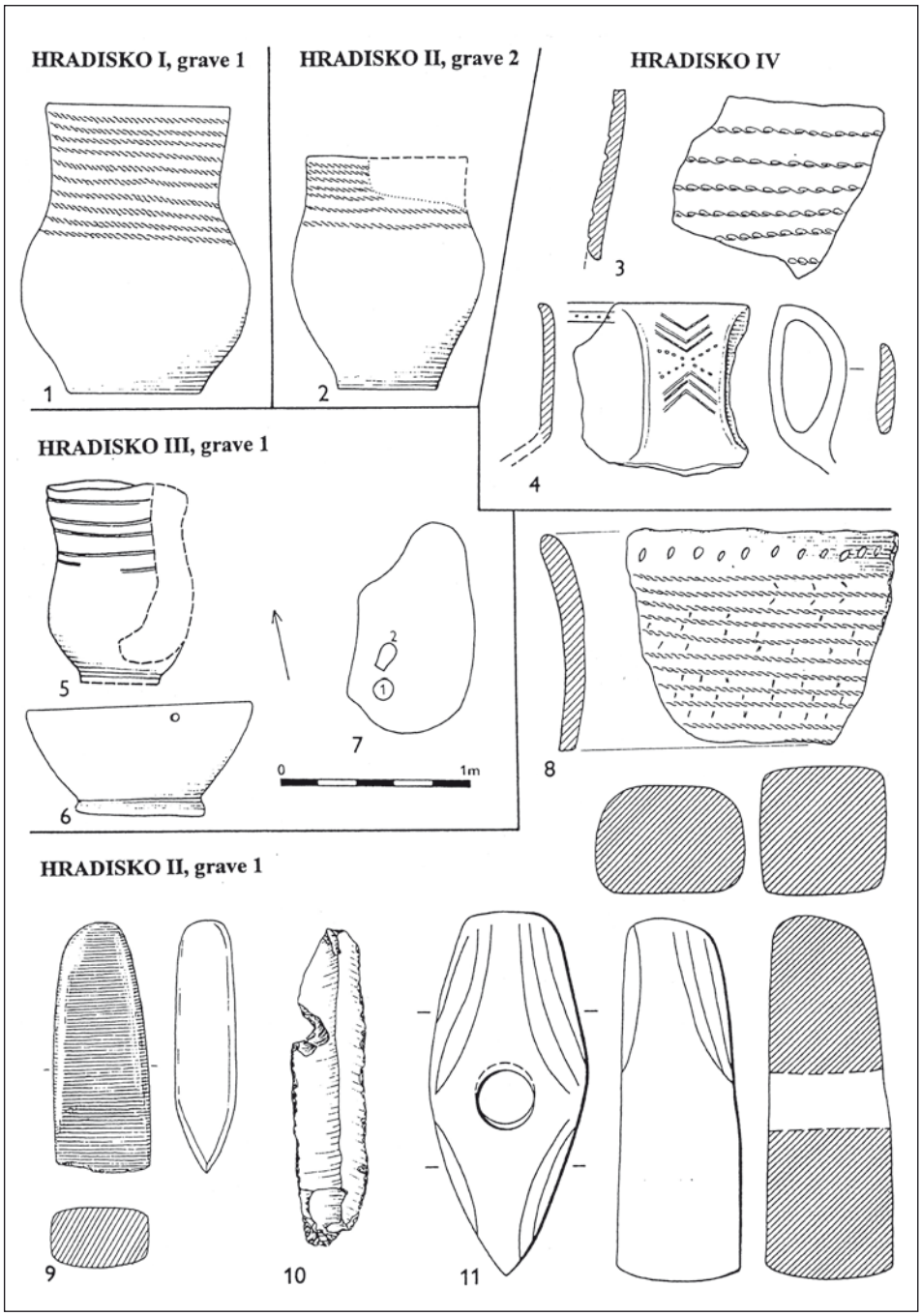

Fig. 3. MCWC representatives (FG I) according to L. Šebela (Šebela 1999)

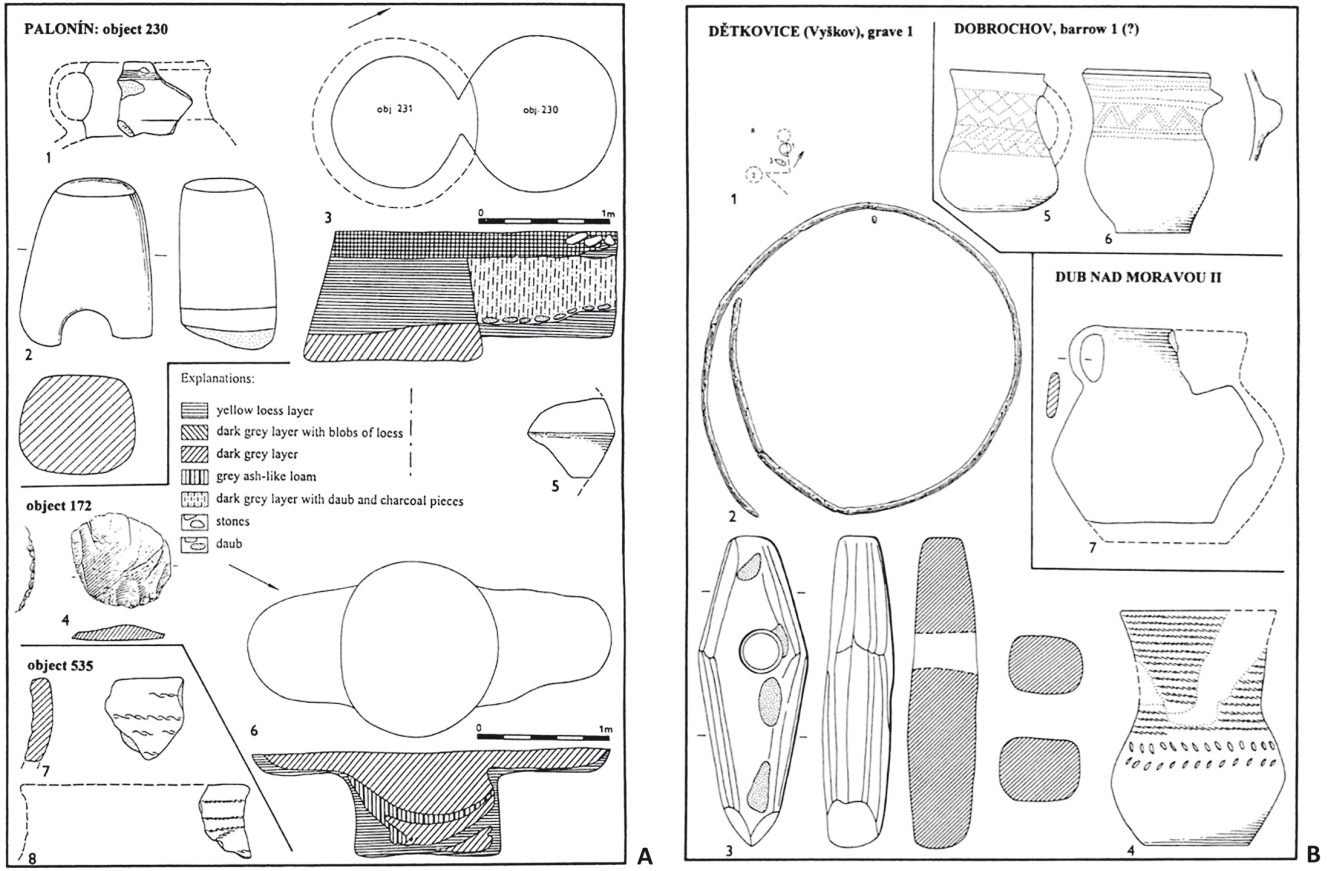

Fig. 4. Representatives of the earlier MCWC period (FG II) according to L. Šebela. A – the settlement in Palonín, Dist. Šumperk; B – graves of Dětkovice, Dist. Prostějov, Dobrochov, Dist. Prostějov, Dub nad Moravou II, Dist. Olomouc (Šebela 1999)

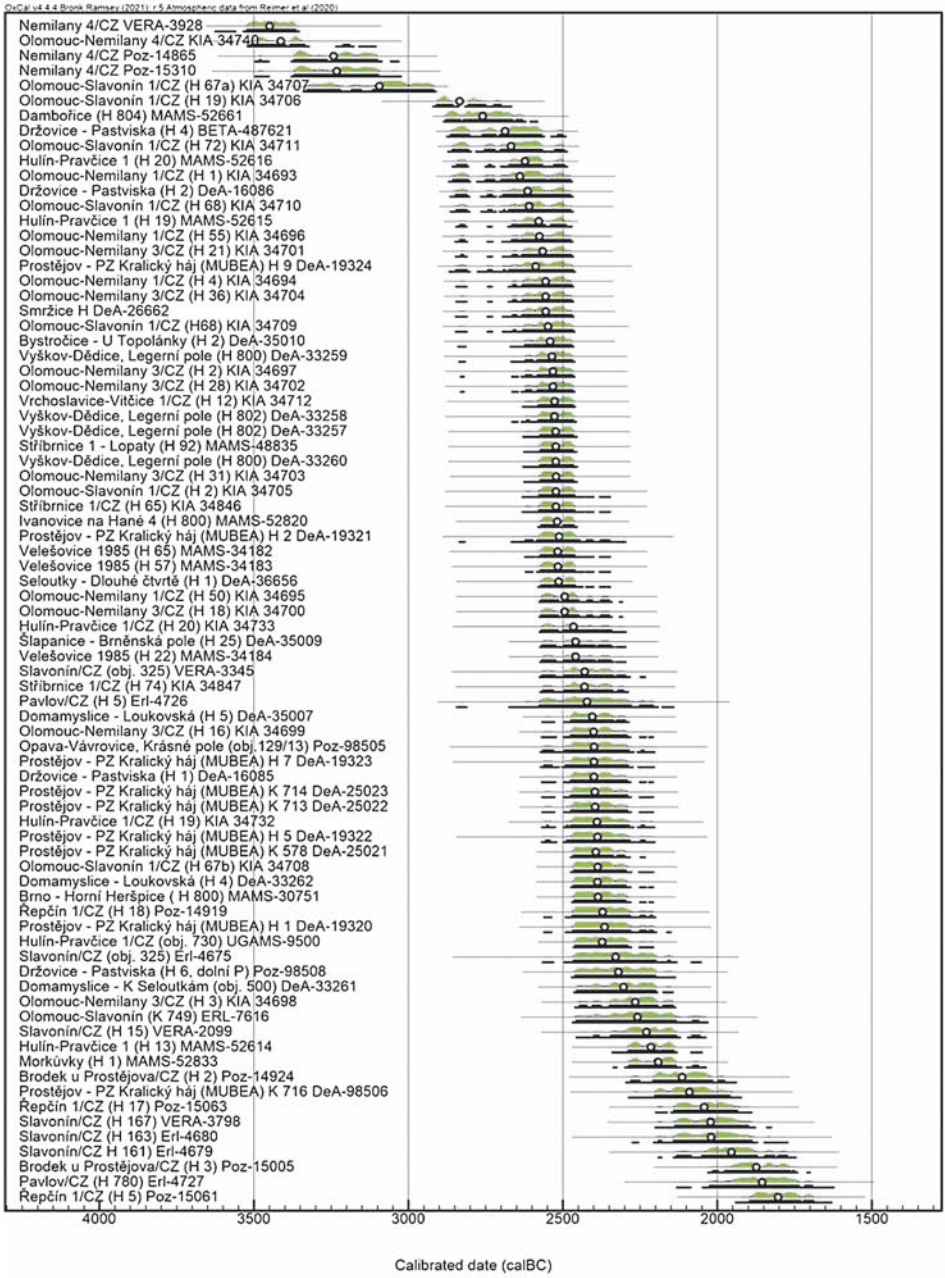

Fig. 5. Summary of absolute MCWC data. OxCal calibration vers. 4.4.4.

the so-called Wellenleistentöpfe and corded beakers from Olomouc-Slavonín (Peška 2000) as intrusions in chronologically younger features. Of special note is the collection of A-type and Moravian-type hammer-axes from layer B in Jevišovice, including blanks indicating local production (Šebela 1997). It is a significant evidence of the synchronization of the MCWC with the Jevišovice culture. Sporadic grave units with simple equipment of corded beakers and bowls are available from Central Moravia (Hradisko u Kroměříže III, H1; Němčice nad Hanou (Fig. 3). The absence of A-amphorae as well as the new excavations documenting grave complexes of the Early Corded Horizon in Moravia testify to the gradual colonization of the area.

The situation is not much better even in the earlier MCWC (FG II), which perhaps includes the settlement with a pair of pits from Palonín, graves from Dub nad Moravou, Hradisko I H1, Hradisko II, H2, Uhřice u Kyjova, mounds from Němetice (no. 7 and 1 with a Silesian hammer-axe) and a grave with a faceted hammer-axe and copper necklace from Dětkovice in the Vyškov region, accompanied by an ancient beaker (Fig. 4). Neither of the above-mentioned find groups is a full-fledged form of settlement activity, so we must expect a gradual infiltration into the existing structure of the domestic settlement.

More than 90% of the MCWC inventory belongs to the local development, where corded beakers (except for type B1) together with classical Dřevohostice jugs, but also beakers decorated with a fish bone motif (Fischgrätenbecher), considered older in the western CWC groups, but surviving at least during Phase IIIa in Moravia, are common in the graves at the beginning. We have hundreds of grave units from smaller group, originally mound-type, chronologically rather closed burials with rich ceramic production of their own (amphora-shaped jugs, amphorae, derivatives of Dřevohostice jugs), but more with designs in the Carpathian Basin (Balkan and Ökörhalom jugs, egg-shaped pots, Moravian-type bowls, other types of amphorae, *etc*). The division of the local development into three phases, IIIa-IIIc according to L. Šebela is still a subject of discussion (the separate appearance of distinctive ceramic types in Moravia does not apply to the Carpathian Basin, *etc.*).

Recent excavations have repeatedly provided evidence of the existence of agricultural settlements from the period of local development (Peška *et al.* 2021) with sunken pits, yet without evidence of dwellings (Olomouc-Slavonín, Horní lán, Vřesovice, Hulín-Pravčice 1, Prostějov – industrial Zone: Fojtík 2019; Peška *et al.* 2021). The Makó/Kosihy/Čaka influence is also strongly present in the settlement component. The first series of absolute data are available (Fig. 5), which indicate the presence of a local MCWC in the period 2700/2600-2400(2200) BC. No data are available from earlier periods (unlike, for example, Bohemia).

CONTACTS WITH EASTERN EUROPE

Elements linking our region with Eastern Europe appear in the MCWC funeral ritual and inventory. The number of graves with ring ditches is slowly increasing (Holubice VII, Babice u Šternberka, Archlebov), where a burial from Babice equipped only with a chipped tool could be a „candidate" to represent the earliest period of corded ware (absolute dating unfortunately failed) (Fig. 6). It is not difficult to find a number of analogues to them across the Yamna Culture range from Serbia to Ukraine (*e.g.*, Bugaj *et al.* 2018; Sava *et al.* 2019; Dergachev 2023, pl. 7: B1; 9: C1; 21: 1; 27: G1; 30: C1 *etc.*). However, as we can see from examples in Bohemia, the hypothesis of the earliest non-ceramic graves may not be valid more generally (Dobeš *et al.* 2021). Outside the Central Moravian specificity of graves with grooves or other internal arrangements, which will be discussed later, there is an interesting full-circuit construction of one grave from Olomouc-Slavonín, Horní lán (H 164) with analogies in the environment of, for example, the Yamna or Catacombna cultures (Fig. 7; Dergachev 2023, pl. 2: B2; 15: B5; 36: B18; 61: D8 *etc.*). The so-called frog position of the lower limbs in burials is known in the CWC *e.g.*, Silesia (Kietrz), eastern Slovakia (Lesné), Bell Beaker Culture in Lesser Poland (Samborzec), but also in the Nitra culture in Slovakia (Jelšovce) and the Únětice culture in Moravia (Suchohrdly) or in SW Slovakia (Nitra-Dolné Krškany), in Bohemia (Kbely, Cerhenice) and from eastern Germany (Nohra). It has direct analogies in the graves of the Yamna Culture in Hungary (Kétegyháza), Balkan, Ukraine and southern Russia (Bátora 2021; Włodarczak 2021; Dergachev 2023, pl. 10: 12; 13: C6; 14: C10; 15: B6 *etc.*). Apparently it is only a matter of time before it appears in the contents of the MCWC.

To a lesser extent than in the Bell Beaker Culture, we encounter metallurgists' graves in the MCWC (Fig. 8). For example, graves from Tešetice and Velešovice (Fig. 9) contained metalworking kits (anvils, hammers) that were positive for copper, gold and silver (!) flakes under the SEM microscope. They have their clear antecedents in the environment of Yamna and Catacombna cultures (Kaiser 2019 with older literature; Dergachev 2023, pl. 5: C12-14; 193: A3-6).

From the rich grave of the metallurgist from Velešovice I H 1, H 2 from Kroužek, Letonice and more recently also from Vyškov-Dědice (Fig. 10) come copper daggers with a tang, or daggers/razors with a blade-shaped tang, morphometrically different from Bell Beaker Culture daggers (slimmer blade and more elongated tang), strongly resembling daggers (daggers/razors) in the area of the northern Pontus and the Caucasus (Fig. 11; Dergachev 2023, pl. 34: C10; 47: B3; 87: D10; 99: C3 *etc.*), for which the closest Central European analogue is found in the Bleckendorf grave (KIA-162: 4080±20 BP; 2631-2577 1 sigma, 2678-2568 2 sigma calBC), together with a bone hammerhead pin, a typical product of the eastern steppes (Hammerkopfnadel) (Fig. 12; Dergachev 2023, pl. 29: 8; 44: C16). Unlike in Bohemia, this type of pin initially passes by Moravia and only appears here later (Fig. 13) (Proto-Únětice C).

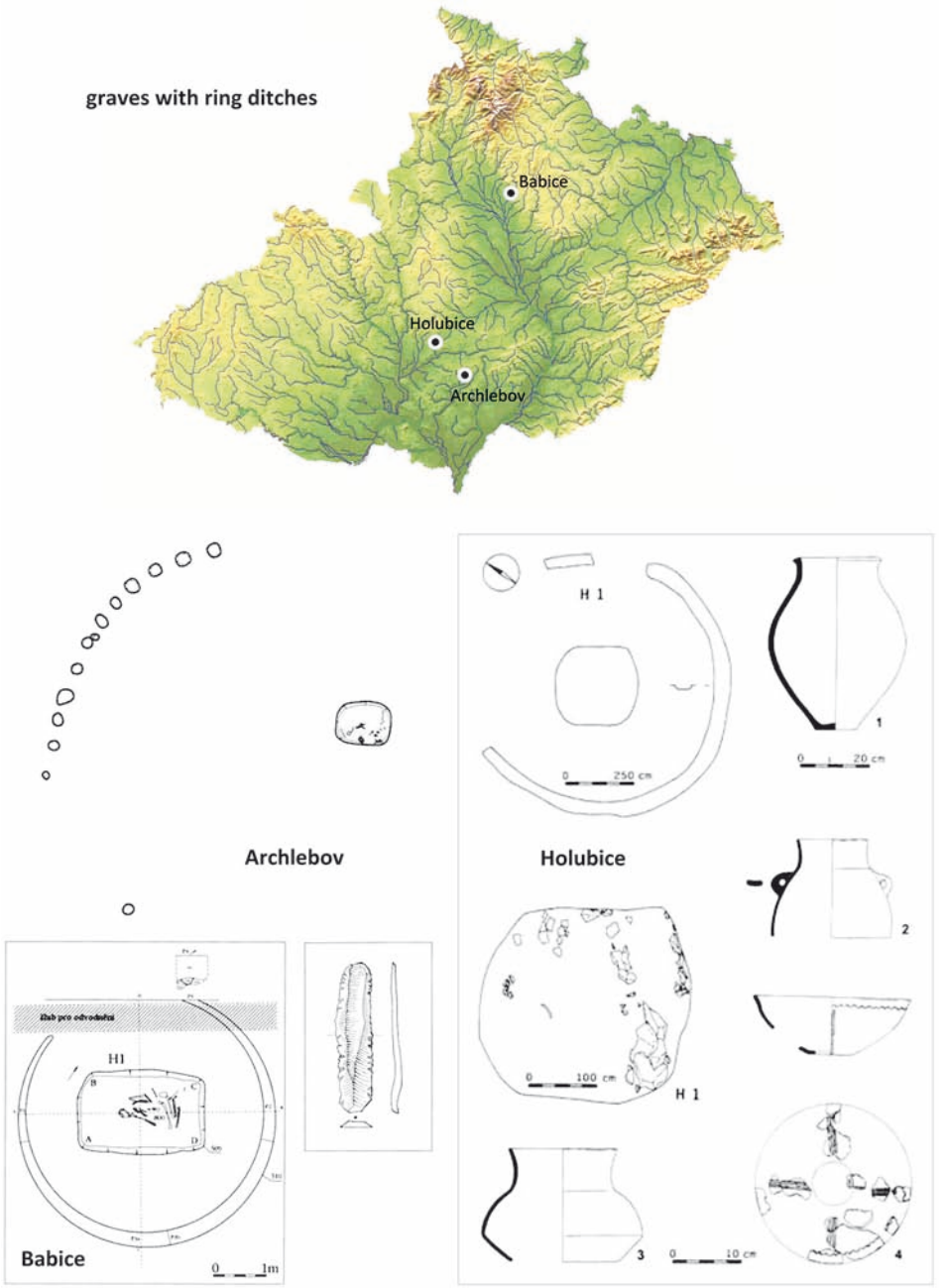

Fig. 6. Graves with ring ditches in the MCWC
(Geislerová – Parma *et al.* 2018; Kalábek *et al.* 2016; Čižmář 1985)

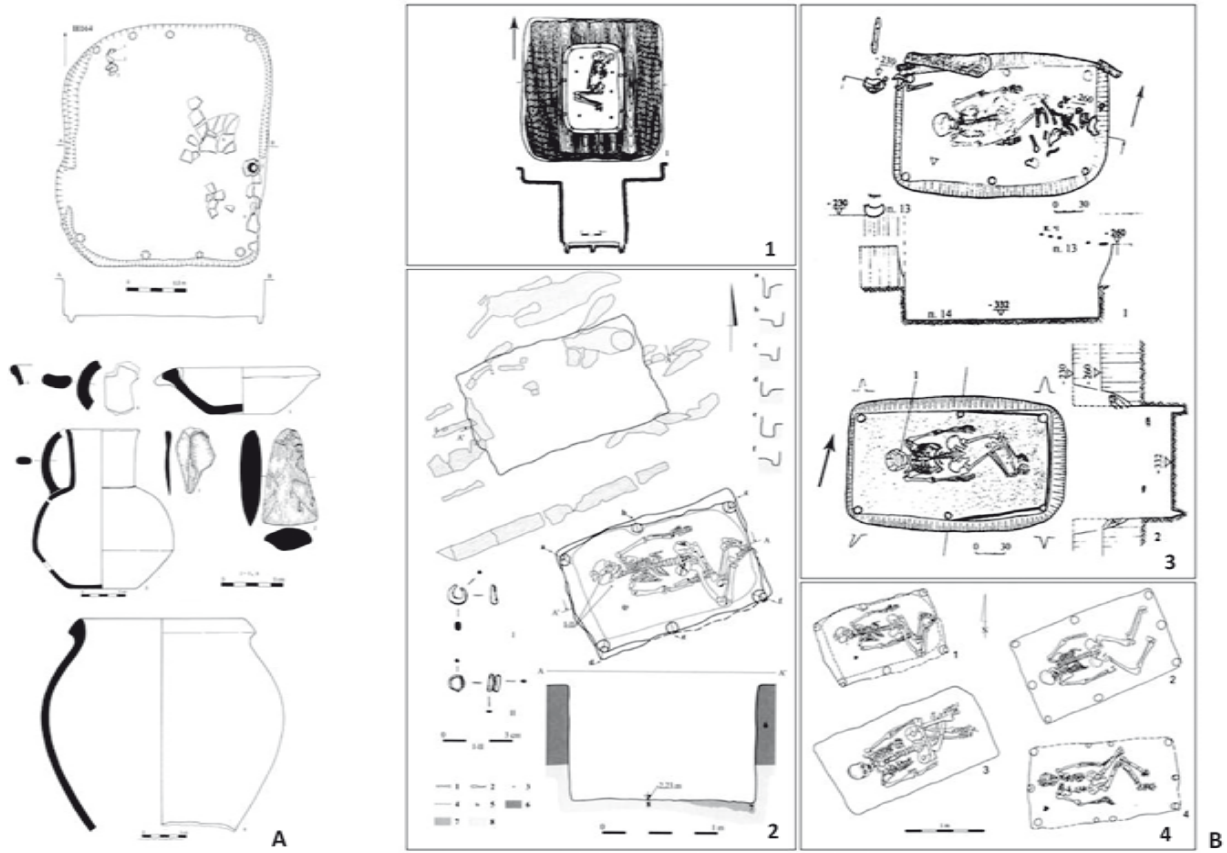

Fig. 7. A – MCWC grave from Olomouc-Slavonín, Horní lán (H 164) and B – its analogue in the Yamna Culture area: 1 – Cazaclia, Kurgan 17; 2 – Pysarivka, Kurgan 5, Grave 2; 3 – Brăviceni, Kurgan 1, Grave 1; 4 – Pysarivka, Graves 5/1, 7/2, 8/2 and 6/2 (Peška 2021; Agulnikov 2011; Harat *et al.* 2014; Larina *et al.* 2008; Włodarczak 2017)

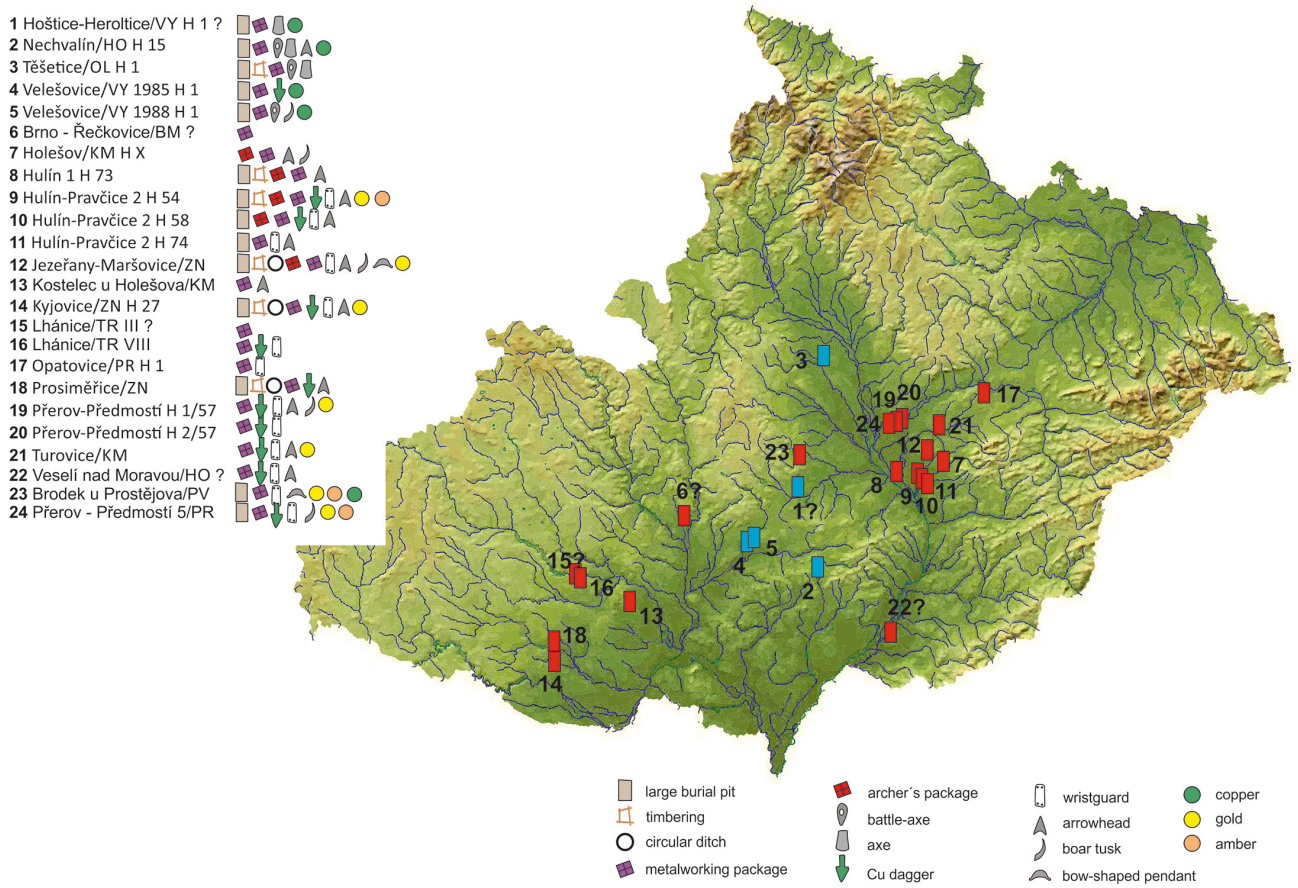

Fig. 8. Map of Moravia with MCWC (blue) and Bell Beaker Culture (red) metallurgists' graves and their equipment. Map by P. Grenar

A pan-European occurrence and a relatively long period of use (c. 800 years) are observed for carefully worked (sometimes decorated) bone tubes (decoys) with a top in Epi-Corded Culture Complex, while representative in CWC graves (Lesser Poland, Bohemia, Moravia, Lower Austria) with examples in the Ukraine and the Bajkal region already in the Dnipro-Donets culture, but mainly in the Yamna Culture (Volga, Lower Don) and also in

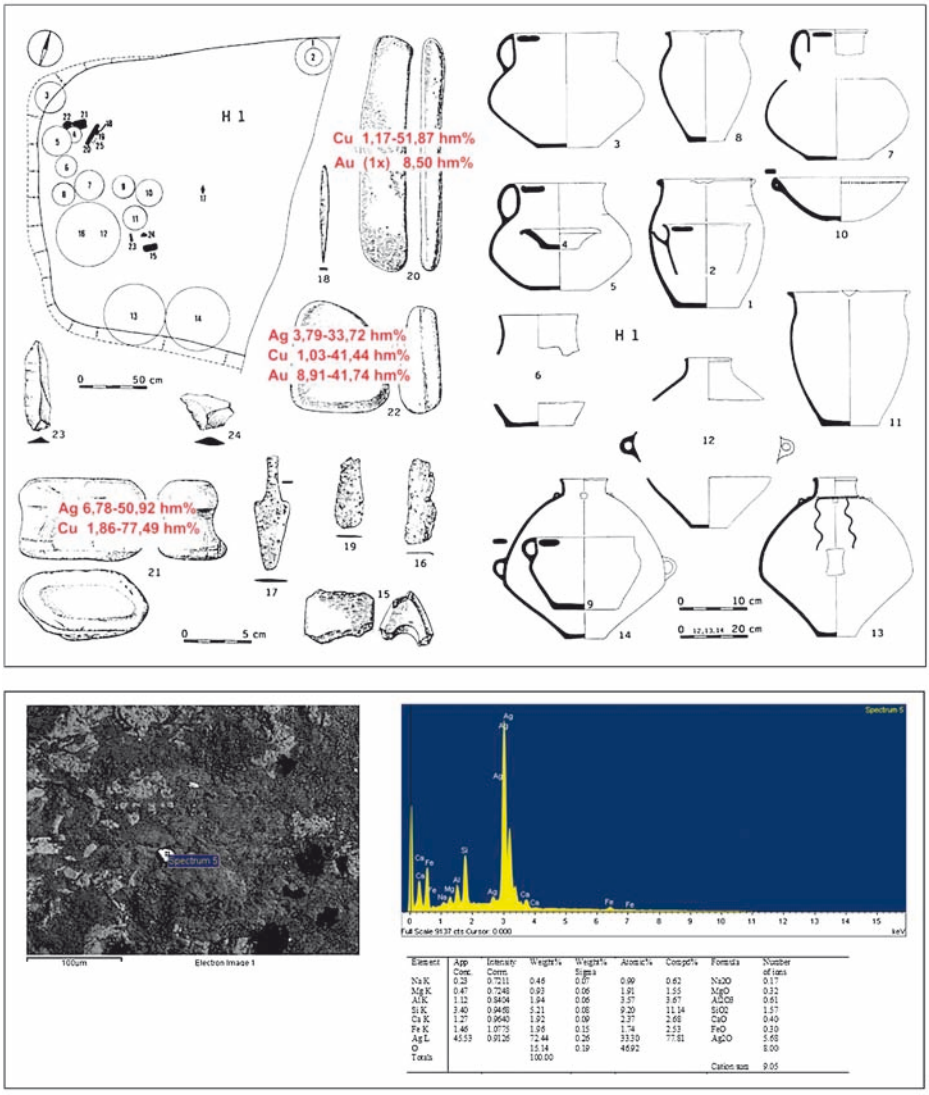

Fig. 9. Velešovice I 1985, H1 – a metallurgist's grave, containing, among other things, also a copper tanged dagger of eastern type, with measurement results of SEM analysis of the surface of stones that were part of the metallurgical toolkit with results of analysis of one of the artefacts (Peška 2021, supplemented)

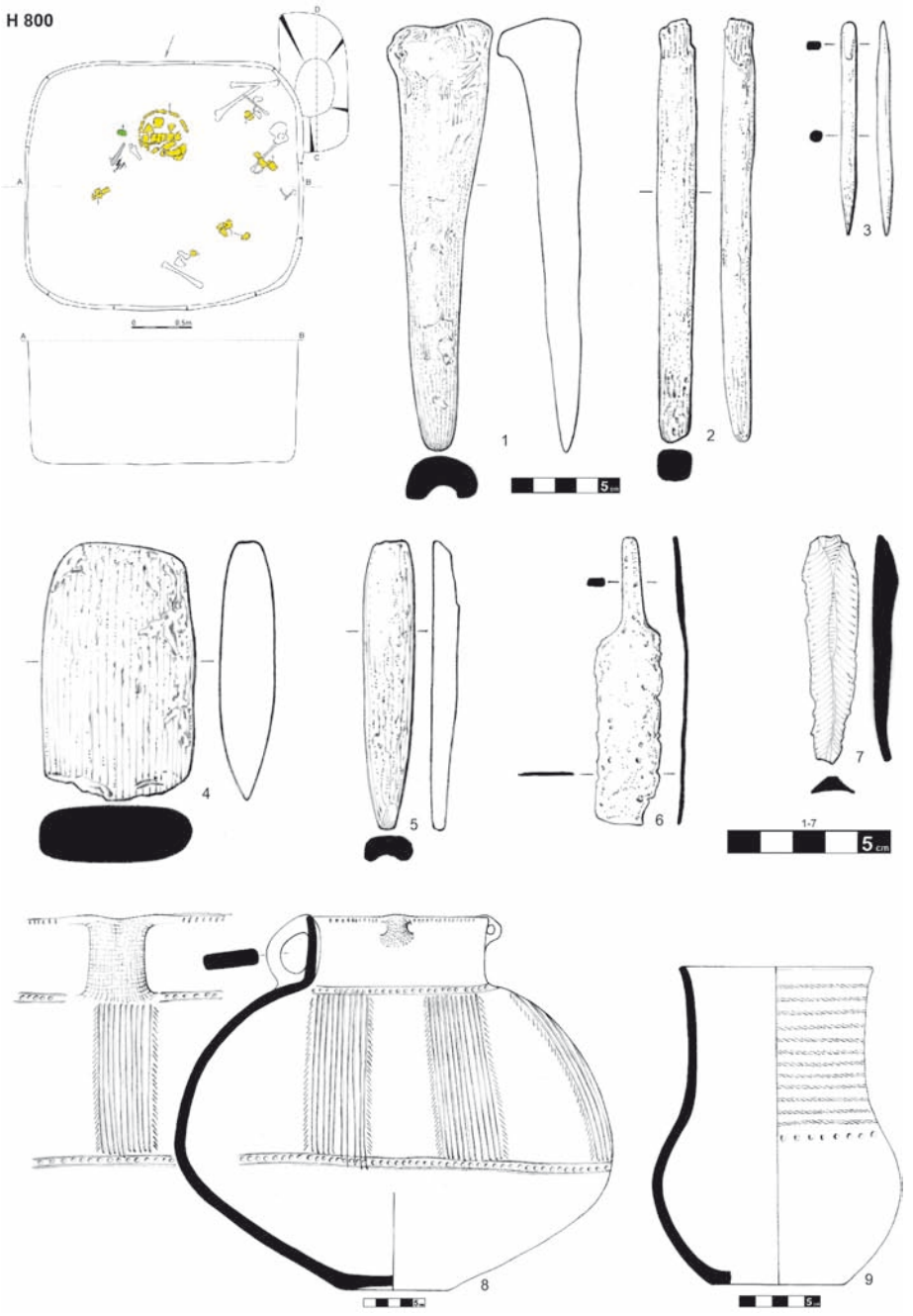

Fig. 10. Vyškov-Dědice, Legerní pole, Dist. Vyškov. MCWC grave (H 800) with copper dagger/razor and awl/chisel (?). Drawings by B. Mikulková and A. Pešková

Fig. 11. Graves of the Yamna culture in the Pontus and Caspian region with similar equipment as the MCWC graves. A Tamar – Utkal VII; B Taraclia; C KVCH 56, 53; D Glinnoe, Taraclia, Friska, Primorskoe, Căuşeni (Morgunova 2011; Agulnikov 2008; Shishlina 2008; Ivanova 2010)

Fig. 12. Bleckendorf, Prov. Sachsen.
CWC grave with copper dagger, awl and bone needle of East European type (Kaiser 2019)

the early Catacombna culture, in the Volga-Urals region and from settlements. Here a comparison with Moravian finds like the MCWC grave from Držovice or the late Jevišovice Culture settlement from Kroměříž 3 – Miňůvky with absolute dating (VERA: 3929 4070±35 BP, 2835-2497 1 sigma and 2851-2476 2 sigma calBC) is offered (Kučera *et al.* 2018; Peška 2011, fig. 6: 18).

A clear symbol of the Corded Ware Complex or phenomenon in the whole territory is the pottery and beaker decorated with the imprint of a twisted cord, which also has numerous parallels in Eastern Europe (Heyd 2021, fig. 4, 5; Dergachev 2023, pl. 45: B8; 57: E2; 132: 18; 144:C10; 192:E3 *etc.*), including beakers decorated with a fish bone motif (Dergachev 2023, pl. 75: A2; 96: B12; 121: A4; 124: A6; 147: A3 *etc.*). We can also find many types of decorated and undecorated amphorae (Koško 2011; Ivanova 2013; Ivanova *et al.* 2018), and decorated footed bowls, accompanying pit burials also in the Carpathian Basin, probably having their secondary focus in the area of the Vučedol and Ljubljana Moors cultures (Korošec and Korošec 1969, T. 37-47; Frînculeasa *et al.* 2017; Kaiser 2019, 245-257; Bátora 2021, fig. 16; Dani and Szeverényi 2021, fig. 3), are probably of eastern origin.

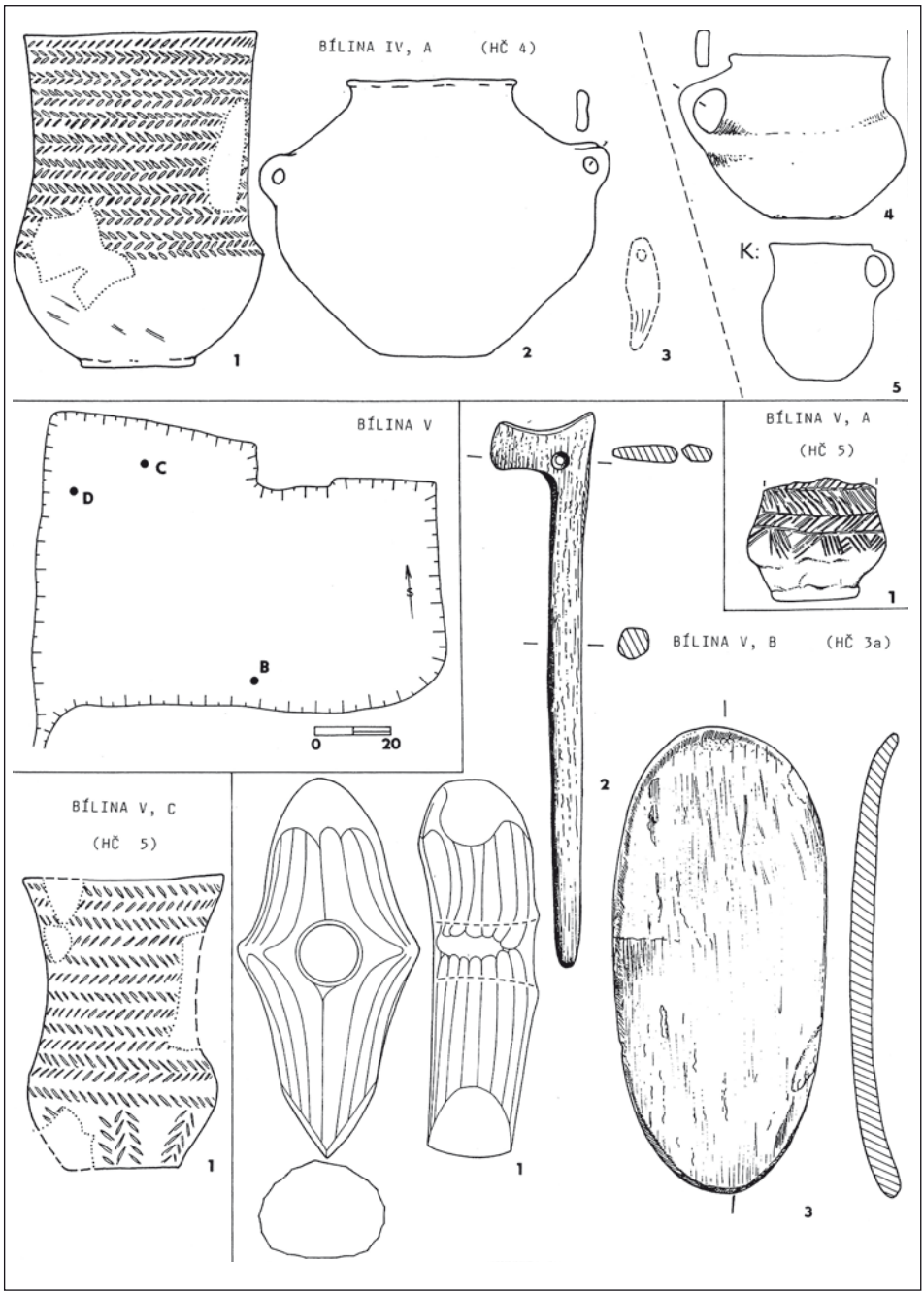

Fig. 13. Bílina V, B CWC grave in Bohemia containing bone hammerhead pin (Hammerkopfnadel) (Dobeš *et al.* 1991)

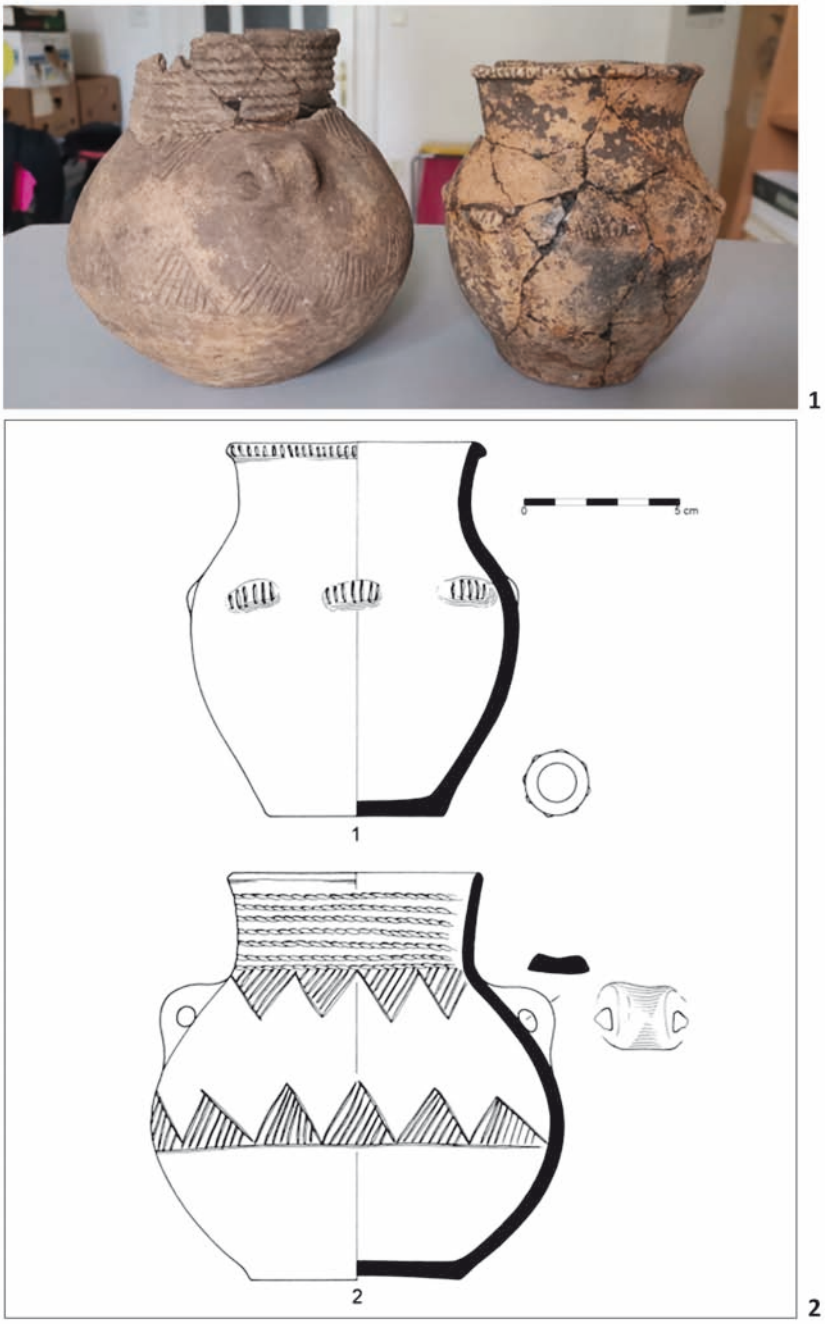

Fig. 14. Viceměřice – Kratiny 2022, Dist. Prostějov. MCWC grave with pottery with analogues in the environment of the Cernavodă II/Folteşti culture. Photo by M. Kršková, drawing by A. Pešková

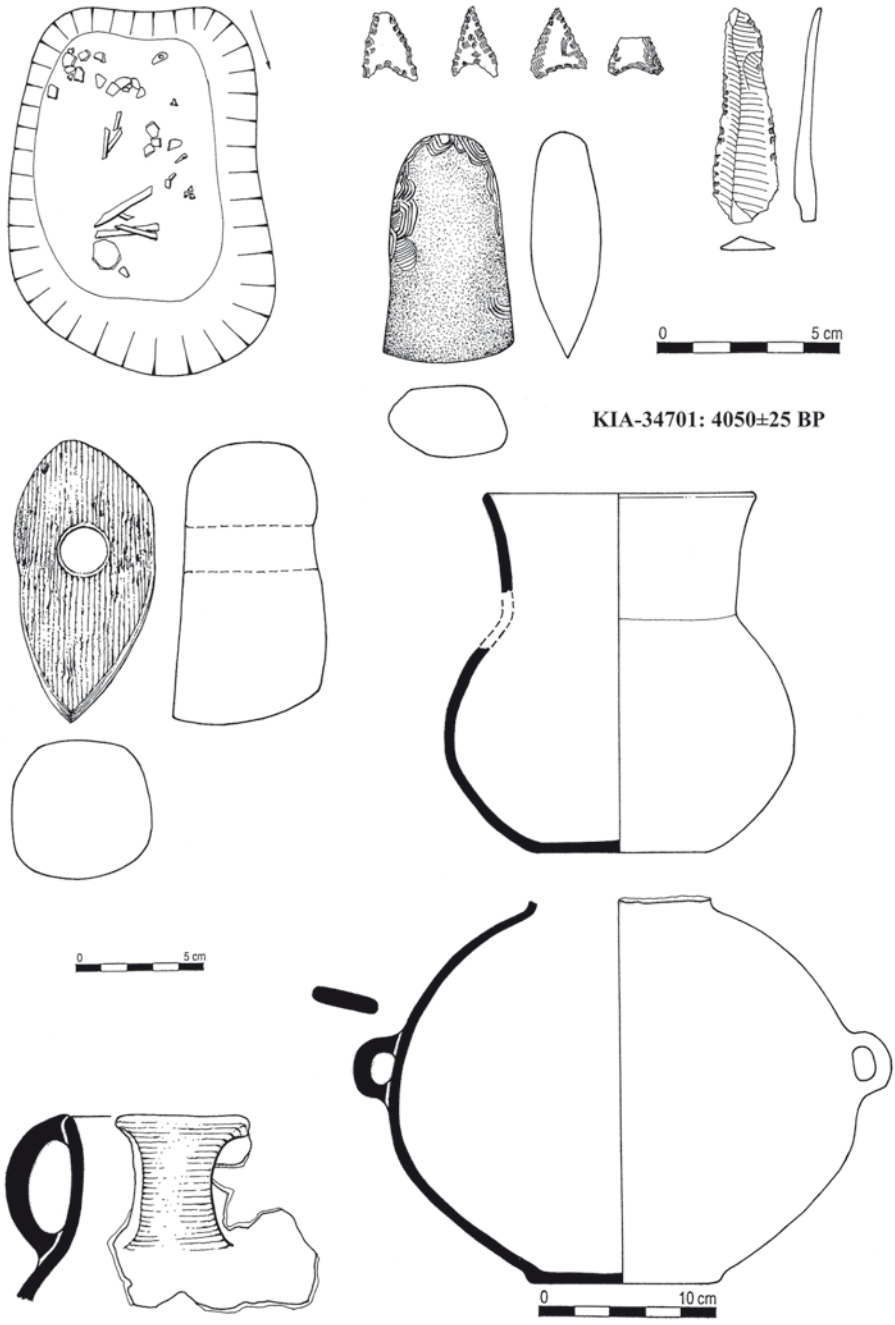

Fig. 15. Olomouc – Nemilany 3, Pravá a Levá k Nedvězí Grave 21. The grave with typically male equipment, including stone arrowheads, relatively rare for MCWC. Photo by M. Kršková, drawing by A. Pešková

A newly discovered grave from Víceměřice in Central Moravia produced (Fig. 14), besides an engraved and cord-decorated amphora, a small beaker in shape and sculptural application, not far from the beakers in the Cernavodă II/Folteşti culture and further in the Yamna Culture area of the eastern steppes (Frînculeasa *et al.* 2017, fig. 7, pl. 62:1-2; Frînculeasa 2020, fig. 6: a; 2021, fig. 2: 4-6; Dergachev 2023, pl. 252: A6; 255: 23).

Similarly, the custom of depositing stone axes, split axes and arrowheads with male burials also appears to a lesser extent in the MCWC (Fig. 15) with numerous counterparts in the Yamna Culture (Agulnikov and Sava 2004, fig. 55: 5, 59: 3, 6; Agulnikov 2008, fig. 4: 2-5; Klochko *et al.* 2015, fig. 24: 1; Agulnikov and Popovich 2022, fig. 31; Dergachev 2023, pl. 12: E1; 39: B9; 96: B5; 53: H5; 104: 10; 4:A2-4; 6: B4; 11: A3 *etc.*).

LOCAL OR NONLOCAL?

We can thus ask ourselves what in the material content of the MCWC is actually of domestic or Central European origin? First of all, the local pottery (amphora-shaped jugs, Dřevohostice jugs, Nagyrév jugs, un/decorated two- and four-eared amphorae, egg-sha-

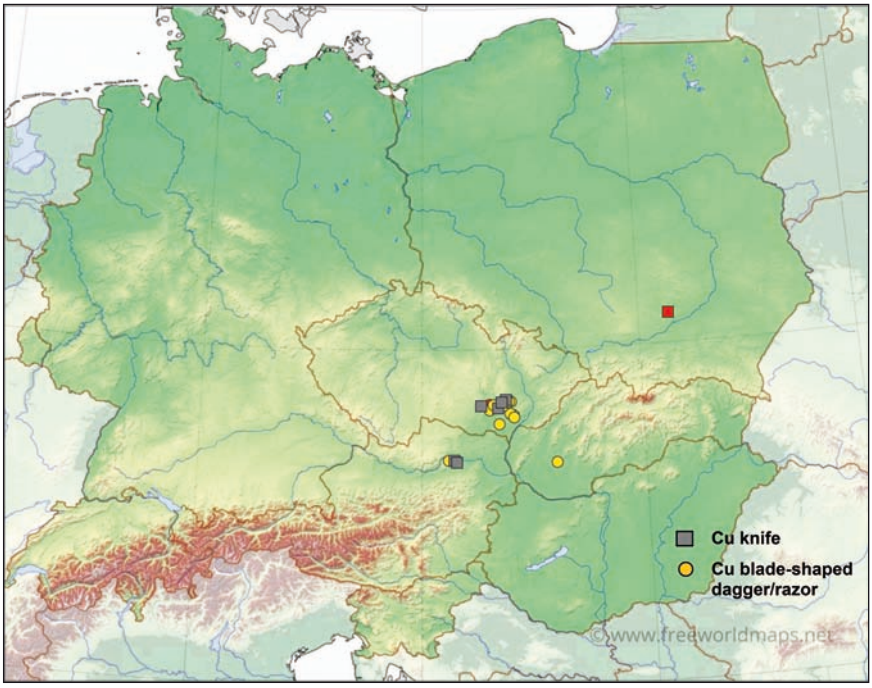

Fig. 16. Distribution of copper knives and daggers/razors in Central Europe (red uncertain typological classification). Map by P. Grenar

ped pots, sharply profiled bowls, Moravian-type bowls) are mainly of Carpathian origin. A southern origin (Vučedol, Ljubljana Moors) may be claimed for the chip-carved decorated footed bowls (so far only in Lower Austria) (Kern 2011, fig. 2), the Ig-type bone belt hook, or their imitations from the Jevišovice Culture (Brno – Líšeň: Šebela 1999, pl. 3: 1), the Czech-type of belt hook have a north-eastern origin (Baltic), but they are directly related to the corded environment.

The prevalence of polished axes could be attributed to a domestic origin, but we cannot forget their less frequent occurrence in Eastern European areas (Dergachev 2023, pl. 5: C11; 43: A4; 55: E6; 80: D5 *etc.*). Typical sheet copper knife blades are cumulated in the territory of narrower central Europe (Fig. 16). The question remains open as to the origin of the wire neckrings, featured in the content of the CWC as well as in the Yamna Culture in the Balkans and Black Sea (Frînculeasa *et al.* 2019, pl. 9: 5; Häusler 1976, Taf. 34: 12; Dergachev 2023, pl. 20: C4-5; 57: B7; 64: 9, 10; 141: F5). Massive bone chisels appear in both male corded ware graves and GAC graves (Włodarczak 2006, pl. 25: 1; 32: 1; 34: 8; 37: 8; 38: 22; 40: 14; 63: 2; 69: 7; Nosek 1964, pl. 65: 3;1967, fig. 68: 5; 167: 6; pl. 18: 5, 14; Bronicki 2000, fig. 4: 8; 2021a, fig. 8: B3; 2021b, fig. 13: 5; 14: 1; 177: 1; 243: B3; Włodarczak *et al.* 2021, fig. 12: 2), but seem to be outside the eastern group, rare in the Yamna Culture (Dergachev 2023, pl. 15: E12).

YAMNA PACKAGE IN MCWC?

Looking at the (especially non-ceramic) inventory of the MCWC, we find that only a small proportion are not associated with Eastern European origins, or are not part of the „Yamna package“ (Harrison and Heyd 2007). The frequent representation of multiple types of selected artefacts in the North Pontus area (for example, the Budzhak Culture) found its reflection precisely in the content of the MCWC. In addition to the grave structures already mentioned, the graves of metallurgists, bone pins and tubes (decoys), and pieces of metalwork include interesting finds of clay funnels (Fig. 17; Häusler 1974, Taf. 17: 15; 24: 18; 28: 18; Shishlina 2008, fig. 40: 5; 44: 9; 83: 1-3; Peška and Vrána 2017, 60, 61, fig. 8, 10; Frînculeasa *et al.* 2017, pl. 88, 89; Šmíd and Přichystal 2021, 48, 49, fig. 18: 18, 19; pl. 63: 1; 134: 8; 153: 1; Dergachev 2023, pl. 57: A4), linking the environment of the Yamna Culture in the Caspian steppes and Pontus with the GAC and Jevišovice Culture, the Carpathian Basin (Somogyvár-Vinkovci: Horváth *et al.* 2013, fig. 3), Kostolac Culture (Sravaš: Balen 2005, 49, Cat. Nos 187-193; pl. 50: 187-190; 51: 191-193), the Western Balkans (Vučedol: Schmidt 1945, Taf. 43: 1-3) and even with the rich princely graves on the Adriatic coast of Montenegro (Gruda Boljevića: Baković and Govedarica 2009, 11, 15, 16, fig. 10; Govedarica 2010, Abb. 5) (Fig. 18). A strong accent of the Caucasian metallurgical circuit is seen in the occurrence of shaft-hole-axes in graves of the CWC (Klochko 2017; Włodarczak 2021, fig. 11: 2, 3) and deposits; in the settlements of the Makó/Kosihy-Čaka culture

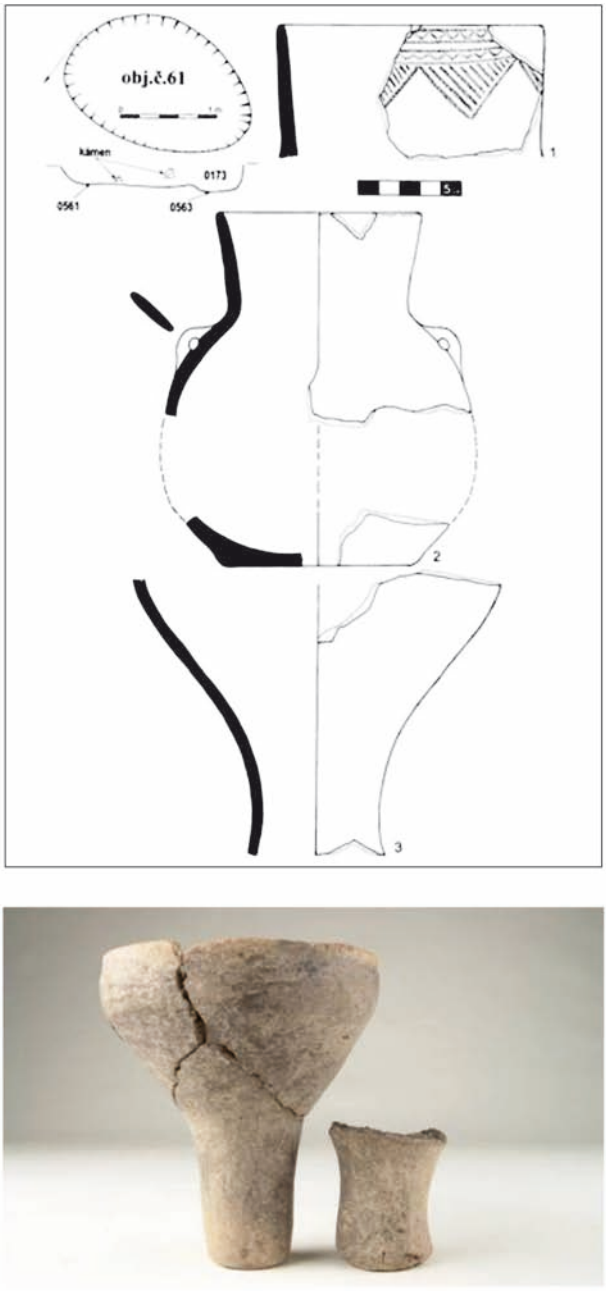

Fig. 17. Clay funnels appear in our environment at the sites of the Globular Amphora Culture (GAC) and the Jevišovice Culture (JeC). A Radvanice Feature no. 61 (GAC), B Modřice – Rybníky 2015, Features nos. 16642 and 19610 (JeC)

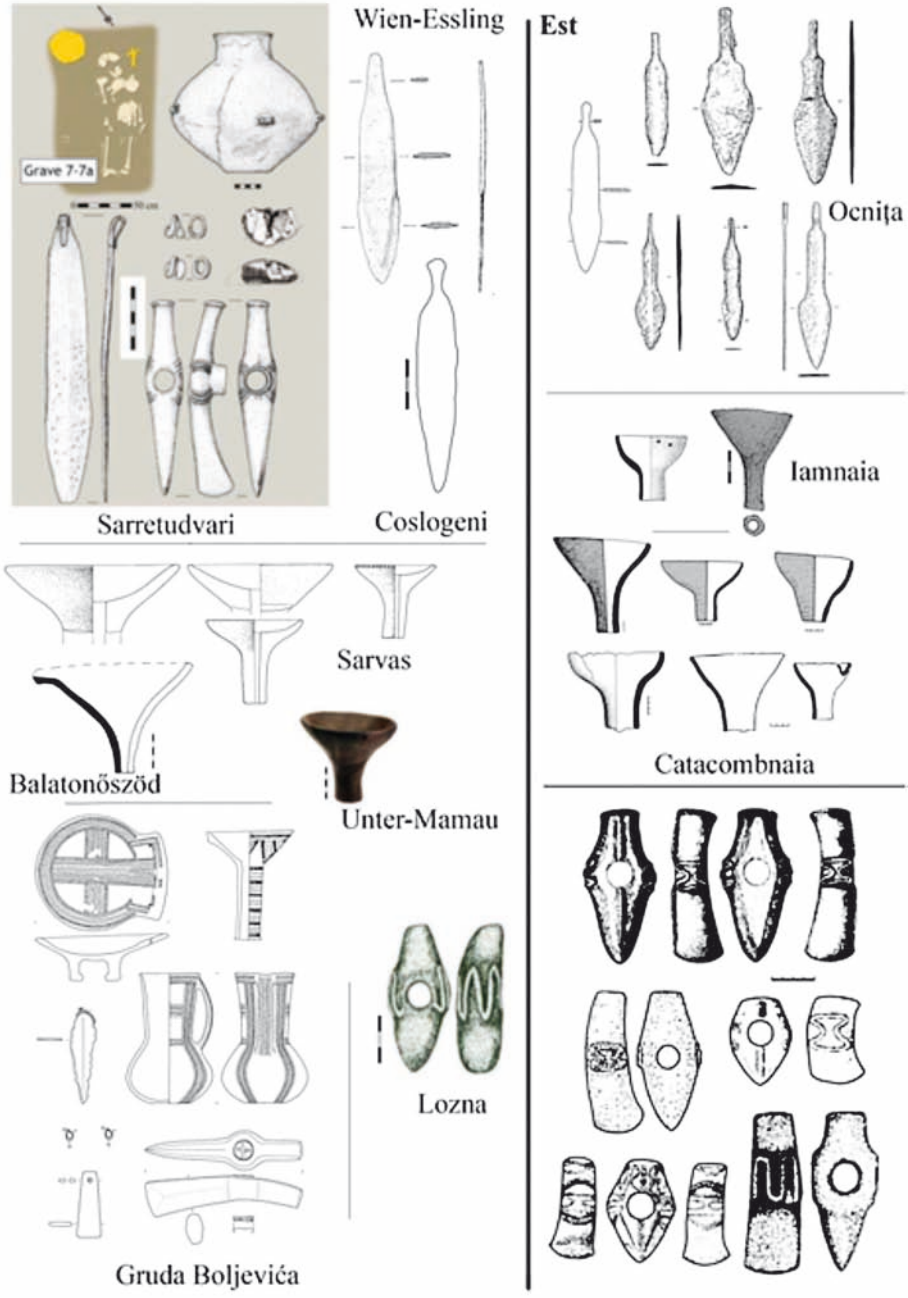

Fig. 18. Examples of analogous finds of clay funnels from the Yamna and Catacombna Culture in Eastern Europe to the so-called princely graves of the Early Bronze Age in the territory of Montenegro (Frînculeasa *et al*. 2017)

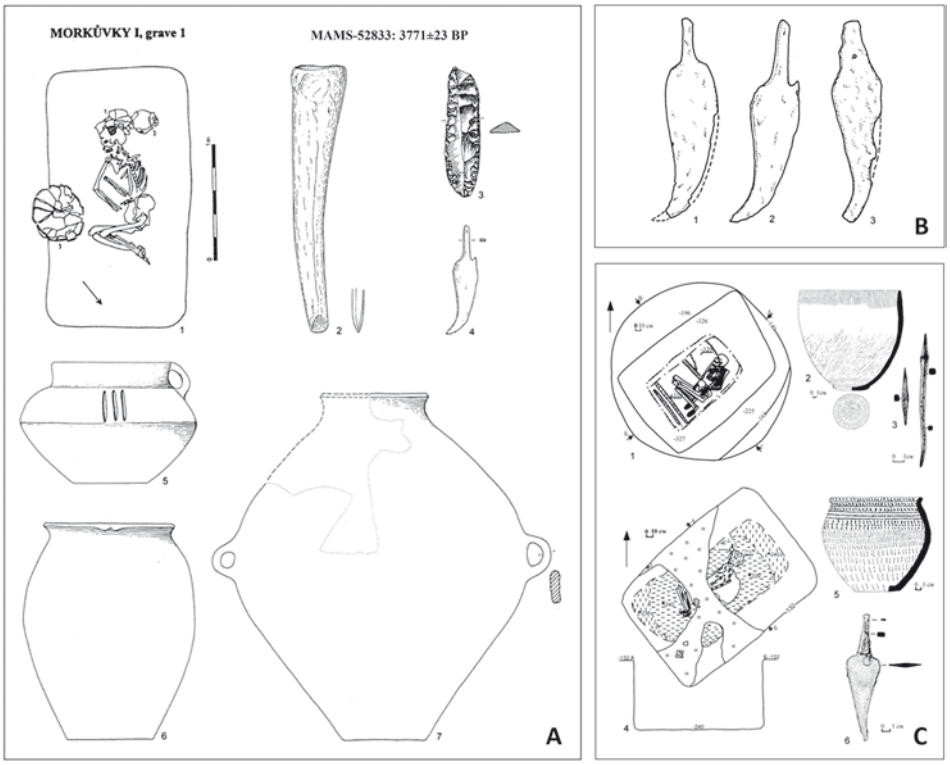

Fig. 19. Absolutely dated MCWC male grave from Morkůvek with a copper „razor" find (A), analogous finds from Ukraine/Sviatovo and Syria/Tell Chazna 1 (B) and from pre-Ural Yamna Culture/Skvortsovka (C) (Šebela 1999, supplemented; Bátora 2006)

we find relics of metallurgy associated with casting (Zók-Várhegy, Üllő, Veľký Meder). The aforementioned daggers or knives with a tang show striking similarities, as does the „razor" from Morkůvky (Fig. 19). Massive hair spirals of gold or silver, so typical of the steppe and Carpathian-Balkan region, end their presence in Burgenland (Neusiedl am See). In Lower Austria, Moravia, Bohemia and Poland, spiral hair ornaments, which also have their counterparts in the East, dominate (Peška and Fikrle 2017; Sava *et al.* 2019, fig. 32: 4; 67: 2; 81: 9-10; Dergachev 2023, pl. 25: B2-3; 42: A3; 43: A2-3 *etc.*). Unlike the MCWC, they do not appear with flattened ends, but in a solid precious metal design (similar to the solid single ones mentioned above) (Dergachev 2023, pl. 178: 9-10; 196: A8-9; 208: A5; 209: C3).

Despite the clear connotations to Eastern Europe, the results of palaeometallurgical analysis (Fig. 20) of part of the metal potential point to sources in the Carpathian region (central Slovakia) from ores of the Fahlerzmetall type, where the composition with higher contents of arsenic, nickel and lead most resemble the tetrahedrite ores of the Early Bronze Age.

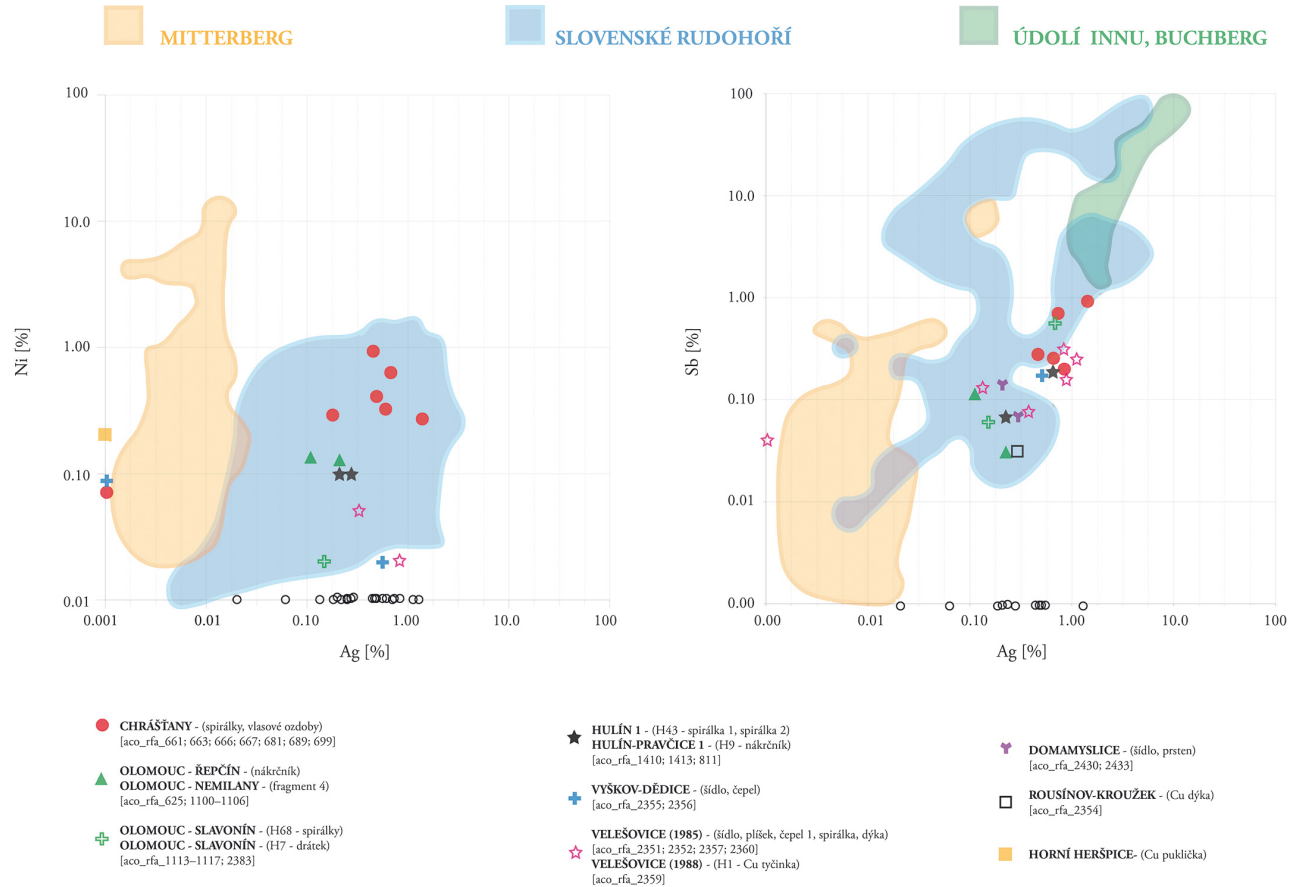

Fig. 20. PCA analysis of the elemental composition of selected MCWC copper artefacts (analysis and graph by F. Ondrkál)

BURIALS ON WAGONS IN THE MCWC?

The biggest surprise for us is a group of MCWC graves with grooves on the bottom with a clear concentration in Central Moravia (Fig. 22) with a new interpretation. Such a construction is unprecedented in our country (Fig. 21). The dimensions, the spatial projection of the reconstructed prehistoric wagons (Figs. 23) convince us that we are dealing with grooves as traces of the placement of a four-wheeled wagon, or with burials on an all-wood ceremonial wagon with clear counterparts in Maikop, Yamna and Catacombna cultures (Gej 2004; Novozhenov 2012; Dergachev 2023, pl. 2: A3; 47: B2; 52: A1-2; 153: E3-4 *etc.*). The average to below-average equipment illustrates the social significance of the burial itself in an elevated and centralized location, carrying a stamp of social prestige over other graves. Placement in the grave may have been preceded by a ceremonial journey with the

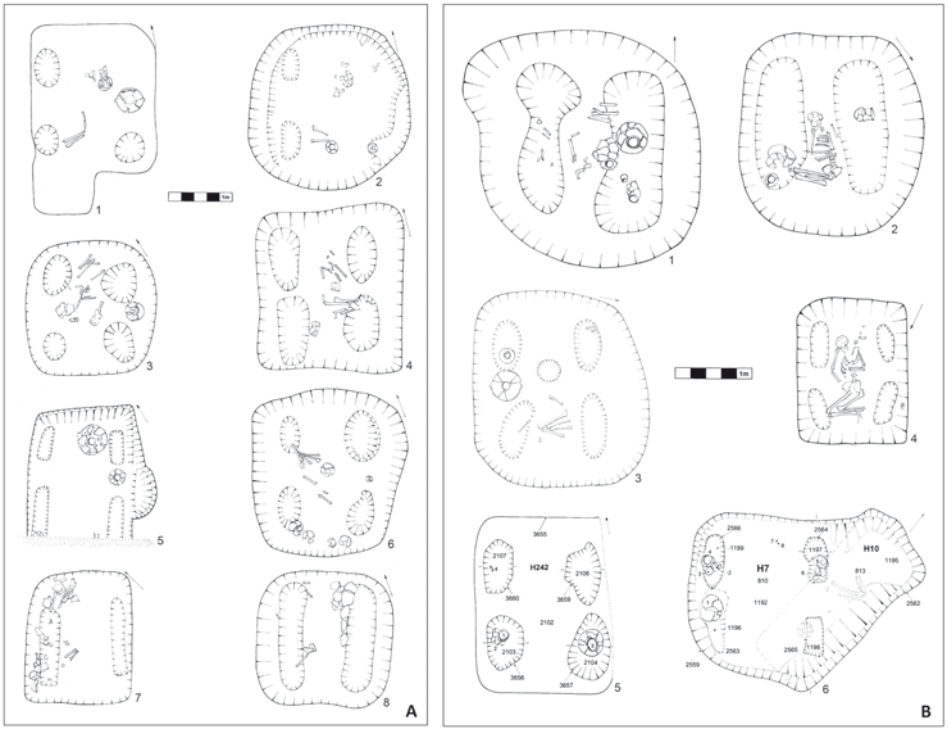

Fig. 21. MCWC graves with internal construction in the form of troughs. A: 1 – Hulín 1, U Isidorka Gr. 43; 2 – Bezměrov 1, Díly Gr. 13; 3 – Olomouc-Slavonín 1, U hvězdárky Gr. 19; 4 – Olomouc-Nemilany 1, Na kopci a Kapitulní Gr. 50; 5 – Seloutky, Dlouhé čtvrtě Gr. 1; 6 – Šlapanice, Brněnská pole Gr. 25; 7 – Bystročice, Na krátkých Gr. 1; 8 – Olomouc-Nemilany 3, Pravá a Levá k Nedvězí Gr. 4; B: 1 – Olomouc-Nemilany 3, Pravá a Levá k Nedvězí Gr. 18; 2 Olomouc-Nemilany 3, Pravá a Levá k Nedvězí Gr. 28; 3 – Vyškov-Dědice, Legerní pole Gr. 802; 4 – Hulín-Pravčice 1, U obrázku Gr. 19; 5 – Olomouc-Slavonín, Arbesova ulice Gr. 242; 6 – Olomouc-Slavonín, Arbesova ulice Gr. 7. Drawings A. Pešková

Fig. 22. Map of Europe with the occurrence of wagon burials in Yamna and MCWC. Map by P. Grenar

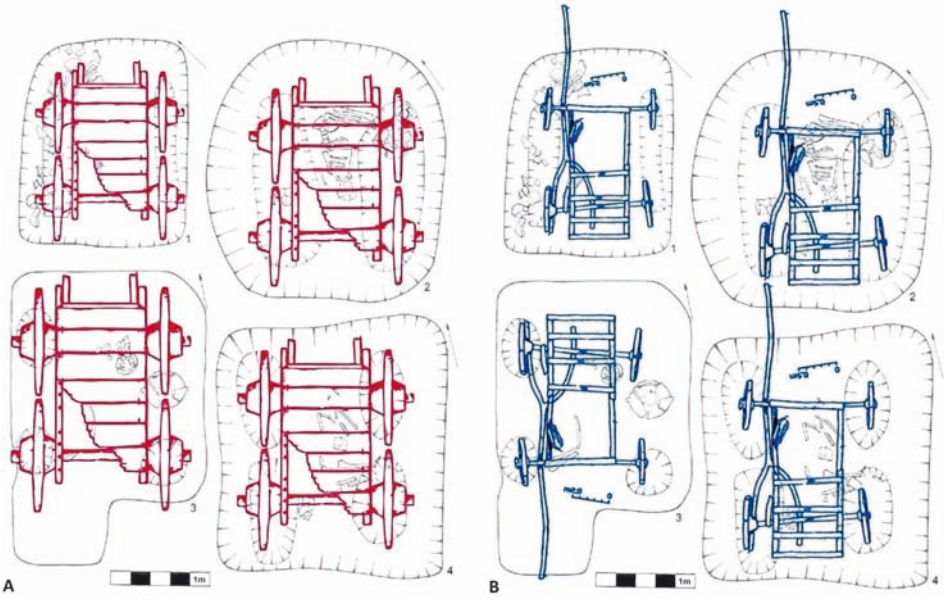

Fig. 23. Projection of the reconstruction of all-wooden wagons in the plan of the burials with troughs in the MCWC. A Trialeti, Barrow 5 (Sintašta culture), B Ostanniy Kurgan 1, Grave 150 (Yamna Culture). Projection by P. Grenar

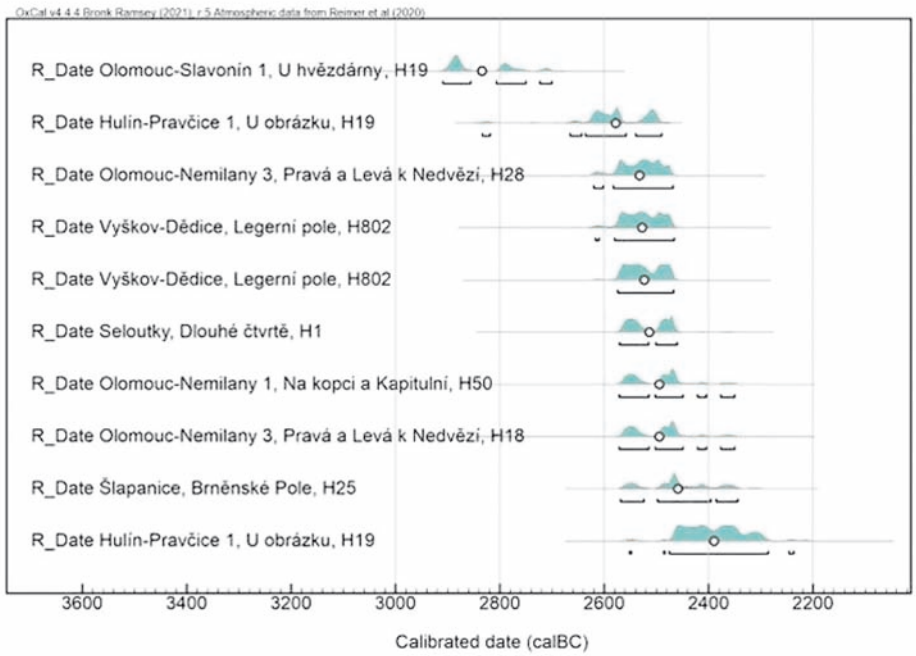

Fig. 24. Absolute dating (^{14}C) of MCWC graves with wagon burials in Moravia. Graph by P. Grenar

corpse, *e.g*., from his house, which may have already been made on a cart. Wagon burials are encountered in Central Europe so far only in Central Moravia (local MCWC) at a time approximately at the level of the Late Yamna Culture and Early Catacombna cultures (mid-3rd millennium BC) (Fig. 24). As in the intact area of the Yamna Culture, they can be considered an integral part of the so-called Yamna package. Yet, with one exception (Plachidol in Bulgaria), wagon burials are not encountered elsewhere than in the North Pontic and Caucasian areas at that time (Fig. 22). This is an Eastern European phenomenon transmitted during the 3rd millennium BC to the interior of Europe (the question remains which way exactly?) and one of the clearest pieces of evidence of direct contact with the Eastern European area.

CONCLUSION

We have to remember that we are spatially not that far from the recognized boundary of the Yamna Culture intrusion in Transdanubia (Görnyü, Környe) and in Burgenland (Neusiedl am See) (Harrison and Heyd 2007, fig. 49), a light influence in the content of the Polish CWC (Koniusza, Balice, Święte: Kośko *et al.* 2018; Włodarczak 2021, fig. 10). Similarly

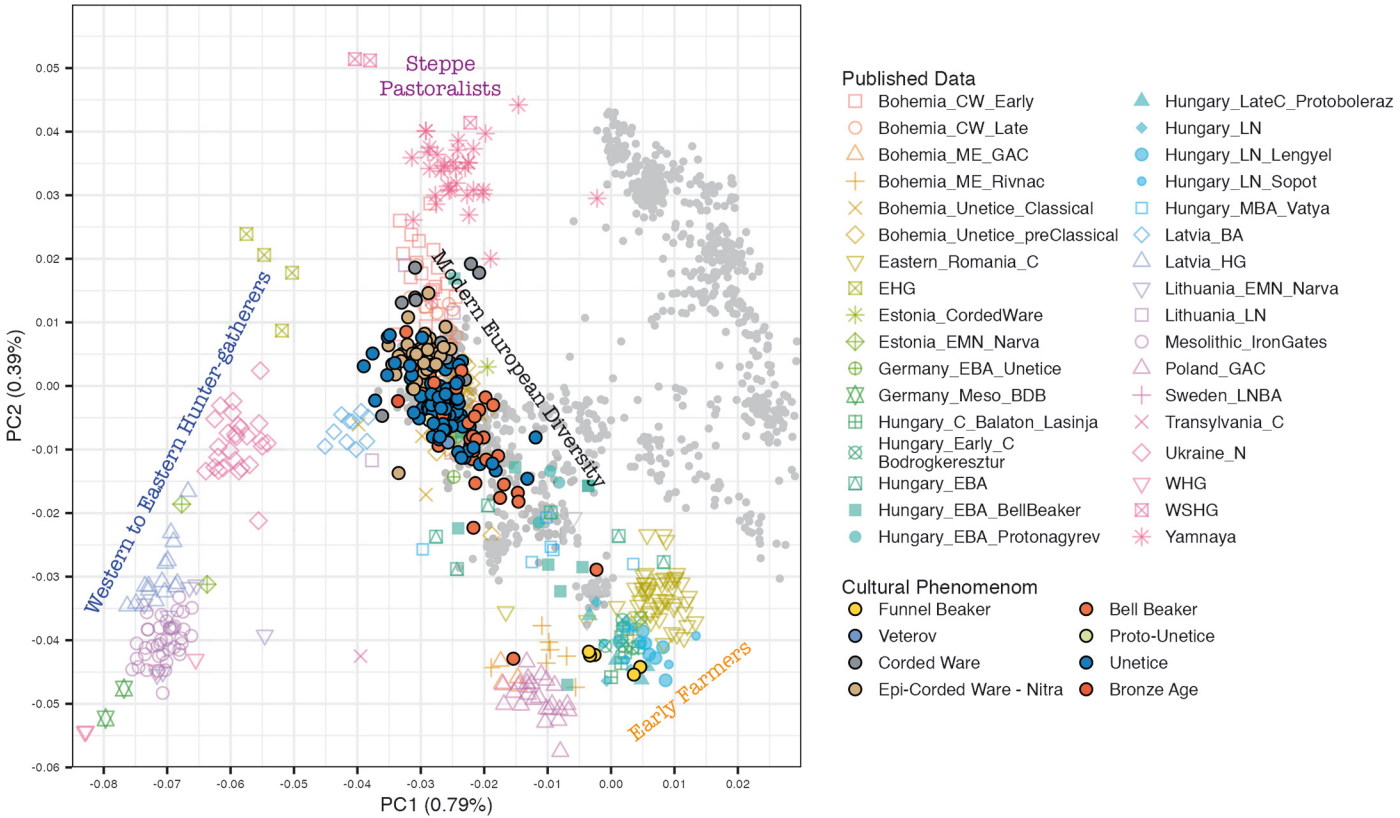

Fig. 25. PCA visualising genetic variation of modern European diversity (grey) with published data of cultural phenomena as indicated in the legend. Graph by W. Haak

to Moravia, a number of eastern – steppe elements are also seen in Lower Austria in the makeup of the local group of Corded Ware culture (Kern 2012). Another example is a grave from Wien-Essling with a Manych-type dagger of North Pontic-Caucasian form made of copper with elevated arsenic content, the westernmost find of its kind in Europe (Zimmermann 2003; 2007, 53-58, fig. 34). The contents of the already mentioned grave from Bleckendorf have a general eastern provenance, and wagon graves in central Germany are also associated with the eastern European steppe region (Profen), but the question is whether they are not more likely to be related to the GAC, the custom of chariot burials being clearly of eastern European origin.

From the genetic analyses so far, we know that the MCWC matches the genetic profile known so far (mainly from Bohemia) with the highest proportion of steppe genes compared to contemporary and subsequent cultures. By comparing Y haplogroups, we can conclude that partially contemporary groups of individuals (CWC, Bell Beaker Culture, Únětice Culture), despite their geographical proximity, remain genetically distinct (Fig. 25).

Everything points to the fact that Moravia, with the exception of the changes at the end of the Jevišovice Culture and the arrival of the two beakers cultures, remained aloof from the direct penetration of the people of the Yamna Culture into the centre of Europe, since the invasion of probably part of the foreign population to the Jevišovice Culture holders cannot be directly linked to these migrations (the background lies in the environment of the Coțofeni and Livezile cultures), but an indirect consequence of the migration waves caused by the events in the North Pontic area up to Tisza cannot be excluded either. Nevertheless, we are able to trace a number of links and contacts with Eastern Europe and, more specifically, with the North Pontic-Caucasian region in the content of cultures at the turn of the 4th/3rd millennium BC. The archaeological findings so far, in the form of individual (mound) burials and a selection of artefacts, demonstrate the interpenetration of individuals (or small groups) rather than the direct intervention of steppe nomads, but better still the influence of progressive commodities as part of the "Yamna package" in the regions lying west of the Tisza. While we cannot rule out the possibility that the foreign intervention at the end of the Jevišovice Culture in Moravia was not triggered by general changes and movements in the more southern patrimonies of central Europe and, as a consequence, that the appearance of CWC in our area itself is not originally and partly genetically related to shifts in the Yamna region, we must continue to look for direct evidence for these claims.

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FIELD SURVEY AND MATERIALS

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NEW RADIOCARBON DATES FOR THE CRIŞ SITE OF SACAROVCA I (MOLDOVA)

ABSTRACT

Kiosak D., Dergaciov V.A., Szidat S. and Tinner W. 2023. New Radiocarbon Dates for the Criş Site of Sacarovca I (Moldova). *Sprawozdania Archeologiczne* 75/1, 175-182.

Four new AMS radiocarbon dates shed new light on the chronology of one of the easternmost sites of the Criş culture. The conventional dating efforts had yielded indecisive results, while the new results correspond well to the typo-chronological position of the site (Criş IV) and the chronology of other sites with similar finds. The comparison with the nearby para-Neolithic sites demonstrated that the establishment of the para-Neolithic way of life (foragers equipped with pottery) in the region happened several centuries before the spread of early farmers of the Criş culture into Moldova.

Keywords: Early Neolithic; radiocarbon dating; Bayesian modelling; early farming colonization; indigenous foragers

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INTRODUCTION

The current consensus for the initial agricultural settlement of Moldova and south-west Ukraine follows the broader, regional model for south-east Europe (Dergaciov and Larina 2015; Larina 1994). It is mostly seen as a phenomenon of the propagation of societies of a particular type that first appeared in Greek Thessaly and later spread out in temporally decreasing steps (Biagi *et al.* 2005; Whittle 1996). This process was brought to the territory of modern-day Moldova by the people of Criş culture in sixth mill. BCE (Dergaciov and Larina 2015). However, its exact chronology remains unclear in detail.

Sacarovca1 is the reference site for the Criş culture between the Prut and Dniester rivers (Fig. 1: A). At present, it is the only excavated site located at the easternmost fringe of the extension of the Criş culture, which was studied by complex investigation with an application of scientific approaches, thanks to the effort of Olga Larina and Valentin Dergaciov (Dergaciov and Larina 2015).

This paper aims to publish four new AMS radiocarbon dates for the site of Sacarovca I and to shed new light on the chronology of the early Neolithic in Moldova.

METHOD AND SAMPLING

The samples were dated in the Laboratory for the Analysis of Radiocarbon with AMS (LARA) at the University of Bern, employing the MICADAS equipment (Szidat *et al.* 2014).

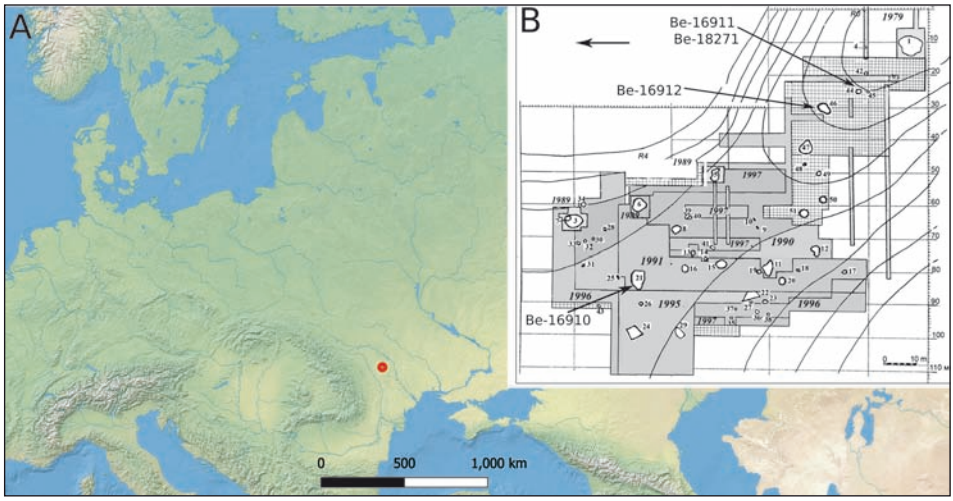

Fig. 1. A: location of Sacarovca 1 on the map of Europe, topo: Natural Earth; B – sampled objects on the plan of Sacarovca 1 (after Dergaciov and Larina 2015, fig. 11 with modifications)

Collagen extraction was performed according to Szidat *et al.* (2017), which was extended by an additional ultrafiltration step.

Radiocarbon dates were calibrated using the online calibration program OxCal 4.4.4 (Bronk Ramsey and Lee 2013) using atmospheric data from Reimer *et al.* (2020).

Samples comprise four *Cervus elaphus* bones (identifications by A. David and O.P. Siekerska, with thanks): two fragments of metacarpi, a chunk of a femur and a piece of an unidentified long bone. The selected samples come from three features of the site (Fig. 1: B): Pits 21 (1 date), 44 (2 dates), and 46 (1 date). These pits yielded abundant lithic and ceramic assemblages alongside notable archaeozoological and palaeobotanical collections.

RESULTS

Three novel dates (Be-16910, Be-16911, Be-18271) form a consistent group encompassing 5617-5479 calBCE, 2σ, while a single date (Be-16192, 5481-5373 calBCE, 2σ) is slightly later (Table 1, Fig. 2). In order to find out whether certain dates are statistically simultaneous, we used the R_Combine function of OxCal. If they could be combined (the X^2 meets a certain threshold), we can say that the group of dates is statistically concurrent. It is in this sense that we study the combinations of dates for Sacarovca 1. Namely, the former three dates can be combined into the time-slot (5613-5482 calBCE, 2σ). The obtained results are consistent with the available radiocarbon dates for Sacarovca 1. The fact that the Berlin date can be successfully combined both with the three earlier AMS dates as well as with the latest date (while these four dates cannot be combined when treated as a group of their own) underlines the increased precision of AMS dating (saying nothing about the Kyiv laboratory's "direct" date on a potsherd, which calibrates to encompass at least 600 years). Another charcoal date (Ki-13899) is a bit earlier than the rest of the dates. It can be explained by a likely "old wood" effect. Thus, it is possible that complexes of Sacarovca 1 were inhabited for a prolonged period. Namely, pit 46 is slightly younger than objects 21 and 44.

DISCUSSION

The chronology of the Starčevo-Körös-Criş cultural complex is defined by over 400 relevant dates. Early work in the inner Balkans put initial settlement activities by agricultural colonists associated with this cultural complex at *ca.* 6200 y. BCE, but a recent reanalysis showed this event likely occurred no earlier than *ca.* 6050 y. BCE (Krauss 2016, 212). This event is viewed as a rapid initial settlement represented by a homogenous material culture across the region (Biagi *et al.* 2005). The territory of Moldova was settled by these early farmers relatively late in the course of their expansion, namely during the III-IV stages of the Criş culture (Dergachev and Dolukhanov 2007; Larina 1994). These oc-

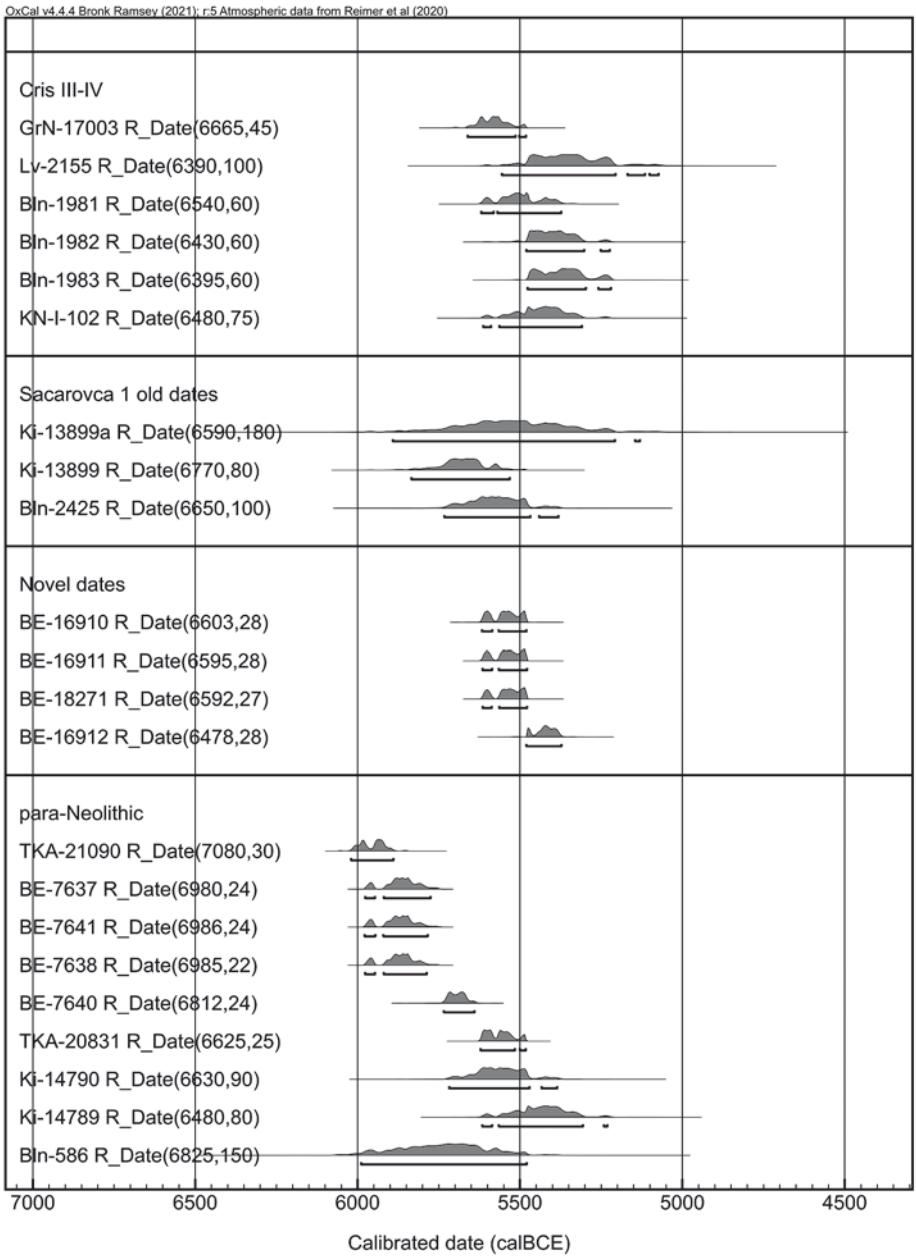

Fig. 2. Comparison of selected dates for Cris III-IV and Buh-Dniester para-Neolithic with novel dates. For captions and references: see Table 2

Table 1. Novel radiocarbon dates for the site of Sacarovca 1

Lab N.	Provenance	Sample	Date, BP	Std. d.
BE-16910	object 21	Fr-t of metacarpus	6603	28
BE-16911	object 44	Fr-t of femur	6595	28
BE-18271	object 44	Fr-t of a long bone	6592	27
BE-16912	object 46	Fr-t of metacarpus	6478	28

Table 2. Comparative material for Fig. 2

Site	Lab N	Date, BP	std.d.	Material	Reference
Trestiana	GrN-17003	6665	45	?	Mantu 2000
Trestiana	Lv-2155	6390	100	?	Mantu 2000
Carcea-Viaduct	Bln-1981	6540	60	?	Biagi *et al.* 2005
Carcea-Viaduct	Bln-1982	6430	60	?	Biagi *et al.* 2005
Carcea-Viaduct	Bln-1983	6395	60	?	Biagi *et al.* 2005
Valea Rosii	KN-I-102	6480	75	?	Biagi et al. 2005
Hlynske I	TKA-21090	7080	30	potsherd	Haskevych *et al.* 2019
Melnychna Krucha, SU2	BE-7637	6980	24	bone	Kiosak *et al.* 2021
Melnychna Krucha, SU2	BE-7641	6986	24	bone	Kiosak *et al.* 2021
Melnychna Krucha, SU2	BE-7638	6985	22	bone	Kiosak *et al.* 2021
Melnychna Krucha, SU2	BE-7640	6812	24	bone	Kiosak *et al.* 2021
Baz'kiv Ostriv	TKA-20831	6625	25	potsherd	Haskevych *et al.* 2019
Gard, lower layer	Ki-14790	6630	90	potsherd	Tovkailo 2014
Gard, lower layer	Ki-14789	6480	80	potsherd	Tovkailo 2014
Soroca-II	Bln-586	6825	150	charcoal	Markevich 1974
Sacarovca 1	Ki-13899a	6590	180	potsherd	Covalenco 2017
Sacarovca 1	Ki-13899	6770	80	charcoal	Covalenko 2017
Sacarovca 1	Bln-2425	6650	100	charcoal	Dergaciov, Larina 2015

cupations and their associated material culture had first been labelled the "Buh-Dniester Neolithic" (Markevich 1974; Yanushevich 1989), but then their affinities with actual Criş were extensively demonstrated (Larina 1994).

The final Criş sites are poorly represented in the radiocarbon dataset. The novel dates, when compared to the existing data, show that Sacarovca 1 is neither the latest nor it is exceptionally early. It fits nicely in the designated time-slot for the late Criş culture (Fig. 2). Taking into account that the Starčevo-Körös-Criş cultural complex is unlikely to have survived much longer than 5400 BCE (Meadows 2019), the chronology of the Sacarovca 1 complexes seems reasonable and expected from a general historical view of the development of early farming communities in the region.

Another essential issue to consider is the comparative chronology of the easternmost Criş sites and the sites of local foragers equipped with pottery (the "Buh-Dniester" para-Neolithic). The proponents of the Balkan impulse for the Neolithization of Ukraine insisted that the "Buh-Dniester culture" sites had arisen as a "barbaric periphery" of the Criş culture during its III and IV stages (Zaliznyak 1998). In particular, ceramics of so-called Pechera style were thought to emerge under the influence of the Criş ceramic technology. Early work on the direct dating of potsherds seemed to indicate the appearance of the ceramic vessels in the forest-steppe Eurasian belt by the mid-7th mill. BCE (Zaitseva *et al.* 2009). However, it was mostly based on totalling the organic content of a sampled potsherd (TOCC approach; Meadows 2020) for "direct" radiocarbon dating. Averaging carbon content in organic remains of different origins can be highly misleading. Recent redating programs moved the first appearance of pottery in the forest-steppe of east Europe into 6th mill. BCE (Courel *et al.* 2021). In the light of a revision of the Rakushechny Yar site sequence (Dolbunova *et al.* 2020), the sites in Moldova appeared to be the crucial link between early potters of Eastern Europe and the ceramists from the Balkans.

The new dates of Sacarovca 1 firmly put its existence in the 57-55th centuries BCE. It is partially later than a single conventional date on charcoal for the Soroca-II para-Neolithic site, definitely later than radiocarbon dates obtained for the para-Neolithic stratigraphic unit of Melnychna Krucha (Kiosak *et al.* 2021) in the Southern Buh river valley, some 200 km to the east (Fig. 2). The "direct" dates on "Buh-Dniester" potsherds yielded divergent results. The only two consistent dates (from the lower layer of Gard, Ki-14790 and Ki-14789; Fig. 2) encompass 5719-5232 calBCE. However, they are in reverse stratigraphic order with the dates obtained for the upper layer of the same site (Tovkailo 2014). The "direct" dating of Criş import in the Buh-Dniester site of Hlynske I yielded unacceptably old results (TKA-21090; Haskevych *et al.* 2019), while dating of another potsherd with some analogies in Criş materials from Bazkiv Ostriv (TKA-20831, 6625±25 BP) returned a result comparable with the chronology of Sacarovca 1 – 5622-5483 calBCE, 2σ, although this potsherd was attributed not to the Pechera style but to the earlier, Skybyntsi style of para-Neolithic pottery (Haskevych *et al.* 2019).

Thus, we can conclude that para-Neolithic sites in the valleys of the Southern Buh and Dniester were settled prior to the expansion of early farmers of the Criş culture during its stages III and IV into the territory between Dniester and Prut. Probably, there were also para-Neolithic sites, which could be contemporaneous with this colonisation event. This chronological framework questions the commonly accepted interpretation of the origin of Pechera-style pottery, namely its origin under the influence of Criş culture potters. Due to their high standard deviations, conventional dates can be highly misleading when solving the issue of the contemporaneity of two samples. The higher precision of AMS dates is needed in order to fine-tune the chronological picture of the first half of 6th mill. BCE in the North-West Pontic region.

CONCLUSION

The new radiocarbon dates demonstrate a prolonged (with at least two phases) habitation in the Neolithic settlement of Sacarovca 1. In general, the site was settled in the 57-55th centuries BCE. When seen in the regional context, this chronology corresponds well with the absolute chronology of the Criş culture and contradicts a typo-chronological synchronization with neighbouring older para-Neolithic sites. This observation will hopefully stimulate further discussions regarding the pathways of Neolithisation in Eastern Europe. It underlines the connections between Balkan "classic" Neolithic and the pottery-bearing sites of the Ukrainian Steppe.

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TRACING THE MICRO PROCESSES OF THE PRODUCTION AND USE OF CERAMIC VESSELS AND TEXTILE PRODUCTS FROM THE CUCUTENI-TRYPILLIA SETTLEMENTS OF BILYI KAMIN AND KRYNYCHKY-FERMA (UKRAINE)

ABSTRACT

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The article presents an analysis of a collection of ceramic fragments with textile imprints from the Cucuteni-Trypillia settlements of Bilyi Kamin and Krynychky-Ferma, which are situated in modern Ukraine. The analysis involved macroscopic and microscopic examinations as well as use-wear studies, aimed at characterizing traces that provide insights into the production and utilization of ceramic vessels and textile products. A comparison of results with published data from the Trypillia settlements located mainly to the east of the Dnister River was carried out. A preliminary characterization of the shared and distinct characteristics in the development of the economic activities during the Trypillia CI and CII stages (*i.e.*, during 4th millennium BC), was completed.

Keywords: Cucuteni-Trypillia, ceramics, textile impressions, microscopic analysis, use-wear, ceramic and textile production

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1. INTRODUCTION

The process of producing ceramic vessels in the Neolithic societies of South-Eastern Europe has occasionally been connected with the use of a layer of textile placed (as a kind of separator or support) under the base of the vessels (*e.g.*, Mazăre 2011a; 2011b; Nincic 2016; Svilar 2016). Vessels produced by the Cucuteni-Trypillia (CT) societies who existed between the Carpathian Mountains and the Dnipro River in the territory of modern Romania, Moldova, and Ukraine during the 5th to 4th millennia BC were no exception to this practice. Archaeological sources from CT sites indicate that the supports were most often used during the working process with still-raw (unfired) clay, probably at the stage of shaping the vessel and possibly at the drying stage (*e.g.*, Novytska 1948; Kordysh 1951; Kosakivskyi *et al.* 1998; Ciobanu and Tencariu 2022). The use of a support provided ancient ceramists with a convenient way to manipulate the vessel, as the production was typically carried out on a stationary surface (Novytska 1948; Kordysh 1951). There is no undisputed evidence of a potter's wheel in the CT environment, although there are assumptions about the presence of some rotating devices (Markevich 1981, 120-130; Ellis 1984, 115-118; Ciobanu and Tencariu 2022). The utilization of these supports represents an evident innovation in the production of ceramic vessels (Novytska 1948; Kordysh 1951; Makarevych 1960). Spiral and perpendicular braided mats, as well as woven or other non-woven fabrics were most commonly used as supports (Markevich 1981, 113-117; Kosakivskyi 2003).

Clay is a very plastic material, and as a result, the use of textiles as supports leaves clear "documentation" in the form of impressions on the bottoms of vessels. Such discoveries have been documented since the initial investigations of the CT sites in the late 19th century (Skrzyniecka 2020). Textile imprints enable us to gain insights into the weave's characteristics, the fabric's density, the quality of the thread, and in some instances, even the direction in which the thread was twisted. These details have been discerned through the first pioneering professional studies of this artefact category (Novytska 1948; Kordysh 1951). Although such imprints are the main source for the study of CT textiles – which are not generally preserved in the archaeological record – a comprehensive study remains incomplete. There are some synthetic works on this topic that have described this artefact type at the regional level (Markevich 1981; Kosakivskyi 2006; Marian 2009; Mazăre 2011b) or at the level of some settlements (Novytska 1948; 1960; Kordysh 1951; Kosakivskyi 1998; Kosakivskyi *et al.* 1998; Sikorski 2016; Skrzyniecka 2020). These work are based on data that are derived either from the author's own field investigations or have been compiled through the analysis of published works and museum collections.

Microscopic studies remain very promising for the study of textile imprints on Trypillia vessels because they make it possible to examine the thread structure in more detail. This approach facilitates a comprehensive examination of thread structures, as well as more precise determination of their metric characteristics. The first application of this method

to the investigation of textile imprints on vessels dates back to the early 1930s, when M. Novytska conducted research on materials recovered from the Stina 1/4 archaeological site, excavated in 1929. Photomicrographs and "micro-analysis" were carried out by that author during this study (Novytska 1933) and the results were published after the Second World War (Novytska 1948). Photomicrographs were also used during the investigation of textile imprints in the middle of the 20th century, for example from the Lomachyntsi-Plyta settlement (Passek 1951, 55-57). Recently, the microscopic method has been actively used to study imprints on CT vessels (Sikorski 2016; Skrzyniecka 2020).

However, during the processing of this category of artefacts, the majority of the studies mentioned above pay most attention to the reconstruction of the CT textile manufacturing. On the other hand, details concerning pottery production related to the utilization of textile supports have typically received less attention, with the exception of a few individual studies (*e.g.*, Markevych 1981, 120-130; Ciobanu and Tencariu 2022). In our opinion, the functional traces of textiles on the bottoms of vessels, although overlooked by researchers despite containing information about the process of how vessels with textile imprints functioned, are equally interesting. Therefore, the main objective of this article is to provide a comprehensive characterization of the technical use of textile in pottery making. As database for this paper the collection of ceramic fragments featuring textile imprints from Copper Age settlements, specifically Bilyi Kamin and Krynychky-Ferma, located within the territory of contemporary Ukraine, has been used. Two sites were also chosen to identify whether there were temporal differences in the ceramic and textile production as well. Additionally, we conducted a comparative analysis of our research findings with published data from settlements of the Trypillia culture, predominantly situated to the east of the Dnister River.

The analyzed collection was gathered during active field investigations conducted by Ukrainian researchers in the early 2010s (Rud *et al.* 2015), and also as a result of later large-scale expeditions during 2016-2021 (Rud *et al.* 2019; 2022; 2023). These expeditions were primarily conducted in collaboration between researchers from the Institute of Archaeology of the National Academy of Sciences of Ukraine in Kyiv and Kiel University in Germany, as part of the CRC1266 "Scales of Transformations". Unfortunately, the successful six-year field campaign of this international expedition was abruptly halted due to Russia's war against Ukraine, which escalated significantly on February 24, 2022.

2. MATERIALS AND METHODS

The textile impressions on the bottoms of ceramic vessels, under analysis in this article, originate from two Trypillia culture settlements dating to the 4th millennium BC. The settlements are situated in the southern part of the forest-steppe zone, located between the Dnister and Southern Buh Rivers, and fall administratively in the southern part of the Vin-

Fig. 1. Localization of the Bilyi Kamin and Krynychky-Ferma settlements and other Cucuteni-Trypillia settlements that are mentioned in the article. Prepared by V. Rud

nytsia oblast of Ukraine. They are identified as the Bilyi Kamin site, affiliated with the Chechelnyk group during the Trypillia CI stage, and the Krynychky-Ferma site (Fig. 1), which is part of the Brînzeni group at the onset of the Trypillia CII stage. Below, we provide a concise overview of these settlements, followed by a detailed description of the contextual information concerning the discovered artefacts.

2.1. Bilyi Kamin settlement

According to the results of the magnetic survey conducted in 2018, the Bilyi Kamin settlement encompasses an expansive area spanning 97 ha in a remarkable topographical situation. This settlement stretches from the lower terrace of the Rohizka River, part of the Southern Buh River system, up to the crest of an elongated promontory that extends in a south-east to north-west direction. Overall, the settlement conforms to the "classical" layout of Trypillia settlements with a concentric ring corridor. A rectangular square (the so-called "plaza") containing three large megastructures is situated on top of the promontory. To the south-east of the plaza, a fourth megastructure is also visible. Settlement activities in Bilyi Kamin took place with the "highest" dating probability mainly during the

39th century BC, which was determined using the radiocarbon dating method (Rud *et al.* 2019a; 2019b).

The first archaeological excavations at the settlement were conducted in 1928 (Makarevich 1940). During the 1980s and 1990s, V. Kosakivskyi repeatedly surveyed the settlement. During his investigations, ceramics with textile imprints were found (Kosakivskyi *et al.* 1998, fig. 4: 4). In this article, artefacts from field investigations conducted in 2010 and 2014 are analyzed (Kosakivskyi and Rud 2011; Rud *et al.* 2015, 19). At that time, we received information from local residents about large-scale looting of the settlement via illegal excavations. The site was immediately examined. Several damaged areas of the cultural layer were recorded in the north-eastern wooded part of the settlement. But the largest number was concentrated in the central part of the settlement, to the south of the megastructures, where numerous robber pits and hundreds of kilograms of ceramic vessel fragments have been discovered. Within this collection, there were 15 ceramic fragments originating from four different vessels (identified as find IDs 2, 3, 4 and 36) notable for the high quality of their textile impressions.

Three more fragments of ceramics with textile imprints were found by the Ukrainian-German expedition in 2018. They all belong to one vessel (Find ID 4903), which was found in Building 7 (Rud *et al.* 2019a), a two-story structure with an area of 12.5 x 4.3 m. The collapsed segments of the vessel were found in a compact area on the first floor of the building near its southern corner in a 98 x 81 cm area (Fig. 2: 1, 2). This first floor seems to have had an economic purpose. It can be assumed that the entrance to the building was located in the southern wall of the building at the second floor level. It is possible that a first floor entrance to the building was also located in the same area, but no confirmation of this assumption has been found. With the highest probability, the use of Building 7 took place over a period of 35 years between 3910 and 3875 cal. BCE (Rud *et al.* 2019a, 51-53).

2.2. Krynychky-Ferma settlement

The settlement of Krynychky-Ferma occupies the flat part of a plateau above the valley of the stream that forms the left tributary of the Markivka River (Dnister River system). The magnetic map of the site produced in 2017 is difficult to interpret due to the arbitrary locations of the small anomalies that were identified. Therefore, the core of the settlement plan is interpreted to be the small number of buildings that together with sunken features form a central circular row with a few buildings situated outside it. Some kind of unoccupied circular corridor around the row is also documented. The area to the south of the central row is mostly occupied by small anomalies that could be pits or other small household features (Rud *et al.* 2024, forthcoming). In any case, the settlement structure of the Krynychky-Ferma site is not as regular as the structure of settlements in the preceding Trypillia period, starting from BI-BII till the CI (Hofmann *et al.* 2024, in print). Considering the topographical conditions of the settlement's location, its total area presumably was no larger than 14 ha.

In 2017, during the Ukrainian-German expedition at the Krynychky-Ferma settlement, six fragments bearing traces of textile imprints from various vessels were uncovered. Among these, four fragments (identified as find IDs 2079, 2157, 2216 and 2217) originated from test pit 2, which measured 1 x 2 m. The primary objective of this excavation was to investigate a rectangular anomaly located within the circular row of the settlement. Subsequently, it was determined that this anomaly was a sunken feature, with a depth of up to 0.7 meters during the Eneolithic period. The bottom of the pit was compactly filled with a significant quantity of artefacts, including fragments of animal bones and ceramic vessels, flint and antler tools, and tiny ceramic figurines. According to the radiocarbon dating, it is highly likely that the filling of the pit occurred between 3640 and 3530 cal. BCE (Rud *et al.* 2024, in print). Additionally, two more fragments bearing textile impressions on ceramic sherds (identified as find IDs 3002/1 and 3002/2) were discovered during a surface survey of the settlement area.

2.3. Sample examination methods

This study focuses on eleven pottery samples with textile impressions. In this article the fragments are presented using an abbreviation of the settlement name, specifically «BK» for Bilyi Kamin and «KF» for Krynychky-Ferma, followed by the respective field numbers of the finds. Therefore, samples originating from the first settlement are identified as BK4903, BK2, BK3, BK4 and BK36, while those from the second are denoted as KF2079, KF2157, KF2216, KF2217, KF3002/1 and KF3002/2.

Compiling the collection of pottery fragments with textile impressions used as a source for this work took place as a result of searching for and identifying samples at the stage of field investigations and additionally under laboratory conditions when working on the ceramic collections. In certain instances, ceramic vessel fragments were subjected to cleaning procedures using a citric acid solution to eliminate contaminants. However, in cases where the residue was tightly adhered and removing it might have caused further damage to the fragile surfaces of the sherds, some portions of the deposit were deliberately left intact.

For the purpose of this investigation, the processing of the collection was completed in several stages. These were planned based on repeatedly tested methodical steps used for processing such ceramic products with imprinted textiles (Skrzyniecka 2020; Skrzyniecka *et al.* 2022) and on the basis of personal experience.

During the initial stage, the ceramic vessel fragments were macroscopically examined both visually as well as with the aid of a magnifying glass. This examination aimed to identify and describe the traces associated with both the production and the use of the vessel and the textile. Through visual inspection, we were able to assess the state of preservation of the textile imprint and provide a general characterization of the imprinted textile fragment. Additionally, whenever feasible, we conducted an initial assessment of the yarns

and fibres impressions. It is important to note that this aspect was applicable solely to finds featuring well-preserved sherd surfaces.

During the second stage, a microscopic analysis was conducted, primarily focusing on the detailed examination of imprinted fibres and yarns (see Table 1). This examination encompassed the determination of spinning and twisting directions (Z-twisted – clockwise direction, S-twisted – counterclockwise direction), measurement of twist angle (given in degrees °), which indicates the intensity of the yarn/thread twist, and width measurements (mm) of the imprints (Grömer and Kern 2010, 3136-3145; Gleba 2017, 1206, 1207; Skrzyniecka *et al.* 2022, 230-231). The possible type of raw material is determined based on the proven formula where plant – with sharp surfaces of fibres, and animal – with soft fibre surfaces (Grömer and Kern 2010: 3140-3144; Skrzyniecka 2020). To determine the yarn/thread size, the metric indicators of 10-15 threads from both directions of the weave were taken into account for each imprint, as is usually done when examining actual fabric (Gleba and Harris 2019). It is important to emphasize that the impressions on clay preserve the negative, therefore twisting direction of yarns observed on the imprint appears in the opposite direction to their actual twisting or spinning (Kordysh 1951, 100; Skrzyniecka 2020). This aspect was considered when describing the structure of the threads. For example, we report Z-plied if the original fabric was spun in the clockwise direction, although the imprint makes it appear as though it was spun to the counterclockwise direction. The investigation was carried out using the Keyence VHX-7000 digital microscope at the ArchaeoMicroLab of the Faculty of Archaeology at Adam Mickiewicz University in Poznań. The microscopic examination and photography were taken under 20x magnification.

The third stage involved creating positive casts of the impressions of textiles on the ceramic sherds. These casts were employed for visual examination, enabling the evaluation and testing of assumptions regarding the production and function of the textile, which had been formulated during the first two methodological stages.

Throughout all the aforementioned stages, high-resolution photo documentation of the artefacts was carried out using both a camera and a digital microscope. In the case of documenting textile imprints, the most optimal results were achieved when employing side lighting and altering contrast settings.

The images and preliminary visual examination description of samples BK2 and BK3 had been previously published (Kosakovsky and Rud 2012, fig. 1; Rud 2018, 153, 161, fig. 79). As part of the preparations for this article, additional cleaning of the surface of the mentioned samples was conducted, accompanied by a specialized microscopic analysis of the finds.

Several definitions to characterize the techniques of the investigated fabrics are used in our article. The first includes textiles made in a simple tabby or plain weave that is characterized by passing alternatively the weft thread over and under every single warp thread (Mazăre 2011b, 33). There is a variation of this technique called balanced tabby weave, in which there are the same number of threads per square centimetre in the warp and

Table 1. Technical data of the textile impressions on ceramic from the Bilyi Kamin and Krynychky-Ferma sites

Sample	Textile imprint dimensions	Vessel bottom diameter/ thickness (mm)	Weave	Thread count in threads per cm, warp/weft	Warp				Weft			
					Thread structure	Thread diameter/ average (mm)	Thread elements thickness (mm)	Raw material/ thickness (mm)	Thread structure	Thread diameter/ average (mm)	Thread elements thickness (mm)	Raw material/ thickness (mm)
BK4903	175x175	175/10	weft-faced tabby	5/8-9	S2z: 34-42°	0.90-1.10/1.00			Z	1.18-1.67/1.42		plant/ 0.036-0.064
BK2	198x191	198/14-18	weft-faced rep tabby	5-6/12-13	S2z: 21-32°	1.35-1.62/1.45	0.53-0.64	plant/ 0.031-0.055	S: <20°	1.06-1.42/1.32		
BK3	188x162	194/9-10	weft-faced rep tabby	6/13-14	S2z: 31-45°	1.13-1.54/1.31	0.62-0.85	plant 0.042-0.094	S2z: 23-37°	1.00-1.44/1.18	0.54-1.01	plant/ 0.036-0.058
BK4	50x36	230/12-15	twining ?	3/8-9						1.76-1.90/1.82		
BK36	88x47	138/12	weft-faced rep tabby	5-6/11-13					S: 20-21°	1.37-1.65/1.45		plant/ 0.029-0.064
KF2079	30x10	125/4-6	tabby	4-5/4-5		0.71-1.15/0.9				0.73-1.13/0.97		
KF2157	20x16	-/9	tabby	7-8/7-8		0.73-0.84/0.79				0.80-0.93/0.87		
KF2216	46x17	146/5-6	tabby	6/8-9	S: 5-23°	0.65-1.11/0.77		plant	S: 5-23°	0.76-0.98/0.88		plant
KF2217	87x44	125/9-12	tabby	6/7-8	S: 23-26°	0.99-1.26/1.14			S: 9-17°	0.77-1.20/1.06		
KF3002/1	55x40	128/10-13	tabby	6/7-8	S: 5-21°	0.79-1.34/1.12		plant/ 0.026-0.064	S: 5-21°	0.74-1.44/1.05		plant/ 0.048-0.072
KF3002/2	75x62	-/7-11	tabby	4-5/9								

weft. And the second variation is a weft-faced tabby – when the weft covers the warp threads and there are more weft threads than warp threads (Mårtensson 2009, 376). The scheme of this technique is well illustrated by the fig. 2 in the following publication (Gleba 2020). The next variation includes textiles made in a weft-faced rep tabby, that also called as rep, gobelin (tapestry) or kilim weave in the preliminary publications of the Trypillia textiles (*e.g.*, Kordysh 1951; Novytska 1948; 1960; Kosakivskyi 1998; Uhl 2016). It is a simple weave structure in which the densely arranged weft threads entirely cover the warp (Uhl 2016, 40-41). It worth emphasizing that in case of textile impressions, usually only a fragment of textile product without selvedges or starting borders is visible, which makes it difficult to distinguish and trace the arrangement of warp and weft threads (Skrzyniecka 2020, 248). But the documented turn of threads on one of the textile samples from the Stina 1/4 settlement (Novytska 1960, 34, 35, fig. 2) confirms the existence of weft-faced textiles in the Trypillia culture territory east of the Dnister River. Although we do not reject the existence of warp-faced textiles. The existence of the twining technique, using two active twisted threads, in the specified territories (Mazăre 2011b, 31-33; Skrzyniecka 2023, 12) has not yet been sufficiently described. According to W. Skrzyniecka (2023), it is possible that sometimes this type of textile is described in literature by mistake as kilim or rep techniques.

3. CERAMIC WITH TEXTILE IMPRINTS FROM THE BILYI KAMIN SITE

Sample BK4903

The textile impression (Fig. 2: 3, 4) has been preserved on the base of a pear-shaped vessel. The upper part of the vessel is decorated with a black painted ornament. The diameter of the base is 175 mm and it is approximately 10 mm thick. The walls of the vessel were fired at a sufficiently high temperature, but the bottom was fired at a lower temperature. As a result, the state of preservation of the bottom is unsatisfactory, as it is covered with numerous cracks and the inner and outer surfaces of the bottom are often peeled off. Moreover, the textile imprints are also damaged. No traces of the use of the vessel were found. Instead, we have traces of non-purposeful smoothing of the edge of the basal surface at the stage when the unfired clay was worked. The imprint of the textile on the largest fragment is better preserved than on the two other fragments. All further observations are made on the basis of the study of this particular fragment.

A torn piece of fabric was utilized, which is notably visible in the central part of the fragment. Deep impressions of at least 12 nearly parallel warp threads, measuring 32-45 mm in length, and not interconnected by other threads, have been preserved. However, in the remaining parts of the imprints, numerous yarns from both the warp and weft in the characteristic over-and-under thread interlacing is observed. These imprints indicate a disorderly

arrangement of threads in the central part of the vessel base. Therefore, we suggest that this textile was created using a weft-faced tabby weave pattern, characterized by a tightly spaced arrangement of weft threads, with a density of 8-9 threads per 1 cm in the weft yarn structure, and 5 threads per 1 cm in the warp.

In the upper part of the fragment (Fig. 2: 4), three weft threads placed adjacent to each other are discernible, possibly indicating the presence of a pattern on the fabric. The length of the preserved part of the pattern segment is approximately 57 mm, which encompasses the entire width of the preserved impression. At a distance of 23 weft threads, two weft threads positioned side by side can be observed. These threads are traced over the entire expanse of the imprint, except for the central torn section of the fabric. Consequently, the total length within the imprint could exceed 150 mm. A similar pattern was noted five threads below, but in this instance, three threads are observed together in the area to the left of the central torn portion of the fabric, while only two threads are present to the right. The absence of the third thread may be due to loss during use or its initial absence. Again, the total length within the imprint exceeds 150 mm.

In the weaving process, threads within a wide thickness ranging from 0.90 to 1.67 mm, were utilized. It is worth noting that the warp threads, in comparison, are noticeably thinner (see Table 1). A majority of the warp threads are twisted with two strands of fibres with an angle measurement falling within the range of 34-42° and an S-plied direction. In contrast, the weft threads demonstrate a Z-plied structure. Most likely the plant-derived fibres were used in this piece of textile range in thickness from 0.036 to 0.064 mm.

Sample BK2

The textile impression (Fig. 3) has been preserved on the basal part, having a diameter of approximately 198 mm and a thickness range of 14-18 mm. It was a rather large table vessel of a closed form. The vessel was fired at a high temperature and the surface of the sherd is solid. Notably, some parts of the base were broken from the walls of the vessel along the technological seam. This makes it possible to partially reconstruct the process by which the lower part of the vessel was formed. Initially, the vessel's bottom was shaped as a disk, with the walls subsequently attached. Both the interior and exterior juncture of the two vessel parts were covered with an additional layer of clay. The surface of the basal part contains numerous linear traces associated with its smoothing, as well as numerous pieces of small lumps of clay that cover the textile impressions. No traces of the use of the vessel were found. Instead, traces of non-purposeful smoothing of the surface of the basal edge at the stage when the unfired vessel was being worked are visible. Such areas have preserved the characteristic gloss of the surface.

Shallow impressions of textile are preserved across nearly the entire expanse of the vessel's bottom. They are clearly visible on the basal edges and are less visible on its central part. Most likely, these imprints provide evidence of a worn textile being used as a support, as indicated by the imprints of several seemingly torn threads, some up to 13 mm in length,

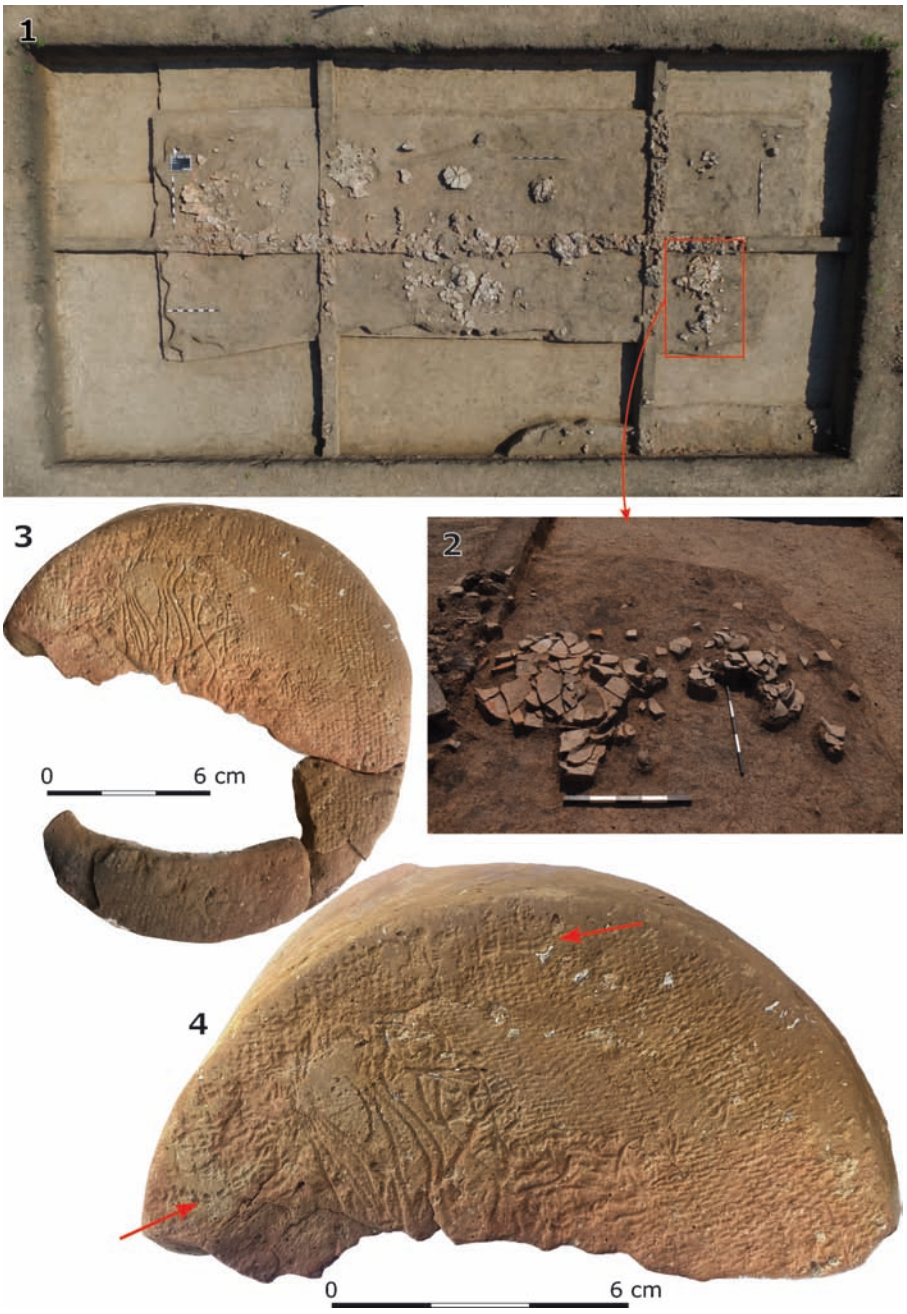

Fig. 2. Bilyi Kamin. (1) Aerial picture of Trench 4 that displays features on the ground floor of House 7; (2) the picture of the collapsed vessel BK4903 on the ground floor of House 7; (3, 4) sample BK4903 with weft-faced tabby weave textile impression with patterned segments. Prepared by V. Rud

Fig. 3. Bilyi Kamin. (1) Vessel base of sample BK2 with weft-faced rep tabby weave textile impression and (2) details of fabric structure, microscopic photography under 20x magnification. Prepared by O. Zaitseva and W. Skrzyniecka

positioned near the centre of the vessel's bottom. Furthermore, there are additional indications of wear, such as three segments measuring 25-40 mm in length, which suggest the loss of several weft threads as well as an irregular density of interlacing. The original textile displayed a high density, featuring a weft-faced rep tabby weave with 5-6 warp threads and 12-13 weft threads per 1 cm. However, due to a reduction in density, certain areas now reveal the warp threads (Fig. 3: 2). This erroneously makes it seem as though the textile was made in a weft-faced tabby weave.

Within an area measuring 8 x 14 mm, located adjacent to the central part of the bottom, an additional textile impression was observed. The orientation of the threads in this imprint is perpendicular to the direction of the textile threads encompassing the entire impression area. This, too, constitutes an impression of a weft-faced rep tabby weave, characterized by a dense arrangement of weft threads that fully covered the warp threads. We have identified a thread count of 5 threads per centimetre in the warp of the fabric and 12 threads per 1 cm in the weft.

Considering the identical thread density in both impressions, it is reasonable to conclude that the same piece of textile was used. In other words, it appears that, during certain vessel production manipulations, it was placed on a piece of the same textile twice.

The potter's work surface on which the textile was laid also contained a number of small objects, possibly lumps of clay left over from the correction of vessel surfaces. Accordingly, the imprint is characterized by deep and well-defined thread impressions (Fig. 3: 2). In specific areas, it is observed that the warp threads comprise two strands between 0.53 and 0.64 mm thick that were twisted (S2z) at an angle of 21-32°. Most likely plant-derived fibres employed in this context display a thickness spectrum spanning from 0.031 to 0.055 mm. The remaining threads are slightly S-plied with an angle of up to 20°. The warp threads measure 1.35-1.62 mm in thickness, while the weft threads range from 1.06 to 1.42 mm.

We assume that the formation of the vessel's bottom did not occur directly on the textile support, as there are no deeply embedded textile impressions across the entire area of the base. The vessel was shaped on the support, albeit with minimal pressure exerted on both the bottom and the support. Subsequently, the vessel was removed from its original support, presumably for the purpose of applying a light slip to its surface, as evidenced by the presence of slip within the textile impressions. In the process of this movement, a second impression was formed, which was also covered with slip. After slipping, the vessel was placed on a surface that contained significant lumps of clay. Such lumps are usually left on the work surface after vessel surfaces were corrected by cutting off excess clay. These pieces of clay overlap the textile impressions and slipped areas in many places. At the final stage of work on the still unfired vessel, numerous traces of mechanical damage to the basal surface occurred, which seem to be related to correcting and possibly smoothing the surface of the central part of the base. In such areas, clay may have been removed with the help of some kind of tool, and along with this, the imprints of the textile were

deformed or destroyed. During these manipulations of the vessel, especially at the final stages, a characteristic flattening of the basal edges occurred.

Sample BK3

The textile impression (Fig. 4) has been preserved on the base of a large tableware vessel of closed shape. The diameter of the base is 194 mm and it is 9-10 mm thick. The vessel was fired at a high temperature and so the surface of the sherd is solid. The peculiarities of the production technology of the lower part of the vessel are evident in several areas. We have traces of the seam where the walls were joined to the disk-shaped workpiece of the base. In one case, the walls were joined from the top of the edge of the disk, and in the other case they were joined from the end. Traces of smoothing clay onto the edge of the basal surface and traces of cutting the corner between the edge of the base and the walls were noted. Additionally, certain sections of the textile impression are covered by small, unprocessed clay lumps that were in a raw state when they became integrated into the vessel's bottom. This indicates that a textile support was not used in the final stages of vessel production in this case.

The textile imprint on the bottom part of the vessel is quite evident, as the fabric is evenly impressed across the entire preserved area of the base. This probably indicates the formation of the basal disk directly on the support. The support was placed on a flat surface with individual small objects on it, possibly pieces of clay. The used textile support was a weft-faced rep tabby weave textile with a relatively high weft thread density, measuring 13-14 threads per 1 cm, and a warp density of 6 threads per 1 cm. However, in certain areas, the density decreases, revealing the warp threads. In these areas, the weft density is 9-10 threads per 1 cm, and the warp is 5 threads per 1 cm. The weft threads have been lost in several areas (Fig. 4: 2, 3), resulting in reduced density and the formation of open spaces ranging from 5 mm to 170 mm in length. The disordered arrangement of thread imprints in the central part of the fragment also indicates damage to the warp threads.

The warp threads (Fig. 4: 2, 3) exhibit a thickness ranging from 1.13 mm to 1.54 mm. The majority of these warp threads are twisted at an angle of 31-45°, plied of two strands (S2z), with each strand measuring 0.62 mm to 0.85 mm in thickness. The plant-derived threads have fibres ranging from 0.042 mm to 0.094 mm in thickness.

Weft threads, on the other hand, have a thickness range of 1.00 mm to 1.44 mm. Similar to the warp threads, the weft threads are predominantly twisted from two strands (S2z), with each strand measuring 0.54 mm to 1.01 mm and twisted at an angle of 23-37°. The plant-derived fibres have a thickness ranging from 0.036 mm to 0.058 mm.

Sample BK4

The textile impression (Fig. 5: 3) has been preserved on the base of a closed-shaped tableware vessel. The diameter of the base is approximately 230 mm. The thickness of the base is 12-15 mm. The firing of the base of the vessel seems to have been conducted without access to oxygen, as evidenced by a black-grey stain on its lower surface.

Fig. 4. Bilyi Kamin. (1) Vessel base of sample BK3 with weft-faced rep tabby weave textile impression and (2, 3) details of fabric structure, microscopic photography under 20x magnification.
Prepared by O. Zaitseva and W. Skrzyniecka

The textile imprint closer to the centre part of the bottom is better preserved. The area closer to the edge of the bottom exhibits slightly deformed and smoothed imprints, probably a result of manipulations with the unfired vessel. This might have occurred immediately after the bottom disc was formed, and the shaping of the vessel's walls had already

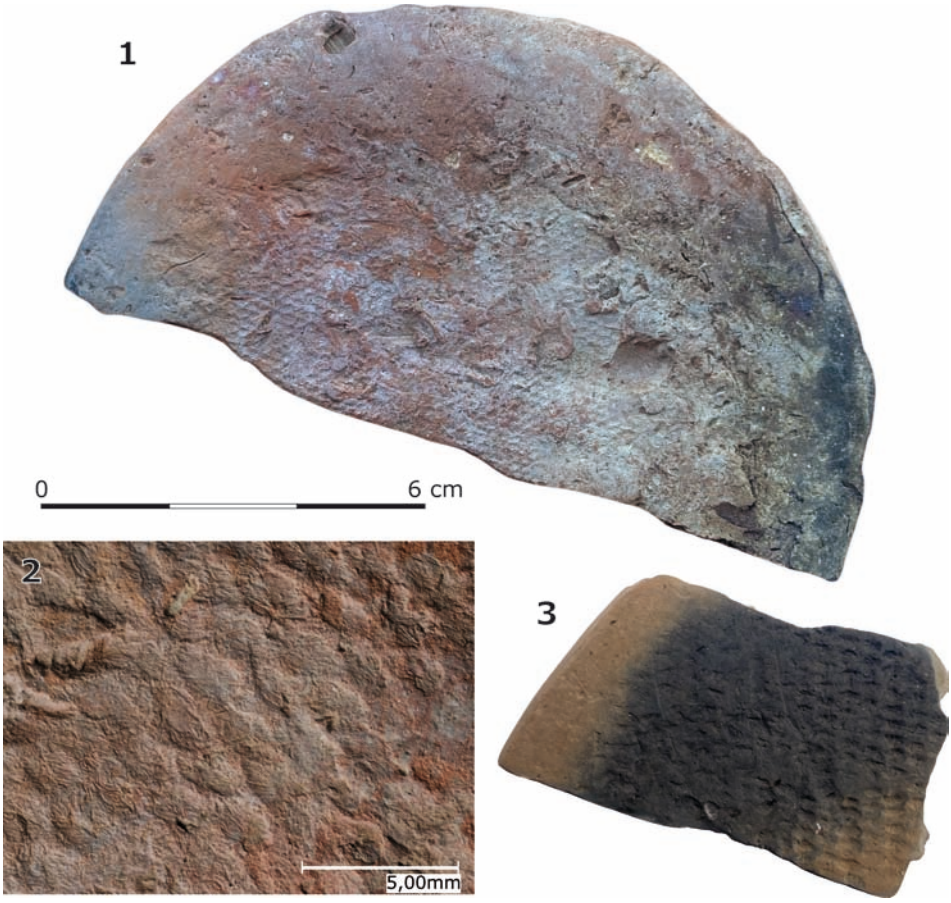

Fig. 5. Bilyi Kamin. (1) Vessel base of sample BK36 with weft-faced rep tabby weave textile impression and (2) details of fabric structure, microscopic photography under20x magnification; (3) vessel base of sample BK4 with twining (?) impression. Prepared by V. Rud and O. Zaitseva

taken place without the use of a textile support. There are no imprints directly on the edge of the bottom, and numerous traces of mechanical damage are visible across the entire imprint area. On the edge of the base, there is also a slight smoothing of the surface, which can be seen in the gloss of the surface. On the other hand, this gloss also indicates the absence of traces of characteristic surface polishing, which is a consequence of the long use of the vessel.

As a support, a high-density probably twined textile was employed. In this case, only the imprints of the weft threads are discernible, as they are closely packed together. The weft threads are at a slight angle to the direction of warp threads, which, in our opinion, indicates the use of the twining technique. Textile fragments made in such technique are

known, for example, from the materials of the Bronze Age of modern Ukraine (Gleba and Krupa 2012; fig. 20.1). The threads of the warp are not visible. Simultaneously, the density of the warp threads is approximately 3 per 1 cm, while that of the weft threads is between 8 and 9 per 1 cm. The weft threads have a thickness within the range of 1.76 and 1.90 mm. Impressions of the fibres are not preserved.

Sample BK36

The textile impression (Fig. 5: 1, 2) has been preserved on the bottom part of a closed-shape tableware vessel with a diameter of 138 mm. The thickness of the base is 12 mm. Traces of how the walls were attached to the basal disk were identified. Additional smoothing of the edges of the base after the formation of the walls was not conducted. As a result, the corner between the base and the walls contains deformations from pressure placed on the basal disk when the walls were attached. The surface of the base, primarily its central part, exhibits a significant amount of mechanical damage, which, among other things, spoilt the textile imprint. The surface of the base is partially covered with slip.

The textile imprint is well-preserved in the central part of the base. In some areas on the edges of the base, faint traces of an imprint were also noted. A dense textile of weft-faced rep tabby weave was used as a support. It consists of 5-6 warp threads and 11-13 weft threads per 1 cm. The thickness of the weft threads ranges from 1.37 to 1.65 mm. They were spun at an angle of 20-21° in the S-direction, using plant-derived fibres with a thickness of 0.029-0.064 mm (Fig. 5: 2).

We could assume that the basal disk was formed on a piece of textile, but the walls were attached after the base was removed from the support, since the textile imprints on the edges of the basal surface were destroyed before the vessel was fired. Numerous traces of mechanical damage, including damage to the textile, additionally confirm that the support was not used in the final stages of the vessel's production.

4. CERAMICS WITH TEXTILE IMPRINTS FROM THE KRYNYCHKY-FERMA SITE

Sample KF2079

The textile impression (Fig. 6: 1) has been preserved on a basal fragment from a tableware plate. The diameter of the base is about 125 mm and the thickness is 4-6 mm. There is no technological seam between the base and the walls.

At the edge of the base, there are hardly noticeable imprints of some threads. It seems that the textile imprints on these areas were worn away during the use of the vessel. The clearest part of the imprint has been preserved closer to the middle of the base covering an area of approximately 30 x 10 mm in size. In this case, a textile made in a balanced tabby weave was used as a support during the production of the vessel. We counted 4-5 threads

per 1 cm in both the warp and weft. Therefore, we are dealing with an imprint from a less dense textile, probably resulting from active use and possibly damage to some areas of this product. Threads with a thickness in the range of 0.71-1.15 mm were used for weaving. No microscopic characteristics related to the structure of the threads were observed.

Sample KF2157

The textile impression (Fig. 6: 2) has been preserved on a fragment of the basal edge of a tableware vessel, possibly open-shaped, as the inner surface was carefully processed. The thickness of the base is 9 mm. The textile imprint is preserved closer to the central part of the base. There are no traces of imprints on the edge of the base, as its surface was polished during the use of the vessel. Textile traces are hardly notable on most of the specified area, as they have also been practically erased. The textile impression was best preserved in a 9 x 5 mm depression.

In this case, a high dense textile made in a balanced tabby weave was used as a support during the production of the vessel. We counted approximately 7-8 threads per 1 cm in the warp and weft. Threads with a thickness in the range of 0.73-0.93 mm were used for weaving. Microscopic characteristics related to the structure of the threads were not recorded.

Sample KF2216

The textile impression (Fig. 6: 4, 5) has been preserved on a fragment of the base of a closed-shaped tableware vessel. The diameter of the base is 146 mm and its thickness is 5-6 mm. There is a technological seam between the base and the wall of the vessel.

The textile imprints are best preserved closer to the central part of the base. There are no imprints on the basal edges, as its surface was polished during the life-use of the vessel. The textile was made in a simple tabby weave. The density of the warp is 6 threads and that of the weft is 8-9 threads per 1 cm. Threads with a thickness in the range of 0.65-1.11 mm were used for weaving. The S-ply of the fibres is characteristic of both the warp and the weft threads. The twist angle of most threads is up to 10°, while the fibres of individual threads were spun at an angle between 15 and 23°. The shape and microstructure of the fibres suggest the use of a plant-derived raw material (Fig. 6: 5).

Sample KF2217

The textile impression (Fig. 7) has been preserved on a basal fragment of a closed-shaped vessel with a diameter of 125 mm and thickness of 9-12 mm. A crack was found on the outer side of the vessel, indicating where the walls and the base were joined.

There are no indications of textile imprints along the edge of the bottom part, as the surface has been notably polished during the vessel's functional use. In the section of the bottom closest to its centre, traces of the textile imprint appear somewhat distorted, potentially preserving even the impressions of the craftsman's papillary lines. Consequently, it is apparent that the use of a textile support was omitted during the final stages of vessel

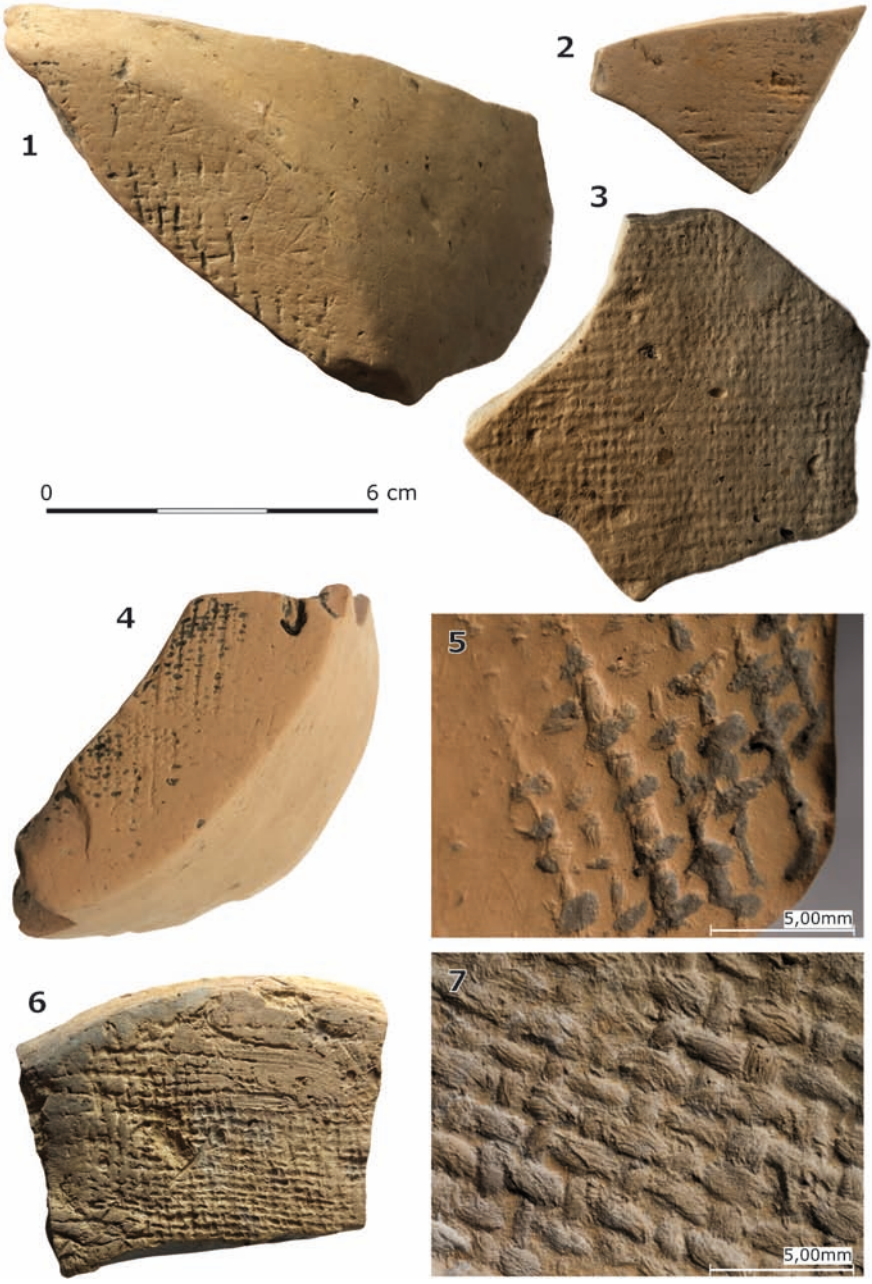

Fig. 6. Krynychky-Ferma. Vessel bases of samples (1) KF2079, (2) KF2157, (3) KF3002/2, (4) KF2216, (6) KF3002/1 with tabby weaves textile impressions and details of fabric structure (microscopic photography under 20x magnification) of samples (5) KF2216 and (7) KF3002/1.
Prepared by O. Zaitseva, W. Skrzyniecka and V. Rud

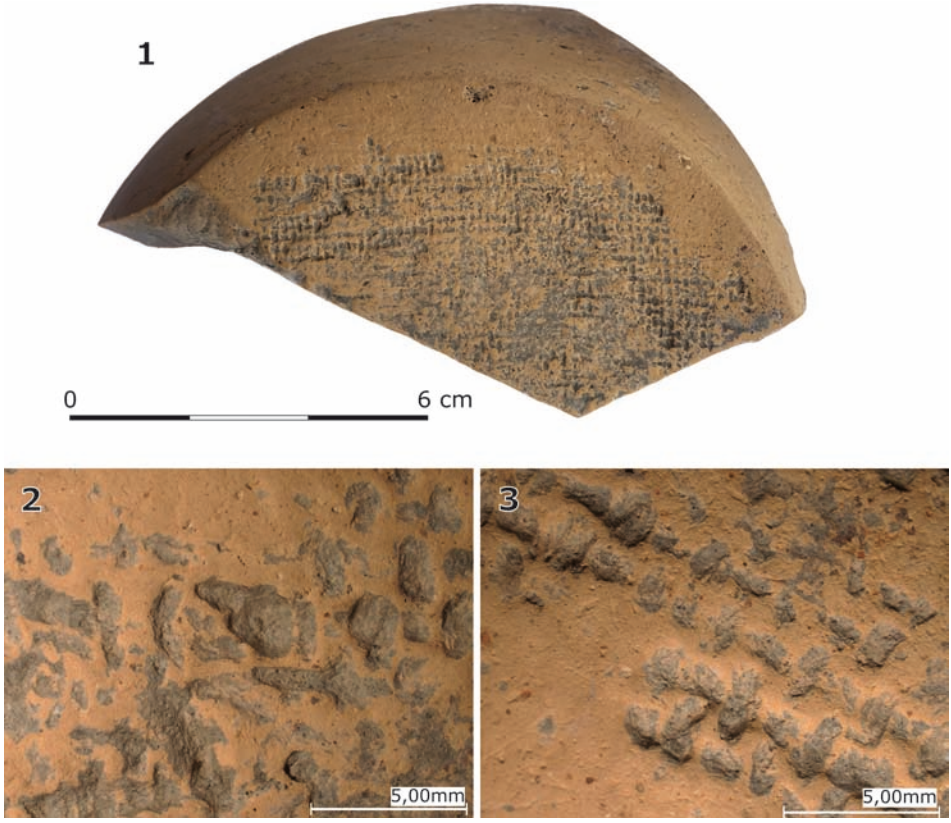

Fig. 7. Krynychky-Ferma. (1) Vessel base of sample KF2217 with simple tabby weave textile impression and (2, 3) details of fabric structure, microscopic photography under 20x magnification. Prepared by O. Zaitseva, W. Skrzyniecka and V. Rud

production. In general, the bottom's surface exhibits irregularities, featuring multiple recessed areas with depths of up to 2.0 mm, where the textile imprints are better visible. The rationale behind this uneven bottom surface can be attributed to various factors. Firstly, inherent surface irregularities probably contributed to this phenomenon, as previously elucidated while characterizing samples BK2 and BK3. Secondly, it seems that the textile may have been unevenly spread across the working surface or became creased during the formation of the bottom disc. Consequently, imprints of these folds were transferred onto the bottom, manifesting as sunken areas with linear characteristics. These depressed areas are interpreted as the placement of an elevating element under the textile pad, which could have facilitated lifting and transporting the formed vessel (Skrzyniecka 2020, 248). Still, this idea is not supported by the sample from our collection, as the textile support was not employed during the concluding stages of vessel production.

A fabric of a simple tabby weave was used as a support during the production of the vessel. The density of the warp is 6 threads, and that of the weft is 7-8 threads per 1 cm. An area was identified where two weft threads were lost. In another case, there is a visible knot (Fig. 7: 2) on the warp thread, which indicates that it was tied (repaired) during the weaving process. A similar feature was also documented on material from the Stina 1/4 settlement (Novytska 1948, 46, 47, figs 5 and 6). Threads with a thickness in the range of 0.77-1.20 mm were used for weaving. The S-ply of the fibres is typical for both the warp and the weft threads. The spinning angle of some warp threads is up to 23-26°, and the weft threads were spun at an angle of 9-17° (Fig. 7: 3).

Sample KF3002/1

The textile impression (Fig. 6: 6, 7) has been preserved on a basal fragment from a closed-shaped tableware vessel. The diameter of the bottom is 128 mm and the thickness is 10-13 mm. It was noted that the base was broken from the walls of the vessel along the technological seam, which was covered on the inside with an additional layer of clay 1-4 mm thick.

On the basal edge, the imprints of the fabric threads are slightly deformed and erased as a result of manipulations while the vessel was still unfired. Several parallel fine lines on the edge of the fragment are possibly impressions of the potter's hand's papillary lines. On two sections of the fragment, long primarily weft threads from the torn edge of the textile are visible. Closer to the middle of the vessel base, the textile imprint is better preserved. This shows that we are dealing with a textile made in a simple tabby weave.

The density of the warp is characterized by 6 threads, while the weft features 7-8 threads per 1 cm. The threads employed for weaving exhibit a thickness ranging from 0.74 to 1.44 mm. An irregular S-ply of the fibres is typical for both the warp and the weft threads. The spinning angle of most threads is up to 10°, while the fibres of individual threads were spun at an angle of 15-21°. The fibres are of plant-derived raw material and their thickness is 0.026-0.072 mm (Fig. 6: 7).

So, the potter firmly integrated the disc-shaped base of the bottom with the textile, facilitating the creation of a high-quality impression. Nevertheless, this impression had partial damage during the handling of the still raw vessel. It is worth noting that the exceptional preservation of fibre imprints can be attributed to the elevated temperature levels during firing of the vessel. This heightened temperature regime effectively strengthened the vessel's surface and ensured its preservation. Traces of the use of this vessel, often indicated by characteristic smoothing of the bottom, remain absent in this case. It is plausible that this vessel became unsuitable for use following the breach of proper firing conditions.

Sample KF3002/2

The textile impression (Fig. 6: 3) has been preserved on a fragment of the central part of the base of a closed-shaped tableware vessel. The thickness of the bottom part is 7-11 mm. Unfortunately, the characteristic bottom edge, which aids in determining the diameter, is

absent. Furthermore, it's worth noting that the surface of the ceramic sherd is in a fragile condition.

The surface of the base is uneven, with numerous depressed areas up to 1.5 mm in depth. The traces of textiles on the not depressed areas were erased during the use of the vessel. Traces of textile were better preserved in the depressions, although the general preservation of the imprint is defined as satisfactory. The reason for such relief on the bottom surface is irregularities on the working surface itself. This was described above during the characterization of, for example, samples BK2, BK3 and KF2217.

A textile with a simple tabby weave pattern was employed as a support. The warp exhibits a density of 4-5 threads, while the weft consists of 9 threads per 1 cm. In one section of the imprint, a combination of two weft threads was observed, which could be attributed to a technological defect or possibly the result of thread loss due to wear and tear. However, the presence of this specific thread arrangement in other parts of the sample remains uncertain due to the poor preservation of the imprint.

5. DISCUSSION

Based on the analyzed collection of ceramic fragments with textile imprints, we are able to reconstruct the processes related to the production and use of ceramic vessels and textile products within the Bilyi Kamin and Krynychky-Ferma settlements of different chronological periods of Trypillia culture. Textiles were used as supports in the production of vessels with basal diameters exceeding 125 mm. The specified diameter is noticed for the KF samples, and the maximum diameter of vessels from this settlement does not exceed 146 mm. Although the minimum diameter of the sampled BK vessels is close to the metric characteristics of the KF vessels, the maximum diameter reaches 230 mm. These findings suggest that textile supports were primarily utilized for vessels of medium to large sizes. A similar conclusion was drawn by V. Kosakivskyi based on materials from the Yaltushkiv settlement (Trypillia CI), where textile supports were used for vessels with bottom diameters ranging from 130 to 180 mm (Kosakivskyi 1998, 36-38).

The data derived from the analysis of most processed samples (BK2, BK3, BK4, BK36, KF2217 and KF3002/1) suggest that the textile support was not utilized during the final stages of vessel production. In these instances, it appears plausible to assert that the supports were not employed during the drying stage of the vessel but rather during preceding phases. In certain cases (BK4 and BK36), the textile support was exclusively employed in the creation of the bottom disc, preventing it from adhering to the work surface. It indicates the absence of clear rules in the use of supports in the technological chain of ceramic manufacture before drying. So, the use of supports in combination with rotary mechanisms (Markevich 1981; 120-130; Ciobanu and Tencariu 2022) is also possible.

In the process of making the vessel, fixing the walls to the disk-shaped basal blank was accompanied by an increased level of pressure on its edge, especially in thin bases and this deformed them. It was precisely these lowered areas of the base that were often in contact with various surfaces during the use-life of the vessels. This led to the destruction of the textile imprints on the basal edges. The absence of textile imprints on the specified areas is documented on most of the KF samples (with the exception of KF3002/1). This indicates that the inhabitants of the settlement intensively used the vessels. In contrast, there is an absence of evidence indicating the use of vessels among the BK samples.

However, we suggest that the functionality of these large, enclosed vessels was not centred around frequent movement, particularly if they served a storage purpose. For instance, the pear-shaped vessel BK4903 has a volumetric capacity of approximately 44 litres. As previously mentioned, it was discovered near the building's corner. Other collapsed large vessels within Building 7 at the ground floor level of the Bilyi Kamin site are positioned adjacent to the building's corners and walls, while in the central section of the building, the vessels are situated near the grain grinding area (Fig. 2: 1; Rud *et al.* 2019a, fig. 13). So, they mark the initial functional placement of storage vessels in the house.

Preliminary observations regarding the frequency at which supports were used in pottery production are important. In 2018, within a 136 m² excavated area at the chronologically earlier Bilyi Kamin settlement (Rud *et al.* 2019a), one textile-imprinted vessel base was found, whereas in a much smaller area of 8 m² at the later Krynychky-Ferma site (Rud *et al.* 2024 , forthcoming), six such artefacts have been found. Although detailed statistical data on the frequency of such imprints are still lacking, these immense differences might in our opinion indicate an increase in the popularity of the use of textile underlays in pottery production from the CI stage to the beginning of the CII stage of the Trypillia culture. This preliminary conclusion seems to be supported by the increasing popularity of this process that is documented in the Usatove materials dating to the second half of the 4th millennium BC (chronology according to: Kaiser 2019). According to various sources, it is estimated that between 10% and 90% of the bottom parts of vessels from both burial and settlement sites exhibit imprints of textile supports, which were created using textile of simple tabby weave or mats plaited using various techniques (Boltenko 1926, 11; Zbenovych 1974, 81, 82; Patokova 1979, 32, fig. 11; Patokova and Petrenko 1989; Burdo 2004, 421).

After analyzing the BK and KF sample collections, it was determined that textiles woven in a simple tabby weave, weft-faced tabby and weft-faced rep tabby weave were utilized as supports during the vessel production process. These correspond to the characteristic Trypillia weaving techniques that have been repeatedly documented on materials from other settlements, primarily of the CI stage, such as Yaltushkiv, Bernashivka, Stina 1/4, and Chechelnyk (Novytska 1948; 1960; Kordysh 1951; Kosakivskyi 1998; Kosakivskyi *et al.* 1998). We assume with caution that the BK4 sample fabric was made using a twining technique, the existence of which was previously indicated by W. Skrzyniecka (2023). It is

worth noting that the BK samples have impressions of dense textiles made using a weft-faced tabby and mainly weft-faced rep tabby weave, and the KF samples are exclusively of a lower density simple tabby weave. In general, at the Trypillia CI stage, in addition to the specified weaving techniques, non-woven textiles made with netting or needle looping techniques are also available in the artefacts from, for example, the settlements of Yaltushkiv, Bernashivka, and Stina 1/4 (Novytska 1948; 1960; Kordysh 1951; Kosakivskyi 1998; Kosakivskyi *et al.* 1998). To date, descriptions of a small number of artefacts from the Trypillia CII stage (the end of the first half of the 4th millennium BC to the beginning of the 3rd millennium BC; chronology based on the dating of the Krynychky-Ferma settlement and according to: Diachenko, Harper 2016) have been published. These imprints are similar to samples from Krynychka-Ferma that are, for example, known from the Vovchynets, Zhvanets-Lysa Hora, and Sharyn 3 settlements (Passek 1953, 59; Burdo 2004, 515; Kushtan 2016). Based on these data, we assume that a simple tabby weave were the most common during the CII stage of the Trypillia culture.

A distinct pattern is observed across all samples in the collection, where the number of warp threads per 1 cm is consistently fewer than the weft threads. In the case of weft-faced rep tabby samples, the number of weft threads (ranging from 11 to 14) is more than twice that of the warp threads (ranging from 5 to 6). In contrast, for simple and weft-faced tabby weaves, the weft threads are slightly greater in number (ranging from 4 to 9) than the warp threads (ranging from 4 to 8), or there is an equal number of threads in both directions (4-5 or 7-8). It has been repeatedly observed that old, worn textiles were used as supports during the production of vessels (*e.g.*, Novytska 1948; Kordysh 1951). This is confirmed by the results of our investigation, and therefore the initial density of the textiles may have been somewhat higher. For instance, sample K2079 has an atypically low weft density of 4-5 threads per 1 cm.

More than half a century ago, samples featuring imprints of decorated fabrics on Trypillia culture ceramics were documented. It is possible to infer the existence of two distinct methods for producing decorative patterns on fabrics, as indicated by materials recovered from the Stina 1/4 settlement of the CI stage. The first method involves weaving, where three or four weft threads are thrown simultaneously (Novitskaya 1960), while the second method employs an embroidery technique (Makarevich 1960, 31). In both cases, it is presumed that coloured threads were utilized to create patterns (Novitskaya 1960). An important result of our research is the identification in the collection of a sample (BK4903) that most likely confirms the existence of patterned textured fabrics in the Trypillia environment in the CI stage. In this case, the texture is created by three weft threads. The formation of texture with two threads is doubtful, but also possible.

In the BK and KF samples, the thickness of the thread impressions range from 0.65 to 1.90 mm. Moreover, the data differ depending on the settlement. In the case of the earlier BK samples, the threads are thicker and most are over 1.00 mm, with an average thread thickness of 1.37 mm. Even if we consider only the results for woven products, the average

thread thickness are high — 1.30 mm. For most samples, along with the use of single-thread elements, the use of plied yarns is also typical. Conversely, on the later KF samples, the threads are somewhat thinner ranging from 0.65 to 1.44 mm thick, with an average thickness of 0.95 mm. Only single-thread elements were used. Perhaps, the difference in the thickness of the threads is a chronological feature.

Currently there exists no large database against which the stated assumption can be verified. The metric characteristics of the threads from textile imprints on ceramics are, however, known to us from several settlements located in the area east of the Dnister River. For example, at the settlement of Stina 1/4 of the Trypillia CI stage, threads with thicknesses close to the range of the BK samples, from 0.7 to 2.0 mm, were used, although the approximate average thickness of the threads is 1.14 mm (Novytska 1948; 1960; Makarevych 1960). That is, this value is intermediate between the data obtained from the samples that come from the Bilyi Kamin and Krynychky-Ferma sites. The thickness of the threads from the settlement of Petreni (Trypillia CI) on the right bank of the Dnister River varies in the range of 0.7-1.9 mm, with an estimated average value of 1.33 mm (Kordysh archive; 1951). Plied yarns were sometimes used at these CI stage settlements (Novytska 1948; 1960; Kordysh 1951; Makarevych 1960). Data on the thickness of the threads from the CII stage of the Trypillia culture are known only from the sites of Romanivka and Kolodyste. For the Romanivka site, the thickness of the threads ranges from only 0.5 to 0.7 mm, and the range for the Kolodyste site is between 0.8 and 1.6 mm (Kordysh 1951). The metric characteristics of the threads imprinted on materials from the settlements of Bilyi Potik and Bilcze Zlote (Sikorski 2016; Skrzyniecka 2020) are not taken into account, since they come from multi-layered sites and it is not possible to determine to which chronological horizon the artefacts belong.

However, it must be emphasized that drying and firing of clay is accompanied by shrinkage of the material, and therefore the actual thicknesses of the threads that were used to produce the textile imprints were larger than those given above.

As for thread structure, the spinning angle of single yarns does not exceed 17-26° for samples from the investigated collection. The maximum spinning angle of double-strand thread, which, as it was mentioned, is typical only for individual BK samples, reaches 32-45°. These data are generally correlated with available information of a similar nature (Sikorski 2016).

We have determined that plant-derived raw material was used to make the investigated threads that were imprinted on BK and KF samples, which correlates with the majority of existing data (*e.g.*, Novytska 1948; 1960; Kordysh 1951; Sikorski 2016; Skrzyniecka 2020). However, researchers assume that some samples exhibit imprints of threads made of animal-derived raw materials, namely yarn made of wool (Kordysh 1951, 104; Makarevich 1960, 29; Kosakivskyi *et al.* 1998, 38). However, BK and KF samples visually demonstrate, in our opinion, a different quality of raw material prepared for spinning. The former show a much higher level, resulting in well-processed plant fibres (for example sample BK36, see Fig. 5: 2).

6. CONCLUSIONS

This research shows that, starting from the CI stage (the beginning of the 4th millennium BC), textiles from the Trypillia culture were integrated into the recycling process, enabling the utilization of worn fabrics as supports during vessel production. The analyzed collection from the Bilyi Kamin and Krynychky-Ferma settlements suggests that these supports were employed at various stages associated with vessel formation, primarily during the creation of the disc-shaped base of the bottom part. Notably, during the drying phase preceding firing, these supports were not utilized. Supports were used for the rotating of the vessel during manufacture or possibly in association with a rotating device.

At the Bilyi Kamin settlement, these supports were primarily employed in the production of large, closed-form vessels that show no signs of extensive use, implying a probable storage function. The most prevalent fabric type at this settlement consisted of dense weft-faced rep tabby weave, crafted using thick threads made from carefully prepared plant-derived fibres. Frequently, threads spun from two yarns were employed, imparting the required thickness and thereby enhancing strength. The presence of patterned fabrics during the CI stage of the Trypillia culture has been verified. Furthermore, at this chronological stage, fabrics woven on a loom in different variations of a tabby weave and produced using non-woven techniques were also frequently encountered.

At the Krynychky-Ferma settlement, textile supports were employed for vessels with smaller volumes but greater functional variability. This is evident in vessels that served both storage and consumption purposes, indicating the increasing popularity of support usage in pottery production. Furthermore, materials from other settlements of the Trypillia CII stage demonstrate the emergence and widespread adoption of specialized mats as supports during this chronological stage. Concurrently, the variety of textile production techniques decreases. During this period, the prevalent type of textile, both at the Krynychky-Ferma settlement and throughout the Trypillia CII stage, consists of less dense fabrics produced on a loom in a simple tabby weave. This technique was, perhaps, the most practical method for fabric production, utilizing thin threads derived from poorly processed plant fibers.

The observed differences in textile production between the settlements of the two successive stages in the development of the Trypillia culture can be correlated with broader trends in the evolution of the economy, social structures, and political organization. These trends, characterized by active development and refinement during the stages of Trypillia BI-BII, BII, and CI (late 5th to early 4th millennia BC), transition into a phase of decline, primarily with the onset of the CII stage of the Trypillia culture or undergo significant transformations (*e.g.*, Hofmann *et al.* 2019; Kirleis *et al.* 2023). There is also a degradation in pottery production during this stage (Ryzhov 2002). However, certain practical aspects of pottery production are experiencing increased popularity, as evidenced by our research.

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EARLY BRONZE AGE PAMUKLI BAIR BARROW NEAR MALOMIROVO AND THE PROBLEM OF EAST-ORIENTED BARROW GRAVES IN UPPER THRACE

ABSTRACT

Alexandrov S. and Włodarczak P. 2023. Early Bronze Age Pamukli Bair barrow near Malomirovo and the problem of east-oriented barrow graves in Upper Thrace. *Sprawozdania Archeologiczne* 75/1, 213-245.

In 2021, excavations of a barrow were conducted on the Pamukli Bair hill in Malomirovo, Elhovo municipality, Upper Thrace, Bulgaria. These excavations yielded a remarkable discovery – a sequence of graves dating back to the late fourth and third millennium BC. Notably, these findings prominently featured elements of the early Pit-Grave culture, also known as the Yamna culture.

However, the commencement of this burial sequence was marked by graves that diverged from the norms of the Yamna culture. These early graves contained individuals interred in a crouched position, with their heads oriented towards the east. Unlike the prevalent use of ochre in the Yamna culture, this type of funeral ritual exhibited its limited presence.

Comparable central graves of this kind have also been documented in other barrows throughout the Middle Tundzha region and various parts of Upper Thrace, particularly in the "Maritsa-Iztok" area. These burials can be dated to the end of the fourth millennium BC and display similarities to both local funeral traditions (Ezero A1) and graves analogous to the Cernavodă/Nizhna Mikhailivka traditions.

The horizon of barrow necropolises featuring these distinctive burials is clearly discernible within the Upper Thrace region and seamlessly connects to the horizon of the early Pit-Grave culture.

Keywords: barrows, Early Bronze Age, Upper Thrace, absolute chronology, funeral rite
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1. INTRODUCTION

In 2021, excavations were conducted on the burial mound situated atop Pamukli Bair hill in the village of Malomirovo, Elhovo municipality, Upper Thrace, Bulgaria. They yielded a wealth of information regarding the funeral customs of barrow communities from the fourth and third millennium BC, specifically from the Early Bronze Age (EBA) in the Balkan region. Extensive radiocarbon testing resulted in a series of 15 dates for the graves explored (Alexandrov and Włodarczak 2022). Notably, this research documented graves

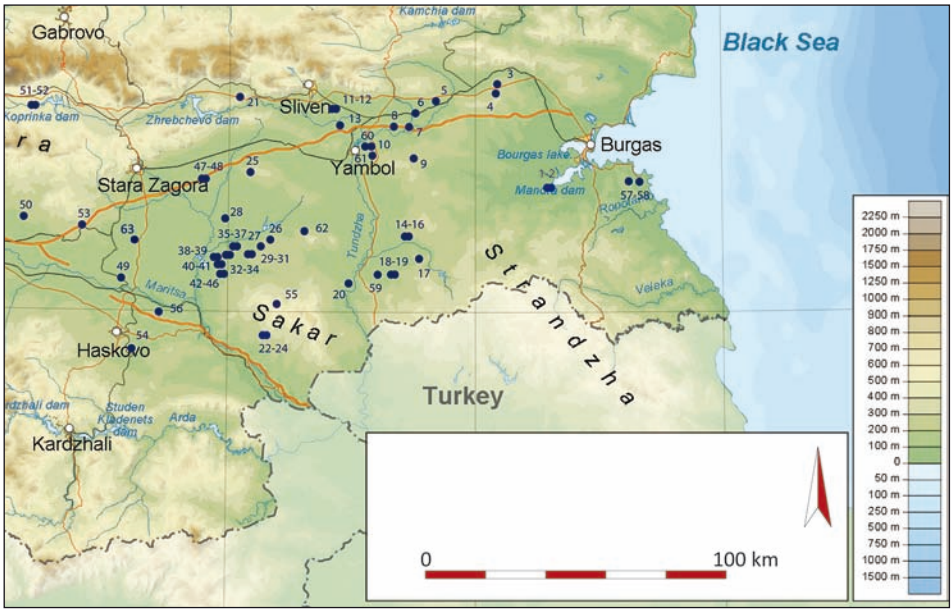


Fig. 1. Bronze Age barrows investigated in Upper Thrace
1-2 – Debelt/Deultum Barrows 1-2; 3 – Karnobat, Gyaurska Mogila; 4 – Chatalevo, Barrow 1; 5 – Venets, Tonchova Mogila; 6 – Atolovo, Barrow 1; 7 – Straldzha, Barrow 3; 8 – Zimitsa, Barrow 1; 9 – Irechekovo, Barrow 1; 10 – Mogila, Barrow 1; 11 – Kamen, Gabrova Mogila; 12 – Kamen, Sekerdzha Mogila; 13 – Drazhevo, Sabev Bair; 14 – Boyanovo, Lozyanska Mogila; 15-16 – Boyanovo, Baiylar Kayrak, Barrows 1 and 3; 17 – Popovo, Golyamata Mogila; 18 – Malomirovo, Golyamata Mogila; 19 – Malomirovo, Barrow 2; 20 – Sinapovo, Barrow 1; 21 – Tvarditsa, Barrow 1; 22-24 – Izvorovo, Barrows 1-3; 25 – Sokol, Barrow 1; 26 – Targovishte, Barrow 1; 27 – Kovachevo, Barrow 1, 28 – Petmogili, Barrow 2; 29 – Ovchartsi, Barrow 1; 30 – Ovchartsi, Barrow 2; 31 – Ovchartsi, Barrow 3; 32 – Malka Detelina, Barrow 1; 33- Malka Detelina, Barrow 2; 34 – Malka Detelina, Barrow 3; 35 – Golyama Detelina, Barrow 1; 36 – Golyama Detelina, Barrow 2; 37 – Golyama Detelina, Barrow 4; 38 – Beli Bryag, Barrow 5; 39 – Troyanovo, Kangalova Mogila, 40 – Troyanovo, Chernyova Mogila, 41 – Troyanovo, Barrow 1; 42 – Mednikarovo, Barrow 1; 43 – Mednikarovo, Barrow 2; 44 – Mednikarovo, Barrow 3; 45 – Mednikarovo, Barrow 4; 46 – Mednikarovo, Barrow 6; 47-48, Benkovski, Barrows 1-2; 49 Merichleri, Barrow 1; 50 – Bratya Daskalovi, Malkata Momina Mogila; 51-52 – Dolno Sahrane, Barrows 3-4; 53 – Svoboda, Barrow 1; 54 – Stambolovo, Barrow 3; 55 – Voden, Barrow 1; 55 –Bulgarska Polana; 56 – Chernogorovo, Barrow 1; 57-58 – Pomorie; 59 – Malomirovo, Pamukli Bair; 60-61 – Mogila; 62 –Prohorovo, 63 – Trakia

that preceded the typical Pit-Grave culture (PGC) burials, marking a significant discovery. These finds serve as a valuable starting point for organizing knowledge concerning barrow rituals in Upper Thrace around 3000 calBC.

Until the end of the 20th century, EBA barrows in Upper Thrace remained relatively poorly known. In the first comprehensive monograph for the Bulgarian region, Ivan Panayotov mentioned only two confirmed burial mounds – near Kovachevo and Troyanovo, along with one suspected burial mound near Sokol (Panayotov 1989, 20, 21). Significantly, an expansion of available data occurred with the publication of barrows excavated near Radnevo in the "Maritsa-Iztok" region (*e.g.*, Kanchev 1991; 1995; Panayotov and Alexandrov 1995) and in the vicinity of Yambol (*e.g.*, Iliev 2011; Iliev and Bakardžiev 2020). Equally important were the publications of research results on Lozyanska Mogila near Boyanovo (Agre 2015) and two burial mounds near Kamen (Gabrova Mogila and Shekerdzha Mogila; Dimitrova 2014; 2021), both in Tundzha river region. While recent comprehensive compilations demonstrate a significant expansion of the source material (Fig. 1; Kaiser and Winger 2015; Alexandrov and Kaiser 2016; Alexandrov 2020), a substantial portion of the materials remains incomplete or unpublished. Consequently, the results presented for the Malomirovo barrow currently hold a crucial role in studies focused on trends within the barrow ritual in the Upper Thrace region.

Analyses of the mortuary practices there have consistently highlighted the distinctive characteristics of materials from Upper Thrace, setting them apart from barrow necropolises situated north of the Balkan range (*e.g.*, Kaiser and Winger 2015; Alexandrov and Kaiser 2016). These distinguishing features encompass a significant quantity of graves within the barrows, the presence of numerous burials with accompanying equipment, the absence of traces of ochre usage in many instances, and the prevalence of graves associated with local EBA communities. These specific traits suggest a substantial indigenous influence on the development of barrow rituals, with less emphasis on signs of incursion by steppe communities from the northern Pontic zone. The taxonomic and chronological details presented below provide compelling arguments for further investigations of these problems.

2. THE EARLIEST BURIALS AT PAMUKLI BAIR IN MALOMIROVO

The burial mound near Malomirovo is situated atop Pamukli Bair hill, which overlooks the valleys of the Popovska and Kurudzadere rivers, left-bank tributaries of the Tundzha River (Fig. 2). It is part of a cluster of burial mounds extending along the west-east axis, including the renowned Golyamata Mogila, located on the border between the villages of Malomirovo and Zlatinitsa, with a royal burial from the 4th century BC (Agre 2011). These burial mounds are part of the network of larger necropolises near Elhovo, positioned to the

Fig. 2. Malomirovo, Elhovo municipality, Pamukli Bair barrow. View of site from the east. Photo P. Włodarczak

far south in the region of central Tundzha River. Nearby, in locations such as Boyanovo (Lozianska Mogila and Baylar Kayryak, Barrows 1 and 3; Agre 2015; Iliev and Bakardžiev 2020), Popovo (Golyamata Mogila; Agre 2007), and Sinapovo (Sechenata Mogila; Agre and Dichev 2013), similar barrows have been explored.

The diameter of the Malomirovo barrow measured around 40 metres, with a height of 3.5-4 metres. The mound fill consisted of layers of humus and weathered chalk rock. All three phases of its construction were associated with EBA burials. The oldest construction stage included Graves 18, 19, and 21 (Fig. 3). The second one featured Graves 16, 17, and 20. Graves 1 and 14 were linked to the third (the last and the largest) barrow enlargement. The two most recent EBA burials (Graves 3 and 5) were dug into the central part of the finally shaped mound. In the southwestern sector, three Middle Bronze Age graves were discovered (Graves 4, 12, and 13), while in the Late Antiquity period, Grave 2 was dug into the top of the barrow.

Until the 21st century, the mound remained remarkably well preserved. Unfortunately, in recent decades, the central part has suffered damage due to several unauthorized activities, including one in 2005. During these treasure-hunters diggings, an EBA burial was unearthed, showing significant ochre discoloration in the bones. Archaeologists conducting a rescue intervention found two gold hair-rings next to the disturbed remains, which

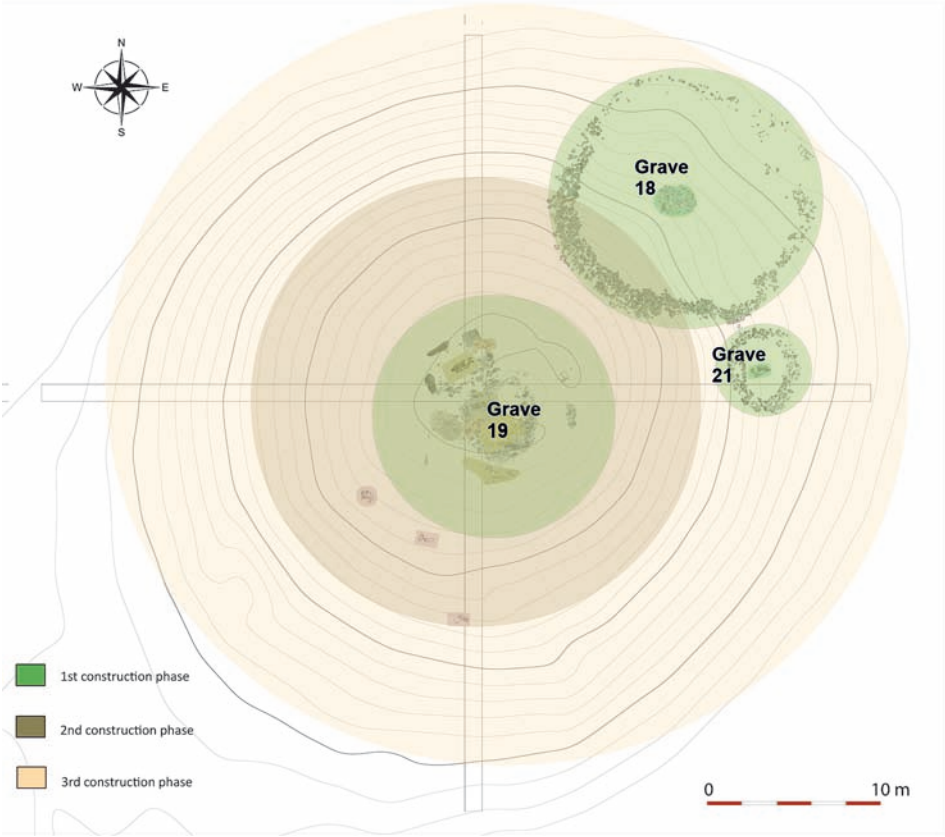


Fig. 3. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Graphic representation of the barrow construction phases. Illustrated by M. Podsiadło and S. Alexandrov

are currently in the collection of the Elhovo museum (Alexandrov *et al*. eds 2018, 475, cat. Nos. 144 and 145). Regrettably, no precise documentation was prepared to locate the robbery trench within the barrow at that time. In 2021 excavations, the remains of three robbery pits were discovered. One of them, designated as Feature 11, lay to the east of Graves 14 and 16 and was visible as a trough-shaped depression before the research began. The second trench, marked as Feature 10, was rectangular and had led to the complete destruction of Grave 16. The third robbery pit was placed directly north of Grave 16, containing iron elements of tools used for excavating earth. This excavation may have entirely obliterated one of the construction phase II graves.

In total, the excavations in Malomirovo revealed 10 EBA graves (Nos 1, 3, 5, 14, 16, 17, 18, 19, 20, and 21). These findings contribute to a complex stratigraphic system and, when combined with 15 radiocarbon dates, provide a significant sequence for a better

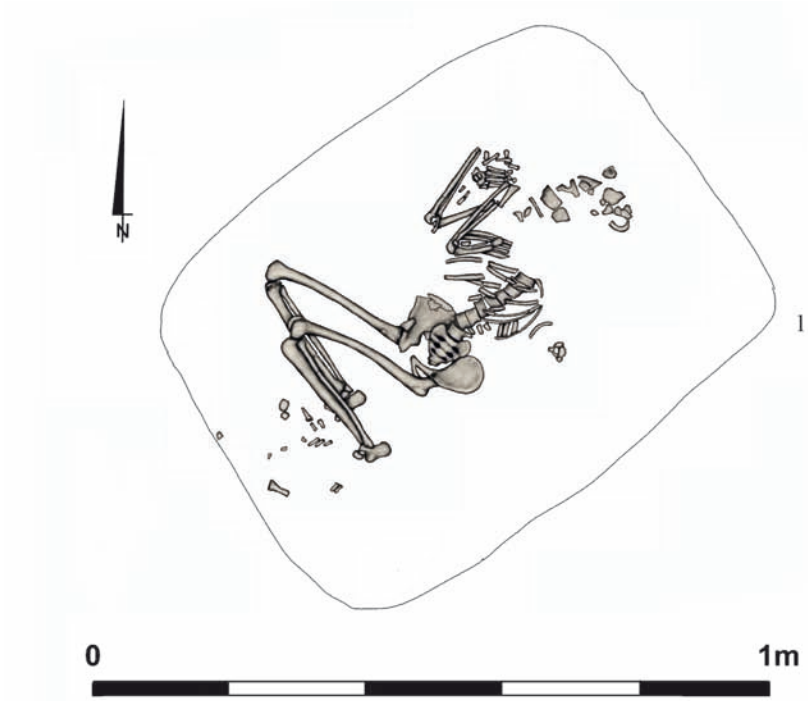


Fig. 4. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
1 – Grave 19, 2 – Central part of the barrow with Grave 19 and stone constructions of two PGC graves (nos 16 and 17). Illustrated by M. Podsiadło and P. Włodarczak

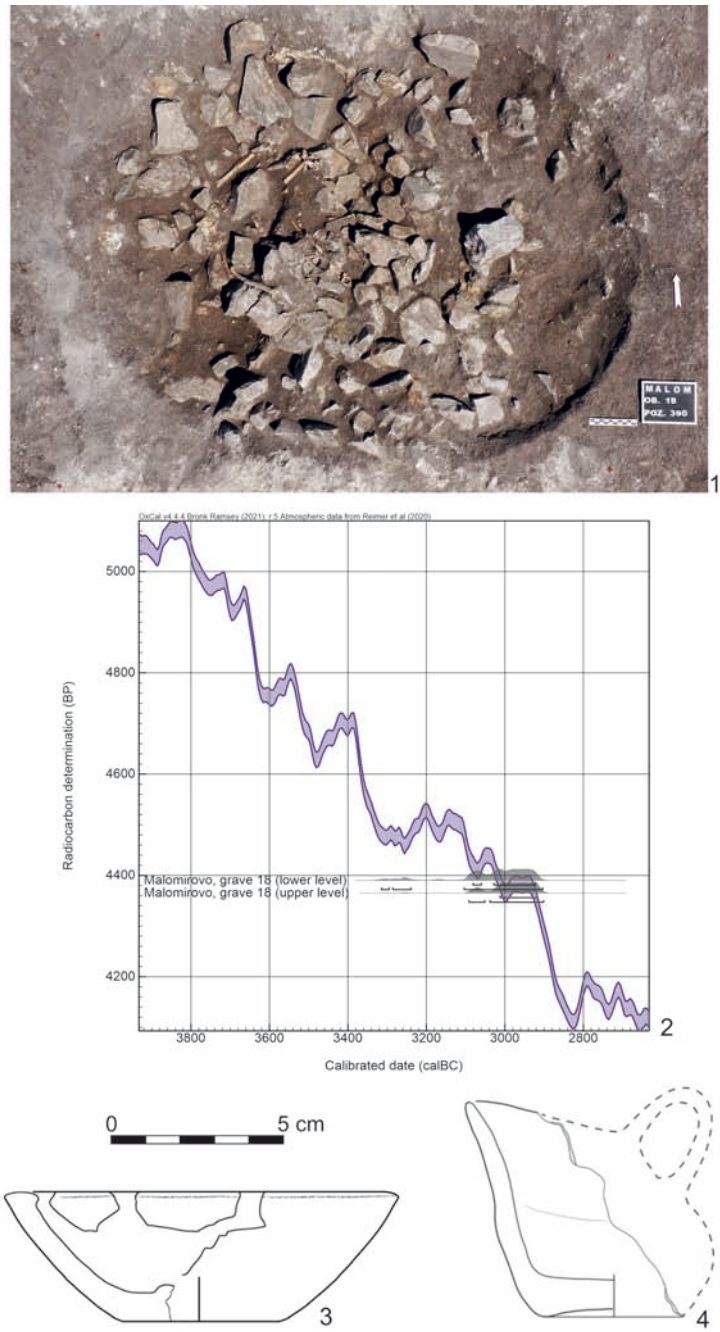


Fig. 5. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Grave 18 (1 – upper part of the grave pit, 2 – radiocarbon dates, 3, 4 – pottery). Illustrated by M. Podsiadło

Fig. 6. Malomirovo, Elhovo municipality, Pamukli Bair barrow. Grave 21. Illustrated by M. Podsiadło

understanding the cultural changes in Upper Thrace at the end of the fourth and the first half of the third millennium BC. Three burials are associated with the oldest phase:

Grave 19. Situated beneath the central part of the barrow, it was dug into the original ground level to a depth of 0.75 m, cutting through the chalk rock debris. The pit had a slightly irregular, semi-rectangular shape with rounded corners and measured 1.6 × 1.3 metres. At the bottom, the remains of a female individual, aged 30-40 were found (Fig. 4: 1).

She was laid on her back with a slight tilt to the right side, oriented along the NE-SW axis, with her head to the NE facing toward the NW. The upper limbs were bent with hands directed toward the face, while the lower limbs were curled at right angles in the hip joint and at an acute angle in the knee joint. The skull and the upper part of the postcranial skeleton suffered secondary damage, most likely caused by the 2005 robbery trench. No items or ochre traces were noted in the grave. The presence of wooden structural elements was also not documented. A mound of dark humus soil, about 10 metres in diameter and approximately 1 metre high, covered the grave. A PGC burial (Grave 16) was dug into the mound directly above this grave. This structure was entirely destroyed by a modern trench. Only lumps of ochre were found on the preserved fragment of its bottom. Nevertheless, on the top of a small mound connected to Grave 19, there were remnants of a stone wreath and traces of a wooden covering associated with the destroyed Grave 16 (Fig. 4: 2). The documented stratigraphic situation rules out the possibility of considering these two burials as a double-storey grave, akin to the features found in Boyanovo, Troyanovo, and Beli Bryag, mentioned below. Graves 16 and 19 in Malomirovo therefore represent two distinct chronological phases.

Grave 18. To the northwest of the barrow fill above Grave 19, another small barrow was constructed, delineated by a stone circle measuring 14-15 metres in diameter. A low mound, reaching up to 1 metre in height, was covered with stone paving, with better preservation in the southwestern part. At the centre of this structure, Grave 18 was dug into the original ground level, accompanied by two heaps of yellow virgin earth (so called "*vykids*"). This feature measured 1.9 × 1.4 metres and had a depth of 1.1 metres. In its fill, starting from the upper part, numerous human remains mixed with large stone blocks were discovered (Fig. 5: 1). The bones belonged to a 25-35 years old male individual. At the bottom of the grave, a small silver bead and an antler tool were found. Fragments of two EBA vessels were also discovered in the grave fill: a small ascoidal cup (Fig. 5: 4) and a bowl with a thickened, horizontally cut rim (Fig. 5: 3).

Grave 21. To the southeast of the stone circle connected with Grave 18, a smaller oval stone structure measuring 4.6 x 3.6 metres was found. Within it, Grave 21 was shallowly dug, approximately 20 cm below the stones. The deceased, about 20 years old male individual, was placed in a contracted position on his back with a slight tilt to the left side. He was oriented along the west-east axis, with his head facing east. A small lump of ochre was discovered near his left forearm (Fig. 6).

The exact stratigraphic relationship between Graves 18, 19, and 21 (along with the small barrows associated with them) is challenging to establish conclusively. The positioning of the stone circles connected to Graves 18 and 21 at a similar level suggests their approximate contemporaneity. However, both structures were already situated beyond the small mound created over Grave 19. Additionally, a low but extensive barrow was constructed above Grave 18, composed of earth and numerous stones. Generally, all three features (18, 19, and 21) are associated with phase I and indicate the intricate nature of the

burial arrangements, consisting of three circular or oval structures linked to individual inhumations. It seems probable that Grave 19 is slightly older, later serving as a reference point for the construction of a larger burial mound by the PGC people. Generally, the complex „ceremonial and funeral zone", featuring graves and additional elements (*e.g.,* sacrificial pits, hearths, or various types of stone structures), is a distinctive characteristic of the funeral rites before the emergence of PGC graves. Similar two- or multi-centric structures, often featuring various types of graves, are evident at other barrow necropolises such as Drazhevo, Sabev Bair (Iliev and Bakardžiev 2020) in the middle Tundzha, Mednikarovo, Barrow 1, in the „Maritsa-Iztok" group (Panayotov and Alexandrov 1995), or Merichleri, Kayryaka, Barrow 1 (Iliev 2019) in the middle Maritza River region.

3. PIT-GRAVE CULTURE (YAMNA CULTURE) HORIZON

In the context of Bulgarian burial mounds, during the early 21st century, some scholars began using the term „Yamnaya culture" (Ukrainian: Yamna, Bulgarian: Yamna), also known as the PGC, to encompass a wide range of EBA mortuary practices (*e.g.*, Nikolova 2000; Anthony 2009, 361-365). These practices included those that had been already previously categorized under various other burial traditions, collectively known as „Pre-Yamna". However, with more in-depth research, we have been able to distinguish between older burials dating back to the fourth millennium BC and those from both earlier and later phases of the PGC (Alexandrov 2011; Alexandrov and Kaiser 2016).

In Upper Thrace, we can identify a distinct group of barrow graves that exhibit characteristics typical for the early PGC, coming from the western Eurasian steppe, specifically the region between the Dnipro and Tisza rivers. These burials share several key features:

Burial chambers: Deceased individuals were placed in rectangular burial chambers. These chambers were covered with beams or wooden boards oriented lengthwise.

Number of individuals: All features were single graves.

Sex of the dead: Only males were buried.

Age of the dead: The remains were only of adult persons.

Body position: The deceased were laid on their backs with the lower limbs curled up and the upper ones extended alongside the body.

Head orientation: The heads of the deceased were placed in the western sector.

Use of ochre: The burial ritual consistently incorporated a red mineral known as ochre. Ochre is to be found in various forms, such as lumps, sprinkled over the bones, and at the bottom of the grave-pit.

Distinctive skull colouring: Notably, some burials, especially those with specific positions within the barrow, exhibit distinctive colouring on the upper part of the skulls.

Metal hair-rings: A common feature of these burials is the presence of metal hair-rings, often crafted from silver or gold.

These ritual elements closely resemble those associated with the early phase of the PGC found in the zone north of the Balkan mountain chain (Alexandrov 2011, 315).

At the Malomirovo barrow, all the aforementioned features of the early Pit-Grave culture were present in the case of Grave 17 (Fig. 7; Włodarczak *et al.* 2023), dated to 3008-2890 calBC period (Alexandrov and Włodarczak 2022, 222, table 1). Its grave-pit was dug within the small mound constructed above Grave 19 and is associated with construction phase II, during which the mound was substantially enlarged. In the middle Tundzha region, other examples of similar graves connected to the second chronological phase of their respective barrows can also be found such as: Graves 24 and 29 from Barrow 1 near Mogila (Iliev and Bakardžiev 2020, pl. 6: 1-3 and 9: 5, 6), Grave 25 from Gabrova Mogila near Kamen (Dimitrova 2014, 72, fig. 4: 4), Graves 18 and 20 from Lozianska Mogila near Boyanovo (Agre 2015, 27, fig. 37 and 29, fig. 41), and Grave 13 from Boyanovo, Baylar Kayryak, Barrow 1 (Iliev and Bakardžiev 2020, pl. 50 and 51). Less frequently, situations are recorded in which a burial typical for the early PGC serves as the primary one for the oldest phase of the barrow construction: Straldzha, Barrow 1 (Alexandrov and Iliev 2016), Zimnitsa, Barrow 1 (Alexandrov *et al.* 2023), and Kamen, Sekerdzha Mogila (Dimitrova 2014).

Fig. 7. Malomirovo, Elhovo municipality, Pamukli Bair barrow.
Typical burial of early Pit-Grave culture (Grave 17). Photo P. Włodarczak

4. EAST-ORIENTED BURIALS IN UPPER THRACE

Even if not all the details of the sequence of events at Malomirovo are conclusively outlined, the site could serve as a valuable reference point for a better understanding the trends in the barrow mortuary practices in Upper Thrace.

In the earliest phase of the Malomirovo barrow, Graves 19 and 21 revealed deceased individuals buried in a contracted position with their heads oriented towards the east. This body arrangement was found to be characteristic for other primary barrow graves in eastern Thrace as well, with head oriented towards the southeast (more commonly) or northeast (less commonly) within this group. In contrast to the regular, rectangular grave-pits associated with the PGC, these pits were typically oval or irregular in shape, though still somewhat close to rectangular. Analogous primary burials, akin to those in Malomirovo, were discovered in the middle Tundzha region, in barrows such as Boyanovo, Baylar Kayryak (Barrow 1, Grave 20; Iliev and Bakardžiev 2020, 178, pl. 54: 2-4), Boyanovo, Lozyanska Mogila (Grave 21; Agre 2015, 30, fig. 42), Drazhevo, Sabev Bair (inhumation graves 1 and 2; Iliev and Bakardžiev 2020, 90, 93), Mogila, Golemiya Kayryak, Barrow 1

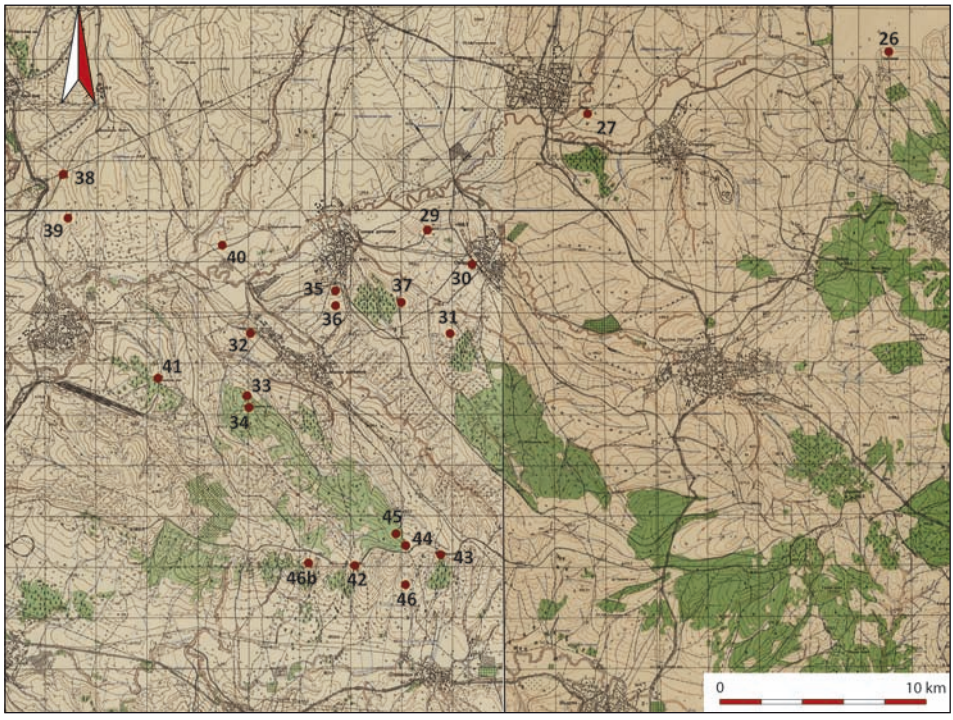


Fig. 8. "Maritsa iztok" cluster of barrows. Numbers of sites: as in Figure 1. Illustrated by S. Alexandrov

(Grave 30; Iliev and Bakardžiev 2020, 134, Pl. 10: 3, 4), and Sinapovo, Sechenata Mogila (Grave 6; Agre and Dichev 2013, 122, 123).

These burials were notably distinct from the graves of the early PGC due to their complete lack of ochre or the presence of only faint traces of its use. Another characteristic feature was the arrangement of the hands, with at least one limb bent at the elbow and directed towards the pelvis, chest, or head. Most of these burials featured individuals in a supine or semi-supine position, in stark contrast to the burial practices of the PGC (see section 3 above).

In the middle Tundzha River region, only the graves in Malomirovo, Pamukli Bair, have been precisely dated – to 3104-2921 calBC, with the possibility of slight variations (age modelled for the group of all three burials), with a slightly earlier estimate for Grave 19 (3321-3016 calBC; Alexandrov and Włodarczak 2022). Grave 19/20 from Barrow 1 in Boyanovo should have a similar calendar age. Its position was stratigraphically earlier than Grave 18 from this mound, whose age was determined at 3099-2938 calBC (Penske *et al.* 2023). Grave 19/20 should therefore be dated similarly to Features 19 and 21 from Malomirovo.

Also related to phase I, Grave 18 from Malomirovo, Pamukli Bair shows the custom of placing secondary burial remains disturbed in the grave fill. It is possible that in this case there was interference that resulted in the destruction of the classic inhumation burial. Fragments of vessels (an askos and a bowl – Fig. 5: 3, 4) and a silver bead found in the fill may be the remains of typical grave equipment from the EBA 1 period, or Ezero A1 (Leshtakov and Popova 1995; Leshtakov 2006). Because of this intrusion, the stones forming the structure of the grave chamber were mixed in the fill with the remains of the disturbed burial.

Also in some other regions of Upper Thrace, sequences in burial mounds from the Early Bronze Age confirm the observations for the Middle Tundzha region. Throughout this area, burial mounds built at the turn of the fourth and third millennium BC are clearly more numerous than those from the first half of the third millennium BC associated with the PGC. Particularly diagnostic data come from the "Maritsa-Iztok" barrow group, located east of Radnevo (Fig. 8). Table 1 illustrates the sequences of burial mounds from this region.

A telling example from the "Maritsa-Iztok" cluster is the group of burial mounds near Mednikarovo, in which four primary graves revealed inhumations with heads in the eastern sector (Fig. 9; Panayotov and Alexandrov 1995 for Barrows 1-4; Barrow 6 is still unpublished). In none of these burial mounds were grave facilities or burial arrangement typical for the early PGC found. Importantly, these mounds had small diameters, not exceeding 20 metres (except for the slightly larger mound no. 2, with a diameter of up to 30 m; see Table 1). These sizes were therefore similar to the diameter of the barrow connected to the earliest phase from Pamukli Bair in Malomirovo. Examples from Mednikarovo therefore indicate that the construction of large mounds, usually 30-50 metres in diameter and several

Table 1. General chronological sequences of barrows from "Maritsa-Iztokregion". Blue colour: burials dated to the end of the 4th millennium BC (east-oriented), red colour – typical burials of PGC (mostly west-oriented), green colour – Csongrad-type burial

Barow	Diameter [m]	1st phase of barrow construction	2nd phase of barrow construction	Remarks	Reference
Beli Bryag, Chitashki Mogili, Barrow 5	?	**Grave 2 (burials 2/1 and 2/2)**	**Grave 3 (burials 3/1 and 3/2)**		Alexandrov *et al.* 2016
Golyama Detelina, Malkata Mogila	21 × 18	**Grave 6**	**NONE**		Kanchev 1991
Golyama Detelina, Golyamata Mogila	46 × 41	**Grave 30**	**?**		Kanchev 1995
Golyama Detelina, Barrow 4	30	**Grave 4**	**Grave 5**	Reinterpretation of sequence presented by K. Leshtakov and B Borissov	Leshchakov and Borisov 1995
Kovachevo, Aldinova Mogila	36 × 30	**Grave 2**	**Grave 1**	Reinterpretation of sequence presented by M. Kanchev	Batsova and Kanchev 1974; Kanchev 1991
Malka Detelina, Manchova Mogila	32 × 30	**Grave 13**	**Grave 12**		Kanchev 1991
Malka Detelina, Tanyokoleva Mogila	31 × 27	**Grave 9**	**Grave 6?**	Grave 6 can be also related to 1st phase	Kanchev 1991
Malka Detelina, Kurdova Mogila	40 × 34	**Grave 5 (burials 5, 6 and 7)**	**?**	Not possible to establish which one of three graves (nos 2-4) was primary for 2nd phase	Kanchev 1991
Mednikarovo, Barrow 1	12 × 15	**Grave 2?**	**Graves 1 and 3?**	Graves 1 and 3 are in unclear position	Panayotov and Alexandrov 1995
Mednikarovo, Barrow 2	28 × 26	**Grave 1**	**Grave 2?**		Panayotov and Alexandrov 1995

Mednikarovo, Barrow 3	13	**Grave 1 (burials 1/1 and 1/2)**			Panayotov and Alexandrov 1995
Mednikarovo, Barrow 4	16	**Grave 1**	**NONE**		Panayotov and Alexandrov 1995
Mednikarovo, Barrow 6	20	**Grave 2**	**Grave 1?**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Golyamata Mogila	50-60	**?**	**?**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Barrow 2	10	**Grave 1**	**NONE**		Unpublished excavation of I. Panayotov and S. Alexandrov
Ovchartsi, Barrow in the vineyard	15	**Grave 1**	**NONE**		Alexandrov and Hristova 2009
Pet Mogili, Bodakovi Mogili Barrow 2	54?	**Graves 1-3**	**?**	Not possible to establish primary feature (due to the destruction of barrow)	Kancheva-Ruseva 1994
Targovishte, Gonova Mogila	?	**Grave 1?**	**Grave 2?**	Barrow partially destroyed	Kanchev 1991
Troyanovo, barrow 1 (Kamenna Mogila)	42	**Grave 1**	**Grave 2?**		Buyukliev 1964; Panayotov 1989
Troyanovo, Chernyova Mogila		**Grave 4**	**?**		
Troyanovo, Kangalova Mogila	40	**Graves 3 and 5**	**Grave 4**		Alexandrov and Kirov 2016

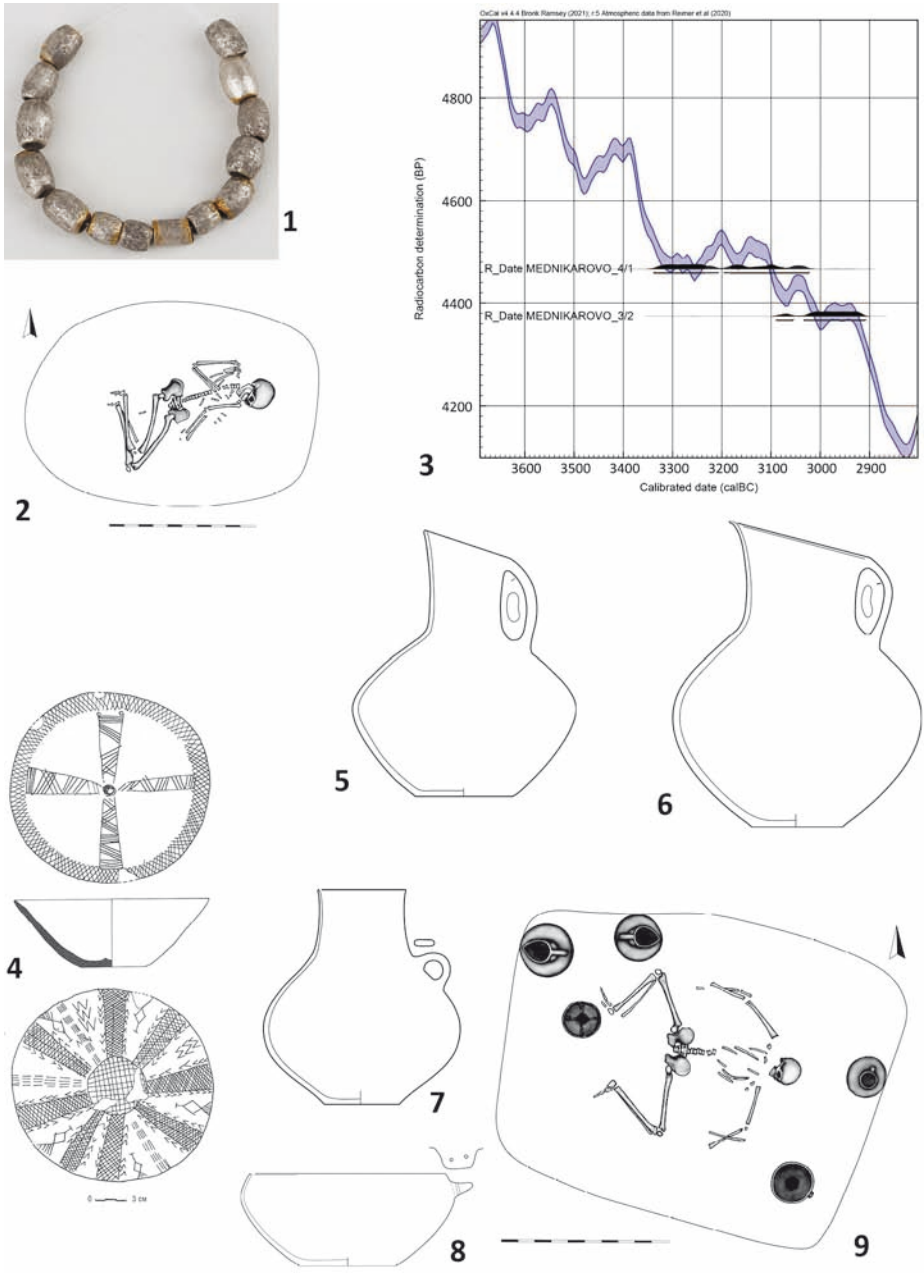
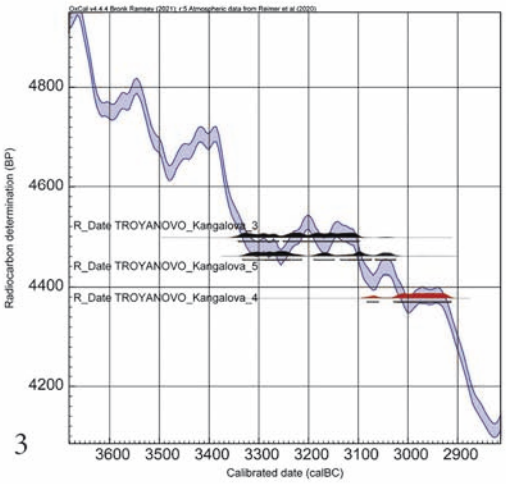


Fig. 9. Mednikarovo, Galabovo municipality, Barrows 2-4.
1 – Silver beads from Grave 4/1; 2 – Grave 1 from Barrow 4; radiocarbon dating of primary graves from Barrows 3 and 4; 4-8 – ceramic vessels from Grave 3/2; 8 – Grave 2 from Barrow 3.
Illustrated by S. Alexandrov

1

2



3

4

5

Fig. 10. Troyanovo, Radnevo municipality, Kangalova Mogila.
1 – Grave 3; 2 – Grave 5; 3 – radiocarbon dating of Graves 3-5; 4-5 – Grave 4.
Illustrated by S. Alexandrov

metres high, was associated with the PGC population of the early third millennium BC. Older tombs (from the end of the 4th millennium BC) are usually structures with a diameter of up to 15 metres and a height of 1-1.5 m. Radiocarbon dating of primary burials from Barrows 2, 3, and 4 in Mednikarovo place them in the period at the turn of the fourth and third millennium BC, or slightly earlier (Fig. 9: 3; Table 2), *i.e.*, they are close to the age of the graves from Malomirovo.

Five other barrows from the region: Troyanovo – Chernyova and Kangalova barrows (Figs 10 and 11), Beli Bryag, "Chitashkite mogili", Barrow 5 (Fig. 12), and Ovchartsi, Barrows 2 and 3 (Fig. 13) revealed primary graves wit eastern orientation as well. In Ovchartsi 3, Kangalova and Chernyova barrows, the primary burials were supine inhumations with flexed legs. In fact, in the Kangalova barrow the primary interments were Graves 3 and 5, forming a two-storey arrangement (Fig. 10: 1, 2). They were located under the central part of the mound. Approximately 10 metres north of these features, Grave 4 was dug into the barrow fill – a classic burial of the older phase of the PGC (Fig. 10: 4, 5). It was probably connected with the second phase of the construction of the barrow and, consequently, with a significant increase in its size about 40 metres in diameter (Alexandrov and Kirov 2017). In the Chernyova barrow, next in the burial sequence came supine inhumations with flexed legs, arms alongside the body and head to the west, some of them with traces of red ochre over the bones (Fig. 11: 4). The last grave from this group (no. 6) revealed an astonishing set of 83 silver beads as well as two pairs of massive gold and silver hair-rings (Fig. 11: 3; Alexandrov 2018). In Ovchartsi 3 ("Barrow in the vineyard") a supine inhumation was the only EBA grave in the barrow (Fig. 13: 4).

In the Beli Bryag barrow, located in the vicinity of the Kangalova one, Grave 2 was the primary one and in it, two layered burials were discovered (2/1 and 2/2 – Alexandrov *et al.* 2016, 153, fig. 2), both oriented with their heads to the east (Fig. 12: 1, 2). In the northern part of the barrow there was Grave 3 – a burial of two individuals lying on their side and semi-side, with legs tucked in, heads oriented to the west (Fig. 12: 4, 5). Apart from its western orientation, the other characteristics of this grave link it to a phase preceding the Pit-Graves horizon in Upper Thrace (Alexandrov *et al.* 2016). In the Ovchartsi – 2 barrow, the primary burial was a semi-supine inhumation (head to north-east, facing south – Fig. 13: 2), followed by two badly damaged burials, an EBA grave and a MBA one (unpublished excavations made by I. Panayotov and S. Alexandrov).

Radiocarbon dating from human bones from the graves discussed shows that primary barrow graves with east orientation in the "Maritsa-Iztok" region cover, generally the period 3300-2900 calBC (Fig. 14; Table 2). Some graves – the two early graves from the Kangalova barrow (nos. 3 and 5), Mednikarovo 4, Grave 1, and Beli Bryag, Grave 2/2 date prior to 3100 calBC and are, chronologically, earlier than Yamna graves. The rest of the discussed group enters, generally on the 3100-2900 calBC period and, as seen from the date of the typical Yamna grave from a Kangalova Barrow (no. 4; Alexandrov and Włodarczak 2022, 236, fig. 28) are contemporary with the early graves of that phenomenon.

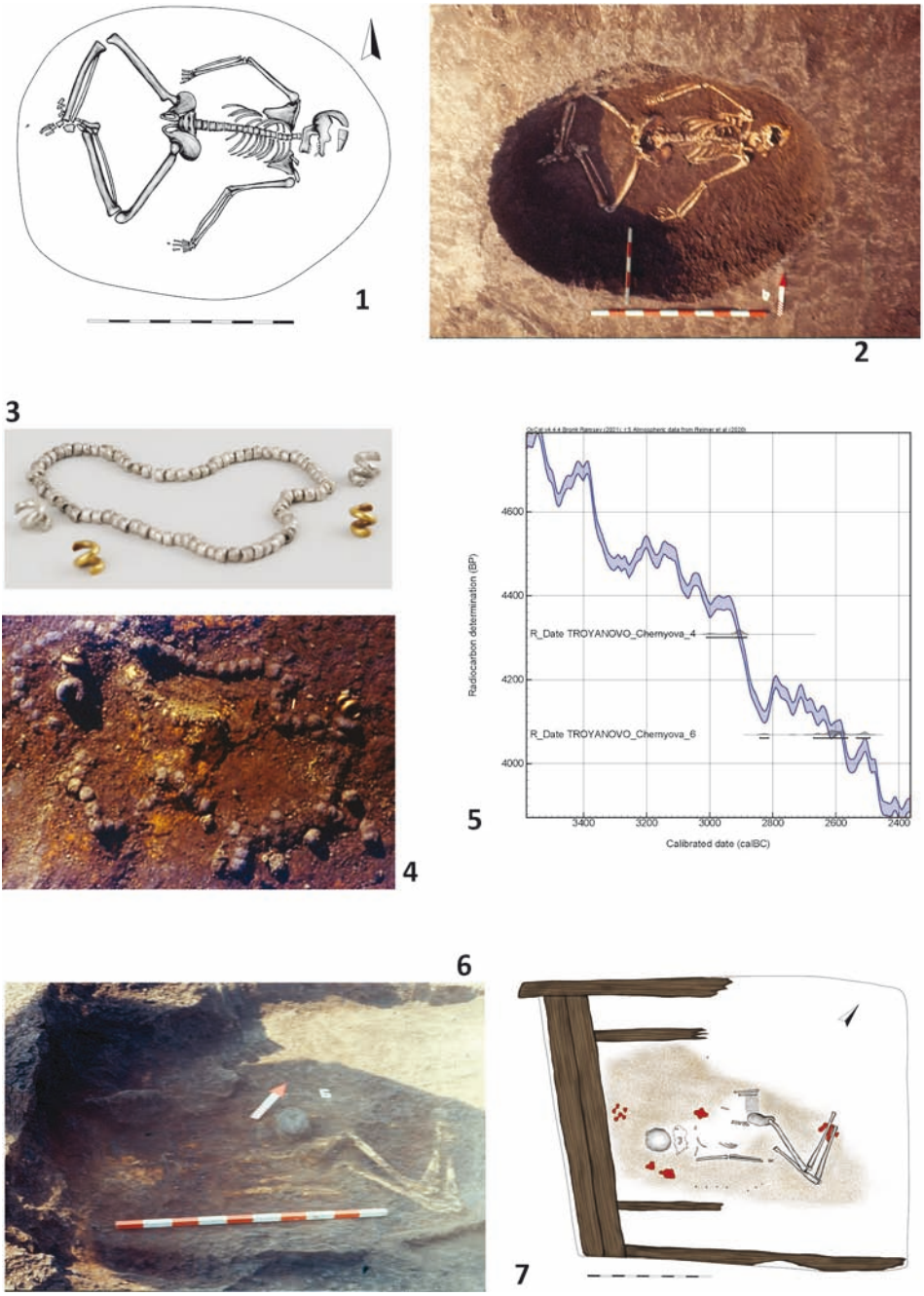
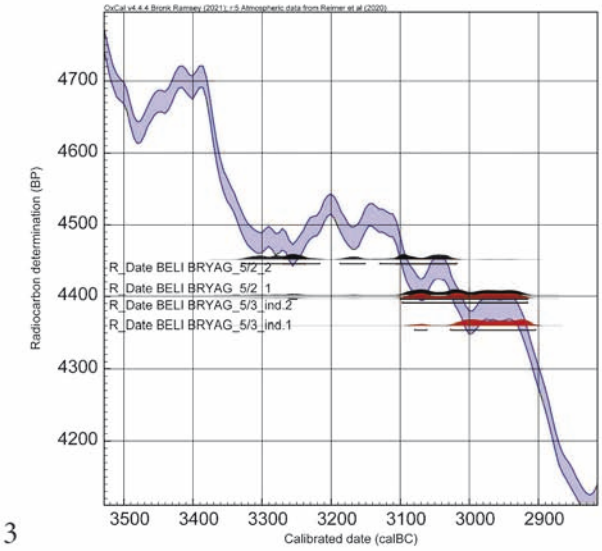


Fig. 11. Troyanovo, Radnevo municipality, Chernyova Mogila. 1, 2 – Grave 4; 3, 4 – gold and silver jewelry from Grave 6; 5 – radiocarbon dating of Graves 4 and 6; 6, 7 – Grave 6. Illustrated by S. Alexandrov

1

2



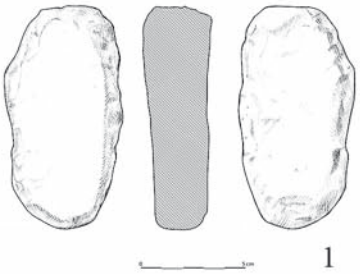
3

4

head to east

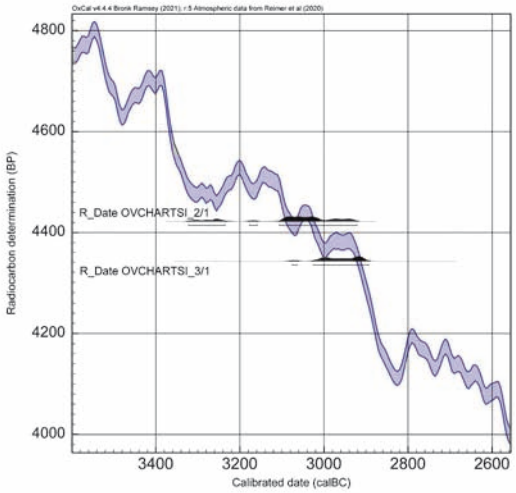
head to west

Fig. 12. Beli Bryag, Radnevo municipality, Barrow 5.
1 – Grave 2, Burial 1; 2 – Grave 2, Burial 2; 3 – radiocarbon dating of Graves 2 and 5; 5 – Grave 5.
Illustrated by S. Alexandrov



1

2



3

4

Fig. 13. Ovchartsi, Radnevo municipality.
1 – Stone tool from Barrow 2, Grave 1; 2 – Barrow 2, Grave 1; 3 – Radiocarbon dating from Barrow 2, Grave 1 and Barrow 3, Grave 1; 4 – Barrow 3, Grave 1. Illustrated by S. Alexandrov

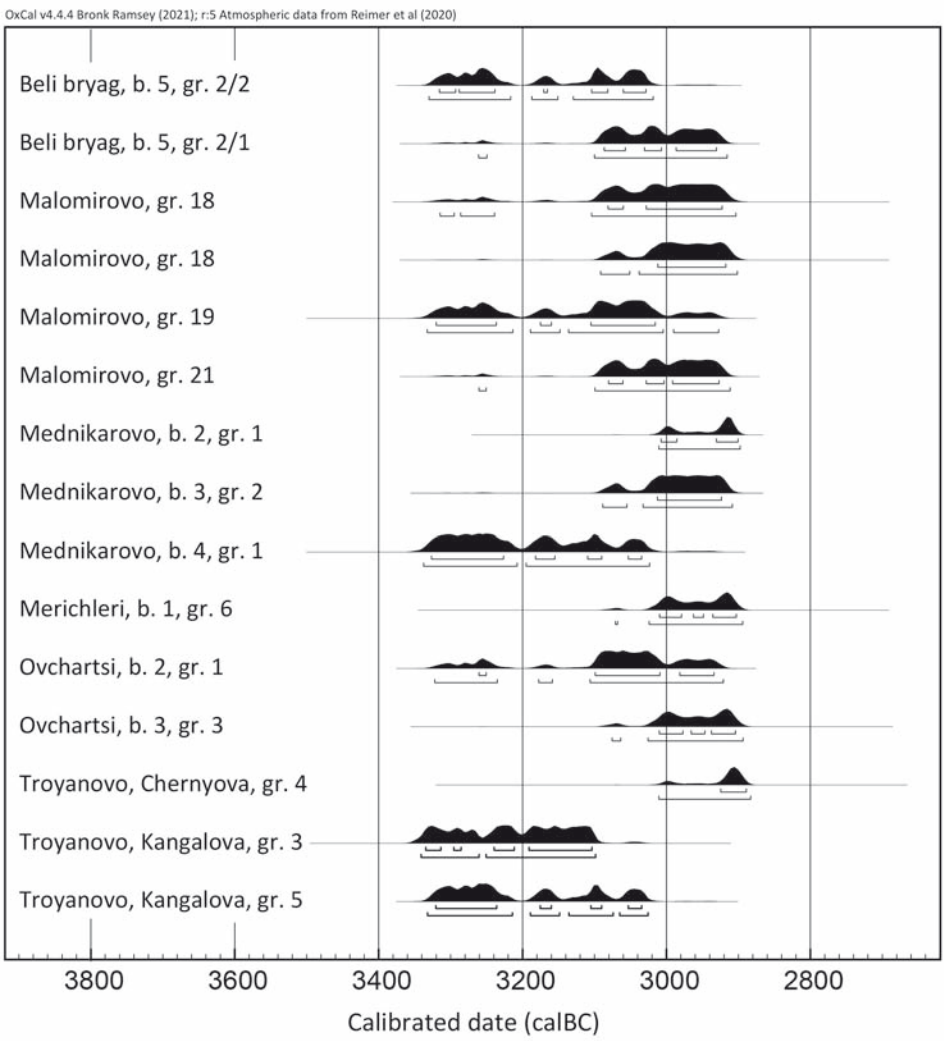


Fig. 14. Calibration diagram of radiocarbon dates obtained for east-oriented barrow graves from Upper Thrace. Prepared by P. Włodarczak (OxCal calibration program v. 4.4.4)

The period discussed here (the turn of the 4th and 3rd millennium BC) is also associated with a specific form of some graves – with burials placed on two levels (Boyanovo, Baylar Kayryak, Barrow 1, Graves 19/20; Mednikarovo, Barrow 3, Graves 1/1 and 1/2, Troyanovo, Kangalova Mogila, Graves 3 and 5; Beli Bryag, Graves 2/1 and 2/2). They had specific features: an oval or not very regular shape of the burial pit, eastern orientation, position on the back, side or semi-supine, bent upper limbs and lack of ochre. The double-storey graves

Table 2. Radiocarbon dates for east-oriented primary graves from Upper Thrace

Barrow	Grave no.	Lab code	Age BP	Calendar age BC (68.2%)*
Beli Bryag, Barrow 5	2/2	MAMS-26836	4452 ± 21	3316-3029
Beli Bryag, Barrow 5	2/1	MAMS-28027	4402 ± 27	3087-2931
Malomirovo, Pamukli Bair	18	Poz-141953	4390 ± 40	3082-2923
Malomirovo, Pamukli Bair	18	Poz-141997	4365 ± 35	3013-2918
Malomirovo, Pamukli Bair	19	Poz-141947	4440 ± 35	3321-3016
Malomirovo, Pamukli Bair	21	Poz-141952	4395 ± 30	3081-2928
Mednikarovo, Barrow 2	1	MAMS-26834	4333 ± 20	3008-2901
Mednikarovo, Barrow 3	2	SUERC-69358	4374 ± 28	3013-2924
Mednikarovo, Barrow 4	1	SUERC-69359	4466 ± 30	3327-3035
Merichleri, Barrow 1	6	Beta-432797	4340±30	3010-2904
Ovchartsi, Barrow 2	1	SUERC-69360	4422 ± 30	3261-2935
Ovchartsi Barrow 3 („In the vineyard")	3	SUERC-63829	4342 ± 33	3011-2905
Troyanovo, Chernyova Mogila	4	MAMS-28031	4308 ± 28	2925-2890
Troyanovo, Kangalova Mogila	3	MAMS 31403	4498 ± 21	3335-3104
Troyanovo, Kangalova Mogila	5	MAMS 31405	4461 ± 21	3321-3035

* OxCal calibration program v4.4.4 (2021)

are therefore connected with a broader trend of burials with the eastern orientation of the deceased's body, immediately preceding the horizon of the PGC. The two-level burial arrangement is also occasionally present in graves from the first half of the third millennium BC (*e.g.*, Kamen, Sekerdzha Mogila, Grave 10; Dimitrova 2014).

Double-storey burials also show another feature of the funeral rite from the time horizon analysed here: the presence of graves with more than one burial. Multiple graves (of more than two individuals buried in one grave) are rare – Kamen, Gabrova Mogila, Grave 30; Drazhevo, Sabev Bair, inhumation Grave 3, and Malka Detelina, Kurdova Mogila, Graves 5-7. Such burials illustrate several similar features of the funeral rite to the group of graves discussed above. Among other things, there is a visible tendency to orient the deceased with their heads to the east. The furnishings in these cases include pottery of a similar type as in burials from single and double graves, as well as from flat cemeteries dating back to the EBA 1 period. Therefore, the graves from Kamen and Drazhevo should be dated to the same chronological horizon: the end of the fourth millennium BC.

Data from other areas of Upper Thrace are much poorer and less diagnostic than the research results in the two regions described above. Only the situation recorded in Barrow 1 near Merichleri is worthy of attention (Iliev 2019). According to the researcher of this mound, the oldest phase is marked by a small mound with stone pavements and a cremation burial located next to it (Grave 7). Five more graves dug into the barrow are inhumation

burials. Among them, Grave 6 is noteworthy – it has the oldest radiocarbon dating. It was a burial lying on the back, with the upper limbs bent, with the head facing east. An ascoidal cup was found next to the deceased. Above this burial, in the same pit, was the burial of a child (Grave 4). This is another example of a two-level grave. Subsequent burials from the burial mound in Merichleri show clearer features of the older and younger horizons of the PGC (Iliev 2019, 321; Minkov 2021). This situation is therefore another example of a sequence with an early-dated east-oriented burial.

In conclusion, the period around the turn of the fourth and third millennium BC witnessed a distinct form of burial, featuring east-oriented, and in some cases two-level graves, and sometimes multiple burials. These burial practices were prevalent just before the emergence of the PGC. The evidence suggests a complex interplay of burial traditions in Upper Thrace during this transitional period. Notably, the graves discussed outnumber primary inhumations associated with the Pit-Grave tradition. This is an intriguing observation in the context of suggestions that emphasize the dominant role of PGC people in spreading the barrow burial rite in European areas (*e.g.*, Heyd 2011).

5. RELATIONSHIP TO EXTENDED INHUMATIONS

Burials in extended position have been dated to the period just before the emergence of the PGC graves (recently discussed by Włodarczak in 2020). Examples of these burials are known from Bulgaria, with one discovered in Upper Thrace at Troyanovo (Buyukliev 1964, 63-65; Panayotov 1989, 83, 32), although they are more common in the broader northern Balkan region and the north-western Black Sea area (Rassamakin 2013). In recent years, the number of extended inhumations containing valuable information about funeral rites has slightly increased. This has drawn attention to the unique characteristics of these graves, such as narrow pits with wooden floors and lower parts of the walls (Włodarczak 2020, 138). These types of graves are also found in the PGC funerary practices, as seen in burial mounds in the Pannonian Plain (Włodarczak 2021, 227). Additionally, a recently published burial in Aliman, Romania's Dobruja, suggests that extended inhumations can be traced back a little earlier to the second half of the 4th millennium BC (Stefan *et al.* 2023, 106, table 2), representing early manifestations of the barrow rite with an Eastern European origin. The significance of this practice in southern Bulgaria remains unclear.

6. CONCLUSIONS

Research on the Malomirovo barrow in Pamukli Bair has led to the discovery of three graves dating back to the late fourth millennium BC. The funeral rituals observed in these features differ in several aspects from those seen in early PGC burials. Their features include:

Stratigraphical position: They are primary for their respective barrows.

Barrow dimensions: The barrows were relatively small, rarely exceeding 20 m in diameter and 1 m in height.

Grave pits: Most of the grave facilities were oval pits; in two cases (Kangalova Mogila and Beli Bryag, Barrow 5) – two burials with east orientation (one above the other) were made in the same grave-pit. In three other graves, the original grave-pit was reused with graves presenting Yamna characteristics (Malomirovo 19/16; Mednikarovo Barrow 3 1/2; Merichleri 6/4). In Boyanovo, Baylar Kayryak, Barrow 1 above the primary grave an inhumation in crouched position was found.

Cover constructions: No cover of the pit-opening or pit-floor has been detected so far.

Number of individuals: All features but one (Boyanovo, Baylar Kayryak, Barrow 1, Grave 21-22 – female and infant) were single graves.

Sex of the dead: Persons of both sexes were buried.

Age of the dead: Persons of all ages were buried– from *infans* to *matures* age groups.

Position of the body: Most of the bodies were arranged in supine position with flexed legs; the arms were bent at the elbows, with palms in different position. It should be noted that, so far no grave had arms extended alongside the body. Semi-supine position with flexed legs with similar arm position is also presented.

Orientation: The orientation of the body was on an east – west axis, with head in the eastern sector.

Presence of ochre: The use of red ochre is reduced to small lumps or, occasionally small quantities over the bones.

Grave goods: Five graves (20%) contained a grave inventory – a necklace of 14 silver beads (Mednikarovo 4/1); five clay vessels and a hair-ring (Mednikarovo 3/2), one vessel (Mogila, Golemiya Kayryak, Barrow 1, Grave 30; Malka Detelina, Tanyokoleva Mogila, Grave 9, and Merichleri, Grave 6).

Currently, the group is composed of 25 graves found in 20 barrows: six graves in Middle Tundzha region (in five barrows), 18 graves in "Maritsa-Iztok" region (in 14 barrows), and one grave in Merichleri, Barrow 1 (Haskovo region, Maritsa River).

The analysis of the materials from burial mounds in Upper Thrace indicates that the majority of richly furnished burials, including ceramic vessels, tools, and metal decorations, date back to the period preceding the early PGC burials. The barrow graves of the latter do not significantly differ from the graves in neighbouring regions, including north-western and north-eastern Bulgaria. However, understanding the mortuary practices in the later phase of the PGC (*c.* 2800-2600 calBC) in the southern Balkans remains challenging. Therefore, the investigation into the specific nature of the barrow graves in Upper Thrace (*e.g.*, Kaiser and Winger 2015; Alexandrov and Kaiser 2016) should be focused on materials from the late fourth millennium BC. The key issue revolves around the role of local elements, such as Ezero in Upper Thrace, Coţofeni in North-Western Bulgaria, and

Ezerovo/Cernavodă II in North-Eastern Bulgaria. Nevertheless, the general principles of the mortuary practices in all three zones seem to be similar, with the apparent difference stemming from the larger number of burials from this period discovered in the southern zone.

Stratigraphic sequences observed in burial mounds consistently indicate that some east-oriented inhumations predate early PGC burials. Absolute dating suggests a slight time difference between the two rituals, indicating a potential temporal overlap as shown by the "Maritsa-Iztok" barrows discussed above. This overlap results in the incorporation of features from the older ritual into PGC necropolises (*e.g.,* the presence of a small ascoidal cup in Grave 13 from Boyanovo, Baylar Kayryak).

From a taxonomic perspective, the graves listed here have close analogies in the burials classified by Igor Manzura as part of Cernavodă I culture (*e.g.*, Manzura 2013, 127, fig. 18), also associated in the northwestern Black Sea with the Nizhna Mikhailivka tradition (*e.g.*, Rassamakin 1999). They can be part of the broader trend in the western Eurasian steppe, encompassing barrow burials and possibly aligning with the funeral practices in flat cemeteries of local Early Bronze Age communities in the northern Balkan zone. The extent of the impact of Eastern European steppe community migrations on the development of this barrow ritual type remains uncertain. It should be emphasized that I. Manzura and some other researchers of the North Pontic zone pointed to the dating of this type of burials to the end of phase C/II of the Trypillia culture, *i.e.,* to the end of the 4th millennium BC (*e.g.*, Ivanova *et al.* 2005, 110; Manzura 2003-2004, 77; 2013, 139).

Although there are some taxonomic similarities between the early east-oriented barrow graves in Upper Thrace and Cernavodă I/Nizhna Mikhailivka mortuary practices, we think that the current stage of the investigations of the so called "*transitional period*" to the Bronze Age here (*i.e.*, the first half of the 4th millennium BC) does not allow a profound discussion on that matter. So far, no settlement structures from that period have been explored here, with only one small group of graves being investigated. The Chernomorets, Akladi Cheiri site at the Black Sea coast revealed one inhumation in supine position, similar to the discussed above but with western orientation of the head. The radiocarbon dates place the grave in the first two centuries of the 4th millennium BC (Leshtakov *et al.* 2020; Krauss *et al.* 2020, table 1).

On the other hand, at least three settlements in Upper Thrace – tell Karanovo, Drama (Yambol region) and Yazdach (Chirpan region) revealed radiocarbon dates similar to the one from the early east-oriented barrow graves discussed here (Fig. 15). Drama^{14}C dates, related to Cernavodă III, centre on the 3500-3100 calBC period (Gleser and Thomas 2012, 192-199, Abb. 7, table 3). Slightly older is the chronological position of the Cernavodă III Yazdach site, currently dated to 3500-3350 calBC (Hristov *et al.* 2023). Other Cernavodă III settlements near Karnobat (Devetak, Bada bunar *etc.* – Hristova 2009) probably have the same date, securely placing the beginning of the Bronze Age in Eastern Upper Thrace in the context of Boleráz – Cernavodă III – Usatovo phenomenon. EBA 1 layers in the Ka-

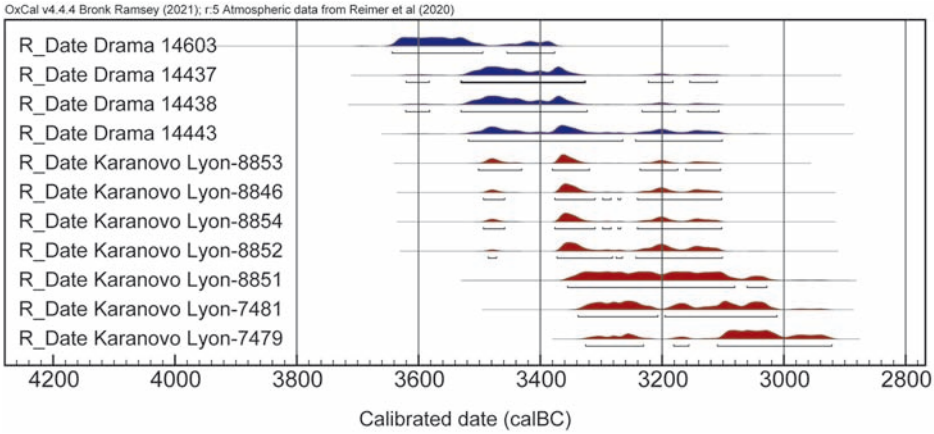


Fig. 15. Calibration diagram of radiocarbon datings obtained for EBA sites in Drama (blue) and Karanovo (red). Prepared by S. Alexandrov (OxCal calibration program v. 4.4.4)

ranovo and Dyadovo tells are younger or slightly overlap the Cernavodă III chronological position in Thrace. In Karanovo, the beginning of the EBA is set around 3310 calBC, the life-span of the layer EBA 1 lasting to approximately 3100 calBC (Nikolov and Petrova 2016, 136-139). The Ezero (EBA 1) stage in the Dyadovo tell is dated to 3200/3100-2900 calBC (Semmoto and Kamuro 2015).

In the regions discussed, "open settlements with ditches" such as Ovcharitsa (Leshtakov *et al.* 2001) and Simeonovgrad (Boyadziev *et al.* 2015) in the "Maritsa–Iztok" area, and tells such as Veselinovo (Tundzha area) and Sokol ("Maritsa–Iztok" area) have also been settled. Around them barrow clusters were formed. In the plain areas, such as Stara Zagora field, tells with defence features (*e.g.*, Ezero, Dyadovo) were settled as well. In these plains, flat graves (Zagortsi) and necropolises (Bereketska tell) are documented (Hristova and Uzunov 2012; Kalčev 2002). It is worth mentioned as well that the EBA pottery discovered in all these settlements and graves is quite similar.

As seen from the above, the end of the fourth millennium BC in the eastern parts of the Upper Thrace presents a colourful picture, in which the east-oriented graves had, probably, an important place. Their investigation is in its very beginning so, we think it is too early to resolve the problems related to their origin, relations to the other contemporary barrow or flat graves and, to the settlements listed above.

The first results of DNA research on barrow graves from Bulgaria indicate the complicated nature of the processes leading to the genesis of a community characterized by the specific nature of mortuary practices described here. It turned out that they could not be directly linked to the steppe origin of the barrow population (Preda-Bălănică and Diekmann 2022, 117). In particular, burials from the late 4th millennium BC demonstrate genetic differentiation. The results for Burials 4 and 6 from Merichleri mentioned above do

not show steppe ancestry (Mathieson *et al.* 2018; Lazaridis *et al.* 2022, Supplementary materials, 260; Preda-Bălănică and Diekmann 2022, 114, 115). In turn, for the burial from grave 1 in barrow 2 in Mednikarovo, a high share of steppe ancestry was registered (Preda-Bălănică and Diekmann 2022, 115). Generally, these first genetic studies show a complex mechanism, taking into account the adaptation of the barrow ritual with an individual grave in local, northern Balkan mortuary practices.

Without doubt, future DNA research will shed much better light on the problem of expansion of the Eastern European Pre-Yamna populations and its role in the genesis of the barrow burial rite.

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YAMPIL BARROWS FROM THE FOURTH AND THIRD MILLENNIA BC IN THE LIGHT OF POLISH-UKRAINIAN INVESTIGATIONS 2010-2014

ABSTRACT

Kośko A., Klochko V., Potupchyk M., Włodarczak P. and Żurkiewicz D. 2023. Yampil barrows from the fourth and third millennia BC in the light of Polish-Ukrainian investigations 2010-2014, *Sprawozdania Archeologiczne* 75/1, 247-281.

In the vicinity of Yampil (Vinnytsia oblast, Ukraine), there exists a cluster of barrows dating back to the Eneolithic and Early Bronze Age. Nestled upon the Podillia Upland, this concentration lies at the crossroads of two cultural spheres: the Eastern European steppe and Central European region. The exploration of the Yampil barrows began during the 1980s by archaeologists from Vinnytsia. This endeavour was enriched by a Polish-Ukrainian expedition that conducted fieldwork from 2010 to 2014. Seven barrows were then examined. Today, an abundance of radiocarbon data allows the construction of a precise chronological framework for the Yampil barrow graves. We can now discern four principal stages in this sequence: (1) Late Eneolithic, (2) early Yamna, (3) late Yamna era, and (4) Catacombna. During the first two periods (3350-2800 cal BC), these barrows were meticulously constructed, sometimes evolving in multiple phases. In the latter two stages (2800-2400 cal BC), cemeteries took shape, marked by graves deliberately dug into the fully formed mounds.

Keywords: late Eneolithic, Early Bronze Age, Podolia, barrows, Yamna culture, Yampil
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1. INTRODUCTION

For more than a century, research on the prehistory of Central Europe has delved into the migration patterns of mobile (nomadic or semi-nomadic) peoples originating from the North Pontic region. This research explores their role in driving cultural and technological innovations, ultimately leading to the emergence of a new form of Eneolithic societies in the 4th millennium BC. This investigation also encompasses the origins of Early Bronze Age European civilization. Over the past 15 years, considerable attention has been dedicated to examining the expansion of populations exhibiting new genetic characteristics. This attention is rooted in the striking genetic similarities between the people of the Yamna culture (YC) and the Corded Ware culture (CWC; Allentoft *et al.* 2015; Haak *et al.* 2015).

A significant part of this research has focused on reconstructing prehistoric events that occurred in the border regions between the East and the West, where human groups first made contact and new societies began to take shape. One of these critical crossroads connecting two worlds is the region of Podillia, which is currently part of Ukraine, and to a lesser extent, Transnistria. The environmental boundary separating Central and Eastern Europe runs through Podillia (*e.g.*, Makohonienko 2009). Historically, this region served as a frontier for the settlement of steppe communities in the North Pontic zone during the 4th and 3rd millennia BC. It also acted as an ecological barrier, restricting the expansion of Central European settlements during the Neolithic and early Eneolithic periods.

Nevertheless, as far back as the beginning of Neolithization in the 6th millennium BC, this barrier was traversed by migrating communities seeking favourable settlement areas and engaging in expeditions for trade and raw material procurement. Throughout the millennia, convenient communication routes traversed Podillia (Kośko and Klochko 2009; Makohonienko 2009). In the 4th millennium BC, the population of the Funnel Beaker culture expanded eastward in this region (Rybicka 2017, 152, fig. 86). The existence of Podillian contact routes is further substantiated by the presence of Trypillia culture features in artefacts found in Central European areas (Kośko 1981; Kośko and Szmyt 2009). In the latter half of the 4th millennium, there was an observable westward expansion of settlements from phase C/II of the Trypillia culture (Rybicka 2017). This period also marked the emergence of the first barrow cemeteries in the Podillia region. In the early 3rd millennium BC, two expansive movements converged in this area: the Globular Amphora culture in the east (Szmyt 1999) and the YC in the west (Włodarczak 2017).

Moreover, around 2900-2800 BC, CWC communities appeared in the western part of Podillia, along with the introduction of funerary practices involving the construction of barrows. The easternmost barrows associated with the CWC are situated along the Zbruch River, a tributary of the Dnister. The origins of barrow communities in this region have become an intriguing issue in the context of research on the genesis of the CWC and the advent of the Bronze Age in Central Europe (this work follows the primary archaeological period divisions commonly used in studies of the North Pontic region).

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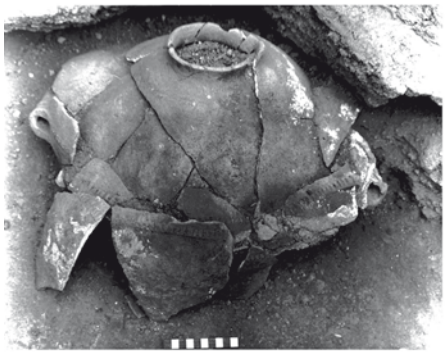

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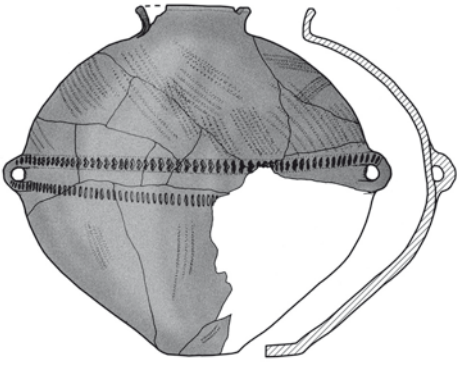

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Fig. 1. Porohy, Yampil rayon, Barrow 2, Grave 6.
Burial of YC (1) equipped with a Corded Ware amphora (2, 3). After Harat *et al.* 2014

One vital region for investigating the aforementioned issues of intercultural relations during the late 4th and the first half of the 3rd millennium BC is the territory surrounding the town of Yampil, located in the middle Dnister region (Vinnytsia Oblast). This area encompasses the westernmost cluster of YC burial mounds within the Podillia Upland. Grave inventories from this region include amphorae with stylistic and technological connections to Central European cultures (Kośko 2011, 184, 185, 188, fig. 6). Notably, a vessel from Grave 6 in Barrow 2 in Porohy (Fig. 1) exhibits an undeniable resemblance to the amphorae from the A-horizon of the CWC (Ivanova *et al.* 2014). This evidence strongly suggests that the Podillia region along the middle Dnister basin served as a hub of extensive interactions between Eastern and Western communities. It might also have been a place where communities with new cultural features, characteristic of the Central European Final Eneolithic (CWC), began to take shape.

Recognizing the significance of this issue in prehistoric studies, the Yampil barrows became the focus of research for a Polish-Ukrainian field expedition conducted from 2010 to 2014. This article aims to provide a summary of chronometric data and a review of taxonomic findings concerning grave materials excavated during that period.

2. YAMPIL BARROW COMPLEX

The Yampil rayon area lies within the forest-steppe zone, situated in the middle Dnister basin on the fringes of the Podillia Upland. The landscape is profoundly influenced by its loess subsoil, currently covered by chernozem, resulting in a terrain characterized by deep, branching gorges and plateau-like watershed areas (Makohonienko and Hildebrandt-Radke 2014). This topography offers expansive vistas, with sweeping views extending for tens of kilometres across gentle hills. In contrast, the deep valleys of rivers and streams in the Podillia Upland remain hidden from view due to the elevated plateaus. These visual attributes are shaped by the prevailing vegetation, predominantly meadows of a steppe nature, although many have now transformed into arable fields and pastures. Historically, these areas were favoured by nomadic herding communities.

Thanks to the efforts of the archaeological heritage services in Vinnytsia, 156 burial mounds have been documented within the administrative boundaries of the Yampil region, covering approximately 790 square kilometres (Jachimowicz and Żurkiewicz 2017, 11, 12). It is important to note that this picture represents only the mounds identified during field inspections, as they stand out in relief against the landscape (Fig. 2). Further analysis of satellite images suggests the existence of hundreds of more eroded mounds, now only discernible as dark patches in cultivated fields.

Within the Yampil cluster, one finds individual mounds as well as compact groups and chains of barrows. A spatial analysis indicates that these mounds are strategically situated on elevated terrain (Fig. 3), usually facing south and southwest, highlighting the impor-

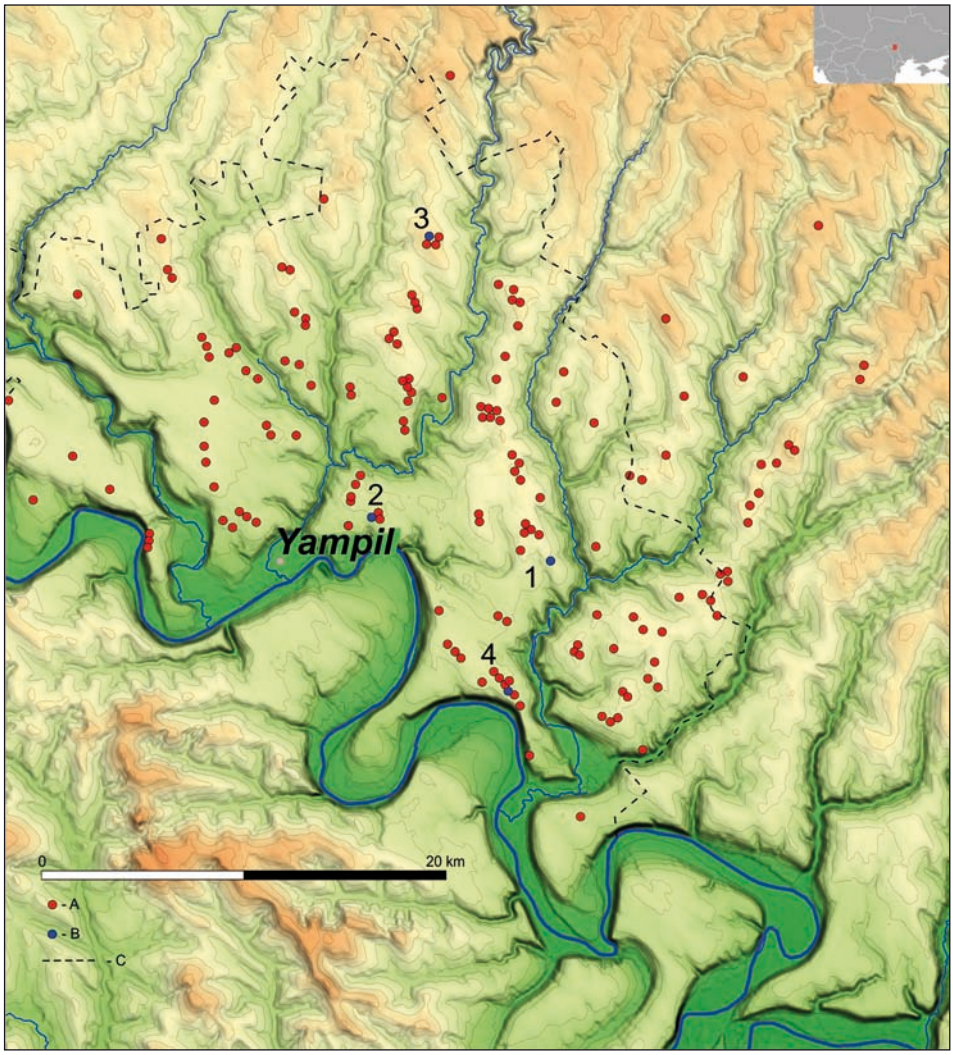

Fig. 2. Yampil barrow complex. A – barrows, B – barrows excavated by Polish-Ukrainian expedition in 2010-2014 (1 – Pidlisivka, 2 –Porohy, 3 – Klembivka, 4 – Prydnistryanske), C – borders of the Yampil rayon. Illustrated by R. Skrzyniecki

tance of visibility for the builders in establishing a network of relationships throughout the region (Jachimowicz and Żurkiewicz 2017).

Sixteen burial mounds in the Yampil rayon were excavated between 1984 and 1993 during various rescue operations. Among them, three barrows in Porohy were explored, where three graves containing amphorae with stylistic connections to Central European pottery were discovered (Iwanowa *et al*. 2014). Unfortunately, a fire in the archaeological

Fig. 3. Barrow IV from Prydnistryanske, Yampil rayon (excavated in 2014 by Polish-Ukrainian expedition). Photo by D. Żurkiewicz

storage facilities has resulted in the loss of bone materials gathered during that time, which could have otherwise been valuable subjects for a variety of analyses. An important accomplishment of the Polish-Ukrainian project was the collection, preparation, and publication of the research results from the years 1984-1993 (Harat *et al.* 2014). The primary aim was to gather as much evidence as possible about the barrow complexes, providing a clear understanding of their chronology and attributes. Nevertheless, in order to obtain appropriate material for specialized analyzes (including chronometric and bioarchaeological ones), new excavations of the barrows from the Yampil cluster were carried out.

3. EXCAVATIONS OF YAMPIL EXPEDITION (2010-2014)

Between 2010 and 2014, the Yampil expedition conducted excavations on seven barrows at four different sites: Pidlisivka (Klochko *et al.* 2015a), Porohy (Klochko *et al.* 2015b), Klembivka (Klochko *et al.* 2015c), and Prydnistryanske (four burial mounds; Klochko *et al.* 2015d). This extensive project was made possible through agreements established between the Institute of Archaeology of the National Academy of Science of Ukraine in Kyiv and the Adam Mickiewicz University in Poznań, Poland, with the collaboration of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Kraków. Leading the

Ukrainian team during the years 2010-2012 was Sergey Razumov, and in 2014, Viktor Klochko took the helm. On the Polish side, Aleksander Kośko managed the expedition, with contributions from Piotr Włodarczak and Danuta Żurkiewicz. Mykhailo Potupchyk from the heritage office in Vinnytsia, a researcher of the Yampil barrows in the 1980s and 1990s, also participated in the fieldwork.

The excavations involved the use of mechanical equipment and the application of a methodology developed by Ukrainian researchers for the exploration of burial mounds (Kośko and Razumow 2014). The barrow layers were systematically examined within trenches oriented along the west-east axis, with widths ranging from 4.5 to 7 metres. Efforts were made to document the vertical sections of the barrow, both in the central area and on the outskirts of the mound. A comprehensive description of the investigated features, materials, and analytical work carried out can be found in two volumes of the "Baltic-Pontic Studies" journal (issues 20 and 22) and in volume 6 of the "Archaeologia Bimaris" series (Kośko ed. 2015; 2017; Kośko *et al.* eds 2014). Genetic research results on prehistoric Yampil populations within the broader context of Central Europe are discussed in a separate paper (Juras *et al.* 2018).

A significant objective of the project was to obtain chronometric data for determining the ages of individual cultural phenomena in Yampil, particularly those from the Late Eneolithic and Early Bronze Age periods. A total of over 60 radiocarbon (^{14}C) dates were obtained for 40 archaeological features, initially at a laboratory in Kyiv and later at the Poznań Radiocarbon Laboratory. The dated materials primarily included human bones, alongside wood samples, animal bones, and charcoal. Previous publications have on multiple occasions presented the dating results and discussions regarding the chronology of the barrow cemeteries in the Yampil region (*e.g.*, Goslar *et al.* 2014; Goslar *et al.* 2015; Włodarczak 2017). Expanding the ^{14}C dating database and conducting new taxonomic studies offer opportunities to validate earlier findings.

The summary of research results presented below for individual burial mounds takes into account several revisions in taxonomic and chronological definitions compared to the previous presentations. These observations pertain solely to burials from the 4th and 3rd millennia BC. More comprehensive excavation results are published in volume 20 of "Baltic-Pontic Studies" from 2015 (Kośko ed. 2015).

Pidlisivka, Barrow 1 (2010)

Barrow 1 was situated on the plateau of the right bank of the Yalanka River, near its confluence with the Markivka, approximately 7 km north of the Dnister valley. At the outset of the 2010 research, the barrow's diameter was approximately 30 metres, and its height did not exceed 1 metre due to extensive ploughing. It had also suffered partial destruction during World War II as it was dug into to create artillery positions. A 4.5-7 metre wide ditch, resulting from soil extraction, delineated the original boundary of the barrow (Kośko *et al.* 2014; Klochko *et al.* 2015a).

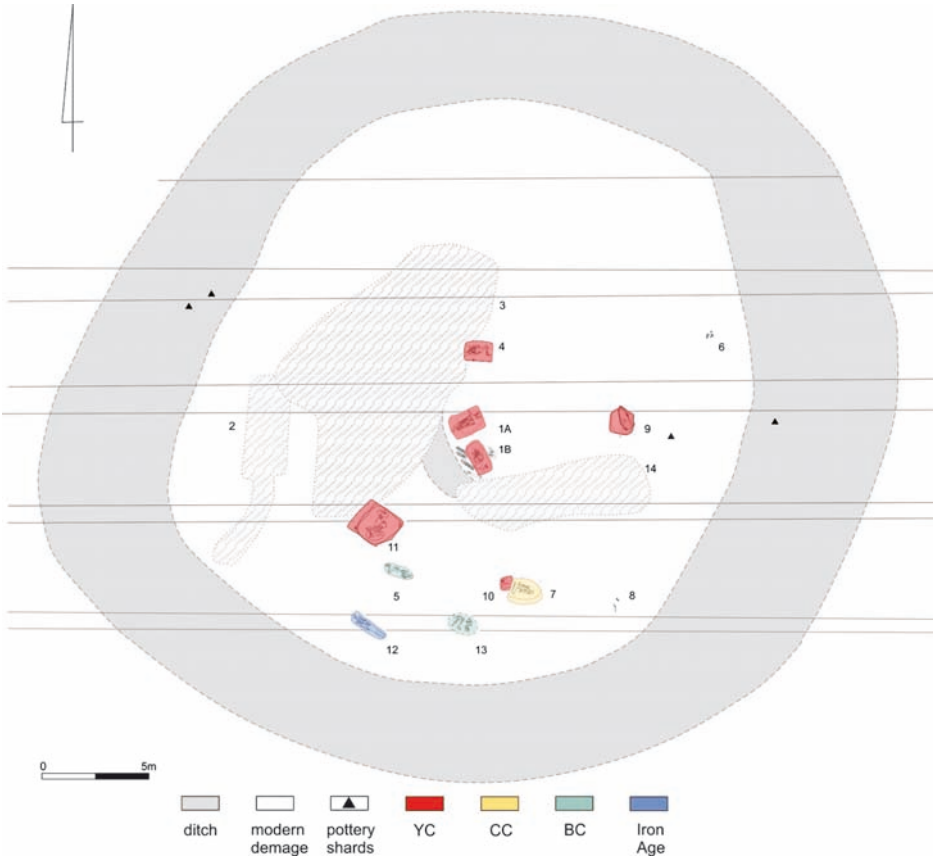

Fig. 4. Pidlisivka, Yampil rayon. Plan of Barrow 1.
YC – Yamna culture, CC – Catacombna culture, BC – Babyno culture. Illustrated by D. Żurkiewicz

The extensive damage to the barrow makes it challenging to reconstruct its chronological phases. The arrangement of the graves suggests that the mound was constructed in two stages, associated with Graves 1A and 1B located in the central portion (Fig. 4). The primary burial for the earlier stage was Grave 1B (Fig. 5), where an adult male was interred. This was classified as Late Eneolithic based on the arrangement and orientation of the chamber, as well as the absence of ochre usage in the burial ritual (Klochko *et al.* 2015a). However, radiocarbon dating of the bones from this burial points to a date in the first half of the 3rd millennium BC (2846-2577 cal BC, 68.3% probability).

A similar age range was established for Grave 1A, which was probably dug into a small mound constructed over Grave 1B (Goslar *et al.* 2014, 308, fig. 4.1:1). An adult man was buried in a rectangular pit, with his head facing west. The skeleton of a child aged 7-8 was also found approximately 20 centimetres above this burial in the same pit. The man's burial

Fig. 5. Pidlisivka, Yampil rayon, Barrow 1. Grave 1B – the primary burial of the first barrow phase. Photo by D. Żurkiewicz

Fig. 6. Pidlisivka, Yampil rayon, Barrow 1. Grave 1A – the primary burial of the second (?) barrow phase. Photo by D. Żurkiewicz

exhibited early YC characteristics due to the arrangement, head orientation, and use of ochre (Fig. 6). Presumably, this grave was connected with the second phase of barrow construction, although the precise stratigraphic relationship between Features 1A and 1B remains uncertain.

Burials from the Early Bronze Age (Nos 4, 7, 9, 10, and 11), the Babyno culture (Nos 5, 7, 13, and possibly 8), and the early Iron Age (No. 12) were placed within the body of the mound . Beneath the mound, a cluster of cattle bones deposited in a basin-shaped depression was discovered (Feature 6, possibly a sacrificial pit). It was probably associated with the barrow's construction phase. The Early Bronze Age burials varied in terms of burial construction features, the positioning of the deceased, and the use of ochre.

Porohy, Barrow 3A (2011)

Barrow 3A was situated on a prominent promontory at the confluence of the Dnister and Rusava rivers. On the southern part of this headland, there were four mounds in a linear north-south arrangement, including Mound 2, which had been examined in 1984 (Potupczyk and Razumow 2014, 37, fig. 1.2: 2). There, two royally equipped burials from the Sarmatian period had been discovered (Simonenko and Lobay 1991), along with a YC grave containing an A-amphora of the CWC (Fig. 1; Harat *et al.* 2014, 84-87). Barrow 3A, the northernmost in this group, had a diameter of about 40 metres. When the research commenced in 2011, its height was 1.2 metres, with a 1933 topographic map noting a height of 3.6 metres. Therefore, the barrow had undergone significant damage, mainly due to ploughing. The mound's boundary was marked by a ditch up to 10 metres wide and an average depth of 0.5 metres (Klochko *et al.* 2015b).

The central grave (No. 14) had been destroyed by a substantial modern trench dug by treasure hunters (Fig. 7). This intrusion also obliterated most of Grave 2 (YC), potentially the central burial for the second phase of barrow construction. Taking into account the presence of a stone cromlech, a stele (subsequently used to build the circle – Fig. 7: B), and two large post-holes, the oldest phase of the barrow in Porohy was dated to the Late Eneolithic period (Klochko *et al.* 2015b). Regrettably, an attempt to date the bone remains found in a secondary position in the destroyed Feature 14 was unsuccessful (the obtained age corresponds to the Babyno culture; Poz-74396: 3675±35 BP). Nonetheless, the Eneolithic age of Barrow 3A appears likely.

Grave 2 (YC) was situated in the central part of the mound, and its discovery depth (0.5 metres) implies that its floor was originally approximately 3 metres below the mound's summit. Hence, it was most likely that the central grave was linked to the expansion of the barrow's size. Nevertheless, due to the destruction of the central part, it is impossible to ascertain whether it was related to the second phase or any subsequent phases (given the depth of discovery, the latter is more plausible).

In addition to Feature 2, eleven other YC graves were discovered (Nos 1, 3, 7, 10-12, 15, 17-20), most of which formed an curved zone encircling the centre of the mound at a distance of roughly 5-7 metres. Outside this area, only graves 18 and 20 were found.

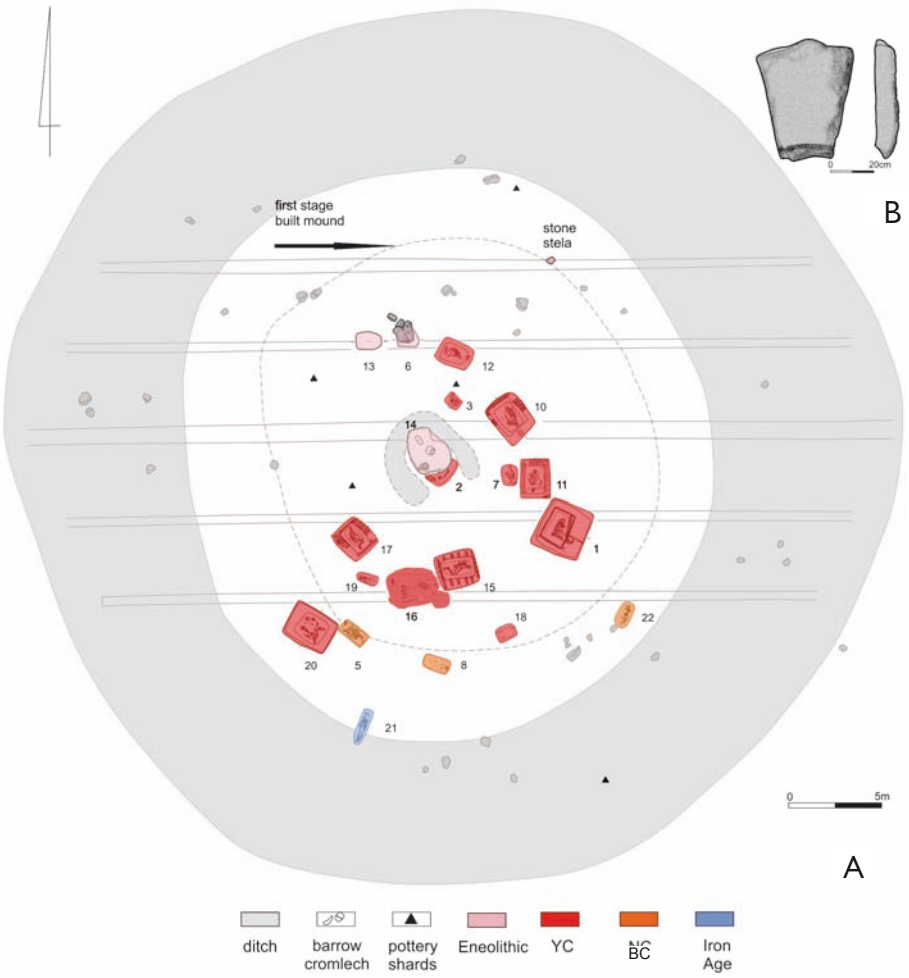

Fig. 7. Porohy, Yampil rayon. A – plan of Barrow 1, B – stone stele, YC – Yamna culture, BC – Babyno culture. Illustrated by D. Żurkiewicz

In the Late Bronze Age, three Babyno culture graves were excavated in the southern part of the barrow (Nos 5, 8, and 22). In the Sarmatian period, grave 21 was dug into its southern edge.

Porohy's burials stand out due to the distinctive nature of the YC funeral rituals (Klochko *et al.* 2015b; Włodarczak 2017). The deceased were placed in a semi-supine position (Graves 1, 10, and 20) or on their sides (Graves 3, 7, 12, 15, and 17), with only occasional instances of a supine position (Grave 11). No burials featuring early YC characteristics were found. Typologically, the Porohy burials represent the late YC phase (though not the

Fig. 8. Porohy, Yampil rayon, Barrow 3A, Grave 10. Barrow of adult woman (late Yamna culture). Photo by P. Włodarczak

latest, as seen in the mounds on the Budzhak steppe), a conclusion supported by the radiocarbon dating discussed in subsequent sections.

A unique discovery in Barrow 3A was Grave 10, belonging to a woman aged 25-30 years (Fig. 8). Traces of pigment on the forearm bones of both limbs were documented and interpreted as either paintings (Lorkiewicz-Muszyńska *et al.* 2017) or being from tattoos preserved due to the corpse's mummification (Włodarczak 2021).

Klembivka, Barrow 1 (2012)

Barrow 1 was located on the northern edge of the Yampil cluster, on a high watershed running along the north-south axis between the Rusava and Korytna rivers, about 15 km from the Dnister Valley. It had a diameter of 40 metres and a height of 1.2 metres. The barrow was encircled by a ditch up to 6 metres wide and 0.5 metres deep. During the excavations, three graves dating back to the 3rd millennium BC were discovered, along with two sacrificial deposits of animal bones from the same period (Fig. 9). In addition, ten graves from the Late Bronze Age, associated with the Babyno and Noua cultures, were found (Klochko *et al.* 2015c).

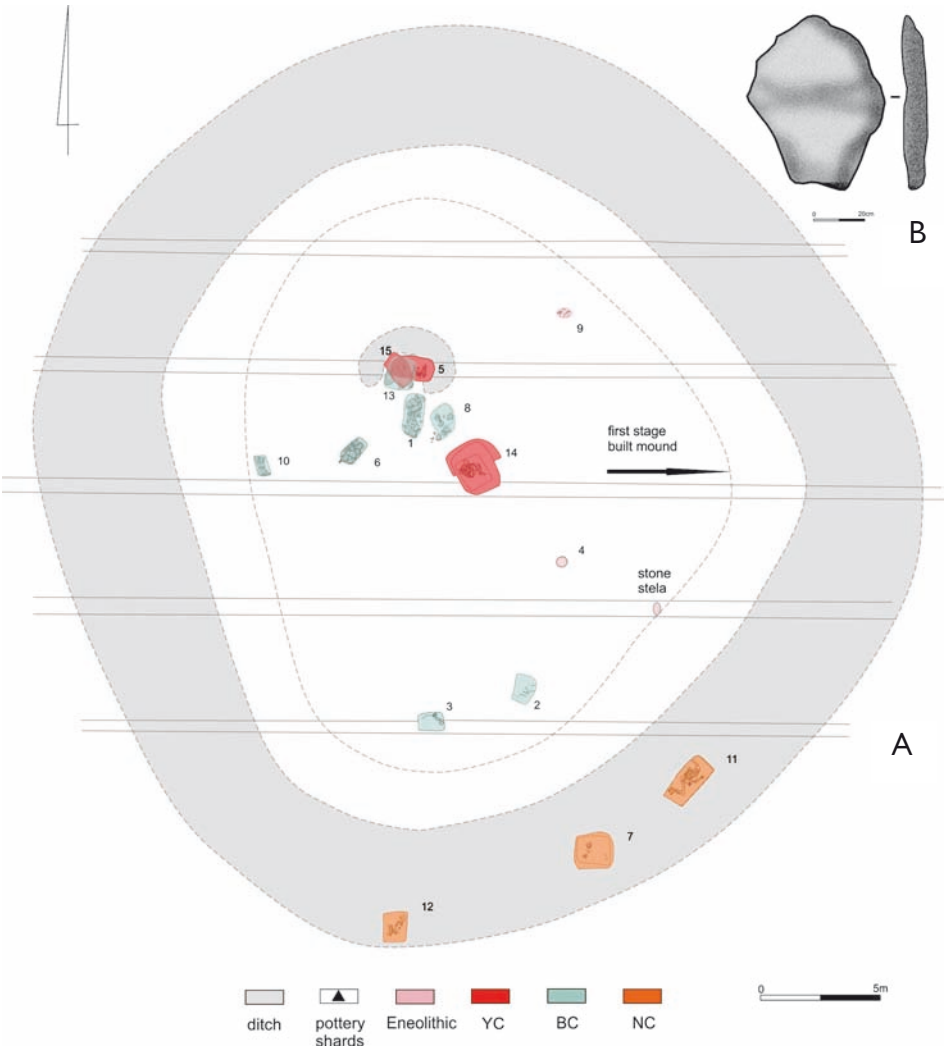

Fig. 9. Klembivka, Yampil rayon. A – plan of Barrow 1, B – stone stele.
YC – Yamna culture, BC – Babyno culture, NC – Noua culture. Illustrated by D. Żurkiewicz

Due to significant erosion, it is challenging to accurately reconstruct the stratigraphic sequence of Klembivka. There appear to have been two stages of barrow construction. Grave 15 was the primary burial for the earlier phase. In a non-regular pit, the poorly preserved remains of a person aged 15-20 years were discovered (Fig. 10). The deceased was placed in a supine position with the lower limbs bent, and the head was oriented to the northwest. The position of the preserved proximal parts of the forearm bones suggests that the upper limbs were extended along the body. A lump of ochre was found near the left

Fig. 10. Klembivka, Yampil rayon, Barrow 1. Grave 15 – primary burial of the first barrow phase. Photo by P. Włodarczak

shoulder. The remains of the mat on which the deceased was placed were also documented. However, no wooden roof construction was found. In general, most aspects of the funeral ritual for Grave 15 point to early YC trends. The only exceptions are the irregular shape of the burial pit and the absence of traces of a wooden roof.

Grave 5 was excavated in the central part of the mound constructed above Grave 15. It was probably associated with the second phase of the mound's construction. The third grave from the Early Bronze Age was Feature 14, also dug into the oldest burial mound (Fig. 11). It is possible that Grave 14 was linked to a second layer of barrow construction, which went unrecorded due to erosion. In a deep square pit, a man (25-30 years) was buried in a tightly contracted position on his left side. The burial was considered Eneolithic (Klochko *et al.* 2015c, 175), corresponding to type IIIC (Rassamakin 2004, 55-59), typical of the Zhivotilovka-Volchansk group and similar cultures. However, its absolute dating to the beginning of the 3rd millennium BC contradicts this interpretation.

On the southeast edge of the older barrow, at an approximate depth of 0.6 metres (*i.e.*, at the original ground level), an anthropomorphic stele made of limestone measuring 0.7 x 0.7 x 0.1 metres was discovered (Fig. 9: B). Moreover, two small concentrations of animal bones were found in two places, potentially related to sacrificial deposits made during the barrow's construction. A domestic horse bone was uncovered on the eastern edge of the

Fig. 11. Klembivka, Yampil rayon, Barrow 1. Grave 14. Photo by P. Włodarczak

younger layer of the barrow, and the bone of a small ruminant was found on the eastern edge of the older mound. Additionally, two sacrificial pits with animal bones were associated with the older mound's construction phase (Features 4 and 9).

Subsequently, seven graves of the Babyno culture were dug into the fully formed barrow (Nos 1-3, 6, 8, 10, and 13), with ^{14}C dates indicating a range from 1880 to 1771 BC. Three Noua culture graves (Nos 7, 11, and 12) are dated to a slightly later period (1443-1311 BC), forming a cluster in the southern zone, in the barrow ditch.

Prydnistryanske, Barrows I-IV (2014)

On a lengthy promontory situated between the Dnister and Markivka rivers, a series of barrows is aligned along a north-south axis. This collection includes four mounds that underwent examination in 2014, as reported by Klochko *et al.* in 2015. Among them, we

Fig. 12. Prydnistryanske, Yampil rayon, Barrow I. Grave 4 – burial of Catacombna culture. Photo by M. Podsiadło

find three smaller, significantly eroded mounds (designated as Nos I-III) closely aligned in a row. In addition, there is a larger, better-preserved barrow (No. IV) located approximately 60 metres to the north (Fig. 3).

Barrow I: This barrow, with a diameter of about 20 metres and a remaining height of just 0.3 metres (Klochko *et al.* 2015d, 188, fig. 5), is encircled by a ditch (a result of soil extraction). Notably, no traces of burial were found in the primary grave (I/1). The fill contained only two fragments of pottery from the late phase of the Trypillia culture, as well as a fragment of a wooden object. In the eastern part of the barrow, a double burial of the Catacombna culture (I/4) was discovered (Fig. 12), and later, two features, including a grave, from the Sarmatian period (I/2 and I/3).

Barrow II: This mound, with an oval shape and dimensions of approximately 23 by 20 metres, maintains a height of no more than 0.2 metres (Klochko *et al.* 2015d, 196, fig. 11). Like Barrow I, no burial traces were identified in the primary grave (II/2), but a few wood fragments were discovered in its fill. Radiocarbon dating of one of these fragments places it in the Late Eneolithic period. In the vicinity of Grave II/2, a hearth (Feature II/1) was found, marked by a cluster of charcoal and burnt earth lumps. In the southern section of the mound, a pit with an unknown purpose (Features II/3) contained limestone rocks, as

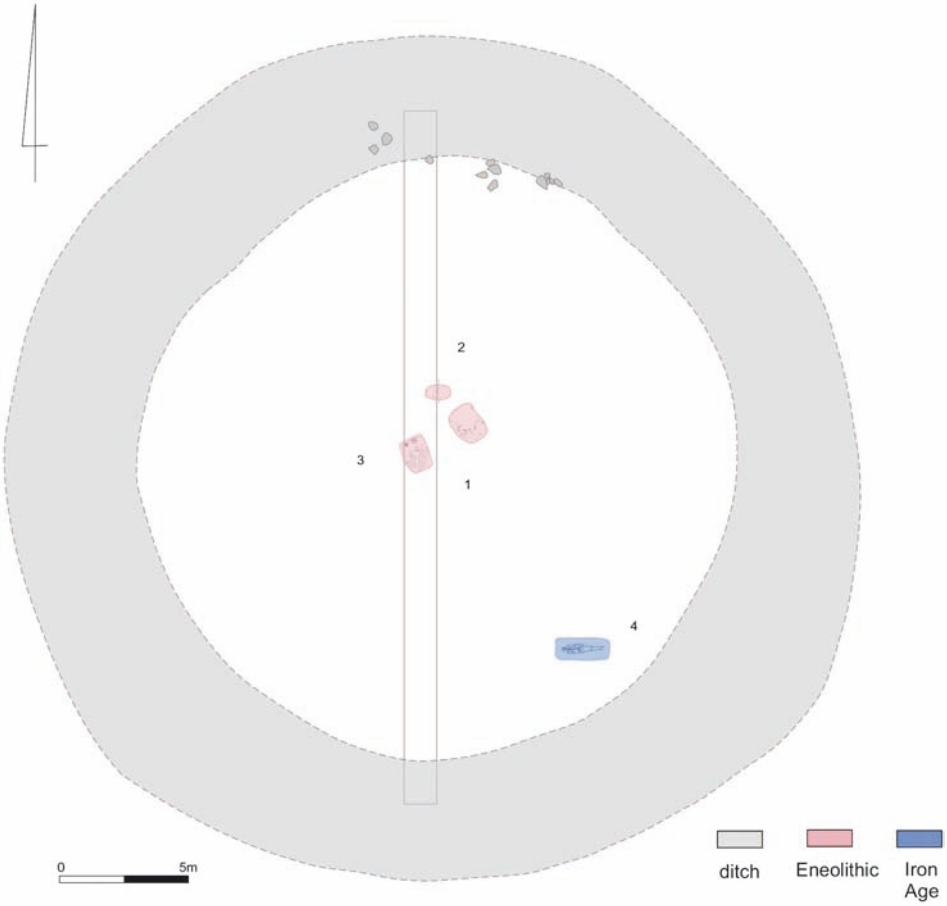

Fig. 13. Prydnistryanske, Yampil rayon. Plan of Barrow III.
Illustrated by D. Żurkiewicz

well as nine human bone fragments in its lower layers. Radiocarbon dating of Feature II/3 indicates a modern age.

Barrow III: This circular mound, approximately 24 metres in diameter and with a remaining height of about 0.15 metres, was enclosed by a basin-shaped ditch (Fig. 13). Limestone pieces were discovered on the border of this ditch and the mound, with a greater concentration on the northern edge. Under the mound's central part, two pits were uncovered. Feature III/1 held disturbed remains of an adult individual and fragments of a Gordineşti-type vessel (Klochko *et al.* 2015d, 205, fig. 18). At the bottom of Feature III/3, an amphora, a beaker (of the Gordineşti group pottery type – Fig. 14: 2, 3), and a stone battle-axe (Fig. 14: 1) were found. In the upper part of the barrow, a concentration of human

Fig. 14. Prydnistryanske, Yampil rayon, Barrow III. Grave 3 and its inventory.
Illustrated by D. Żurkiewicz and M. Podsiadło

remains (an adult and a child in Feature III/2) was observed, possibly originating from the disturbed Grave III/1. In the southeast part of the mound, a human burial dating back to the early Middle Ages was located (Feature III/4).

Barrow IV: This mound, boasting a diameter of 35 metres and a height of 2.5 metres, was encircled by a circular ditch up to 15 metres wide (Fig. 15). Regrettably, the eastern edge of the barrow had to remain unexcavated due to the presence of a powerline pole. Stratigraphic analysis revealed three construction phases of the barrow. The oldest phase, dating to the second half of the 4th millennium BC, involved the creation of a small mound with a diameter of 17-19 metres above Grave IV/10, featuring a catacomb construction. Radiocarbon dating of this feature places it in the Late Eneolithic period. The oldest barrow suffered disturbance through an extensive, irregular trench (Feature IV/11), which obliterated a significant portion of its central area, possibly due to animal burrows. Subsequent construction phases of the barrow are connected to the YC. A complex grave, associated with the early YC, known as Grave IV/4, was excavated in the eastern part of the Eneolithic barrow (Fig. 16). This elaborate construction, including stone block covering and additional wooden elements, signifies the high status of the interred individual. This burial led to the expansion of the mound, primarily on the eastern side, increasing its diameter to approximately 25 metres. A second grave from the YC (Feature IV/6) was exca-

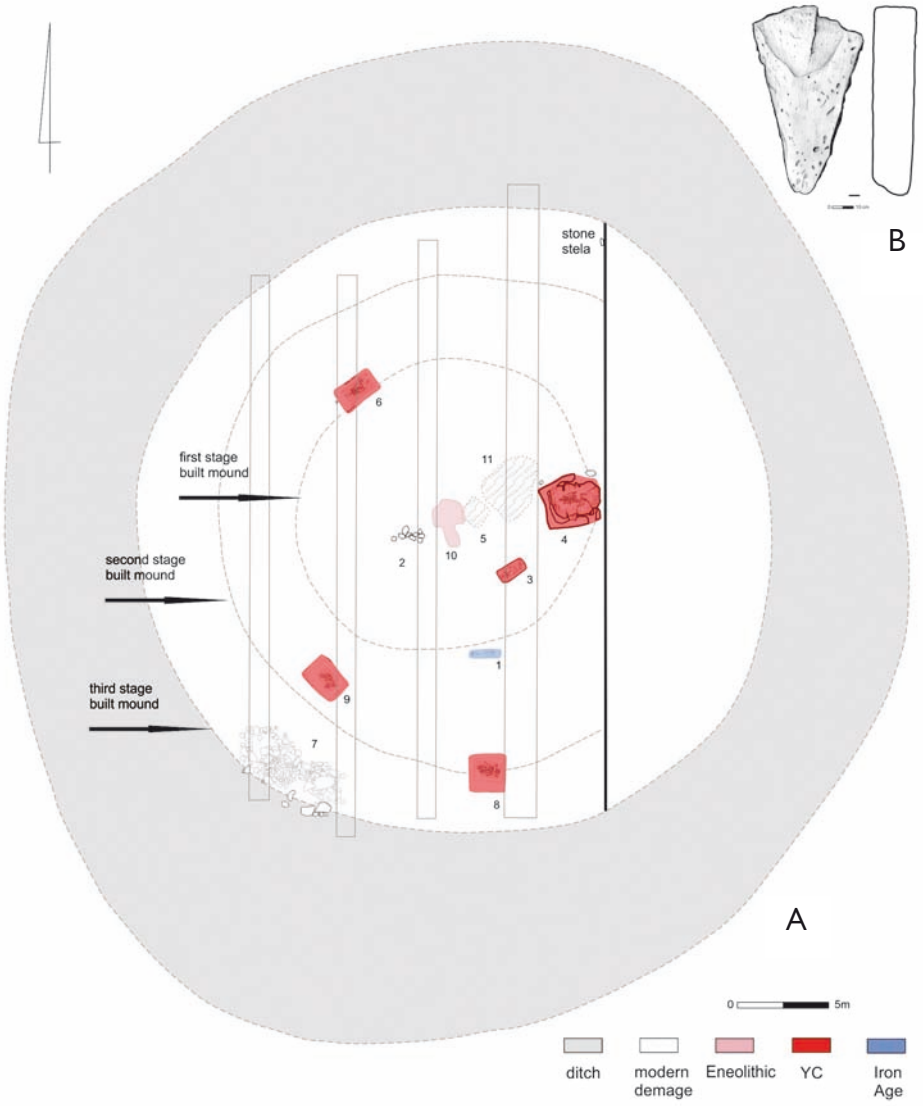

Fig. 15. Prydnistryanske, Yampil rayon. Plan of Barrow IV. YC –Yamna culture. Illustrated by D. Żurkiewicz

vated in the mound, around two hundred years later. The final stage of the barrow's construction, marking its ultimate dimensions, is associated with this burial, also from the early YC. Subsequently, three late YC graves were inserted into the southern side (designated as IV/3, IV/8 - Fig. 17, and IV/9). Much later, a Sarmatian period grave (IV/1) was discovered on the southern slope of the barrow.

Fig. 16. Prydnistryanske, Yampil rayon, Barrow IV. Grave 4 – burial of the early Yamna culture. Photo by M. Podsiadło

Fig. 17. Prydnistryanske, Yampil rayon, Barrow IV. Grave 8 – burial of the late Yamna culture. Photo by P. Włodarczak

4. CHRONOMETRY OF THE YAMPIL BARROWS

The list of radiocarbon dates for the Yampil barrows, as published by Goslar *et al.* in 2015, has been expanded with additional results obtained for Barrow 3A in Porohy and one for Pidlisivka. These findings provide an opportunity to propose a new chronology for the Podillian barrow communities. Previous research had primarily relied on results from four burial mounds in Prydnistryanske to establish the periodization of the Yampil barrows, marking the Late Eneolithic stage, late Trypillia Gordineşti, or Zhivotilovka-Volchansk groups, followed by the Early and Late/Classic YC phases. Now, a more extensive series of dates from Porohy allows us to refine the chronology of the late YC. Additionally, the taxonomic and chronological assessments of the burials in Klembivka need to be partially revised. The following dating lists of the Yampil barrows take into account the results obtained at the Poznań Radiocarbon Laboratory. The dates obtained at the Kyiv laboratory were previously compiled in a publication by Goslar *et al.* in 2015. While some of these dates confirm the results presented below, in other cases, they deviate from our expectations.

Stage I – Late Eneolithic

For the central graves in all four barrows at Prydnistryanske, we obtained similar absolute ages, suggesting years around 3350-3150 cal BC (Table 1; Goslar *et al.* 2015). These dates represent the oldest horizon of barrow graves in Podillia to date (Fig. 18). Determining the taxonomic relationships of the Eneolithic burials from Prydnistryanske proved challenging. The presence of characteristic pottery in Features III/1 and III/3 suggested a connection with the Gordineşti group (Klochko *et al.* 2015d). Some researchers also associated the barrow ritual observed at various Moldovan sites with this Late Trypillia cultural phenomenon (Larina 2003). However, burials from the Zhivotilovka-Volchansk group exhibited similar features, frequently featuring pottery from the Gordineşti group

Table 1. Radiocarbon dates of late Eneolithic graves from barrows nos I-IV in Prydnistryanske, Yampil rayon

Barrow	Grave no.	Dated material	Lab code	Age BP	Calendar age BC (68.2%)*
Prydnistryanske I	1	Wood	Poz-66214	4640 ± 40	3504-3365
Prydnistryanske II	2	Wood	Poz-66222	4655 ± 35	3507-3370
Prydnistryanske II	1	Charcoal	Poz-66221	4485 ± 30	3331-3100
Prydnistryanske III	1	Human bone	Poz-66224	4540 ± 35	3363-3109
Prydnistryanske III	2	Human bone	Poz-66225	4530 ± 35	3359-3107
Prydnistryanske III	3	Wood	Poz-71367	4510 ± 40	3346-3104
Prydnistryanske IV	10	Human bone	Poz-66234	4520 ± 40	3355-3105

* OxCal calibration program v4.4.4 (Bronk Ramsey 2021)

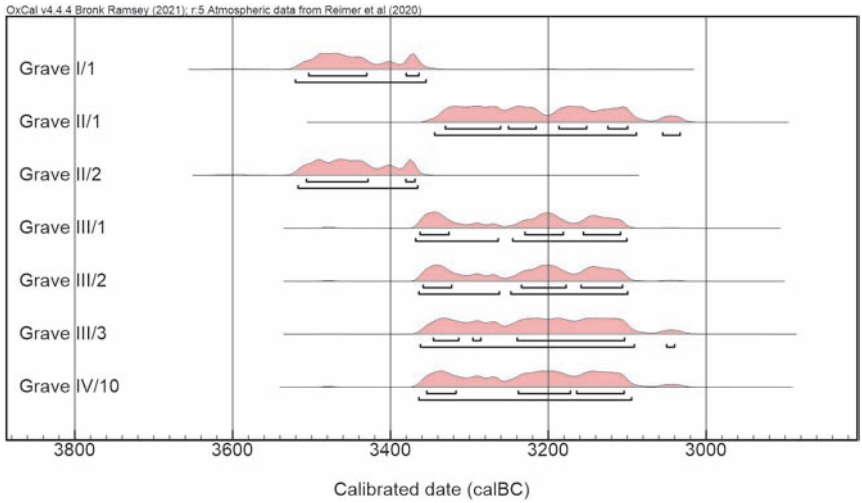

Fig. 18. Calibration results of ^{14}C ages of samples from Barrows I-IV at Prydnistryanske (late Eneolithic phase). For the calibration, the Oxcal v4.4.4 software (Bronk Ramsey 2021) was used

(Rassamakin 2004, 126). No inhumation burials with preserved body positioning were discovered in the graves at Prydnistryanske. The pits were oriented along the NW-SE axis, and in the case of Features III/1 and III/3, it can be suggested that the deceased were placed with their heads facing SE. This orientation aligns with the Zhivotilovka-Volchansk group's burial ritual (Dergachev 2022, 161). On the other hand, secondary interventions in burial chambers, leading to the decomposition or removal of human remains, are characteristic of the Gordineşti group's ritual and have been documented at sites in northern Moldova near Prydnistryanske (Larina 2003; 66). The ^{14}C dating of Eneolithic features from Prydnistryanske aligns with the results obtained for the Zhivotilovka-Volchansk group graves in Bursuceni (Petrenko and Kovaliukh 2003) and Cimişlia (Popovici and Ciobanu 2021), as well as for settlements of the Gordineşti group (Rybicka *et al.* 2020).

Stage II – Early Yamna

The marker for the early YC in the Podillia region is Grave 4 from Barrow IV in Prydnistryanske. It was excavated in the eastern part of the Eneolithic mound and was associated with a significant extension of the barrow. This grave featured a monumental construction, including a wooden chamber casing and stone slabs, probably reused stelae, as well as mats and wooden poles forming a roof (Fig. 19). The chamber had a rectangular shape with vertical, straight, and carefully finished walls. The deceased, a man aged 35-50 and approximately 187 cm tall, was placed on a mat in a supine position with the lower limbs curled up and the upper limbs stretched along the body. The body was oriented

Fig. 19. Reconstruction of Grave IV/4 from Prydnistryanske, Yampil rayon.
Illustrated by M. Podsiadło

along the W-E axis, with the head facing W. The bones were adorned with ochre in several places, and the upper part of the skull exhibited an intense coloration. A separate lump of bright red ochre was found near the head. This ritual is characteristic only of male burials from the older phase of YC and has strong parallels in graves from the burial mounds of this culture in the steppe zone, especially along the lower Dnister, Inhul, Inhulets, and the

Table 2. Radiocarbon dates of graves from the early-Yamna period

Barrow	Grave no.	Dated material	Lab code	Age BP	Calendar age BC (68.2%)*
Klembivka 1	15	Human bone	Poz-77470	4290 ± 35	2920-2884
Klembivka 1	14	Human bone	Poz-52422	4260 ± 40	2916-2782
Klembivka 1	14	Wood	Poz-52605	4135 ± 35	2862-2630
Klembivka 1	5	Human bone	Poz-70670	4225 ± 35	2898-2707
Pidlisivka 1	1Aa	Wood	Poz-52423	4190 ± 35	2883-2700
Pidlisivka 1	1A	Human bone	Poz-38529	4195 ± 35	2885-2701
Pidlisivka 1	1A	Human bone	Poz-39214	4080 ± 40	2843-2500
Pidlisivka 1	1A	Wood	Poz-52424	4085 ± 35	2842-2504
Pidlisivka 1	1B	Human bone	Poz-102979	4100 ±35	2846-2577
Prydnistryanske IV	4	Human bone	Poz- 66230	4455 ± 40	3327-3026
Prydnistryanske IV	4	Wood	Poz-66229	4380 ± 35	3024-2921
Prydnistryanske IV	6	Human bone	Poz-70673	4090 ± 40	2846-2505
Prydnistryanske IV	6	Wood	Poz-66231	4185 ± 35	2882-2698

* OxCal calibration program v4.4.4 (Bronk Ramsey 2021)

lower Southern Buh (see, *e.g.*, Shaposhnikova *et al.* 1986, 15; Rychkov 2001, 45). The two radiocarbon dates for this grave differ significantly (Table 2; Fig. 20). A typical result for early YC was obtained for a sample of wood (ash) from the grave construction, indicating the transition from the 4th to the 3rd millennium BC, similar to most western YC results (*e.g.*, Preda-Bălănică *et al.* 2020, 87; Alexandrov and Włodarczak 2022). The date obtained for the bone sample from Grave IV/4 is earlier (3327-3026 cal BC), although the younger part of the range allows reconciliation, suggesting an age around the last century of the 4th millennium BC. This is currently the only such early dating for a YC grave in the Yampil region. Another early YC burial from Prydnistryanske, Grave IV/6, shares similarities with Grave IV/4 in terms of grave construction and body arrangement. However, its ^{14}C dates indicate a later period, approximately 2850-2600 cal BC.

The early YC rite also extends to Grave 1A from Barrow 1 in Pidlisivka, which was considered primary for the second phase of the barrow's construction. In terms of arrangement, orientation, and the use of ochre, this burial exhibits characteristics typical of YC. Grave 1B, probably older than 1A, differs in its orientation, with the burial at a slightly lower level. Despite the suggested chronology, the arrangement of the deceased aligns generally with the tradition of the early YC. The skull also shows signs of ochre staining. Based on these features and the radiocarbon dating results, it is necessary to revise previous proposals and classify Graves 1A and 1B within the early YC period. Another early YC burial, Grave 15 in Barrow 1 in Klembivka, presents an exception in terms of the irregular shape of the grave pit. This may partly result from the poor preservation condition. Nevertheless,

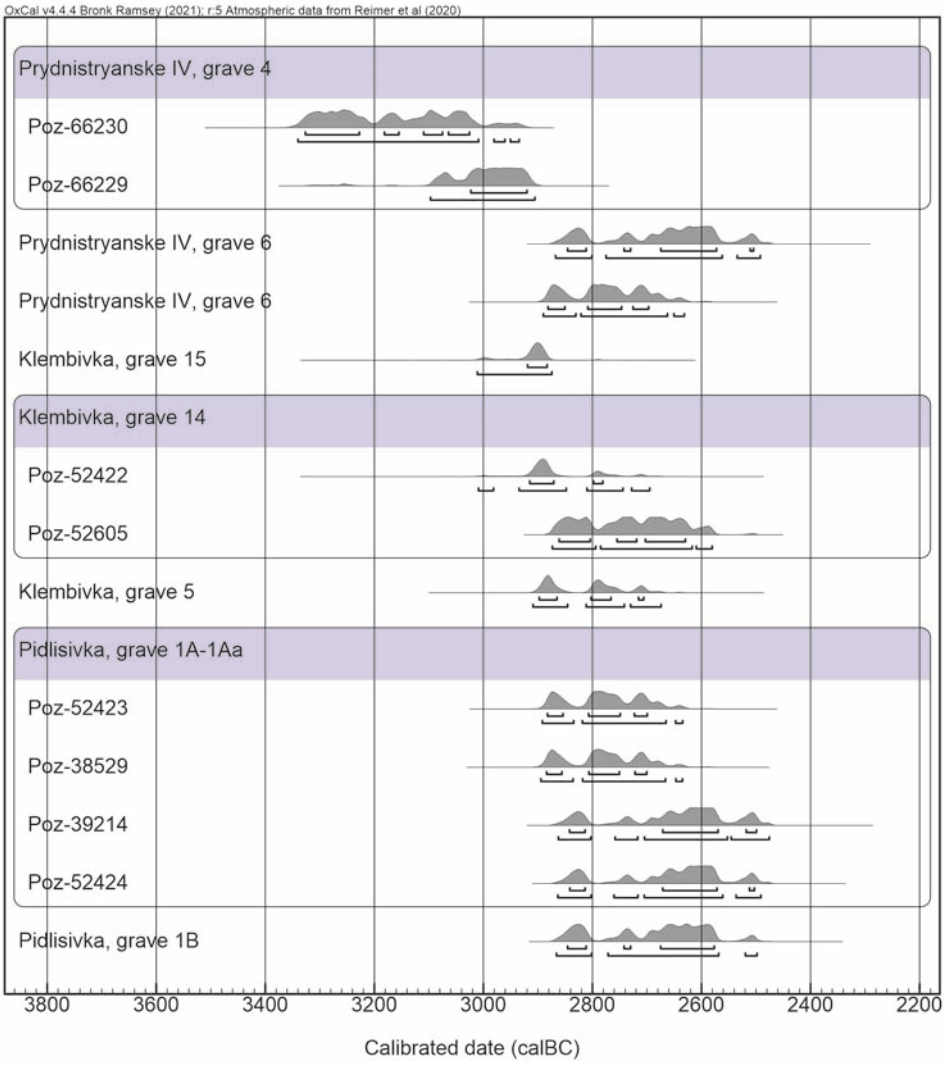

Fig. 20. Calibration results of ^{14}C ages of samples from the early Yamna graves. For the calibration, the Oxcal v4.4.4 software (Bronk Ramsey 2021) was used

the position, orientation of the deceased, and the presence of an ochre lump near the head indicate a typical early YC burial. This assessment is confirmed by its absolute dating, placing it in the period of 2920-2884 cal BC. However, two subsequent burials from this mound, Nos 5 and 14, were previously considered Eneolithic. Radiocarbon dating, however, suggests an early YC period. The position of the deceased in Grave 14 is particularly characteristic of the Zhivotilovka-Volchansk group and the rite in phase C/II of the Trypillia culture.

Accepting the obtained absolute age, the burials from Klembivka should be considered an example of the preservation of older traditions (Eneolithic funeral rites) into the 3rd millennium BC. Similar exceptions to the dominant YC ritual are known from other Podillia barrows, such as Grave 7 in Barrow 3A in Porohy (Klochko *et al.* 2015b, 99, fig. 18), or Grave 2 from Barrow 2 in Kuzmin (Bubulich and Khakheu 2002, 130, fig. 10: A).

Stage III – Late Yamna

Burials from the later YC phase were discovered in Pidlisivka, Porohy, and Prydnistryanske (Barrow IV). In Prydnistryanske, these features (Nos 3, 8, and 9) were stratigraphically younger than graves from an earlier phase (Nos 4 and 6). Stratigraphic observations confirm the characteristics of the grave construction and burial arrangements. It is possible that Grave 3, located near the top of the barrow, represents a slightly older chronological position, with the same body arrangement and W-E orientation characteristic of the older phase. Features 8 and 9, on the other hand, were dug into the outskirts of the

Table 3. Radiocarbon dates obtained for graves dated to late YC period

Barrow	Grave no.	Dated material	Lab code	Age BP	Calendar age BC (68.2%)*
Pidlisivka 1	11	Human bone	Poz-81793	4085 ± 30	2839-2573
Porohy 3A	1	Human bone	Poz-70668	3760 ± 35	2276-2065
Porohy 3A	1	Wood	Poz-103120	4095 ± 35	2846-2576
Porohy 3A	2	Human bone	Poz-74392	4140 ± 35	2866-2632
Porohy 3A	3	Wood	Poz-103052	4105 ± 30	2846-2580
Porohy 3A	7	Human bone	Poz-70667	4115 ± 35	2852-2584
Porohy 3A	7	Human bone	Poz-102978	3925 ± 35	2470-2346
Porohy 3A	10	Human bone	Poz-74393	4105 ± 35	2847-2580
Porohy 3A	10	Human bone	Poz-81824	4040 ± 35	2622-2488
Porohy 3A	11	Human bone	Poz-47741	4075 ± 35	2837-2500
Porohy 3A	11	Bone of goat	Poz-101625	4070 ± 35	2835-2497
Porohy 3A	12	Human bone	Poz-47742	3985 ± 35	2568--2467
Porohy 3A	17	Human bone	Poz-47743	4050 ± 35	2627-2492
Porohy 3A	17	Human bone	Poz-74394	3930 ± 35	2472-2347
Porohy 3A	18	Bone of goat	Poz-101626	4115 ± 35	2852-2584
Porohy 3A	19	Human bone	Poz-70665	4185 ± 35	2882-2698
Porohy 3A	20	Human bone	Poz-47744	4190 ± 35	2883-2700
Porohy 3A	20	Human bone	Poz-74397	4175 ± 35	2879-2680
Prydnistryanske IV	3	Human bone	Poz-66228	4090 ± 35	2845-2573
Prydnistryanske IV	8	Human bone	Poz-66232	4090 ± 35	2845-2573
Prydnistryanske IV	9	Human bone	Poz-66233	4120 ± 35	2856-2585

* OxCal calibration program v4.4.4 (Bronk Ramsey 2021)

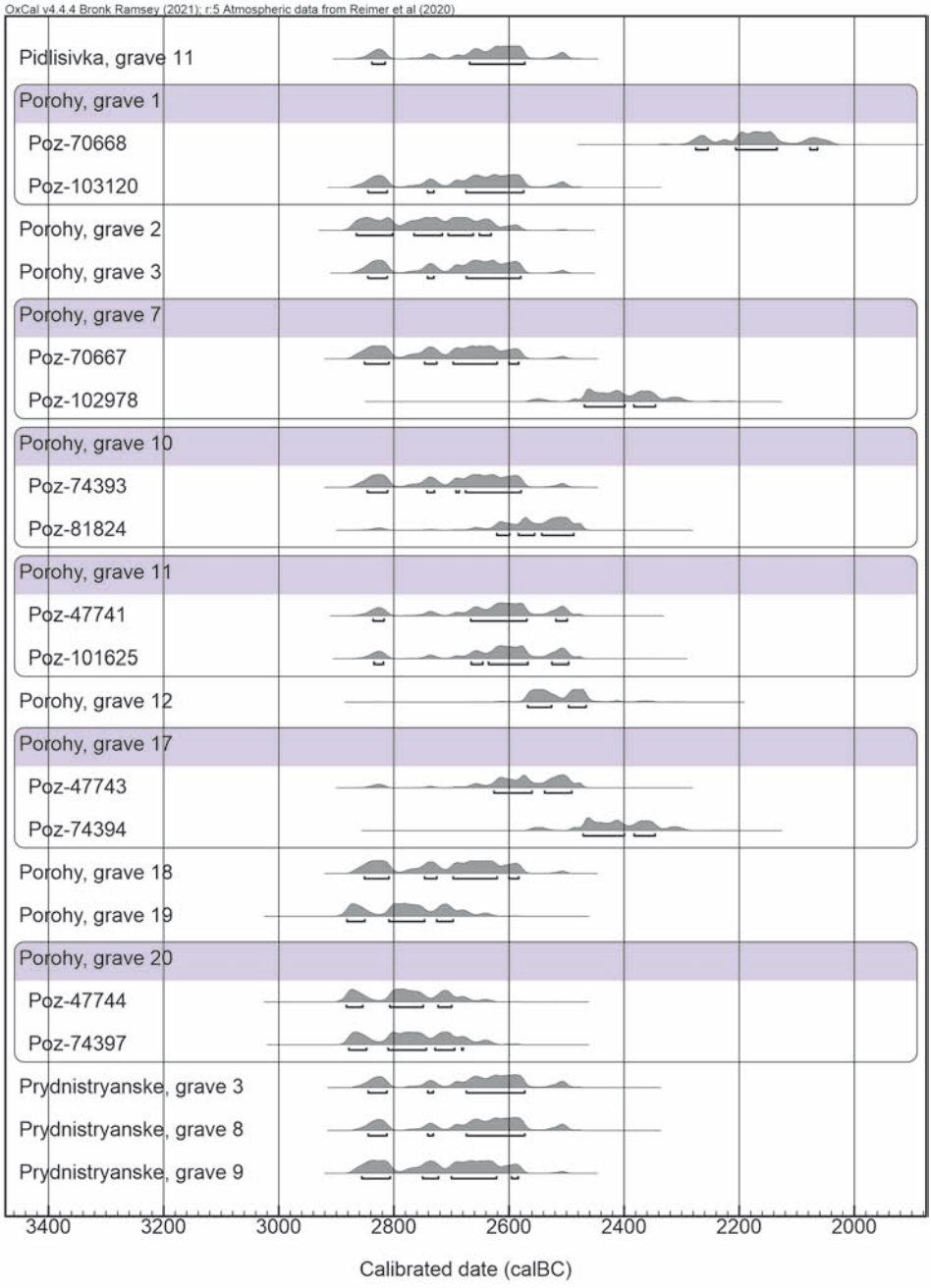

Fig. 21. Calibration results of ^{14}C ages of samples from the late Yamna graves. For the calibration, the Oxcal v4.4.4 software (Bronk Ramsey 2021) was used

mound, marking a younger phase. Barrow IV in Prydnistryanske provides an example of clear stratigraphy, demonstrating patterns in the northwestern Pontic region. In Barrow 3A in Porohy, a cemetery from the late YC phase was discovered, consisting of 11 graves. Such a significant accumulation of burials is rarely found in the forest-steppe zone of the Podillia Upland and was not observed in the other four burial mounds examined in Porohy. In the Yampil cluster, only Barrow 2 in Severynivka exhibits a similar arrangement of eleven YC graves to that in Porohy 3A (Harat *et al.* 2014, 173, fig. 2). In the neighbouring Kamenka cluster, numerous late YC graves were discovered in Barrows 3 and 6 in Ocniţa, situated around the centre of the mound (Manzura *et al.* 1992, 109, 121, figs 7 and 19). This method of organizing the cemetery reflects a model from the Budzhak steppe (see Yarovoy 1985, 52-61; Dergachev 1986, 36-42). The Podillian sites lack pottery equipment typical of the latest (= Budzhak) YC period. An interesting and challenging issue in this context is the chronological relationship between the dated Yampil graves and features with Budzhak-style pottery. The latter may belong to a later period than the cemeteries of the Porohy 3A type (*cf.* Dergachev 1986, 82-87). The primary grave in Mound 3A in Porohy (No. 14) was unfortunately destroyed by modern treasure hunters. Due to the barrow's construction, the age of its older phase was determined to be Late Eneolithic (Klochko *et al.* 2015b). The modern intrusion also destroyed a significant part of Feature 2 – the YC burial, probably

Fig. 22. Porohy, Yampil rayon, Barrow 3A. Grave 7 – late Yamna stage.
Photo by P. Włodarczak

associated with the barrow's superstructure phase. It is unknown whether this burial was linked to the early or late YC. The radiocarbon date obtained for it is similar to the results from other YC graves (Table 3; Fig. 21). It can only be assumed that Grave 2 is slightly older than the surrounding features. Radiocarbon dating suggests that the absolute age of the Porohy graves falls within the range of approximately 2800-2600 cal BC. Graves 7 and 12 probably have a slightly younger age (around 2600-2400 cal BC), with two distinct ^{14}C results for Feature 7. The correctness of the younger one is supported by the specific burial arrangement and the presence of a fragment of a vessel, secondarily used as a "zharovnia" (a stand for storing embers), an element characteristic of the Catacombna culture stage (Fig. 22). Three late YC graves (Nos 4, 9, and 11) were discovered in the Pidlisivka barrow. Radiocarbon dating was conducted only for Feature 11, yielding a date of 2839-2573 cal BC (Table 3). This date aligns with the analyses performed for the cemetery in Porohy 3A.

Stage IV – Catacombna culture

The documentation of the Catacombna culture phase in the Yampil region is limited. A grave unequivocally connected with the Inhul Catacombna group (Feature I/4) was found only in Barrow I in Prydnistryanske. The absolute age for this feature (Table 4) was estimated to be around 2550-2450 cal BC (Fig. 23). Although this date is surprisingly early, considering the typological features of the burial, it is slightly younger than the estimated age for the late YC in the Yampil region. Burials displaying features of the Catacombna culture were also uncovered in the barrows in Pidlisivka and Porohy. In the former, the poorly preserved Grave 7 probably had a semi-catacomb construction (Klochko *et al.* 2015a, 57, fig. 13). In horizontal projection, its chamber had an oval shape, unlike the rectangular structures of the YC. However, a relatively early ^{14}C date was obtained for this grave, corresponding to the late YC results (Table 4). Attempting to reconcile the typological and absolute dating, one would need to assume the presence of early Catacombna culture features in the Yampil region, dating to around 2850-2600 cal BC. The coexistence of early Catacombna culture and the YC in the Podillia Upland is supported by the discovery of a typical, early-dated grave with a catacomb construction in Barrow 3 in Ocniţa (Klochko

Table 4. Radiocarbon dates for graves of the Catacombna type from Yampil region

Barrow	Grave no.	Dated material	Lab code	Age BP	Calendar age BC (68.2%)*
Pidlisivka 1	7	Human bone	Poz-38531	4120 ± 35	2856-2585
Prynistryanske I	4	Wood	Poz-66218	4105 ± 40	2848-2579
Prynistryanske I	4	Human bone	Poz-66219	4070 ± 35	2835-2497
Prynistryanske I	4	Human bone	Poz-66220	3940 ± 40	2556-2347
Prynistryanske I	4	Human bone	Poz-66732	3940 ± 35	2553-2347

* OxCal calibration program v4.4.4 (Bronk Ramsey 2021)

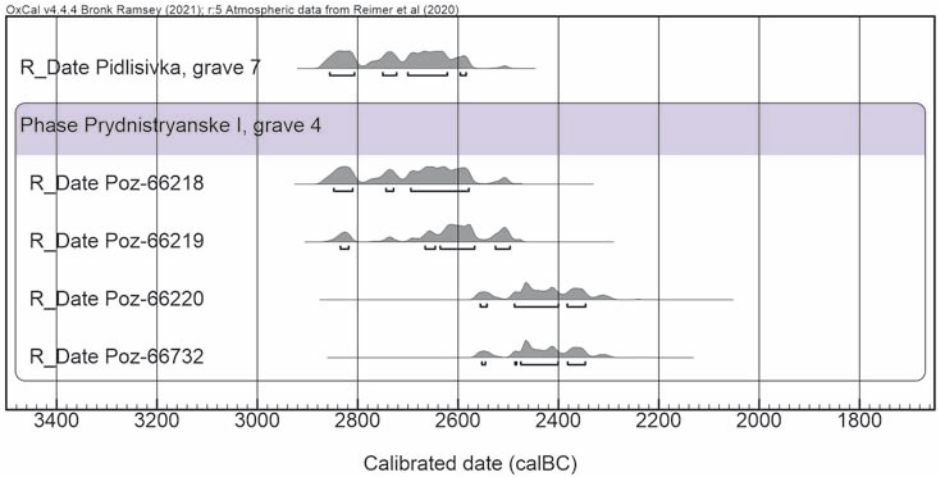

Fig. 23. Calibration results of ^{14}C ages of samples from the Catacombna graves. For the calibration, the Oxcal v4.4.4 software (Bronk Ramsey 2021) was used

1990; Manzura *et al.* 1992, 20, 21). The burial from Grave 7 in Porohy may be an example of a late-dated YC feature with elements of the Catacombna culture's funeral rite. Two distinct ^{14}C dates were obtained for this grave. The younger date – 2470-2346 cal BC (68.3% probability) – appears to align better with the typological assessment of this burial.

5. CONCLUSIONS

During the field research conducted between 2010 and 2014, intriguing sequences of graves were unearthed in four barrow cemeteries located in the Yampil region. The list of 48 radiocarbon dates presented above serves as a crucial reference point for the entire eastern Podillia area, offering valuable insights into the historical context of this region. It is essential to note that the materials collected by the Polish-Ukrainian expedition do not comprehensively represent the taxonomic and chronological diversity of the Yampil barrows, as evident from comparisons with earlier studies in the region, including those in the neighbouring Kamenka region. Chronometric investigations have revealed that the majority of Yampil barrows were constructed during two distinct periods: the late Eneolithic and the early YC. Notably, research on barrows I-IV in Prydnistryanske led to the discovery of the oldest barrow graves in Podillia, marked by pottery from the late Trypillia Gordineşti group and dating back to 3350-3150 cal BC. A slightly different Eneolithic tradition may have been represented by Barrow 3A in Porohy, though its precise age remains undetermined. The area also features extended inhumations, including the Post-Mariupol/Kvityan-

natype, and burials reflecting the Cernavodă/Nizhna Mikhailivka tradition, though their absolute chronology is presently uncertain.

A second phase of barrow construction, associated with the early YC, is documented in Klembivka and Pidlisivka. This period also witnessed the utilization of Eneolithic mounds, such as Prydnistryanske IV and probably Porohy 3A. The construction activities commenced around 3100-3000 cal BC (Prydnistryanske IV, Grave 4) and persisted until around 2800 cal BC (Klembivka, Grave 15; Pidlisivka, Graves 1A and 1B). It is probably during this time that distinctive chains of barrows were established, similar to those in the well-identified Pysarivka cemetery from previous research. Between 2800-2600 cal BC, YC graves were predominantly dug into pre-existing mounds, often featuring superstructures associated with early YC burials. Late YC cemeteries typically contain multiple graves, although, in some cases, like Porohy 3A, they exhibit characteristic curved zones with a higher number of graves, akin to the barrows found in the steppe zone. Singular graves confirm the continued use of the Yampil barrow cemeteries approximately between 2600-2400 cal BC. Only one grave from this period exhibits classic characteristics of the Catacomb culture (Prydnistryanske, Grave I/4). Subsequently, there was a hiatus lasting several hundred years until the early 2nd millennium BC when graves of the Babyno culture were incorporated into the mounds.

Based on typological analysis, Yampil graves featuring pottery with Central European characteristics are linked to the late YC stage (approximately 2800-2600 cal BC). These burials were interred within barrows that date back to the Eneolithic and early YC periods. The chronometric findings presented here provide a solid foundation for further research aimed at organizing barrow sequences in the Podillia zone and studying the cultural transformations between the North Pontic steppe and Central Europe.

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REDISCOVERING A MIDDLE BRONZE AGE CEMETERY – THE BARROW NECROPOLIS IN PIDHORODDYA, WESTERN UKRAINE

ABSTRACT

Romaniszyn J., Niebieszczański J., Cwaliński M., Rud V., Kochkin I. and Makarowicz P. 2023. Rediscovering a Middle Bronze Age cemetery – the barrow necropolis in Pidhoroddya, Western Ukraine. *Sprawozdania Archeologiczne* 75/1, 283-298.

The following article presents the archaeological revaluation of the Middle Bronze Age Komarów culture cemetery of Pidhoroddya in Western Ukraine in the Pre-Carpathian region. By examining scarce archival information from the pre-Second World War period, the Polish-Ukrainian research team brought to light evidence of a vast cemetery complex in Pidhoroddya, consisting of 39 barrows. The applied combination of archaeological survey, drilling, and magnetometry prospection revealed aspects of the spatial arrangement of the Komarów culture necropolis, as well as details of the funeral architecture, which allowed associating the burial mounds with the known canon of Komarów culture rites. This study presents the results of the archival research, followed by non-invasive survey, and their potential for revaluating the present state of knowledge regarding this barrow cemetery.

Keywords: Pidhoroddya Barrow Cemetery, Middle Bronze Age, Geophysical survey, Landscape archaeology, Funerary architecture, Komarów culture

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1. INTRODUCTION

In recent years, a joint Polish-Ukrainian expedition (a cooperation of Adam Mickiewicz University in Poznań, Ukrainian National Academy of Sciences in Kyiv and the Vasyl Stefanyk Precarpathian University in Ivano-Frankivs'k) has conducted archaeological research in the Upper Dniester Basin (Makarowicz 2012; 2019; Makarowicz *et al.* 2013a; 2016a; 2016b; 2016c; 2017; 2018; 2019), which lies in the Pre-Carpathian area and stretches along the Carpathian Arc. One of the main tasks of this project is to create a complex catalogue of the barrow cemeteries attributed to the Komarów culture and dated to the 2nd millennium BC. As such, this research reconsiders the archives of excavations that took place at several sites during 1920s-1930s by Polish and Ukrainian archaeologists, including Tadeusz Sulimirski and Jarosław Pasternak – scholars from the Jan Kazimierz University in Lviv. One such site was Pidhoroddya (Podgrodzie) located to the north of Rohatyn town in Ivano-Frankivs'k oblast, Ukraine (Fig. 1).

Fig. 1. The location of the Pidhoroddya cemetery (red point) in the Upper Dniester Basin, western Ukraine

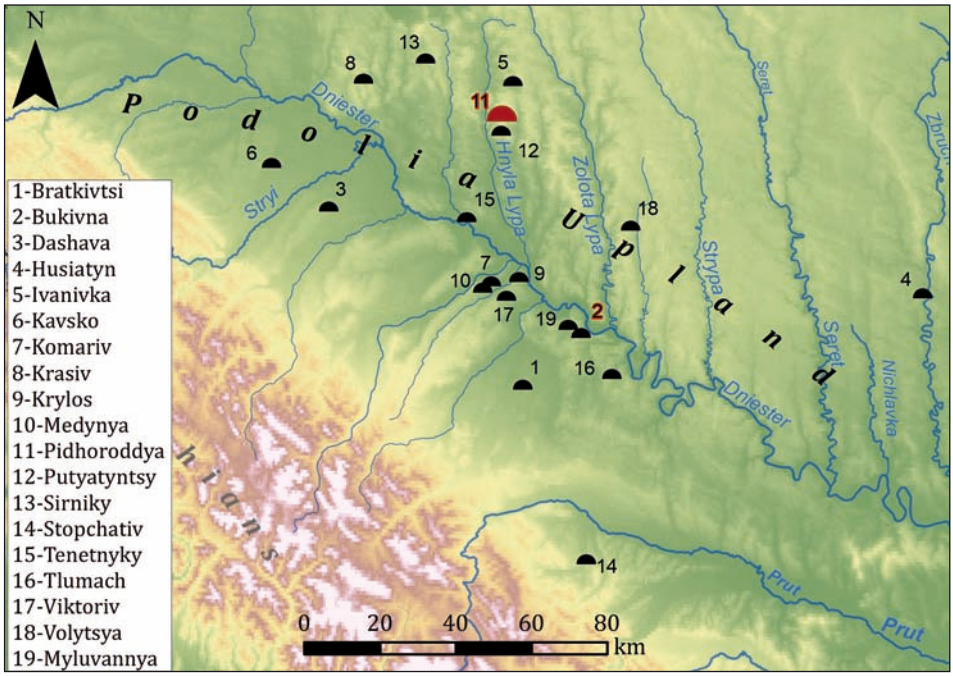

Fig. 2. Distribution of Komarów culture barrow cemeteries in the Upper Dniester Basin investigated by non-invasive methods

The aim of the following paper is to present the information collected to date regarding the Pidhoroddya barrow cemetery, and compare these data with the present state of knowledge regarding burial rites of the Komarów culture. Due to the almost perfect state of preservation, the discussed site is an excellent case study for investigations of spatial patterns in the distribution of prehistoric mounds, as well as considerations of the ritual life of past societies and archaeological landscape in general.

The barrows are situated within dense beech forest, which hinders access to the site and protects it from agriculture, industrialization, and urbanization (for a discussion of the role of forests in barrow preservation see, for example, Šmejda 2011, 123; Czebreszuk *et al*. 2013, 158). Also, the site in Pidhoroddya does not appear in the literature, and therefore is virtually unknown to illegal diggers and looters. As a result, the site lacks any traces of illicit digs, so common in other prominent Komarów culture sites in the region such as Komariv and Bukivna (Makarowicz *et al*. 2016a; 2016b, 76, 272; 2016c).

The barrow cemetery is located approximately 5 km north of the village of Pidhoroddya and 2 km east of Klischivna. When the Polish-Ukrainian team began this research, the only existing and available record of the site was that of Jarosław Pasternak, who wrote in 1930s: "Podgrodzie (Pidhoroddya), Stanisławów county: a barrow of the Komarów culture

with cremation grave" (Pasternak 1937, 109). To date, no archaeological materials from those excavations have been found; if there were any, it is likely they have been lost. The 'rediscovery' of this site was possible thanks to information from a local resident, who reported a single mound located near a forest pathway. Based on this knowledge, several surveys have been conducted since 2014, thus revealing other new barrows in the vicinity. To date, several dozen mounds have been found clustered within two major concentrations. The surveys led to creation of digital elevation models and plans followed by a geophysical prospection of the two main groups of mounds.

2. LOCATION OF THE SITE AND ITS INTERNAL ARRANGEMENT

The cemetery in Pidhoroddya is located in western Ukraine in a region of Rohatyn Oppilia, being a part of the Podillia Upland (Makarowicz *et al.* 2016a, 419-420). Just as the latter, the area of the cemetery consists of flat topped hills, cut through in numerous places by deep ravines and gullies within the loess sediments. The main hydrological artery of this area is the Hnyla Lypa River and the site lies on its western side.

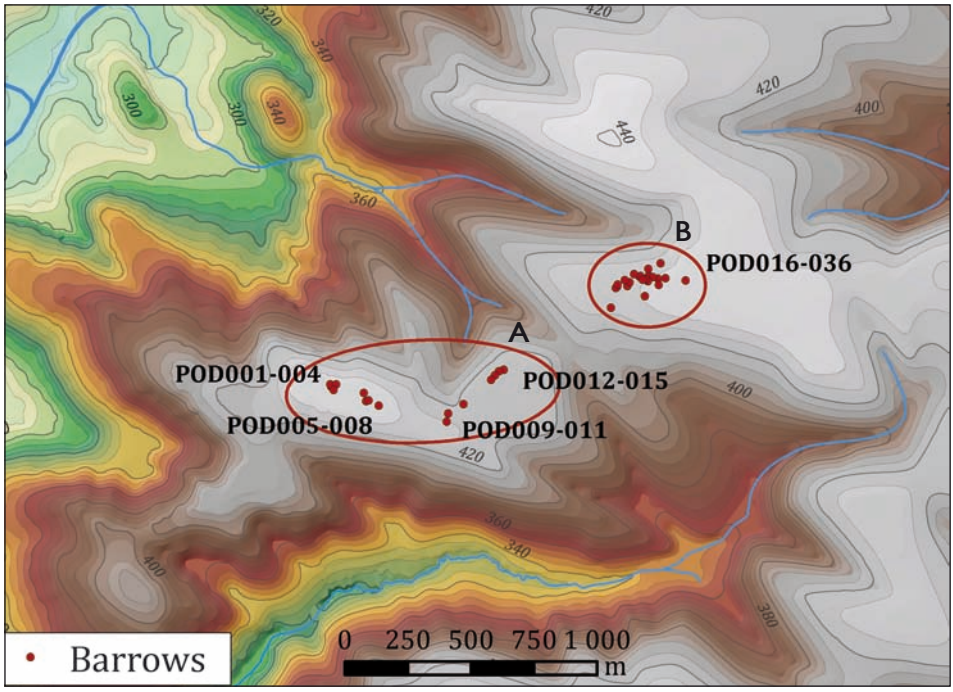

Fig. 3. Elevation map of the Pidhoroddya barrow cemetery indicating the two main barrow clusters (A and B)

As in the case of other cemeteries of the Komarów culture in western Ukraine (see Makarowicz *et al.* 2018; 2019; Romaniszyn *et al.* 2021), the barrows in Pidhoroddya are positioned on top of the flat summits. The linear and group-like arrangements follow the structural orientation of the hills. The altitudes on which the barrows are situated vary between 418 and 433 m a.s.l.

There are two concentrations of mounds: the first located on the south-western summit (cluster A) and the second on the north-eastern elevation (cluster B). The first of these comprises 15 barrows (mounds POD001 – POD015) that can be further divided into two groups – the north-eastern and the south-western ones. Within the latter a notable example of a linear alignment of mounds can be distinguished, composed of four barrows (POD012-015) oriented along SW-NE axis and stretched on a distance of approximately 80 m. With addition of barrows POD009-011 located to the south-west it can be assumed that this linear arrangement measures 800 m in total. The western part of cluster A consist of a concentration of eight mounds forming two separate groups (POD001-004 and POD005-008). The second cluster – B – contains 21 mounds in a much denser distribution than cluster A. Only scarce indications of a linear arrangement are observed in this area (*e.g.*, POD033-035) and as such this concentration has to be identified as a group-like organized funerary space. Also, the forest prospecting has revealed three other barrows on a remote summit located approximately 1 km north of Cluster B. These two clusters (A and B) are divided by a ravine/gully of steep slopes, carved by the seasonal tributary of the Hnyla Lypa River.

The monuments are differentiated in terms of diameter from 10 to even more than 20 m. One of the mounds, however, presents a peculiar type of construction – the double-mound located in cluster A (POD036). This particular barrow measures more than 24 m on the W-E axis. In terms of relative height, both clusters comprise barrows measuring between 0.3 to 1.8 m in height.

3. GEOPHYSICAL PROSPECTION AND THE FUNERARY ARCHITECTURE OF THE BARROWS

The good state of preservation of the mounds in Pidhoroddya provided an opportunity to conduct the geophysical investigations by the means of magnetometry. Despite the densely forested area within which the barrows are located it was possible to conduct the survey of 0.55 ha covering 10 mounds divided into two groupings: POD012-POD015 (Fig. 4) and POD031-POD036 (Fig. 5). In order to reveal the internal structure of the monuments as well as to search for accompanying features in the area, a Bartington® GRAD601 fluxgate magnetometer was used. The survey was held in a grid net of squares 20 × 20 m with parallel method of sampling along the traverses. In each polygon, the traverses were separated by distance of 0.05 m and the measurement along transects were taken each 0.25 m.

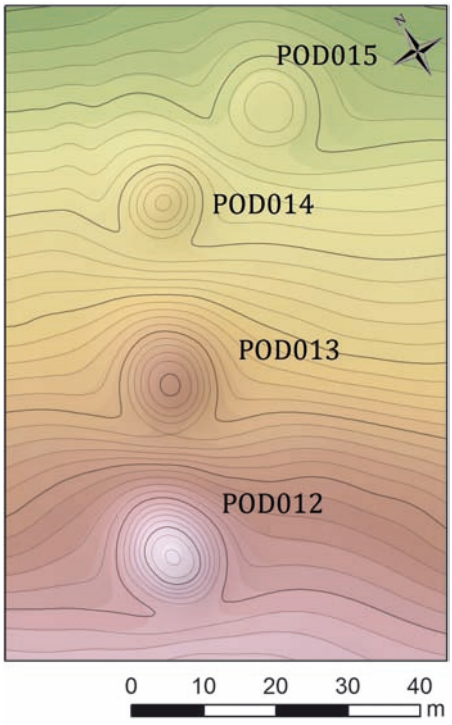

Fig. 4. The NE section of the Cluster A barrows in Pidhoroddya

The results were processed in the GeoPlot 3.0 software with application of following tools: Zero Mean Grid, Zero Mean Traverse, Despike and Interpolation. In order to compare the results of geophysical prospection with the topographical models, the magnetic maps were georeferenced in the ArcGIS software and superimposed on each other. Final magnetograms were also clipped to the range of -5/5 nT in order to detect slight differences in magnetic field of the research area.

Additionally, in order to verify interpretation of the magnetic maps, a series of geological drillings were conducted, also in order to reveal the stratigraphy of the mounds. A 10 cm-wide auger for loess sediments was used in each of the drills, while their depth varied in accordance to the level of natural soil (loess profile). The soundings evidenced the lithological structure of the mounds, which is strictly related to the geological background (Romaniszyn *et al.* 2021). The deposits building up the barrows were mainly loess (silt/clays fractions) with an addition of organic matter. This organic contamination is one of the most visible differences in terms of lithology between the anthropogenic and natural deposits in the area of the cemetery. The topmost layers of the mounds (mainly first 20-40 cm) comprised illuvially depleted horizons which are characteristic for the pedological processes ongoing in forested conditions (Hildebrandt-Radke *et al.* 2019).

The geophysical prospection in the first polygon, covering Barrows POD012 to POD015 in Cluster A, comprised five measurement grids, arranged in an L-shape (Fig. 6). As it is positioned slightly off the main alignment of mounds (NE-SW), POD015 required widening the grid to the east. In contrast to the remaining three mounds (POD012 – POD014), it is weakly discernible in the resulting image. Gradient values obtained over the mound do not differ substantially from those in its vicinity, and the picture is distorted by the presence of features yielding high-amplitude dipolar anomalies (probably modern ferrous waste). This situation might be explained by the relatively low profile of the mound, which resulted in complete illuviation and depletion of organic matter in its composition. Furthermore, the SW section of the mound (where the dipolar anomalies are located) was disturbed by a nearby path.

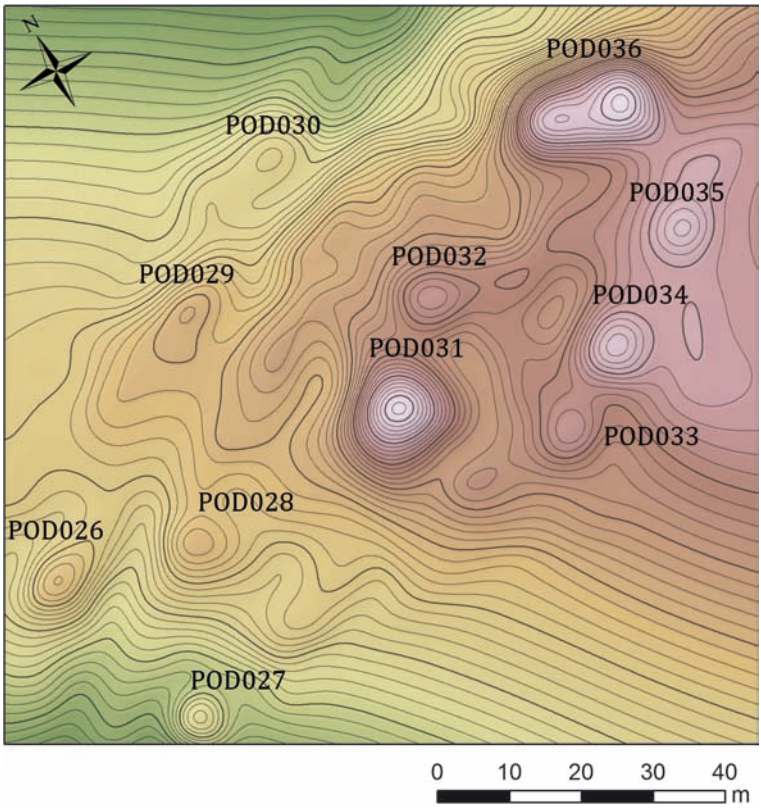

Fig. 5. The central-NE section of the Cluster B barrows in Pidhoroddya

The remaining barrows are characterized by slightly increased magnetization values (actually gradient of magnetic flux density) in comparison with the background. This most probably results from their specific lithology, consisting of rich organic material seen in the drilled profiles from the mounds. Additionally, Barrows POD012 and POD013 revealed the presence of anomalies that might reflect burial chambers. The former is characterized by the presence of a large, kidney-shaped magnetic anomaly registered on the southern side of the mound's centre with corresponding, albeit barely noticeable magnetic low to the north. A similar feature was found in POD013; however, in this case it is smaller and slightly weaker magnetically. This is indicative of considerably magnetized residues of a structure made of stone or, more likely, burnt timber. The latter seems more probable as the previous excavations of the Komarów culture burial mound in the Upper Dniester Basin have not revealed evidence of purposely built stone structures that would consist of ferromagnetic minerals, nor the availability of such lithic material has been confirmed in the region (Łanczont *et al.* 2002). On the other hand, burnt timber structures were recorded in the

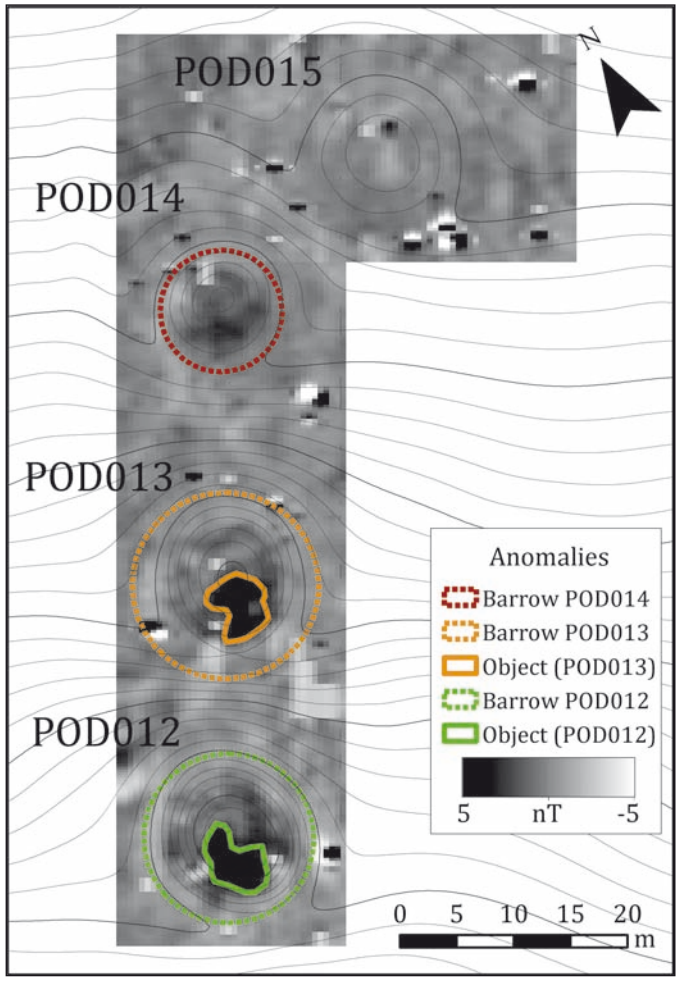

Fig. 6. Magnetic map of the NE section of Cluster A with imposed contour lines symbolizing height. Discussed features are marked with coloured lines

past both geophysically and through excavations in several Komarów culture mounds (*cf.* Romaniszyn *et al.* 2021). It is also possible that this particular anomaly was produced by a concentration of organic matter (*i.e.*, the backfill of a feature) with enhanced magnetic susceptibility. The spaces between the barrows are abundant in dipolar anomalies of high amplitudes, often non-normally polarized, thus they should be treated as modern metal waste or other objects not related to the barrows.

The second part of the survey took place within Cluster B, which consists of 21 mounds. However, due to the dense vegetation, the prospection included only six of them (POD031 – POD036), located in the N-central part of the group (Fig. 7).

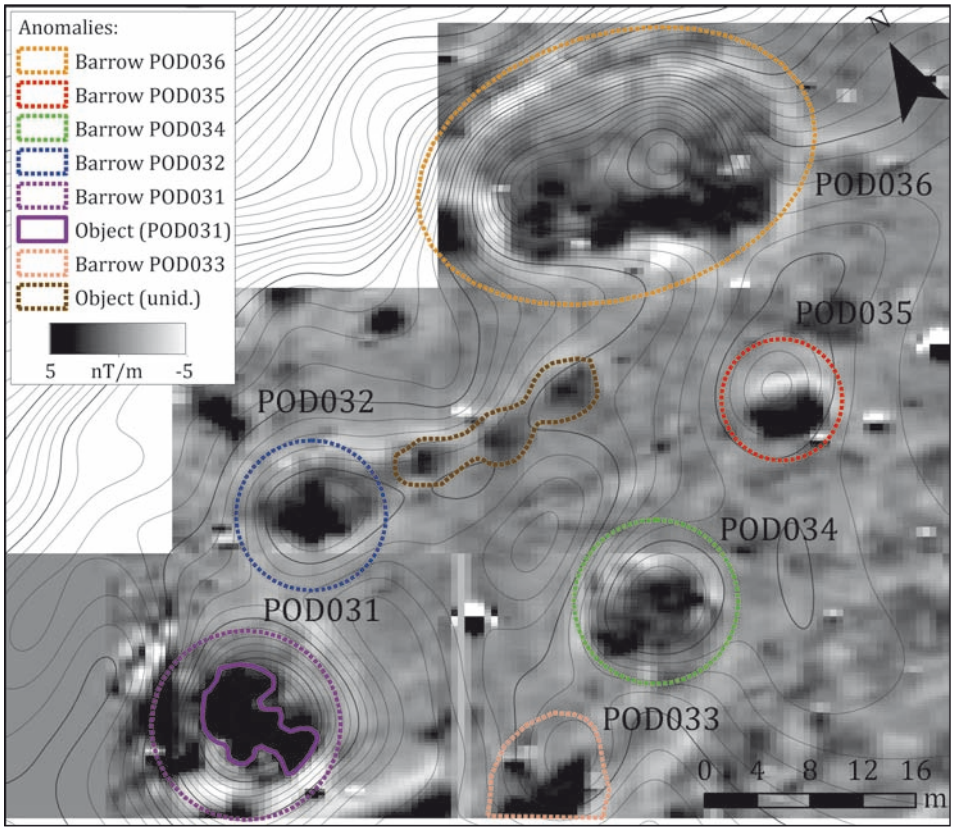

Fig. 7. Magnetic map of Cluster B with imposed contour lines symbolizing height. Discussed features are marked with coloured lines

The majority of the prospected monuments are characterized by the bands of negative values at their circumference. On one hand these signals may be regarded as magnetic lows linked to much more focused magnetic highs visible over the inner parts of the mounds which by the sheer mass of heaped up material generate considerable anomalies. On the other hand, one has to take into consideration the sudden increase of the height over the ground on which the instrument is held when approaching and then ascending the more sizable mounds with steeper slopes (*cf.* Smekalova and Bevan 2002; Makarowicz *et al.* 2017). The enhanced magnetism over the mounds, clearly indicated by strong magnetic highs, most likely originates from the mixed sediments of loess and organic matter (like turf blocks) that were additionally subjected to firing activity, thus increasing the magnetism in relation to the adjacent loess detritus (Makarowicz *et al.* 2017; Romaniszyn *et al.* 2021; see also Schmidt 2009, 10-11; Stróżyk 2019). The presence of sediments more susceptible to magnetism may also explain the sharp changes of magnetic flux gradient

over the mounds; for example, soils enriched with specific iron oxides compounds produce pronounced dipolar anomalies, like that recorded at Pidhoroddya (see Hildebrandt-Radke *et al.* 2018). On the other hand, one should consider surrounding ditches as a probable reason for the occurrence of such an anomaly (*cf.*, Mazurkevych *et al.* 2009), however there is no evidence for the presence of such features in the funerary rites of the Komarów culture (Makarowicz *et al.* 2016a).

Most of the mounds appear on the magnetic map as anomalies with positive centres and negative circumferences. However, in case of the Barrows POD031 and POD036, further features can be distinguished. In the case of an elongated anomaly within the extent of POD036, the analysis of magnetic plan revealed only slightly raised values of magnetization, that might be related to higher content of organic matter, it could equally, however, be a manifestation of the overall anomaly produced by the double mound, with the magnetic high on the southern slope of the embankment (see discussion of Romaniszyn *et al.* 2021 for the interpretation of the double mound's magnetogram). With respect to POD031, the magnetic high of the main anomaly is positioned in the very centre of the tumulus, while the magnetic low to the north is barely visible (the pronounced and extensive negative signal immediately to the south and the east most likely results from an adjacent feature, located just beyond the southern limit of the grid). This suggests induced magnetization from a quite large and deeply buried feature (*cf.*, Schmidt 2009, 10-12). Similar to the previously discussed anomalies in POD012 and POD013, it can be hypothesized that the signal stems from deposits of burnt organic material, such as a wooden construction or the remains of a hearth of some kind (*cf.*, Makarowicz *et al.* 2017; Schneiderhofer *et al.* 2017).

In addition to these anomalies, several others were recorded in the spaces between the barrows. Especially intriguing are the anomalies visible between POD032 and POD036. These are normally magnetized circular signals of approximately 7 nT each, appearing in three spots arranged along an E-W axis. These anomalies occur along a slight ridge over a dozen centimeters high. Due to the specific topography of their position, it seems unlikely that they reflect pits (*cf.*, Król and Niebieszczański 2019) containing anthropogenic backfill. Perhaps these anomalies reflect the position of minor barrows accompanying POD032, which have undergone erosion over time and thus are currently indiscernible in the relief of the land. This however needs further research, *i.e.*, drillings in order to verify the lithology of the anomalies' position.

4. THE PIDHORODDYA BARROW CEMETERY IN THE CONTEXT OF KOMARÓW CULTURE BURIAL RITES

Data acquired from the Pidhoroddya cemetery can be associated with the so-called Komarów burial rite canon (Makarowicz 2012; 2019; Romaniszyn 2015; 2018). Considering the modern literature, the Komarów culture is primarily known from its barrow-grave

cemeteries (Romaniszyn 2015, 37). This culture is treated as a part of the Trzciniec Cultural Circle (TCC – Makarowicz 2010) – a macrostructural formation that developed in the 2nd millennium BC in the borderland between Western and Eastern Europe, stretching roughly between the Oder and Dnipro River Basins. The necropolis in Pidhoroddya is set within the northern part of the Upper Dniester group of this culture (Fig. 2). This concentration embraces the Dniester springs in the west and reaches the eastern borders of Podilla to the east. Within its extent, the most prominent cemeteries are Komariv and Bukivna (Sulimirski 1936; 1939; 1964; 1968, 105-121; Siwkówna 1937; Rogozińska 1959; Makarowicz *et al.* 2013a; 2013b; 2016b, 37-97, 261-350; Lysenko *et al.* 2015; Makarowicz 2019). The site in Pidhoroddya is located approximately 60 km north/northwest from the latter. The archival sources indicate the presence of other Komarów culture cemeteries in this area. For example, similar sites are reported in the publications of J. Pasternak from the 1930s, such as the cemetery in Janczyn (present day Ivanivka), situated 7 km north of Pidhoroddya. The excavations revealed a mound with two burials accompanied by artifacts (Sulimirski 1935, 23; Rogozińska 1959, 111). Approximately 9 km south from Pidhoroddya, another barrow cemetery was discovered in Putyatyntsy during the construction of a railway. Cremated bones and two bronze pins, both characteristic of the Komarów culture, were collected during the excavations of one of the burial mounds (Sulimirski 1968, 144). It is highly probable that the cemeteries in the area of Pidhoroddya were much larger than their presently observed extent indicates. Perhaps, the barrows formed a vast necropolis complex, similar to those in Bukivna, Komariv, and Krasiv (Makarowicz *et al.* 2016b, 37-07, 261-368; 2019).

These types of Komarów culture cemeteries are located in the upper parts of the landscape – a characteristic clearly observable in every funeral site (Romaniszyn 2015, 41; Makarowicz *et al.* 2019). Therefore, it is not a coincidence that the Pidhoroddya necropolis was erected on the highest summits in the area. In some sites, mounds are scattered along the ridges for more than a dozen kilometres, thus forming unique 'barrow landscapes' (Fontijn 1996; Bourgeois 2013; Makarowicz *et al.* 2018; 2019). Similar to the well-known cemeteries in Bukivna and Komariv (Makarowicz *et al.* 2016b, 37-226, 261-350; 2019), the one in Pidhoroddya comprises linear and group-linear arrangements of mounds. Some interpretations treat such necropolis organization as a manifestation of lineage and kinship (Makarowicz *et al.* 2016d, 149; 2018). For instance, studies of the chronology of barrow alignments in Bukivna (Makarowicz *et al.* 2016b, 149; 2018) indicated their emergence over a relatively short time span (around 200 to 250 years; Makarowicz *et al.* 2016d). Each site in the Upper Dniester Basin comprises such alignments: in Bukivna (Groups I, III, IV), Dashava (Barrows 140-146 and 147-150), Komariv and Myluvannia (Barrows 280-293 and 307-311, respectively) (Makarowicz *et al.* 2016b: 37-226, 261-350; 2019). The other form of organization is a group-like agglomeration of mounds, such as those in Dashava (the remaining mounds), Vikniany (Barrows 95-101), Myluvannia (Barrows 255-271), and Tenetnyky (Makarowicz *et al.* 2016b, 419-502). This phenomenon is not

restricted only to this region, as similar patterns appear throughout the "upland" areas of the TCC (Makarowicz 2010, 207-219). Comparable organization was identified in the barrow cemetery in Netishyn in Volhynia, where the mounds formed both grouped (Group I) linear concentrations as well as clustered arrangements (Groups IV and VII) (Berezanska and Samoljuk 2004). On the other side of the Dniester – close to the Carpathian Arc in northern Romania and Moldova – we observe the same patterns in barrow distribution and clustering. Linear-group arrangements were recorded, for example, in Adâncata, Volovăţ, Horodnic de Joş, and in Medvezha (Dergachev and Sava 1984, 98-108; Ignat 2003, 159-164; Niculică 2010; 2015, 139-140, 152-173; Romaniszyn *et al.* 2017).

One of the most spectacular examples of a cemetery arrangement comes from central Ukraine and is located in Kolosivka village (Khmelnytskyi Oblast), where 22 groups of mounds were distinguished (Gamchenko 1930; Lysenko and Lysenko 2018). These clusters consist of alignments spreading over considerable distances on one hand and group-like arrangements focused within much more confined areas on the other. The clustering of barrows into groups and alignments is not restricted to the Komarów culture, as it is recorded throughout vast areas of Europe during the Middle Bronze Age (see e.*g.*, Bourgeois 2013; Krištuf and Švejcar 2015). Importantly, the form and internal structure of the barrow cemeteries should not be regarded as serving only a funeral purpose, as they most likely also constituted social and symbolic values (Górski 1996; Garwood 2007; De Reu 2012; Bourgeois 2013; Makarowicz *et al.* 2019).

An important feature is the presence of a double-barrow (POD036) in the cemetery of Pidhoroddya which was dicsussed in a separate study (Romaniszyn *et al.* 2021). Despite its morphological similarity to the mound 6/I/2014 in Bukivna, the magnetic appearance shows no connection in the possible occurrence of the complex structure under the mound. The double mound from the Bukivna cemetery comprised a mortuary house, ritually burned and manifested by the presence of strong magnetic signals that the magnetogram of barrow POD036 lacks (Romaniszyn *et al.* 2021). Therefore, it perhaps comprise another type of construction, not detectable by the means of magnetometry survey.

5. CONCLUSIONS

The 'rediscovered' cemetery consists of specific mound arrangements characteristic of the Komarów culture habitus. Based on the results of field activities and analyses, it seems that the barrows recorded there are the remnant of a vast cemetery that once spanned the summits of the hills along the Hnyla Lypa River. The observed structures are analogous in terms of sizes, arrangement, and their position in the landscape to other similar Komarów culture sites in the Upper Dniester Basin. The barrow lines or their groupings and clear preference for constructing the mounds in the higher areas of the landscape, indicate that the use of the cemetery had a function that was not only funerary, but was a part of a much wider social and symbolic act.

The geophysical prospection points to the presence of a complex sepulchral architecture in some of the mounds. The comparison between the magnetic maps of barrows POD012, POD013 and POD031 in Pidhoroddya and for example Bukivna's mound 6/I/2014 provides further evidence for the possible existence of a complex funerary objects within the former mounds (Romaniszyn *et al.* 2021). This is supported by the archival study of Pidhoroddya, which contains remarks on traces of cremation recorded on the site.

The cemetery in Pidhoroddya is a valuable source of information due to its excellent state of preservation. Despite the laconic archive data, it was possible to rediscover this site through non-invasive methods. As such, it should serve as an example to follow, even though little information was available. In the future, perspectives obtainable from excavations, for example, may provide more detailed data on the burial rites and chronology of this particular Komarów culture cemetery.

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BARROWS IN THE FOREST-STEPPE BETWEEN THE DNISTER AND SOUTHERN BUG, UKRAINE. INITIAL RESULTS OF COMPREHENSIVE RESEARCH

ABSTRACT

Szmyt M., Włodarczak P., Hildebrandt-Radke I., Potupchyk M., Przybyła M. M., Rud V., Shelekhan O., Szczepanek A., Żurkiewicz D., Ławniczak M. and Podsiadło M. 2023. Barrows in the forest-steppe between the Dnister and Southern Bug, Ukraine. Initial results of comprehensive research. *Sprawozdania Archeologiczne* 75/1, 299-333.

The article presents the preliminary results of research by a Polish-Ukrainian team who in 2018-2023 worked on the project of comprehensive exploration of barrows situated in the forest-steppe between the Southern Bug and Dnister in modern Ukraine. There, two major stages of erecting and using barrows were distinguished for the 3rd and 1st millennia BC. Two barrows discussed herein, explored as part of the project, were erected in the second stage. Barrow 3 in Ivanivtsi-Antonivka can be dated to the second half of the 10th – first half of the 8th century BC, whereas Barrow 6 in Sloboda Noskovetska to the late 8th – early 7th century BC. The older one was erected and then used by communities related to the early period of the Chornolis culture. The younger one is at present one of the main pre-Scythian complexes of eastern Podillia. The multi-component set of artefacts deposited under its mound represents a mixture of the Chornolis culture, Basarabi-Şoldăneşti influences and the impact of early steppe nomads (Kimmerians?). This well illustrates the complex cultural mosaic found in the forest-steppe between the Southern Bug and Dnister rivers.

Keywords: barrows, Eastern Podillia, 1st millennium BC, Chornolis culture, Basarabi-Şoldăneşti culture, early nomads impact

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1. INTRODUCTION

The barrows in the forest-steppe between the upper Southern Bug and Dnister were explored by a Polish-Ukrainian archaeological expedition under agreements between the Institute of Archaeology, National Academy of Sciences of Ukraine, Kyiv, and the Adam Mickiewicz University, Poznań, Poland, and the Archaeological Museum in Poznań (Rud *et al*. 2020; Przybyła *et al*. 2021). On the Ukrainian part, fieldwork was led by Vitalii Rud and scientific expertise was provided by Yurii Boltryk. On the Polish part, the project was headed by Marzena Szmyt and Piotr Włodarczak.

The purpose of the joint project was to research the form and intensity of intercultural contacts in the forest-steppe between the upper Southern Buh and middle Dni ester (Fig. 1: A).

For detailed exploration, an area on the upper reaches of the Murafa (a left tributary of the Dnister) and Riv (a right tributary of the Southern Bug) was selected in the Zhmerynka and Bar territorial communities of the Zhmerynka *raion*, Vinnytsia *oblast* (Fig. 1: B-C). The study area lies where the Dnister and Southern Bug flow close to each other and is dissected by the tributaries of the two great rivers (Fig. 2) that may have provided convenient transportation routes in prehistoric times. It is thus part of the wider issue of routes between the Baltic and the Black Sea (Kośko and Klochko eds 2009). Hence, a working hypothesis was adopted that the study area had served as a communication hub in the past, probably at least since the 3rd millennium BC. As such it must have witnessed multilateral cultural contacts and the merging of influences by various cultural units from the

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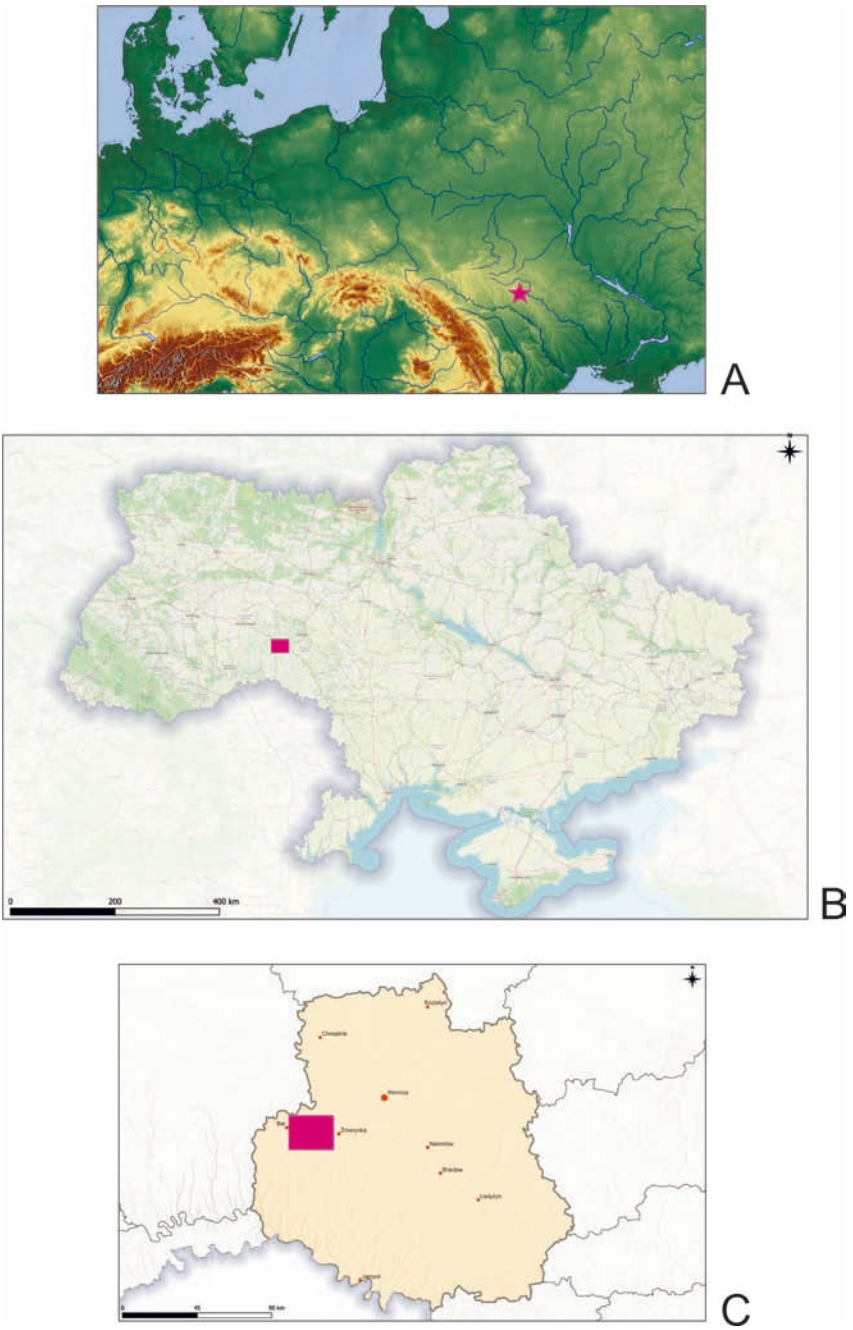

Fig. 1. Location of the study area: A – in the European context; B – in Ukraine; C – in Vinnytsia *oblast*. Prepared by M. Ławniczak and M. Szmyt

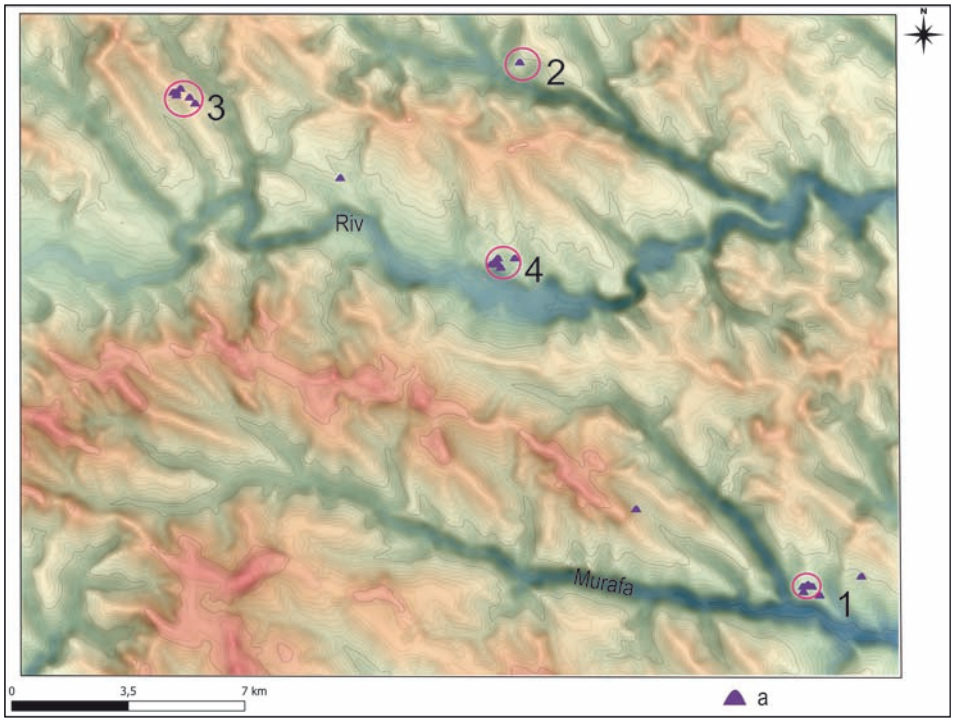

Fig. 2. Location of barrows in the study area. Prepared by M. Ławniczak
Key: a – barrow; 1 – group of barrows in Sloboda Noskovetska; 2 – barrow in Sloboda Mezhyrivska; 3 – group of barrows in Ivanivtsi-Antonivka; 4 – group of barrows in Tokarivka

East-European forest-steppe and steppe. It was further assumed that the exploration of barrows, which are the most numerous relics there of human activity from the 3rd to 1st millennium BC, would yield some material evidence of such contacts.

2. STATE OF RESEARCH

Barrows on the Murafa and Riv rivers were explored first in the late 19th century. In 1886 and 1889, two such features in the village of Tokarivka were excavated, exposing stone grave structures in them that held flint or stone axes (Sitsinskyi 1901, 27). However, the absence of any maps, plans or relics prevents the location of the two barrows and the verification of observations made by their explorer. The cited publication also mentions barrows close to other villages in the vicinity of Bar such as Ivanivtsi, Luka Barska or Mizhlissia as well as in the vicinity of Zhmerynka such as Severynivka, Somaky, Noskivtsi, Sloboda Noskovetska, Stanislavchyk (Sitsinskyi 1901).

In later archaeological literature, Yu. Sitsinskyi's work was rarely mentioned and when it was it was treated as controversial. For instance in the opinion of some authors, the presence of flint axes was argued for a connection of both graves directly to the Globular Amphora culture (Sulimirski 1968, 177; Sveshnikov 1983, 54). However, it is more likely that the barrows and the graves found in them may have been associated with communities of the Yamna culture that adapted selected elements of the Globular Amphora culture, as evidenced by a series of other sites from the Ukrainian forest-steppe (Szmyt 2013; 2021, here more references). With this interpretation, the barrows at Tokarivka may be the northernmost or northwesternmost relics of the Yamna culture in Podillia.

It is worth mentioning that in 1901 a flat stone grave was discovered by accident near the village of Tartak, close to Zhmerynka (Sitsinskyi 1927, 44, 45, fig. 28). A rectangular stone cist held two skeletons, one had its head pointing east and the other to the west. At the head of the first deceased, two ceramic vessels were placed, while at the head of the other there was one. The last-mentioned vessel, still kept in the Vinnytsia Regional Museum (Potupchyk *et al.* 2018, 143), strongly argues for attributing the grave to the Globular Amphora culture.

After Yu. Sitsinskyi's work, the barrows on the Murafa and Riv did not attract any attention from archaeologists for a long time. This happened even though barrow exploration was occasionally carried out on the eastern (left) side of the Southern Bug (*e.g.,* Lobai 1977; Zaec 1979; Salo *et al.* 2018). Only in the 21st century did Mykhailo Potupchyk from the Cultural Heritage Protection Sector, Regional State Administration, Vinnytsia, undertake the systematic recording the barrows between Zhmerynka and Bar. In the early 2010s, barrows in the vicinity of the village of Severynivka were verified with existing records in the course of exploration of the surroundings of a fortified settlement from the Scythian times. The exploration was headed by Y. Boltryk and M. Ignaczak (Boltryk and Ignaczak eds 2016). In 2011, these barrows were also identified by V. Rud and V. Kosakivskyi, while barrows from Ivanivtsi-Antonivka were explored in 2012 by a local historian V. Paziuk and V. Rud (Przybyła *et al.* 2021, 331).

Two conclusions can be drawn from the works cited. Firstly, despite its still poor archaeological exploration, at least two stages of barrow building and use can be expected in the study area. One is placed in the 3rd millennium BC, comprising features hypothetically related to the Yamna culture and another in the 1st millennium BC, grouping features hypothetically dated to the Scythian times. Secondly, it is unclear what local relations subsisted in the 3rd millennium BC between hypothetical 'barrow-building' communities on the Murafa and Riv, and Globular Amphora populations. The occurence of Globular Amphora culture communities on the upper Southern Bug, including the Riv, is evidenced by several finds (Szmyt *et al.* 2021, 283). Moreover, from elsewhere in the forest-steppe, we know of barrows testifying not only to the contemporaneity of the Globular Amphora and 'barrow' communities, but also close contacts between them (Szmyt 2013; 2021).

3. THE PROGRAMME OF BARROW EXPLORATION IN THE FOREST-STEPPE ON THE MURAFA AND RIV (2018-2023)

The state of the research described above was before the inception of a comprehensive research programme, implementing the project "Podolia as a contact area in the third millennium BC: Kurgans on the rivers Murafa and Riv", financed by the National Science Centre, Poland, under no. 2017/27/B/HS3/01444. It was developed using experience gathered while carrying out other important research programmes into 'barrow-building' societies in cooperation between Poland and Ukraine in the 21st century. Two deserve a special mention: a programme of barrow exploration in the forest-steppe and on the middle Dnister (The Yampil Project: Kośko ed. 2015; 2017) and another focused on the upper Dnister (The Bukivna and Catalogue projects: Makarowicz *et al.* 2021; see also Makarowicz *et al.* 2017).

The Murafa and Riv programme posed a number of research questions concerning:

– identification of local barrow stratigraphy,

– determination of the beginning of 'barrow architecture' in the study area,

– construction of a local sequence of graves dated to the Bronze and Iron Ages,

– procurement of chronometric data for as many graves as possible,

– determination of local peculiarities of grave forms and grave goods,

– description of the natural environment when barrows were erected and used,

– determination of the bio-archaeological and genetic characteristics of the deceased interred in graves covered by barrows or placed in their mounds.

The programme was planned in three major stages of which two consisted of fieldwork, while the third provided for indoor and laboratory studies. In the first stage, non-invasive investigations were to be performed such as surface surveys and magnetic examinations of barrows situated in the study area (Rud *et al.* 2020; Przybyła *et al.* 2021). In the second stage, four barrows were to be thoroughly explored: no. 6 in Sloboda Noskovetska (Murafa drainage basin), no. 3 in Ivanivtsi-Antonivka (Riv drainage basin) and nos 2 and 3 in Tokarivka (Riv drainage basin). The third stage, running partly in parallel to the second, focused on a multidisciplinary study of all retrieved sources: artefacts and ecofacts.

The research programme started to be implemented in 2019, but alas unforeseeable and insurmountable obstacles limited, impeded, delayed, and in part simply prevented, the full performance of tasks planned. Firstly, in 2020, measures related to the COVID-19 pandemic disrupted work. This was followed by the devastating effects of the war waged by Russia against Ukraine since 24 February 2022. Nonetheless, the results obtained so far have shed new light on the prehistory of the forest-steppe fragment under investigation.

4. NATURAL ENVIRONMENT

The study area is situated southwest of Vinnytsia and west of Zhmerynka. In terms of geology, it lies on the East-European Platform (Ukrainian Shield), while as far as the geomorphologic division is concerned, it is part of the Volyn-Podillia Plate known as the Zhmerynka-Shargorod Plain. This is an erosion-accumulation plain covered by loess and dissected by river valleys. In terms of geobotanical classification, the study area is included in the forest-steppe zone (Struk 1993), although it straddles the boundary between deciduous forests – of the Podillia-Besarabia Subprovince – and the forest-steppe of the Podillia-Dnister Subprovince (Fig. 3: A). Its soil cover (Fig. 3: B) is composed mostly of grey and light-grey podzolized chernozem developed on clay and loess, designated as gley soils (Jones *et al.* 2005).

5. NON-INVASIVE INVESTIGATIONS

Two non-invasive investigation methods were used: field survey and geophysical prospection.

5.1. Field survey

In 2019, verification field surveys covered the entire study area, focusing on the state of preservation of the barrows on record kept by M. Potupchyk of Vinnytsia. Only in the vicinity of Ivanivtsi-Antonivka were they supplemented with information collected by the local historian V. Paziuk.

As a result of the survey, four sites were selected for geophysical investigation in which single barrows or barrow groups were located in the fields of the following villages (Fig. 2): Sloboda Noskovetska (four barrows), Sloboda Mezhyrivska (one barrow), Ivanivtsi-Antonivka (six barrows), Tokarivka (four barrows).

5.2. Geophysical prospection

For geophysical prospection, the magnetic method was chosen, which allows for surveying large areas in a reasonably short time. It allows for relatively complete and quick exploration of archaeological sites (*cf.* Misiewicz 2006; Smekalova *et al.* 2008; Fassbinder 2015). Its shortcoming, though, is a rather small penetration depth only slightly exceeding 1.0 m (David *et al.* 2008, 16).

On the selected sites, magnetic measurements were made with a transductor (fluxgate) magnetometer, 4.032 DLG Foerster Ferrex, with two sensors placed 0.5 m apart (only in Tokarivka, Barrows 1, 2 and 4) or 1.0 m apart (in all the other cases) of a resolution of 0.2 nT.

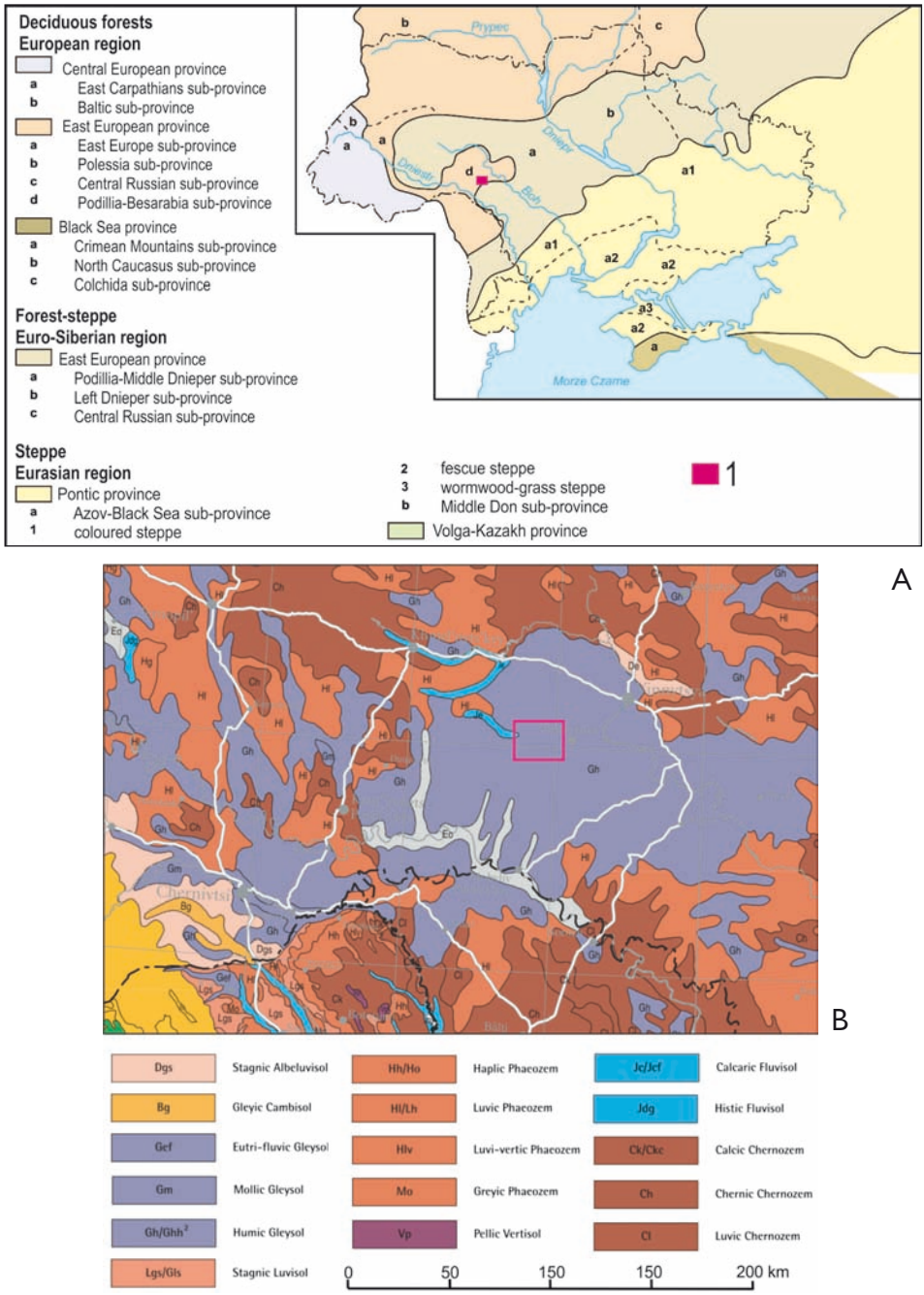

Fig. 3. A. Study area against the background of: A – geobotanical division of Ukraine (after Struk 1993); B – soil cover of Ukraine (Jones *et al.* 2005)

Measurements were made along lines every 10 cm in a two-way fashion. The results are presented on magnetic maps developed under Terra Surveyor 3.0.29.3.

The surveys, conducted in 2019 and 2021, covered the barrows and their immediate surroundings within a radius of 5-10 m from a mound edge. On all the sites, bedrock consisted of loess on which chernozem had developed. Overall, in Sloboda Noskovetska, 1.86 ha with four barrows were investigated (Fig. 4: A), in Ivanivtsi-Antonivka – 3.19 ha with six barrows (Fig. 4: B), in Sloboda Mezhyrivska – 1.0 ha with one barrow (Fig. 5: A) and in Tokarivka – 3.6 ha with seven barrows (Fig. 5: B). It should be noted that Barrow 4 in Tokarivka was surveyed twice (in 2019 and 2021) because in the first season prospection was hampered by a standing crop (sunflowers).

In most cases, anomalies were registered that could be interpreted as consequences of various activities connected to the erection and use of the barrows. The anomalies were of the following types: (a) positive linear circle-shaped; (b) positive spot; (c) positive longitudinal; (d) dipolar; (e) zones of raised magnetic susceptibility. In addition, anomalies located outside barrows (f) were captured as well.

a. Positive linear circle-shaped anomalies, sometimes irregular, were distinctly recorded in Sloboda Noskovetska, Barrows 6 and Barrow S, Ivanivtsi-Antonivka, Barrows 1, 2 and 3, Sloboda Mezhirivska, Barrow 1, and Tokarivka, Barrows 1 and 4.They encircled the mound, testifying most likely to an annular ditch. Their diameters varied from 20 to 30 m.

A few weaker positive linear circle-shaped anomalies were also recorded, with some being discontinuous. They were registered in Ivanivtsi-Antonivka, Barrows 5 and 6, and Tokarivka, Barrow 3. In the latter case, a weak positive linear anomaly could be seen around the mound, having a diameter of about 30 m. By reason of its low value and boundary indistinctiveness, it is likely that it was caused by the erosive accumulation of humus, a more strongly magnetic material, at the base of the barrow mound (Makarowicz *et al.* 2017, 67-69).

b. Positive spot anomalies, potentially related to archaeological features, were many and variously placed within mounds.

Special attention is due to positive anomalies in mound centres, potentially indicating main grave chambers. They were registered in Ivanivtsi-Antonivka, Barrows 1, 2 and 3, Sloboda Mezhyrivska, Barrow 1 and Tokarivka, Barrows 2, 3 and 4. In Ivanivtsi-Antonivka, Barrow 1, in the mound centre, a group of positive anomalies could be seen, arranged in a regular rectangle, oriented W-E. In Tokarivka, Barrows 3 and 4, and Sloboda Mezhyrivska, Barrow 1, in mound centres, positive spot anomalies were registered whose high value indicated some baked material in a feature (or features). A hypothesis about accumulated intensively baked material can also be advanced with respect to Tokarivka, Barrow 2. However, this is a somewhat different case: the anomaly is of a relatively low value, but of a large size. Moreover, in the centre of the same mound, there are three more positive spot anomalies, indicating such features as pits or intrusive digging.

Fig. 4. Results of magnetic surveys:
A – Sloboda Noskovetska, Barrow 6, N, E, and S; B – Ivanivtsi-Antonivka, Barrows 1-6.
Prepared by M. M. Przybyła

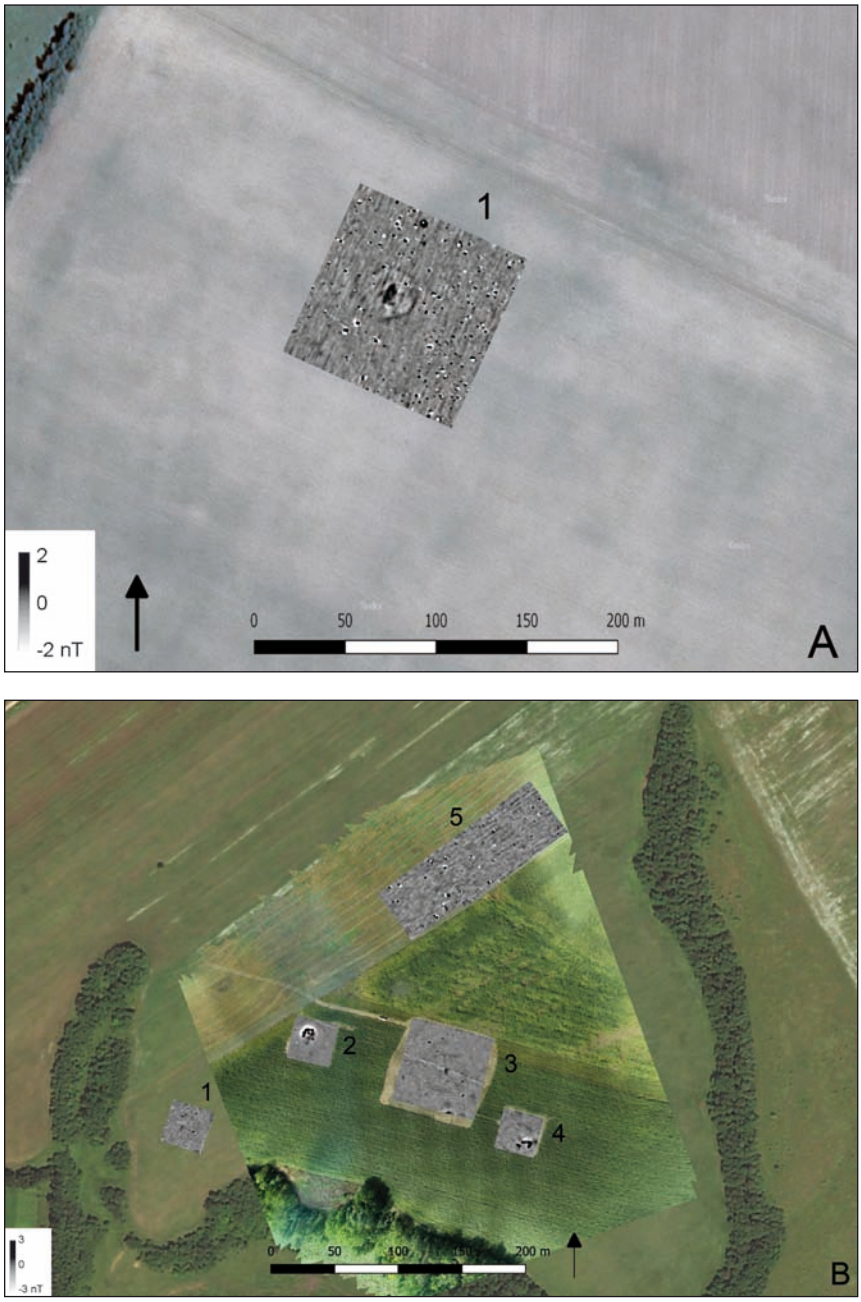

Fig. 5. Results of magnetic surveys:
A – Sloboda Mezhyrivska, Barrow 1; B – Tokarivka, Barrows 1-5 (Barrows 6 and 7 are located outside the photo). Prepared by M. M. Przybyła

Positive spot anomalies were also registered beyond mound centres, for instance in Sloboda Noskovetska, Barrow 6, where their high values may indicate burnt or overheated objects. A group of positive spot anomalies was also found in the eastern portion of Barrow 1 in Ivanivtsi-Antonivka. Most collided with a linear anomaly (annular, possibly related to a ditch surrounding the mound). These anomalies were caused by such features as pits or hearths; they may also be a sign of burials dug into the mound.

c. Two positive longitudinal anomalies were observed in the southwestern portion of Barrow 3 in Ivanivtsi-Antonivka. It cannot be ruled out that they may be related to graves dug into the mound. In Sloboda Noskovetska, Barrow E, two positive linear anomalies appeared on a magnetogram, of which one co-occurred with a linear arrangement of positive spot anomalies. It is hard to tell if they have any connection with the barrow.

d. Many dipolar anomalies connected with modern-day iron objects were registered in Sloboda Noskovetska, Barrow 6. A rather large dipolar anomaly of a relatively low value was revealed in the mound centre, Sloboda Noskovetska, Barrow S. It may have been caused by an iron object, but its position in the mound centre suggested a connection to the central burial, containing a relatively strongly overheated object. In turn, in Tokarivka, Barrow 4, a cluster of such anomalies was found in the southern portion of the mound. They may have been related to the accumulation of overheated material, as was also the case in Tokarivka, Barrow 2. In the latter case, in the centre of the mound, a strong dipolar anomaly could be seen, measuring about 15 cm in diameter. When viewed from the north, it was regularly semicircular, while from the south it appeared irregular. With its rather low values and a considerable size, it appeared to be thermoremanent, *i.e.* it was caused by the presence of accumulated strongly overheated material. Most likely, it was a structure of which overheated daub was left. Similar anomalies, albeit of a different shape, are caused by the remains of Trypillia culture buildings (Pickartz *et al.* 2019).

e. In two barrows (Sloboda Noskovetska, Barrow N, Tokarivka, Barrow 6), there were distinct circular zones of slightly raised magnetic susceptibility, about 35 m and 12 m in diameter, respectively. It is likely that this is how mounds appear in magnetograms if their main component is humus. Such a zone but crescent-shaped, was also registered on the west side of Barrow 3, Tokarivka, where it could represent a borrow pit of earth used to build the mound.

f. In four cases, in the immediate surroundings of a barrow, positive spot anomalies were registered that could be caused by such features as pits or small hearths. In Sloboda Noskovetska, Barrow S, such anomalies were found especially on the north side of the mound, in Ivanivtsi-Antonivka, Barrow 6, – on the southeastern side, and in Ivanivtsi-Antonivka, Barrow 1 – on the southern side. They were also noticed in the surroundings of Barrow 1, Tokarivka, while in the western portion of the area where Barrow 5 once supposedly stood, a very weak positive linear crescentic anomaly was registered whose connection to the mound, however, was not certain.

6. EXCAVATIONS

Four structures were chosen for excavation. In 2019, Sloboda Noskovetska, Barrow 6, and Ivanivtsi-Antonivka Barrow 3 were examined, while in 2021 Tokarivka, Barrows 2 and 3 were excavated.

The processing of excavation results was considerably prolonged by the COVID-19 pandemic and above all by Russia's subsequent aggression against Ukraine. The circumstances that greatly impeded the research team's efforts included communication problems between Ukrainian and Polish project participants and the temporary unavailability of collections and laboratories, resulting in delays in sending materials for specialist analyses. Moreover, since the beginning of the hostilities, some specialists working on the material from barrows have been drafted into the army, while others have been available only part-time. However, against all these odds, the research team has been carrying out the tasks assigned to them, making it possible to present now the selected results of excavations of two of these barrows, those at Ivanivtsi-Antonivka and Sloboda Noskovetska. Both date to the second stage distinguished above of the erection and use of barrows in the forest-steppe between the Southern Bug and Dnister.

6.1. Ivanivtsi-Antonivka, Barrow 3

The explored barrow was in close proximity to three other, less visible barrows and at a greater distance (over 500 m) from two further mounds, much more distinctly marked in the landscape (Fig. 4: B).

The mound was only 40 cm high and 21 m in diameter. After analysing soil samples from its central part, it was found that the original ground level was at a depth of 30 cm, with loess subsoil below. While the lithology of the mound was dominated by the sandy fraction, samples from features had a higher content of finer fractions. The reason for the over-representation of the silty mineral fractions may have been the mineralisation processes of the organic matter that was originally present in the features. The intense mineralisation processes may also be evidenced by the light brown colour of the humus horizon of the original soil.

Several features were found (Fig. 6), though only one erecting horizon was traced in the mound: a ditch (Feature 7), the main grave (Feature 1), a side grave (Feature 4), relics of a funeral feast (Feature 6), and three irregular pits (Features 2, 3 and 5). A comparison of the features with the results of the magnetic survey confirmed that the geophysical work had predicted the presence of the ditch but not its form. In addition, the two longitudinal geophysical anomalies that collided with the ditch could be identified with Features 4 and 6. The cluster of structures in the barrow centre had not, however, produced a distinct magnetic signal.

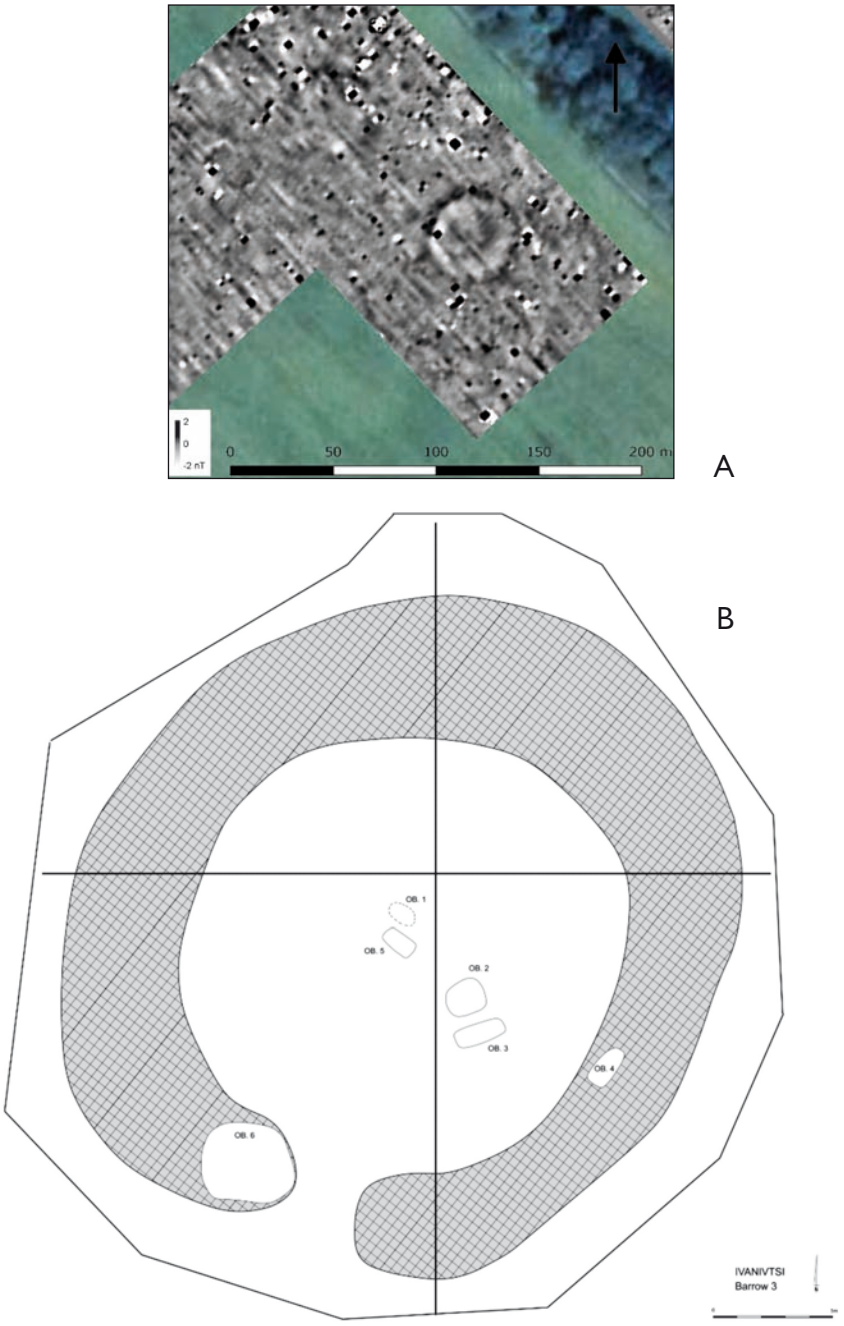

Fig. 6. Ivanivtsi-Antonivka, Barrow 3: A – results of magnetic survey; B – plan of features. Prepared by M. M. Przybyła, M. Podsiadło

In the main grave (Feature 1), that was located directly in the mound under the primary surface, the body of an individual, probably female, over 25 years old, was deposited. Only one vessel was found: a cup with an S-shaped body and high handle (Fig. 7: 2). It had a grey slightly polished surface without additional ornamentation. Similar cups were in use for quite a long period, as is shown by such Final Bronze – Early Iron Age sites as Sobkivka, Grygorivka and Severynivka (Berezanska 1964; Smirnova 1984) and Mervyntsy, Kurgan 1 (Smirnova 1977).

The ditch (Feature 7) was 25 cm deep and from 4 to 6 m wide. It had a passage in the southwestern sector and was dug out simultaneously with the main grave because in its fill scattered sherds of pottery of the same type were found as in the grave. They had a lot of crushed rock in the ceramic body.

The remnants of a funeral feast (Feature 6), including fragments of ceramic vessels and animal bones (of sheep/goats, pigs and unidentified fragments), were traced mostly to the west of the passage, however, a part of them was also found in various parts of the mound. The fragmentation of the pottery prevented any vessel reconstruction. It was only found that, as a rule, pot rims were plain or ornamented only with punctures. By contrast, many of the wall fragments were ornamented with raised bands on the body or necks (Fig. 7: 5). In some cases, the bands were additionally adorned with deep finger impressions. This assemblage of pottery fragments is similar to the finds from the Chornolis culture hillforts at Grygorivka and Subotiv (Smirnova 1983; 1984; Gershkovich 2016). Analogous pottery comes from the necropolis in Mervyntsy (Smirnova 1977).

One of the very few reconstructed vessels is an undecorated deep bowl (Fig. 7: 3). It is similar to the type of semi-globular bowls from the Sobkivka settlement of the Bilogrudivka culture (Berezanska 1964). Also, the very wide bowls of the Subotiv hillfort have the same shape. They were considered typical wares of the third horizon of this site (Gershkovich 2016).

A peripheral grave (Feature 4), detected in the south-western part of the ditch, contained the burial of an individual (possibly a female) about 50 years old. Next to the body, a cup was deposited (Fig. 7: 1). This is a poorly fired vessel with a smooth non-polished surface of various shades of grey and brown. It has an everted rim that is wider than its body, a high handle and a flat base. Its ornament is a range of stamped dots and three smooth knobs on the shoulder. The shape of this specimen resembles the Type 1 cups of the Saharna culture, e.g., in Kurgan V at Saharna I (Ţiglău) necropolis (Kashuba 2000). However, its simplified decoration and poor quality indicate the local production of this vessel.

Of the three irregular pits (Features 2, 3 and 5) that were explored under the central part of the mound, only one (Feature 2) contained artefacts – single fragments of pottery. Only a clay 'loaf' was notable. It is a poorly-fired light-orange figurine (Fig. 7: 4). Such brightly-coloured votive objects were typical of the sites of the Bilogrudivka and Chornolis cultures (Terenozhkin 1961; Berezanska 1964).

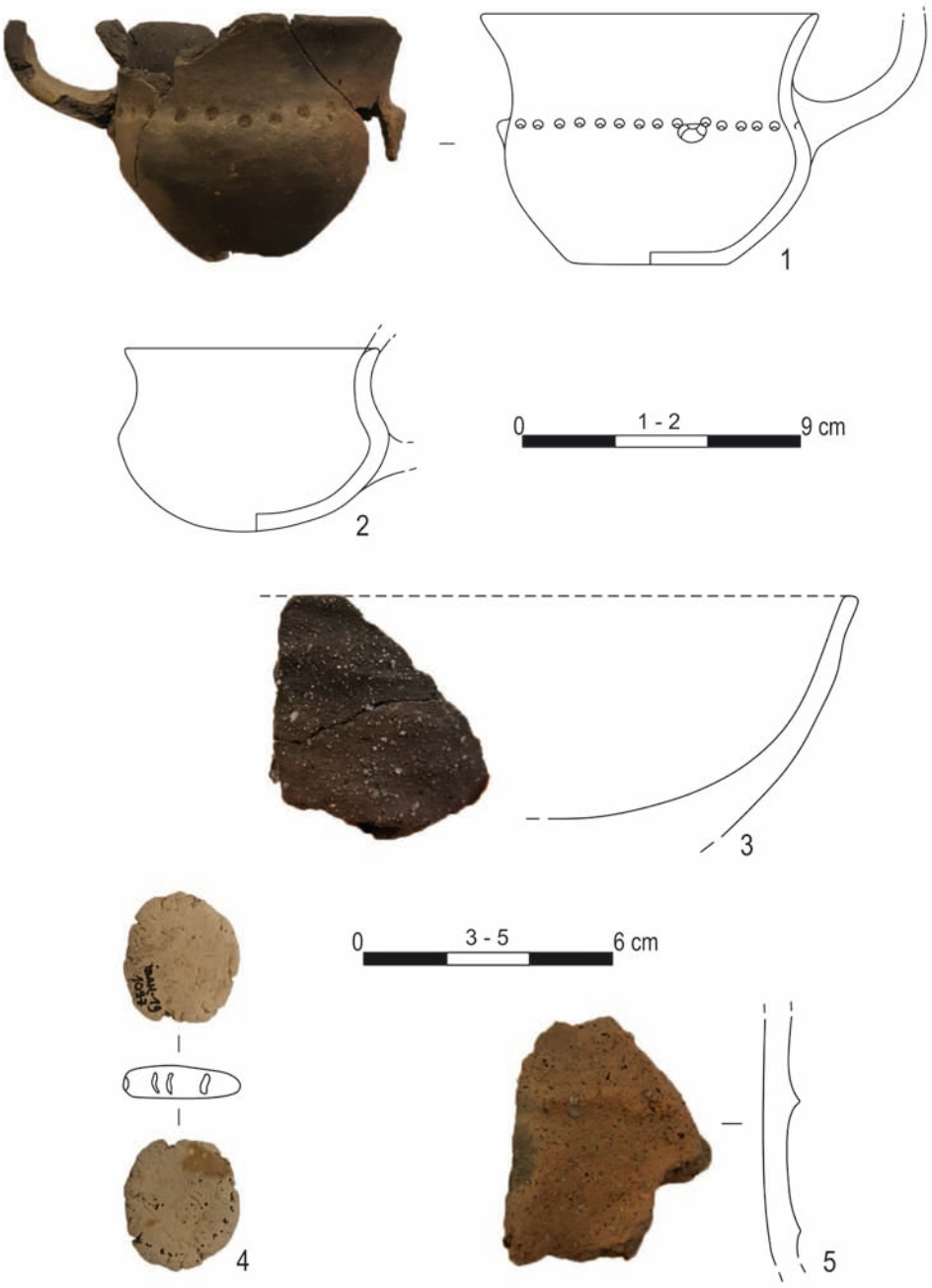

Fig. 7. Ivanivtsi-Antonivka, Barrow 3. Selected finds: 1 – from Feature 4; 2 – from Feature 1; 3, 5 – from Feature 6; 4 – from Feature 2. Prepared by V. Rud and V. Kosakivskyi

The chronological position of Barrow 3 in Ivanivtsi-Antonivka can be determined only with a certain level of probability as metal objects are absent from it. The assemblage of pottery, in turn, is quite monotonous. In it, the sherds of poorly fired kitchenware dominate. Most contain a lot of sand and large pieces of crushed rock in the ceramic body, making their surface rough and ragged. This kind of pottery is typical of the Bilogrudivka and early Chornolis cultures (Terenozhkin 1961; Berezanska 1964; Gershkovich 2016). In eastern Podillia, similar materials were found at the Sandraky settlement (Lagodovska 1954). Among burial sites, one can mention the Pechery necropolis, where a relatively numerous set of early Hallstatt adornments was retrieved together with similar vessels (Rybalova 1961).

The most notable find is a cup from the peripheral grave (Feature 4), for which an analogy has been found in the Saharna I (Ţiglău) necropolis. Since it existed from the second half of the 10th to the early 8th century BC (Kashuba 2000) and taking into account analogies for the rest of the material, it may be assumed that the barrow in question belongs to the early period of the Chornolis culture. Parallels with Bilogrudivka materials do not contradict this supposition, as their traditions continued for a long time. Based on this observation, Barrow 3 in Ivanivtsi-Antonivka can be dated to the second half of the 10th – first half of the 8th century BC.

So far, one ^{14}C AMS measurement has been obtained for the main grave (Feature 1): Poz-120856, 2395±30 BP, 729-398 BC. Unfortunately, it does not fully agree with the relative chronology suggested by the artefacts. Since no reservoir effect has been found, it is difficult to explain this inconsistency at present. It is likely that further chronometric analyses, which are in progress, will help to unravel this issue.

6.2. Sloboda Noskovetska, Barrow 6

The explored barrow was one of six scattered on the slope of the Murafa river valley. It was clearly visible in the landscape and marked with an information board by the Vinnytsia Cultural Heritage Service. Prior to the excavation, its diameter was about 35 metres and its height 1.8-2.2 metres (Fig. 8: A; 9: A).

The lithology of the barrow was established on the basis of a soil profile from its central part. This was 250 cm deep and contained 31 samples, which were analysed for sediment grain size, organic matter and calcium carbonate content. For comparison purposes, a reference profile was obtained outside the mound. Fourteen sediment samples were taken from it, reaching a depth of 70 cm. Finally, six lithofacies were identified in the barrow, originating with the building of the barrow (from a depth of 250 to 190 cm) and subsequent post-depositional processes (from a depth of 190 cm to the barrow surface). The lithological variability of the sediments may indicate either a slightly different source of soil for the construction of the barrow (from a greater distance?) or stages of raising it with soil from the surrounding ditch after it had been periodically filled with colluvial deposits.

Fig. 8. Sloboda Noskovetska, Barrow 6: A – view from the south; B – view from the drone. Photo by P. Włodarczak and M. Ławniczak

Fig. 9. Sloboda Noskovetska, Barrow 6: A – results of magnetic survey; B – plan of features. Prepared by M. M. Przybyła, M. Podsiadło

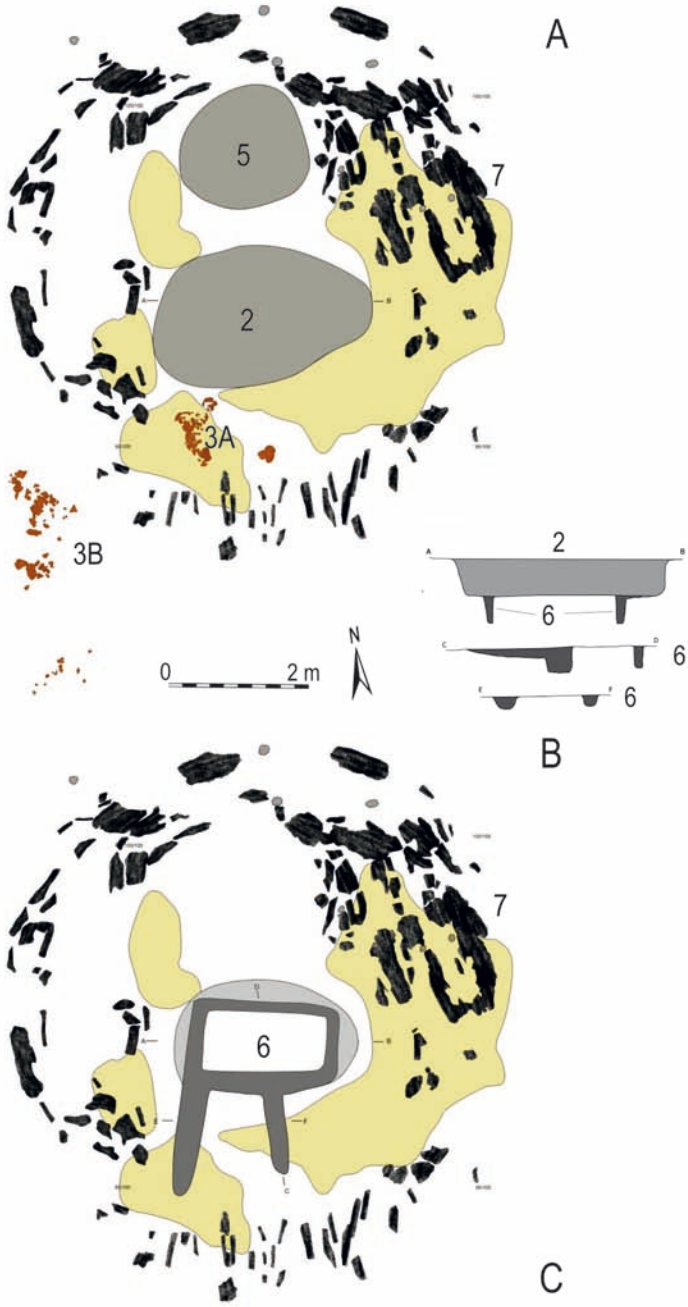

Fig. 10. Sloboda Noskovetska, Barrow 6. Plan of features in the central part of the barrow:
A – level 220 cm; B – cross-sections of features; C – level 260 cm. 2, 3A, 3B, 5, 6, 7 – numbers of features.
Prepared by M. Podsiadło

The barrow was surrounded by a shallow ditch (Feature 10) 3-5 m wide and 20-40 cm deep, filled by homogeneous grey-brown soil (Fig. 8: B; 9). This was sediment derived from the topsoil of the barrow, which had filled the ditch by natural processes.

Eight features were identified under the mound or in the mound (Fig. 9: B; 10; 11): the main grave (Feature 6) with a wooden structure (Feature 7), a peripheral grave (Feature 4), remains of a funeral feast (Features 3A and 3B), two robber pits (Features 2 and 5) and two other intrusions that seem to be datable to the modern age (Features 1 and 8). It is worth mentioning that the excavation confirmed the presence of the ditch and main grave (together with robber trenches) as well as modern intrusions that had been registered as anomalies in the magnetic survey (Fig. 9: A). It also appeared that the peripheral grave (Feature 4) was actually visible in the magnetic image, but its visibility was hampered by numerous dipolar anomalies.

The main grave (Feature 6) was almost destroyed by two robber pits (Features 2 and 5; Fig. 10: A). The original grave probably had the form of a square and two additional ditches sloping from its south side (Fig. 10: B). Possibly, the base of a wooden structure was placed in them. Only the two ditches, up to 50 cm deep, remained untouched. Single fragments of pottery (Fig. 12: 1-3) as well as a large amount of cremated bones of a human individual (male, aged 30-40 years) were found in their fills.

A thin layer of clayey dumped soil lay to the west, east and south of the main grave. The remains of a burnt oak wood structure (Feature 7) were found on this clay layer and the buried surface under the mound (Fig. 10; 11: A). Most of the burnt logs were placed in a semicircle, surrounding the grave on the east, west and north sides. Charred wooden boards formed a radial pattern in the southern sector of the mound. Additionally, seven postholes with pieces of wood inside were discovered in the northern part of the mound. All these remains show that a wooden structure made of large oak logs up to 2.5 m long was erected above the grave, which had a circular plan, and the whole structure could have taken the form of a hut or yurt.

Inside Feature 7, some artefacts were found: parts of at least nine ceramic vessels, fragments of two iron knives and a globular openwork bronze pendant that could be considered a rattle (Fig. 13: 1-3). It is highly probable that the metal and clay artefacts belonged to the furnishings of the deceased from the main grave and were relocated during the robbery.

Two clusters of fragmented pottery were found under the burned-wood layer on the dumped soil (Fig. 10: A): Feature 3A was located in the south-western part of the wooden structure, while Feature 3B lay outside the structure, in front of its south-western wall, about 2 m from the previous one. Feature 3A consisted of eight fragmented vessels (Fig. 14) and Feature 3B contained another three vessels (Fig. 13: 4-5).

Numerous artefacts, mostly pottery sherds, were found under and in the same layer with the wooden logs. Several sherds appeared to come from the same broken vessels found in the main grave and robber pits. However, many others could not be connected

Fig. 11. Sloboda Noskovetska, Barrow 6: A – wood construction (Feature 7) during exploration; B – peripheral grave (Feature 4) during exploration. Prepared by M. Podsiadło, P. Włodarczak

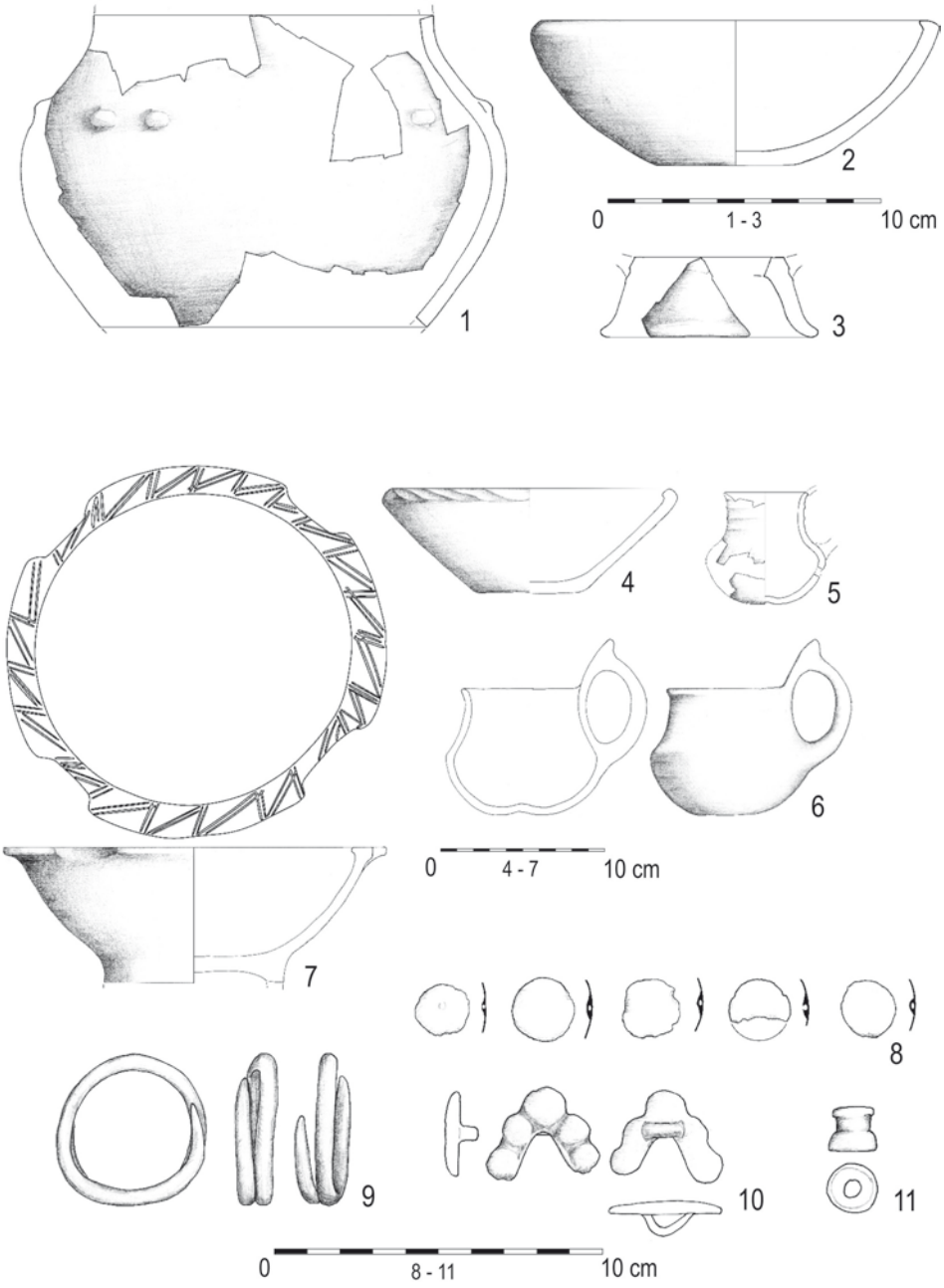

Fig. 12. Sloboda Noskovetska, Barrow 6. Selected finds:
1-3 – from the central grave (Feature 6); 4-11 – from the peripheral grave (Feature 4).
Prepared by O. Shelekhan and V. Rud

Fig. 13. Sloboda Noskovetska, Barrow 6.
Selected finds: 1-3 – from Feature 7; 4-5 – from Feature 3B.
Prepared by V. Rud and O. Pashkovskyi

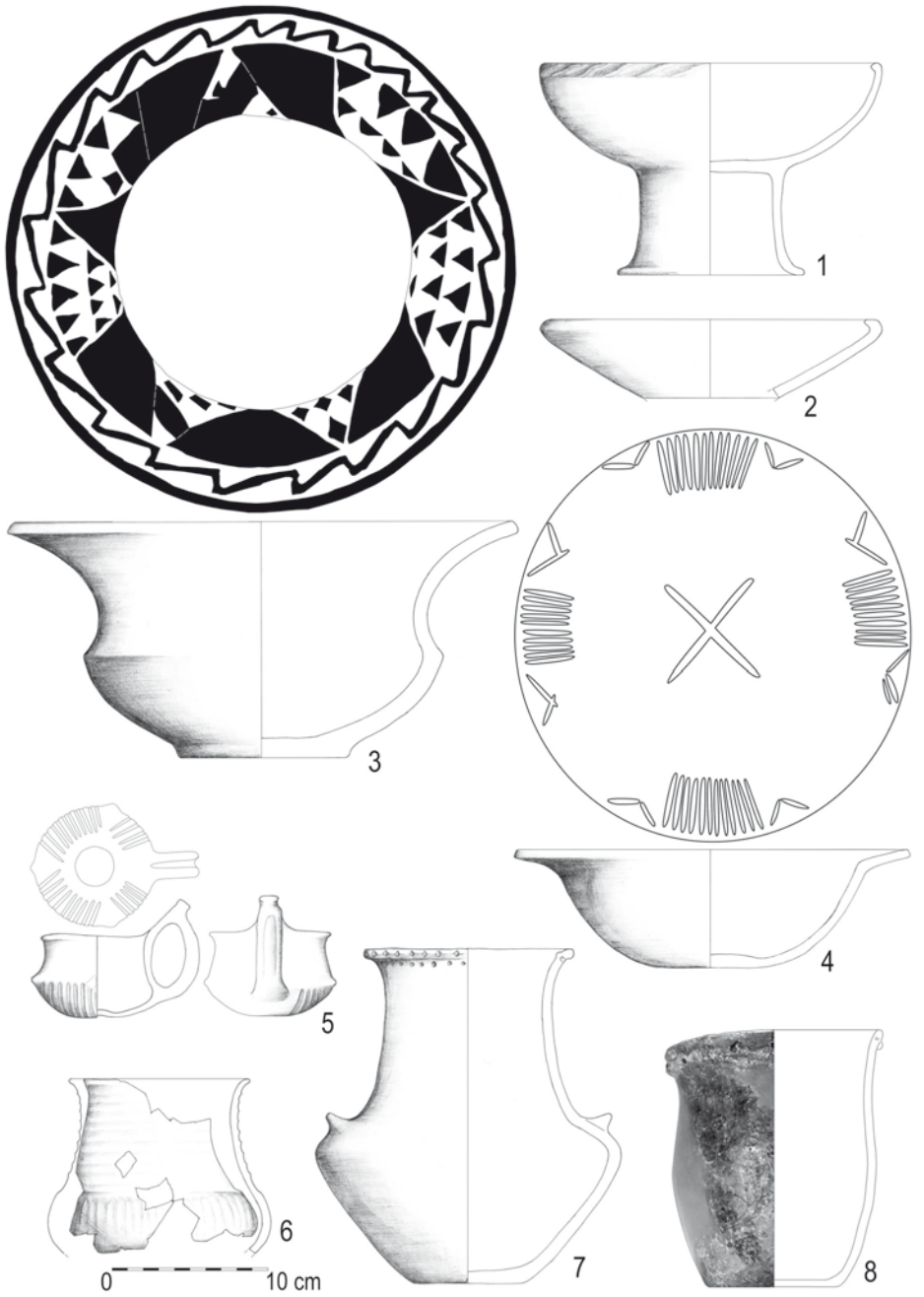

Fig. 14. Sloboda Noskovetska, Barrow 6. Selected finds from Feature 3A.
Prepared by O. Shelekhan and V. Rud

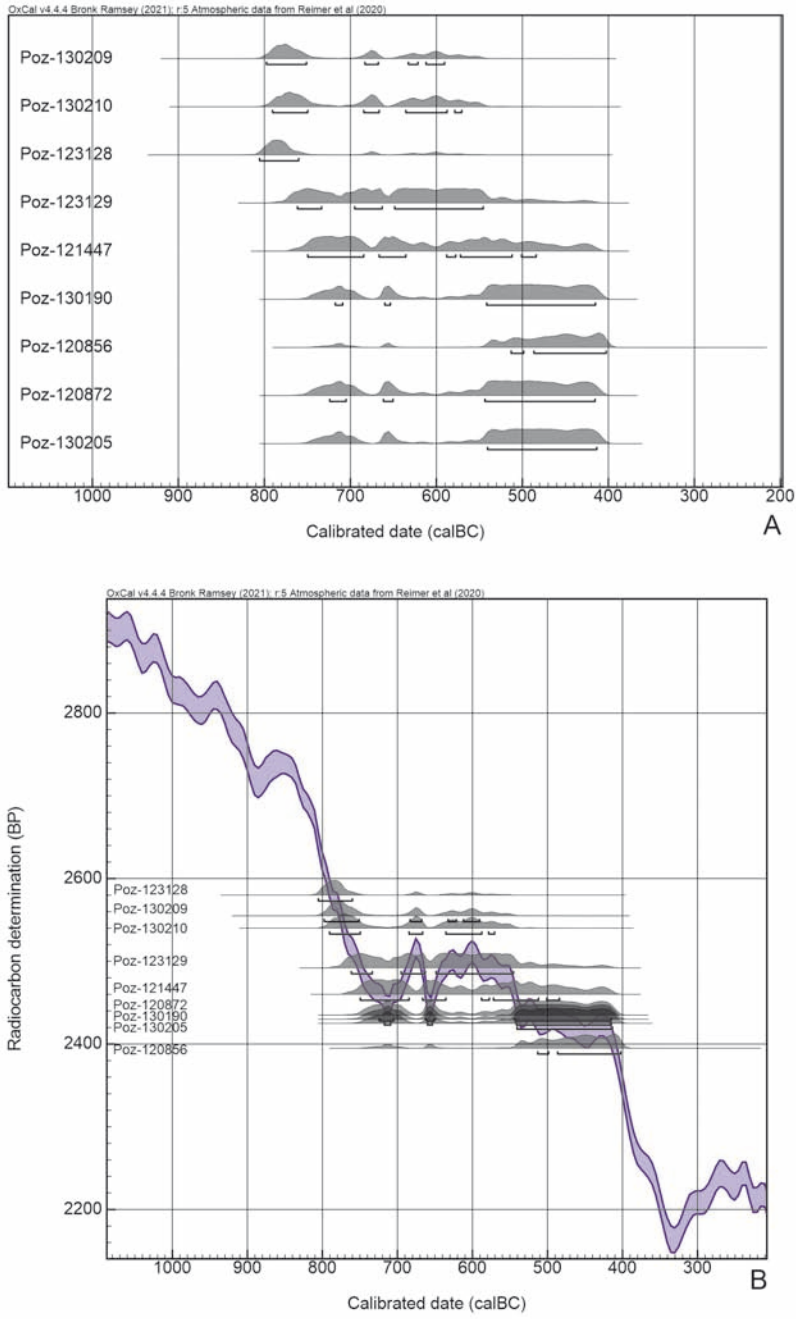

Fig. 15. Sloboda Noskovetska, Barrow 6. Radiocarbon datings for Features 4, 6 and 7. Calibration in OxCal v4.4.2 (Bronk Ramsey 2020), atmospheric data from Reimer *et al*. 2020. Prepared by M. Szmyt

with any features. Instead, the pottery from a funeral feast was probably directly covered by a layer of burnt wood. Therefore, the logs could be interpreted not as a platform, but as some standing structure that fell on the grave and relics of a funeral feast after being burnt. It is highly probable that the building of the grave, together with the wooden structure erected over it, depositing of the vessels, burning of the whole complex and erecting of the mound were all carried out within a short space of time.

Analogies in the form of similar structures can be found on the middle Dnieper in the pre-Scythian and early Scythian barrows, *e.g.,* Kvitky (Kovpanenko and Gupalo 1984), Kostantynivka (Bobrinskiy 1887, 35; Ilinskaya 1975, 30), Chervona Mohyla and Ivankovychi (Kovpanenko 1984; Bilan and Soltys 2014, 10). However, it should be noted that in the case of Sloboda Noskovetska, there are such peculiarities as, above all, massive boards up to 2.5 m long encircling the central grave along its perimeter and smaller logs radially arranged only at the southern part of the barrow (that probably mark an entrance to the wooden construction above the central grave). The central part of the wooden structure that they were once a part of could have been supported, it seems, by wooden posts fixed directly in the grave. However, due to the destruction of the grave and only partial survival of its relics, this supposition remains hypothetical.

A side burial (Feature 4) was found in the south-eastern part of the mound. It contained the non-cremated remains of a child aged 7-8 years, who lay on the buried soil in a foetal position, head pointing west (Fig. 11: B). Cremated bones of another unidentified person were deposited 20 cm above the child's feet. Four ceramic vessels and a set of bronze adornments were placed on the child's skeleton and close to it: a miniature bracelet, lunula pendant, five buttons and a bead - perhaps a figurine (Fig. 12: 4-11).

The artefacts from Barrow 6 in Sloboda Noskovetska have analogies in so-called pre-Scythian sites from the steppe and forest-steppe zones. It is highly probable that the barrow represents the last pre-Scythian period and can be dated to the late 8th – early 7th century BC. The series of radiocarbon determinations obtained from bone and wood samples (Table 1) agrees with the typo-chronological assessment, although, unfortunately, it falls within the so-called "Hallstatt plateau" (Fig. 15).

Three components could be distinguished among the materials from the Sloboda Noskovetska barrow. The first component can be linked to the local farming communities and their archaeological representation – the Chornolis culture. Most of the pottery deposited in both graves as well as that used during a funerary feast, belong to this unit. There are, for instance, bowls with a cylindrical base and relief decoration on the rim, tulip-shaped and barrel-shaped pots ornamented with punctures and raised bands, non-ornamented bowls with rounded bodies, S-shaped cups with high handles, *etc.* (*cf.* Smirnova 1982; 1983; 1986; Krushelnytska 1998; Shelekhan and Lifantii 2021). As for the late 8th century BC, simple metal tools, such as iron knives can also be considered a local element (Melyukova 1989; Smirnova *et al.* 2018).

Table 1. Barrows in Ivanivtsi-Antonivka and Sloboda Noskovetska. Radiocarbon datings performed in the Poznań Radiocarbon Laboratory. Calibration in OxCal v4.4.4 (Bronk Ramsey 2020); IntCal13 atmospheric curve (Reimer *et al.* 2020)

Sample signature	Barrow and feature	Material	Lab. no.	^{14}C BP	Cal BC (68,2%)	Cal BC (95,4%)	Comment
Ivanivtsi 1	Ivanivtsi-Antonivka 3, feature 1	human bone	Poz-120856	2395±30 BP	507BC (4.0%) 501 BC 490BC (64.2%) 404 BC	729 BC (6.0%) 693 BC 658 BC (0.7%) 653 BC 543 BC (88.7%) 398 BC	4.0%N 11.0%C, 10.6%coll
Sloboda 1	Sloboda Noskovetska 6, feature 4	human bone	Poz-120857	2435±30 BP	728 BC (5.2%) 716 BC 709 BC (6.5%) 694 BC 657 BC (1.2%) 654 BC 542 BC (55.2%) 416 BC	751 BC (21.5%) 683 BC 669 BC (7.7%) 637 BC 625 BC (1.0%) 615 BC 592 BC (65.1%) 406 BC	1.7%N 6.4%C, 4.2%coll
Sloboda 2	Sloboda Noskovetska 6, feature 4	human bone	Poz-120872	2435±30 BP	728 BC (5.2%) 716 BC 709 BC (6.5%) 694 BC 657 BC (1.2%) 654 BC 542 BC (55.2%) 416 BC	751 BC (21.5%) 683 BC 669 BC (7.7%) 637 BC 625 BC (1.0%) 615 BC 592 BC (65.1%) 406 BC	3.9%N 11.3%C, 7.6%coll
Sloboda 3	Sloboda Noskovetska 6, in the mound	human bone, burnt	Poz-121447	2460±30 BP	751 BC (27.0%) 683 BC 668 BC (11.7%) 637 BC 623 BC (2.0%) 616 BC 591 BC (26.9%) 509 BC 497 BC (0.7%) 495 BC	758 BC (29.5%) 678 BC 672 BC (65.9%) 429 BC	0.0%N 0.6%C carbonate
Sloboda 4	Sloboda Noskovetska 6, in the mound	human bone, burnt	Poz-123128	2580 ± 35 BP	806 BC (68.2%) 765 BC	816 BC (77.0%) 748 BC 685 BC (4.9%) 667 BC 642 BC (10.4%) 587 BC 582 BC (3.1%) 556 BC	0.0%N 0.3%C carbonate
Sloboda 5	Sloboda Noskovetska 6, in the mound	human bone, burnt	Poz-123129	2492 ± 35 BP	766 BC (12.9%) 735 BC 689 BC (11.1%) 663 BC 648 BC (44.2%) 547 BC	790 BC (94.6%) 507 BC 501 BC (0.8%) 490 BC	0.0%N 0.3%C carbonate

Sample signature	Barrow and feature	Material	Lab. no.	^{14}C BP	Cal BC (68,2%)	Cal BC (95,4%)	Comment
Sloboda 6	Sloboda Noskovetska 6, feature 3	charcoal	Poz-130190	2430 ± 30 BP	718 BC (3.8%) 710 BC 661 BC (2.9%) 654 BC 542 BC (61.6%) 416 BC	750 BC (18.2%) 686 BC 667 BC (7.8%) 638 BC 588 BC (0.9%) 579 BC 571 BC (68.7%) 404 BC	charcoal - sample no. 20
Sloboda 7	Sloboda Noskovetska 6, feature 5	charcoal	Poz-130205	2425 ± 30 BP	541 BC (68.3%) 414 BC	749 BC (16.1%) 686 BC 666 BC (6.8%) 640 BC 587 BC (0.3%) 583 BC 570 BC (72.3%) 403 BC	charcoal - sample no. 12
Sloboda 8	Sloboda Noskovetska 6, feature 6	charcoal	Poz-130209	2555 ± 35 BP	798 BC (42.6%) 752 BC 684 BC (9.2%) 668 BC 633 BC (4.8%) 622 BC 613 BC (11.7%) 591 BC	805 BC (47.5%) 741 BC 693 BC (12.8%) 663 BC 647 BC (35.2%) 548 BC	charcoal - sample no. 11
Sloboda 9	Sloboda Noskovetska 6, feature 7	charcoal	Poz-130210	2540 ± 35 BP	791 BC (28.8%) 750 BC 685 BC (11.0%) 667 BC 636 BC (25.2%) 588 BC 579 BC (3.3%) 571 BC	800 BC (35.7%) 726 BC 701 BC (15.8%) 662 BC 651 BC (43.9%) 544 BC	charcoal - sample no. 6

The second component is identified as influences of the Basarabi-Şoldăneşti culture from the south and south-west. Their markers are above all black-glazed tableware, large storage vessels and bowls decorated with flutes, as well as the composition of incised and fluted ornaments. They have their closest analogies in ceramics from the areas of today's Moldova and East Romania (Melyukova 1958; Vulpe 1965; 1986; Golceva and Kashuba 1995; Zverev 2004; Kulkova *et al.* 2020). However, it should be noted that the vessels from Sloboda Noskovetska have some peculiarities in contrast to the truly Basarabi artefacts that have stricter and symmetrical decoration. The bronze bracelet and buttons from the peripheral grave could also be considered part of the south-western component because analogies to them can be found on the Danube (Vulpe 1986; Gumă 1993). However, if we take into account the longevity of such finds and their simple form, it cannot be ruled out that by the late 8th century BC, they had already become an integral part of the local dress.

Impulses from the same direction are likely to be reflected in the form of the cremations deposited in both central and lateral graves at Sloboda Noskovetska. Varied funerary rites, including both cremation and inhumation, were usual for the communities that occupied the western and south-western parts of the North Pontic region (Melyukova 1979; Klochko and Skoriy 1993). The opposite was true in the steppe and forest-steppe, where cremation was relatively rarely practiced. Only Stebliv, Barrow 10 and the Butenky barrow can be mentioned in this context (Klochko and Skoriy 1993; Skoriy 1999; but *cf.* Scythian cremations in the northwestern Black Sea region: Kashuba 2015; Sinika *et al.* 2020; Hutsal *et al.* 2021).

The third component is represented by the elements of steppe pre-Scythian culture: namely the lunula pendant from Feature 4 (child grave) and the rattle probably from the main grave (probably relocated in Feature 7). A wide circle of analogies to these finds can be mentioned, *e.g.*, for the rattle: Chauchitsa necropolis (Kilian-Dirlmeier 1979), Khurvin and Tepe Sialk B (Pogrebova 1984; Castelluccia and Dan 2014), Rožanci in Serbia (Sveshnikov 1964; Bouzek 1973; Metzner-Nebelsick, Nebelsick 1999). Even a larger set of analogies can be found regarding the lunula pendant because such artefacts, which are considered to be horse-bridle adornments, were most widespread in the Northern Caucasus and Kuban basin (Mogilov 2004; Erlih 2007). If we take a look at complexes from Eastern Europe, an analogous bronze lunula with a silver cover was found in a Kvitky barrow (Kovpanenko and Gupalo 1984). Another similar find is a seven-circle lunula from Yasnoziria, Barrow 8 (Kovpanenko *et al.* 1994). A well-known set of lunulae made of antler originated from a barrow at Zolne in Steppe Crimea (Schepinskiy 1962). Closer to the study area, no similar specimens have yet been found in Podillia. Only two low-profile lunulae can be mentioned from Barrows 1 and 2 near the village of Bandyshivka (Boiko 1989; Zagoruiko 1990). Such a broad range of analogies is not a surprise as artefacts of this type were spread over Eastern Europe by early steppe nomads (Kimmerians?), who sometime later appeared in the forest-steppe (Skoriy 1999; Makhortykh 2005).

7. SUMMARY

Until recently, the relics of the Bronze and Iron Ages communities in the middle part of the forest-steppe between the Southern Bug and Dnister have been poorly explored by archaeologists. Although Severynivka, a fortified settlement dated to the Early Iron Age, was an important exception that continued to be excavated for several years (Ignaczak *et al.* 2016), the exploration of local barrows that was begun almost 130 years ago (Sitsinskyi 1901) was not continued. This was only to be undertaken in 2018-2023 by a Polish-Ukrainian research team that conducted a comprehensive exploration of barrows located between Zhmerynka and Bar. It involved comprehensive non-invasive surveys, excavations, and multidisciplinary analyses of the discovered artefacts and ecofacts.

In the study area, two major stages of barrow building and use can be distinguished. One in the 3rd millennium BC, comprising features hypothetically related to the Yamna culture (perhaps with the influx of the Globular Amphora communities) and another in the 1st millennium BC, grouping features hypothetically dated to the Scythian times. Both excavated barrows preliminarily discussed above date to the latter stage: Barrow 3 in Ivanivtsi-Antonivka can be dated to the second half of the 10th – first half of the 8th century BC, whereas Barrow 6 in Sloboda Noskovetska to the late 8th – early 7th century BC. The older – Barrow 3 in Ivanivtsi-Antonivka – was erected and then used by communities related to the early period of the Chornolis culture. The younger – Barrow 6 in Sloboda Noskovetska – is one of the main pre-Scythian complexes of Eastern Podillia at present. The multi-component set of artefacts deposited under its mound represents a mixture of the Chornolis culture, Basarabi-Şoldăneşti influences and the impact of early steppe nomads (Kimmerians). It is a good illustration of a complex cultural mosaic in the forest-steppe between the Southern Bug and Dnister rivers, as well as being a marker of a so-far little-known route along which early nomad influence spread northwards.

Acknowledgements

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FUNERAL RITE IN THE MOUND OF SCYTHIAN TIME NEAR VASYNE

ABSTRACT

Kozyr I., Panchenko K., Chornyi O. 2023. Funeral rite in the mound of Scythian time near Vasyne. *Sprawozdania Archeologiczne* 75/1, 335-356.

The article is devoted to an analysis of the funeral rite from the mound near the village of Vasyne in Kirovohrad region. The site is located on the border of the Dnipro right-bank forest-steppe and steppe. The main Scythian burial was deposited in a wooden chamber on the ancient ground surface. A complex wooden burial structure of oak timbers constructed over it was partially burnt, but was well preserved. The remains of artefacts found in the burial site, including fragments of ancient amphoras, among them plump-throated Chios, thin-walled antique black-figured kylix, fragments of ceramic vessels, and animal bones. Undoubtedly, the most interesting find was a stone anthropomorphic stele of grey granite. The complex dates to the first quarter of the 5th century BC.

Keywords: barrow, Scythian time, mound, anthropomorphic stele, trizna ritual
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The barrow cemetery near the village of Vasyne in Kirovohrad region is located in the upper reaches of the river Beshka (Kozyr *et al.* 2019, 300), a right tributary of the upper reaches of the Inhulets river (Fig. 1) (Kryvulchenko 2011, 146, 245). The excavated barrow discussed here is labelled No. 33 and was part of Group 8 of mounds. In the spring of 2017, during deep ploughing, the upper part of a Scythian stone anthropomorphic stele with relief images and a fresh fracture was discovered in the barrow mound. On the surface of the stele, especially on its front part, the damage caused by the plough is clearly visible. The site was explored by an archaeological expedition of the Central Ukrainian State University in August – September 2017. The material from these excavations was published by the authors of this article (Kozyr *et al.* 2019).

This article is devoted to the analysis of the funeral rite performed during the construction of the mound. The height of the barrow is 1.7 m above the level of the modern surface, the diameter is 48 m. The surface of the barrow has been ploughed for a long time, its mound is eroded, and has a segmented shape. At the top of the ploughed-out earthwork, at the site of the discovery of the fragment of the stone stele, there were the remains of burnt and rotten wood visible on the surface.

The barrow had previously been significantly damaged during World War II. During excavations in the northern sector of the barrow, significant traces of destruction were

Fig. 1. Barrow No. 33 near the village of Vasyne on the map of Ukraine

Fig. 2. Vasyne Barrow 33 during excavation

found: a dugout, trenches, areas of mixed soil from shellings. An artillery shell, grenade, bullet casings, remnants of a portable radio station and iron objects, wire, metal dishes, pieces of roofing material, remnants of wooden boxes and other similar items were found. Also, at a depth of 0.2 m from the surface of the barrow the lower part of a destroyed skeleton was found. The condition of the bones allows us to attribute it to the period of World War II.

The main Scythian burial was laid on the ancient ground surface, which had carefully been cleaned of turf. A complex wooden burial structure constructed of oak timbers was well preserved, but partially burnt, which allows for a fairly complete reconstruction of its architecture and appearance. In the centre of the funerary structure was a square wooden tomb, oriented to the cardinal points with a slight deviation. Its dimensions at its base were 5.5 × 5.5 m (Figs 4-6). Due to the destruction of the supporting posts, the walls of the tomb in the upper part were deformed and bent inwards. The size of the tomb was 5.25-5.4 m.

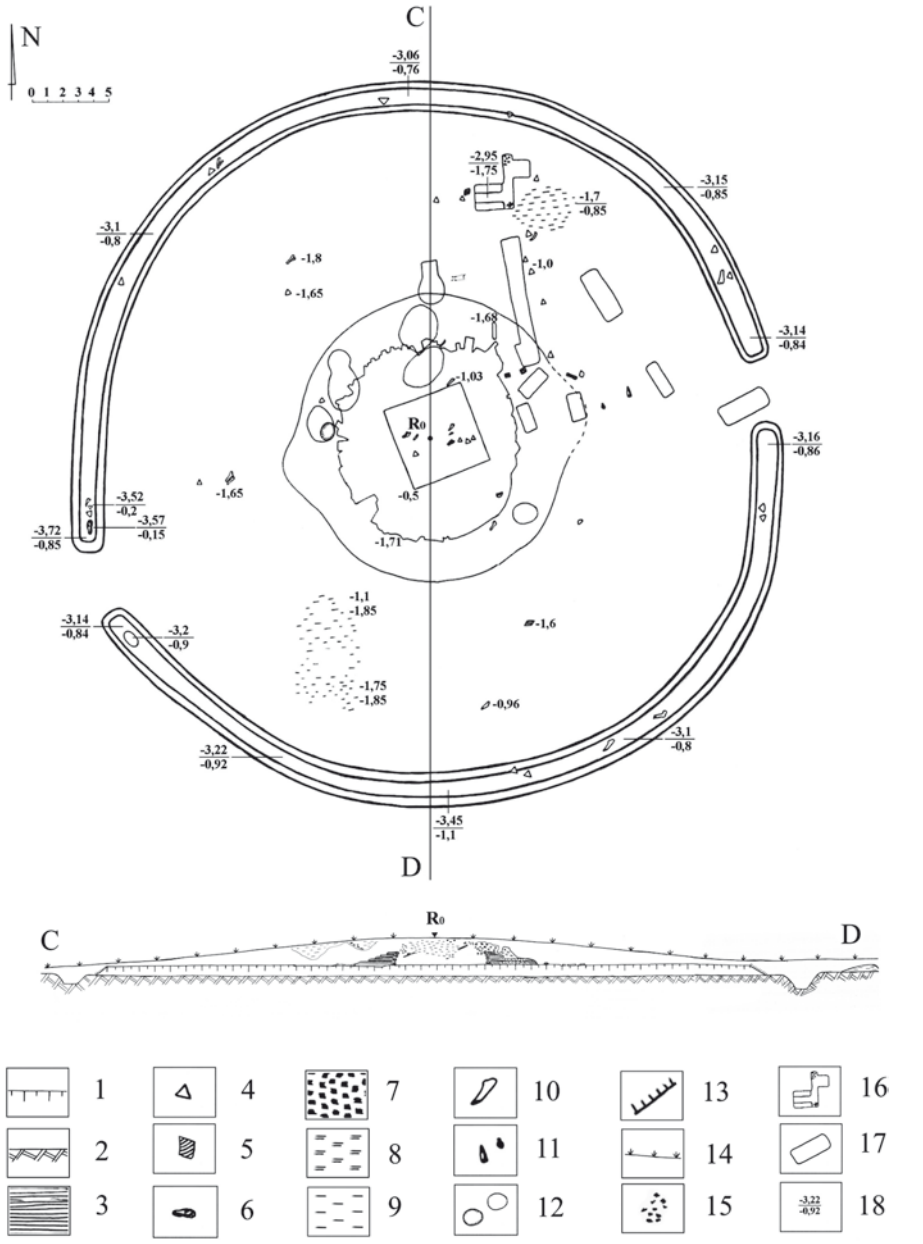

Fig. 3. Plan (1) and profile (2) of Vasyne Barrow 33: 1 – ancient ground surface; 2 – natural ground; 3 – scorched wood; 4 – amphora fragments; 5 – fragments of pottery vessels; 6 – horse skull; 7 –burnt wood; 8 – fired clay; 9 – unfired clay; 10 – animal bones; 11 – ammunition from World War II; 12 – pits from explosions during World War II; 13 – edges of the mound; 14 – modern ground surface; 15 – charcoal; 16 – a dugout from World War II; 17 – trench from World War II; 18 – depth of the ditch from R0/upper surface of natural loam

The frame of the tomb was built of wooden beams of a square section 0.15-0.2 m thick. The beams were made of logs by trimming four faces to ensure a tight fit. On many beams, the corners between the faces remained rough and retained a rounded shape. The load-bearing structures were ten wooden posts dug vertically in the centre, corners and along the walls of the tomb. These were rounded in cross section had a diameter of 17 to 28 cm, and were dug into the ground 0.5-1 m from the level of the ancient surface. The state of preservation of the supporting pillars was different: the central pillar and the pillars located by the southern and northern walls of the frame had collapsed completely to the bottom of the tomb, and the others survived to a height of 0.16-0.73 m.

The walls of the tomb were brought up vertically close to the supporting pillars, at the corners they were laid in a joint. The western wall has been preserved to a height of 1.3 m (five full rows of beams), the southern and eastern – 1 m, the northern – 0.9 m (four rows of beams each). The ceiling had not been fully preserved, but its remains can be traced in the stratigraphy of the filling of the tomb and in some places on its walls. Fragments of

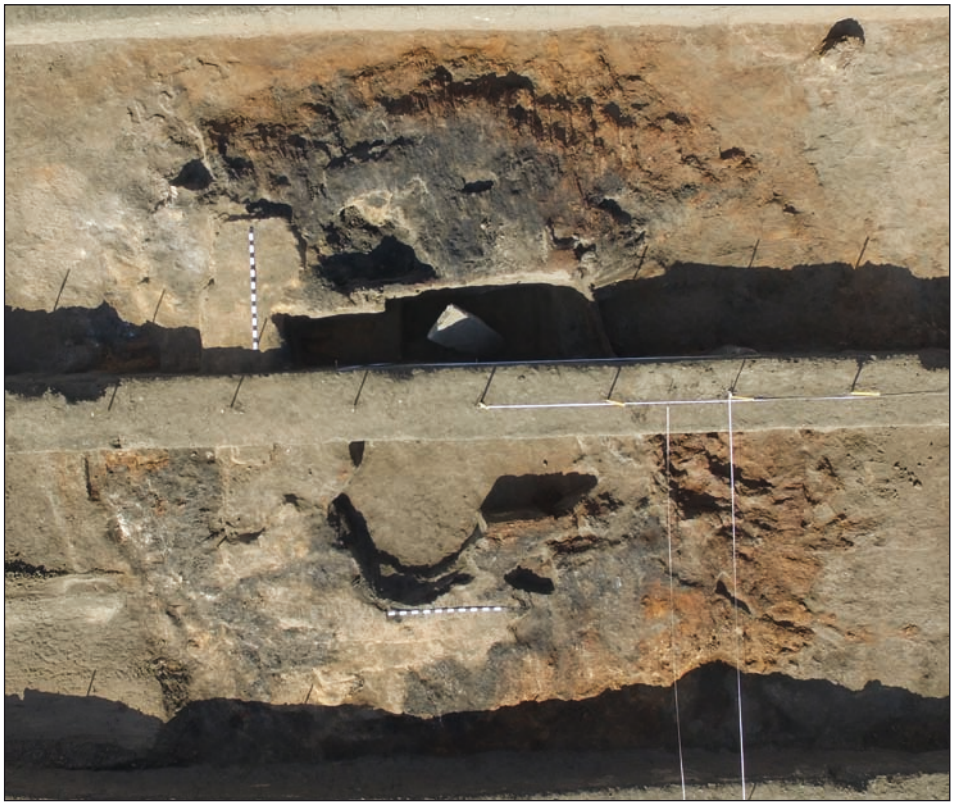

Fig. 4. Remains of a wooden burial structure in Vasyne Barrow 33

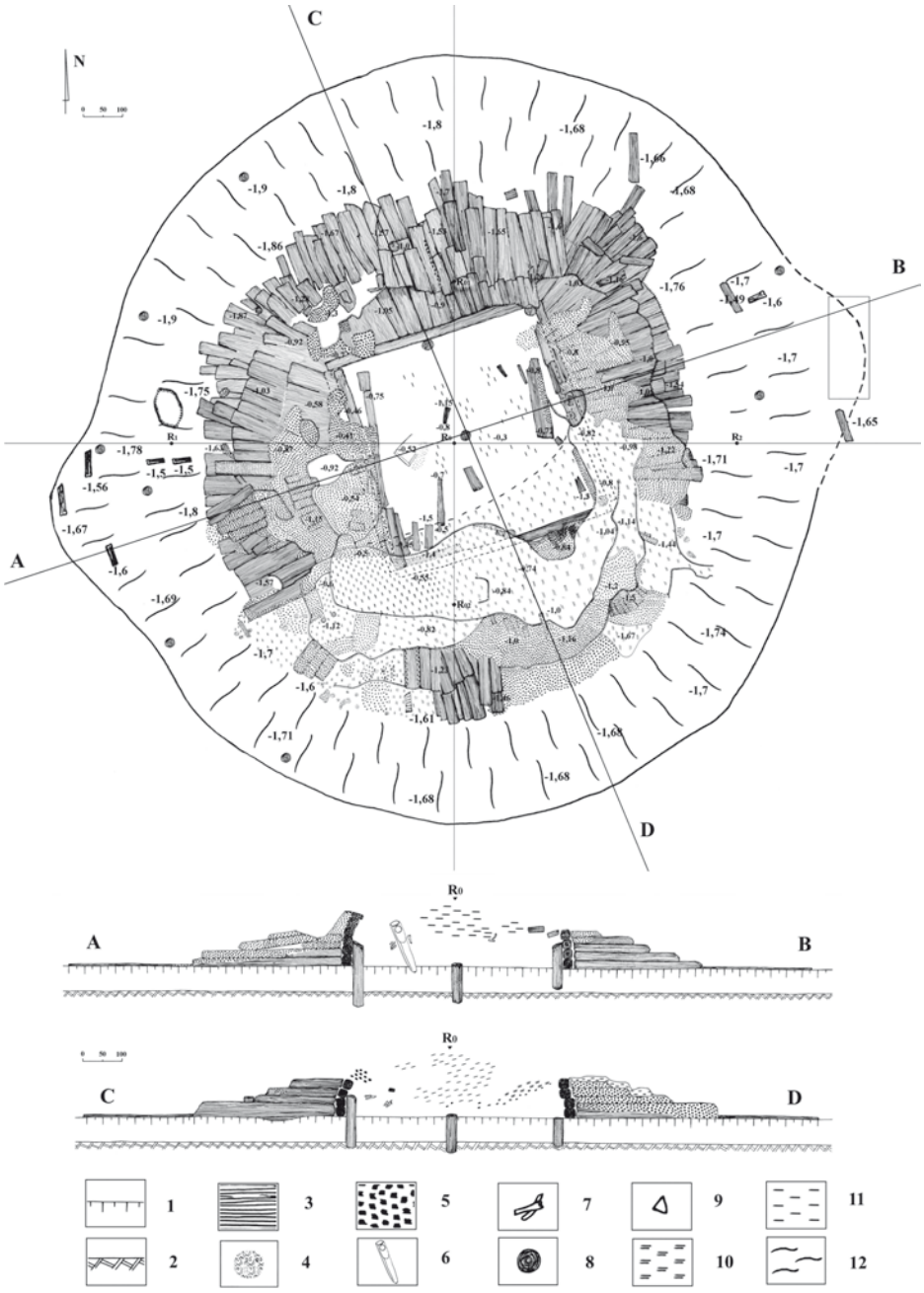

Fig. 5. Plan (1) and profiles (2, 3) of the tomb in Vasyne Barrow 33: 1 – ancient ground surface 2 – natural ground; 3 – scorched wood; 4 – ash; 5 – burnt wood; 6 – stone anthropomorphic stele; 7 – animal bones; 8 – wooden post; 9 – ceramics; 10 – fired clay; 11 – unfired clay; 12 – wooden decking

beams with a width of 0.2-0.3 m, a thickness of 0.12-0.15 and fragments of cross beams were recorded. Judging by their placement in the filling of the tomb, the cross beams (at least three) were laid west to east on posts, and they supported a continuous flat overlap of planed rectangular beams running from north to south.

Around the square tomb, close to its walls, a complex cone-shaped wooden structure was erected from several horizontal layers of logs. They were placed according to a clear system: perpendicular to the walls of the tomb and radially at its corners (Figs 4-6). The lower tier is made of solid tree trunks, 30-40 cm in diameter and 3.2-4 m long, on which the remains of bark and, in some places, stumps of branches have been preserved in many places. Each subsequent tier was made of shorter trunks or logs of smaller diameter laid in a checkerboard pattern, so that the layers of wood narrowed stepwise to the top. Together with the adjacent construction of logs and their segments, the flat ceiling of the tomb, formed a kind of "pyramid" in the core of the mound with a total diameter of 12.5-13 m (Figs 2 and 4). The height of the preserved "pyramid" was: 1.3-1.4 m in the western sector, on the, south and east it was 1 m, and on the north it was 0.9 m. All these stacks of wood were stacked very tightly, and in the upper part of the structure split logs were used to fill the volume. Vertical support columns were dug in some places to strengthen the walls, or transverse segments of logs were laid. At the same time, in the western and south-eastern profile of the "pyramid" at the level of the second - third tier of logs, artificial cavities were

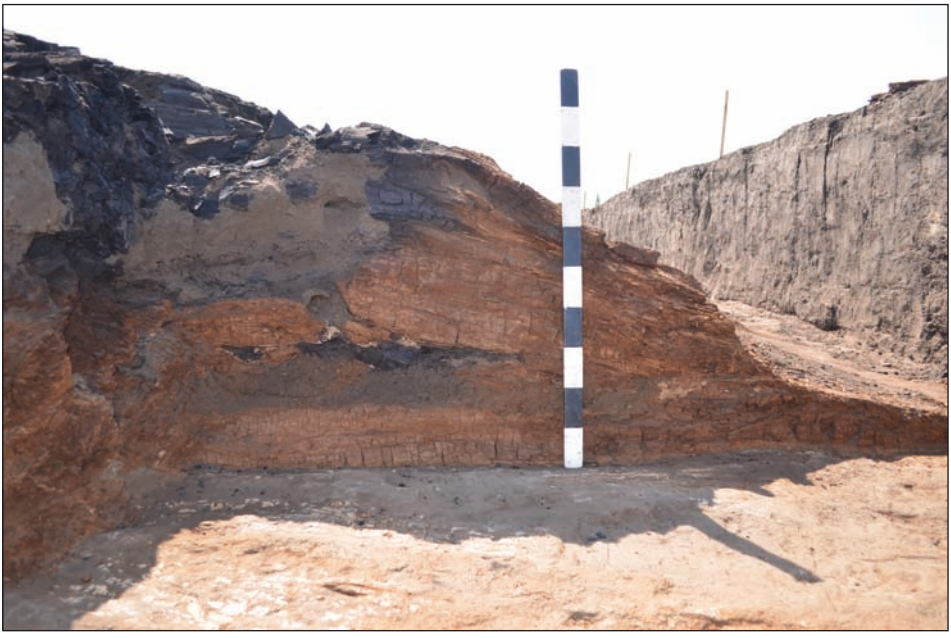

Fig. 6. Profile of the wooden "pyramid" in the core of the mound. Western sector

recorded, formed by a special method of construction, when the lower tier logs were superimposed by the edges of the upper tier logs. In fact, it was a kind of canal that ran inside the wooden building and covered it from east and west. Their purpose will be discussed below. Oak was used to build the described pyramidal structure.

Around the "pyramid" at the ancient ground level, remains of a wooden planked decking with a thickness of 5-7 cm and a width of 2.2-3.8 m were discovered. Thus, the total diameter of the wooden structure (the tomb with the "pyramid" and the deck) was about

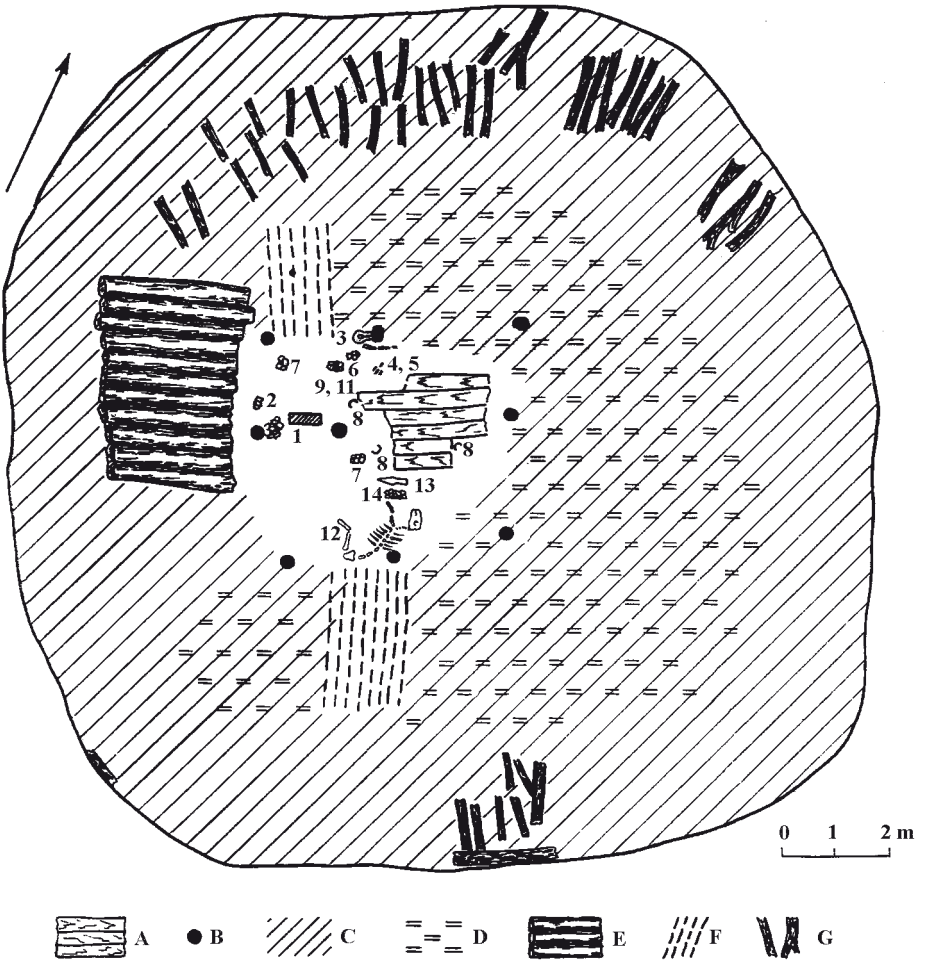

Fig. 7. Plan of the tomb from the barrow near the village of Mederove (by Bokii 1974):
A – wooden flooring; B – pits for posts; C – burnt layer; D – red burnt layer; E – burnt decking; F – trace of wooden flooring; G – burnt wood. 1 – stone anthropomorphic stele; 2, fourteen amphora fragments; 3 – horse skull; 4 – sheep bones; 5 – iron knife; 6 – ceramics; 7 – armour fragments; 8 – iron staples; 9, 10 – rods; 11 – boar's tusk; 12 – horse skeleton; 13 – spearhead; 14 – fragments of amphora

19 m. In several places along the edge of the decking, the remains of wooden vertical columns with a diameter of 10-15 cm were preserved. On the western edge of the decking, there was a protruding convex segment that extended beyond its diameter. Here are recorded fragments of wooden logs placed horizontally, and another vertical column. The latter was not placed along the edge of the flooring, but closer to its centre. It is likely that a similar protruding segment had existed on the opposite side of the decking, on its eastern edge, as evidenced by individual details: vertical columns, including one placed closer to the middle of the mound, the remains of a horizontal fragment of a log. But this part of the site was destroyed by a trench dug during World War II, so it is impossible to reconstruct it reliably.

The wooden structure was partially burned. The southern, south-western and south-eastern sectors of the "pyramid" were significantly charred, and in some places traces of fire were recorded on the walls and ceiling of the tomb. In these sectors, a layer of clay was found above the charred structure, which was also affected by the action of fire and was burned. Interestingly, the thickness of the clay coating is uneven. Thus, on the sides of the "pyramid" built against the south wall of the tomb, the layer of clay did not exceed 15-20 cm, and around the south-western and south-eastern corners of the tomb it was quite thick, up to 1.0 m thick. In the profile of the central edge, it was noticeable that a layer of clay had entered the ceiling of the tomb on the south side, where it was partly baked and partly collapsed inside the tomb unbaked together with the ceiling.

In addition, on the slope of the "pyramid" in its southwestern corner, rounded features, 0.25-0.3 m in diameter, filled with embers from burnt wood, around which there was a ring of whitish ash, are clearly visible on the upper surface of the clay layer. The described filling is deepened through the layer of clay to the burnt timber under it. It can be assumed that these features are remnants of vents that led deep into the structure to the place of ignition of the structure. This area has traces of intense burning, which spread along the western sector of the "pyramid" through the artificial cavities-channels mentioned above. This, led to the failure of its top near the western wall of the tomb, measuring 1.4 × 2.3 m to a depth of 0.6-0.7 m from the original height of the "pyramid". Near the opposite, north-easter corner of the "pyramid" there is also a failure, around which the construction is well burned. In the area of the south-eastern corner of the "pyramid" a high intensity of burning was also recorded, a strip of burnt wood runs along the eastern wall of the tomb also through artificial cavities in the wooden construction. At the bottom of the slope in this place there are also visible spots of ash 0.25 × 0.4 m, 0.2 × 0.3 m. Probably, there were also vents, which are inconspicuous due to the greater burning of this sector.

The wooden structure did not burn down completely, but was charred in specific sectors of the pyramid. In many places, the layers of logs were charred through, but retained their integrity.

It is obvious that the described situation with features of burning of the tomb could develop as a result of purposeful actions of the barrow builders. It can be assumed that all

the preparatory work for the construction of the "pyramid" around the wooden tomb was necessary to implement a special technology for burning the wooden structure without air. This is a well-known issue in modern forest chemical production by the pyrolysis technique, which has its origins in antiquity and was used for the production of charcoal and tar (Gordon *et al.* 1988; Douglas Olson 1991). It is obvious that the builders of the Vasyne barrow, building a wooden "pyramid", previously equipped a kind of firebox in the southern corners (the highest intensity of burning was recorded here), from which channels went into the thickness of the wooden construction along the western and eastern walls of the tomb. An additional layer of clay was also laid over the sites of the primary fires in the southern sector of the "pyramid".

Given all of the above, it can be assumed that the combustion of the "pyramid" was carried out after the entire wooden structure was covered with a sufficiently thick layer of soil, which blocked air access. The air was supplied through the vents only in the places of conventional furnaces in the southern corners of the "pyramid" until the fire broke out. A discharge channel was also needed to provide draught. It is likely that it could have been installed near the north-eastern corner of the "pyramid", where a sinkhole in the wooden construction was traced, surrounded by a section of burnt wood. After that, the open areas were also filled in. Only under such conditions was the wood in the structure baked through, and its structure was completely preserved.

The barrow above the wooden structure consisted of homogeneous chernozem, which was taken from the ground directly next to the barrow. Only in some places on the edge of the embankment were there loamy inclusions. In the profiles the borders of the lower edge of the mound construction are clearly visible all around the perimeter of the barrow (Fig. 3: 13).

The barrow was surrounded by a circular ditch with two causeways on the western and eastern sides. The width of the causeway is 3.8 m on the western sector and 4.2 m in the eastern sector. The above-described protruding segments of the wooden decking under the mound with vertical posts are oriented to the causeways. There is an impression of a certain compositional unity of these elements, which symbolized the passage to the burial space. The top of the ditch lies at the level of the top of the underlying natural loam. Given the contents of the barrow mound, we can assume that it was dug after removing the upper chernozem soil layer. The width of the ditch is 1.6-2.5 m, and it has a depth of 0.8-1.1 m. In cross section it has a trapezoidal shape, the bottom is flattened, the walls are concave, rarely straight. The width and depth of the moat, the shape of its walls differ in some areas. Thus, on the south, the moat has the greatest width (2.5 m) and depth (1.1 m). In the north it is narrower and shallower (2.1 and 0.8 m, respectively). In the south-eastern and south-western sectors, the width of the moat is only 1.6 and 1.7 m.

The evidence shows that the burial was accompanied by a ritual trizna (funeral feast), the remains of which (animal bones, fragments of amphorae and other pottery vessels) were found during excavations in the barrow at various depths, in the ditch, in the filling

of the wooden tomb. The ditch fill contained very few remains of the trizna ritual. Fragments of amphorae and animal bones were also found here at various depths, indicating that they entered the moat during its natural gradual filling with soil from the surface of the barrow. For example, the skull of a horse on the north side of the western causeway was at a depth of 15 cm from the upper section of the ditch fill. No finds were found at the bottom of the ditch, but on the southern side of the western causeway, there was a hollow of regular oval shape, measuring 0.6 × 1.2 m, and 5-6 cm deep dug into the bottom of the ditch. Its purpose is unknown.

A significant amount of remains of the ritual trizna is concentrated within the square tomb in the central part of the barrow. It was filled with fragments of antique amphorae, among them are Chios amphorae with swollen neck, small fragments of thin-walled vessels in the black-figure style, bones of animals that fell inside the tomb together with the wooden ceiling. At a depth of 1.25-2.5 m remains of wooden trays (at least two) with sacrificial food and bronze and iron straps from them were found. These trays had originally been placed on the ceiling of the tomb, as the traces of charring were clearly discovered underneath a layer of scorched wood, on which the animal bones were found. In the southwestern sector of the tomb, at various depths (from 0.4 to 1.4 m), bones from a horse carcass were found. Remains of grass litter were found around its pelvic bones. Apparently, the horse was also laid on a grass litter onto the ceiling of the tomb, and then fell down with it inside its frame.

Residues of grains, which lay in a compact pile, were found near the horse's bones in the area of the southern wall of the wooden tomb, at a depth of 0.9 m (Fig. 13). The top wooden beam, next to which the grains were found, was partly burnt and partly charred (Fig. 12). In the previous publication, it was published as the remains of millet (Kozyr *et al.* 2019, 305, 306). According to S. Horbanenko (senior researcher at the Institute of Archaeology of the National Academy of Sciences of Ukraine), these were instead the seeds of the medicinal herb – gromwell (*Lithospermum officinale L.*). According to the conditions of the find, it is likely that these nuts were in a cup. Various parts of this plant have been used by people from ancient times for magical, religious and medicinal purposes. Gromwell is known for its useful properties as a medicinal and oilseed plant (Pashkevych and Chernovol 2021, 49, 50, 60; Andruschenko 2017, 14).We can assume that to some extent or another this find could be an illustration of the account by Herodotus bout the burial of the Scythian nobility, which is accompanied by various herbs (Herodot 1993, IV, 71).

Within the tomb, closer to its western wall, the lower part of the anthropomorphic stele was discovered, which had apparently collapsed as a result of the natural destruction of the wooden ceiling.

The burial site had been completely looted in ancient times, probably by digging down through the mound's top and entering a gap in the tomb's lid. The skeleton of the deceased, as well as the funeral inventory, are missing. Little remained of the original contents. By the western wall of the tomb there was a partially destroyed skeleton of a dependent person,

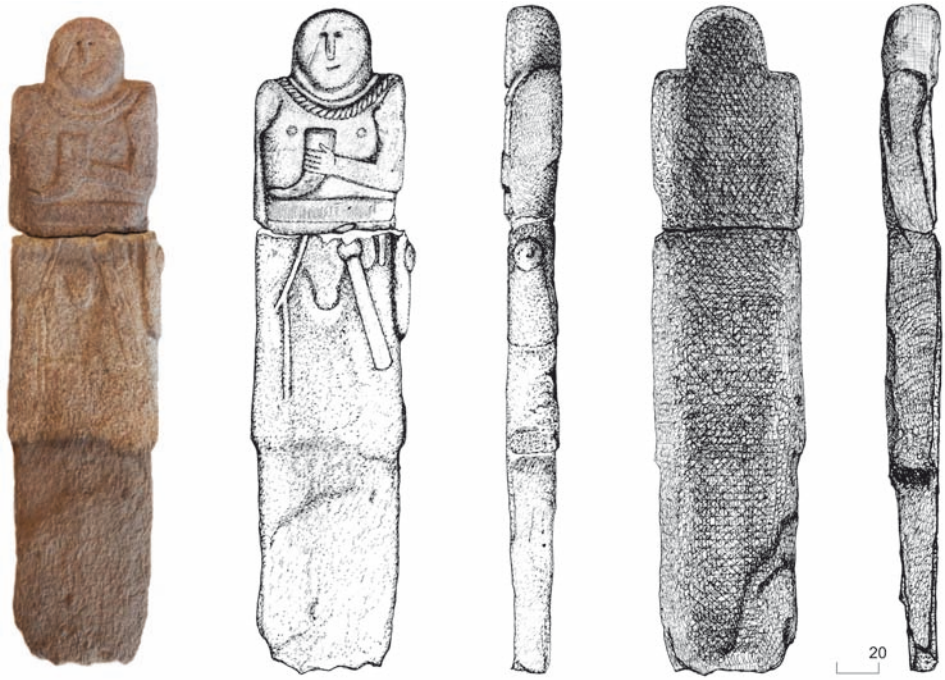

Fig. 8. Stone anthropomorphic stele from Vasyne Barrow 33

next to which a punch made of a horse's splint bone with a broken end was found. In some places in the south-western sector of the tomb, decay from a litter (straw mat?) was recorded. At the bottom of the tomb, at the level of the ancient ground level, near its northern wall, next to the supporting pillar, a bronze three-bladed arrowhead was found – the only item from the accompanying inventory that remained after the robbery. The absence of the skeleton and burial equipment may indicate a short period of time between burial and grave robbery. We assume that the skeleton was removed from the tomb when it still retained its anatomical integrity. As a result, nothing remained of the buried person.

The quantitative list of finds from the Vasyne barrow is therefore quite modest, but even what is left after the robbery of the grave is informative enough to determine the date of construction.

Undoubtedly, the most interesting and significant artefact is a stone anthropomorphic stele (Fig. 8). The sculpture is made of local grey granite by the method of adzing, engraving and grinding. The stele, 2.65 m high, is a massive image of a standing warrior. The lower end of the stele was isolated by a ledge and slightly narrowed down to form a spike-like projection. No remains of a base or any other devices for mounting the sculpture at the site of the find were found. Apparently, it was simply dug into the top of the barrow, and after the destruction of the wooden ceiling, part of it sank under its own weight into the tomb.

In its morphological type, the stele belongs to flat anthropomorphic sculptures with a fairly realistic image. Embossed faces, shoulders, arms, as well as individual details stand out. The head is circular with a high chin. The face is marked with eyes, a long straight nose and a mouth. The head smoothly passes into the neck, on which two torcs are shown, one of them is plain, the other one is twisted. The right arm is straight and pressed to the side of the torso, the left one is bent at the elbow and holds a rhyton in front of the chest. On the chest are marked elements of protective armour (?) in the form of two symmetrically placed rounded plates. In the lower part of the torso there is a belt, to which a sword and a whetstone are attached at the front in the area of the left thigh, and a whip in the area of the right. Also, a halyard is marked below the belt. On the left side of the stele there is a relief of a corytus fixed on a belt, decorated with a round umbon-shaped plate.

The set of things shown on the sculpture is characteristic for the images of the VI-V centuries BC. Some items are of particular interest. The long sword has a bar-shaped tip and a "kidney-shaped" crossguard; it is depicted in the sheath and attached to the belt with an elongated blade. Such swords are characteristic of the weapon kits of the second half of the VI century BC. However, they appear in the second half of the VII century BC (Meliukova 1964, 47). The element of fastening the sheaths to the belt resembles similar elements from complexes of Kelermes time (Meliukova 1964, fig. 17).

The image of the elements of protective armour on the chest in the form of two symmetrical hemispheres is recorded on three stelae from the Northern Black Sea Coast: Bilotserkivka (first half of the VI century BC) (Olkhovskiy and Evdokimov 1994, 30, 139, fig. 51), Vynohradivka (second half of VI – beginning of V century BC) (Olkhovskiy and Evdokimov 1994, 18, 94, fig. 6), Sibioara (first half of VI century BC) (Olkhovskiy and Evdokimov 1994, 17, 89, fig. 1). Two more stelae with images of such elements were found in the Caucasus – Zamni-Yuart (VI century BC) (Olkhovskiy and Evdokimov 1994, 37; 171, fig. 83) and Vorvorovskoliska (end of VII – beginning of VI centuries BC) (Olkhovskiy and Evdokimov 1994, 35, 126, fig. 76). It is assumed that the same domed plates in Scythian times could be sewn on leather armour for additional protection of the soldier (Olkhovskiy and Evdokimov 1994, 72; Chernenko 1968, 17, 18).

The image of a round umbo-shaped plate on a corytus is also quite interesting. Decoration of a corytus with such plates was recorded in the Urals in burials of the second half of the V-IV centuries BC from the Barrow No. 4 of the Filipovsky Grave (Yablonsky 2008, 202; 2009, 419, 421). According to Olkhovskiy, umbon-shaped plates of truncated-conical and rounded shape are a characteristic feature of corytus quivers of the V-IV centuries BC. In turn, the time of the advent of these plates was determined by the researcher to have occurred at the turn of the VI-V centuries BC (Olkhovskiy and Evdokimov 1994, 73). The closest analogy is the image of a similar plate on a sculpture with a broken head in the Kirovohrad Regional Museum of Local Lore (the exact location is unknown), which dates from the second half of VI – early V century BC. It should be noted that this analogy is quite similar to the iconography as a whole. Thus, the rhyton is depicted in the left hand,

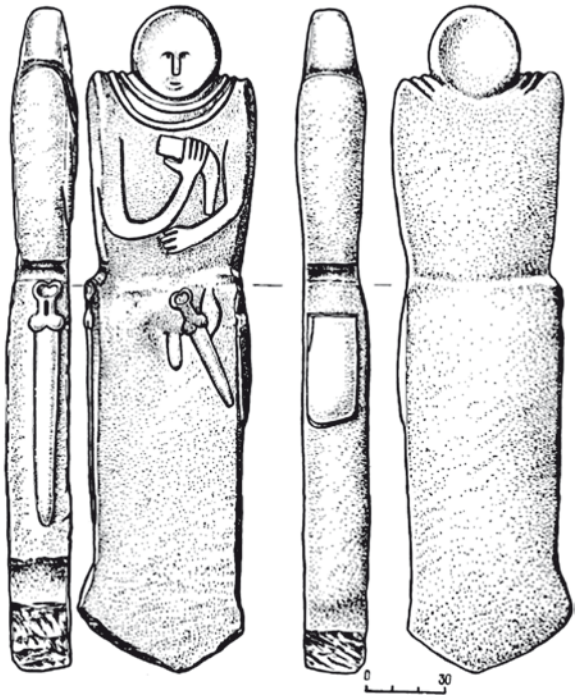

Fig. 9. Stone anthropomorphic stele from the barrow near the village of Mederove (by Olkhovskiy and Evdokimov 1994)

there are two tores, a belt and a whip, identified male features, but there is no whetstone. The assemblage of items on the Kirovohrad Museum is supplemented by a sword on the right side, and the warrior himself is depicted dressed in a kaftan, a long scythe is marked on his back (Bokii and Mohylov 2014, fig. 16; Gorbul and Bokii 1987, 49; Olkhovskiy and Evdokimov 1994, fig. 43).

Also close to Vasyne in iconography is a stele from the barrow near the village of Mederove (Fig. 9). The statue has a similar set of items – two tores, a rhyton, a belt, two swords, a quiver and an image of a halyard. The facial features of both stelae are very similar, in particular, the close-set eyes. However, the head of the Mederove statue is more rounded, as if "sunk" in the shoulders, the neck is not isolated, the tip of the nose and mouth are below shoulder level. Both tores on the neck are plain and here are no rounded plaques on the chest. The narrower belt is clearly seen only in places. The arms are folded in a different position – the right holds a rhyton, and the left one is placed on the abdomen. The warrior's set does not include a whip or a whetstone, but an additional sword is marked on the right side. The swords on the statue from Mederove have a volute-shaped top and a kidney-shaped crossguard (Bokii 1974, fig. 2).

It is also important that both analogies are geographically close to our stele. In fact, Mederove village is located 5 km from Vasyne village, and the stele from the Kirovohrad Regional Museum of Local Lore has long been interpreted as having been found in the Melhunovskyi barrow (Gorbul and Bokii 1987, 48).

The suite of objects depicted on the stele allows us to determine the time of its creation at the turn of the VI-V centuries BC. The iconographic and morphological features of other Scythian sculptural images of this time do not contradict this date (Olkhovskiy and Evdokimov 1994, 46-60).

However, a more accurate date was given for the burial by finds of ancient ceramic vessels from the mound. The Chios amphorae are represented by wall fragments and necks with fragments of handles (Fig. 10: 8-10). All vessels were made of light clay, the fabric was well mixed with finely ground impurities of lime and mica. The firing is uniform, in some places the central part of the sherd is lighter in colour at the thickening of the walls and at the end of the handles. The vessels belong to the Chios amphorae of Type III – with swollen neck (early swollen-neck variant III-A, according to the classification of S. Monakhov). Similar amphorae appear in the Northern Black Sea region in the last third of the VI century BC and are present here in the first quarter of the V century BC (Bessonova and Skoryi 2001, 78, fig. 51: 3; Buiskykh *et al.* 2018, 148, 149, fig. 2: 2; Monakhov 1999, 57; 59, fig. 9: 1-4). Later amphorae of this variant have more elongated proportions of the necks (Monakhov 2003, 16, 17).

The most important thing for dating is the fragments of an Attic black-figure kylix (Fig. 10: 1-7). This belongs to the products of the masters of the group "Leafless Group" and dates from 500-480 BC (Beazley 1956, 632-653; Boardman 1974, 150, 151). Similar elements of the images are found in the bowls of Athens (Burow 1980, pl. 31: 1-4, 32: 1-4; Beazley 1956, pl. 642: 139, 716: 66; Freyer-Schanenburg eds 1988, pl. 27: 5).

The bronze arrowhead is also a chronological indicator. It belongs to the so-called basic type (Fig. 11: 1). It is three-bladed with a hidden sleeve, height – 1.4 cm, base width – 1.3 cm. Such tips appear in the "mixed" complexes of the second half of the VI century BC, containing both Kelermes and Middle Scythian products (Mohylov and Didenko 2009, fig. 7). In early Middle Scythian burials, they dominate numerically (Polin 1987, fig. 4). In the steppe region, in particular, the same arrows were found in Burial 1 of Barrow 6 near the village of Oleskandrivka dated to the VI-V centuries BC (Kovaleva and Mukhopad 1982, 95, fig. 4: e), in a barrow near the village of Novokiyivka in the V century BC (Evdokimov and Murzin 1984, 77, fig. 2: 6). In the forest-steppe on the Right Bank of the Dnipro, similar artefacts have been found in the burials of Barrow 52 near the village of Kovali and Barrow 467 near Turia (Petrenko 1967, vol. 34: 133, 134), near Hryschentsi (Galanyna 1977, tab. 31: 32). On the Left Bank – similar items were found in the barrows near the village of Basivki (Ilinskaya 1968, vol. 27), Barrows 9 and 478 near the village of Vovkivtsi (Ilinskaya 1968, vol. 35: 13, 39: 14; Galanina 1977, pl. 23: 26), Barrow 13 in the tract of Staikin Verkh (Ilinskaya 1968, vol. 10: 24-25), in Barrow 5 of the Protopopivsky burial

Fig. 10. Ancient Greek pottery from Vasyne Barrow 33:
1-7 – fragments of a black-figure kylix, 8-10 – fragments of Chios amphorae

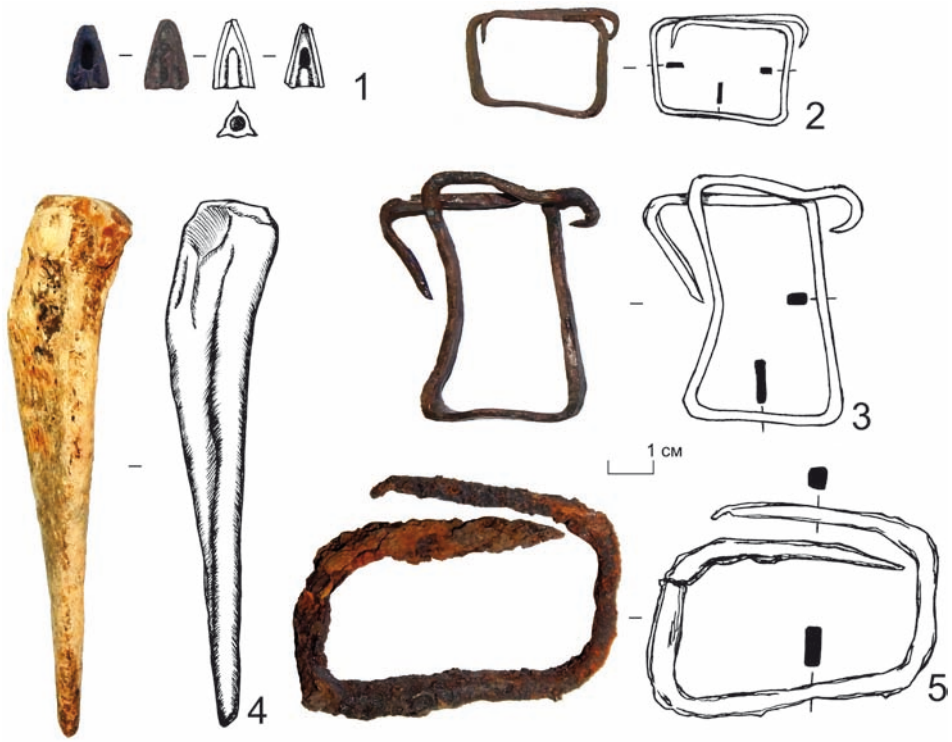

Fig. 11. Finds from Vasyne Barrow 33:
1 – bronze arrowhead, 2-3 – bronze staples, 4 – bone pin, 5 – iron bracket

Fig. 12. Residues of "nuts" of *Lithospermum officinale L.* (photo by Serhii Horbanenko)

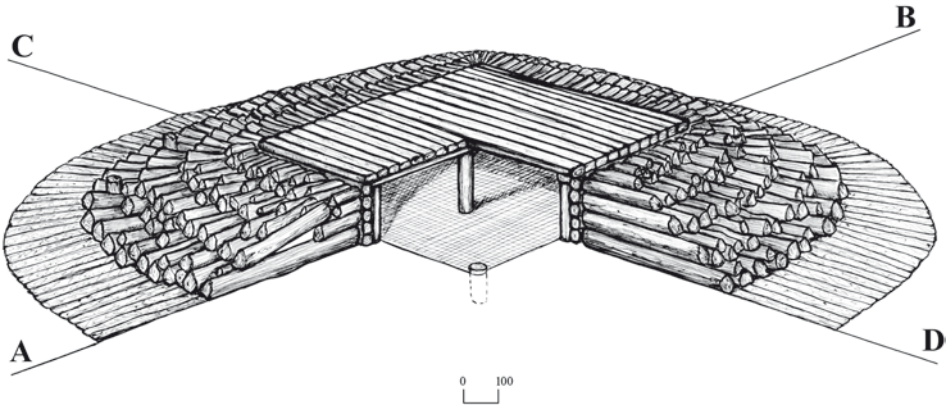

Fig. 13. Reconstruction of the wooden burial structure from Vasyne Barrow 33

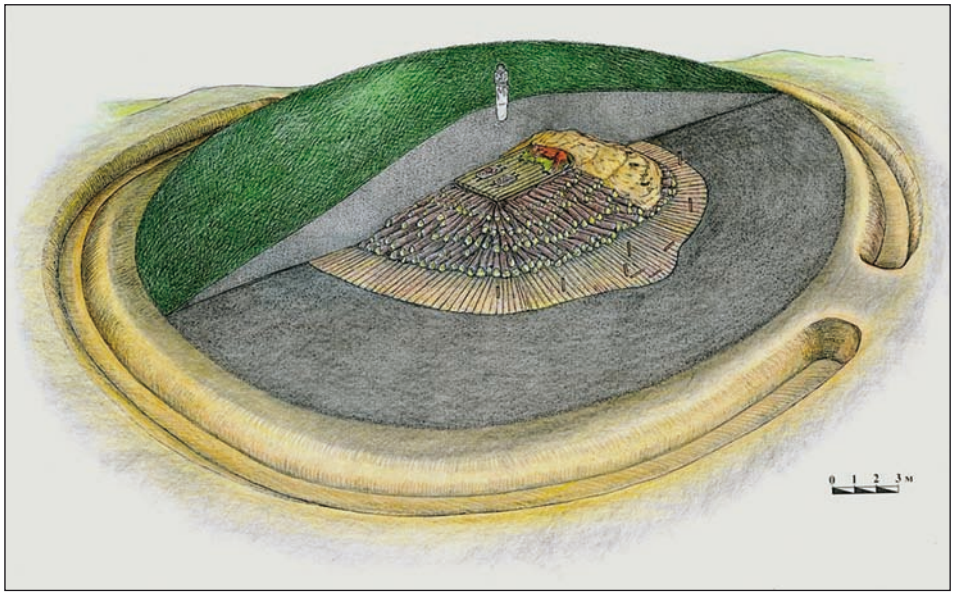

Fig. 14. Reconstruction of Vasyne Barrow 33

ground (Babenko 2007, 35, fig. 2: 30) and in Burial 1 of Barrow 1/2013 of the Skorobor burial ground (Shramko 2016, 272, fig. 1).

Thus, the finds from the Vasyne barrow have numerous analogies in the complexes of the beginning of the Middle Scythian stage. But nothing like a burnt wooden pyramid-shaped burial structure around the tomb has yet been discovered. In general, the type of ground-level wooden chamber tombs is one of the rare types of burial structures of Scythian

times. Generally, they are preserved in a rather dilapidated condition due to the use of fire in the funeral rite. In the region of the Dnipro Right Bank, only a few Scythian monuments with ground-level wooden tombs can be named. In particular, in the steppe the remains of such a tomb were recorded in a barrow near Kryvyi Rih on the Kalytva River. However, its construction is unknown, only traces of burnt wood and baked soil were found under the barrow (Murzin 1982, 50; 1984, 50). Other steppe wooden tombs were built in pits (Olkhovskiy 1991, 42). In the forest-steppe Right Bank, in the basin of the Tyasmin River, the remains of wooden earthen tombs were excavated in barrows of early Scythian times – Barrow 49 near Gulyai-Horod and Barrow 220 on the river Tenetynka. The details of their construction are also unknown to us, as they were almost completely burned in antiquity (Kovpanenko *et al.* 1989, 29-31; Ilinskaya 1975, 19, 20).

Also, the remains of massive wooden ground-level structures were discovered in the burial mounds of Butory-I on the left bank of the Dnister. Unlike the tomb in Vasyne, they were not separate burial structures. There are probably the remains of a grandiose ceiling over the graves. It is also worth noting that there are no support columns in their construction. These mounds (Nos 2, 5, 10, 13 and 16) are dated to the 4th century BC (Sinika *et al.* 2013, 48, 49, 63-65, 73-75,79, 80, 86, 87).

On the border of the forest-steppe and steppe on the right bank of the Dnipro River, there are mounds under which the remains of wooden tombs have been excavated. Unfortunately, they were all destroyed, and therefore do not allow us to draw analogies. This concerns a mound near the village of Kutsevolyvka (Bokii and Olkhovskiy 1994), a mound near the village of Zaschita (Bokii 1970), and also in Mound 10 near the village Pokazhove (Bokii 1994, 108-110).

The closest in cultural and territorial terms to the described monument is the already mentioned barrow of the beginning of the V century BC near the village of Mederove, excavated in 1964 by an expedition led by A. I. Terenozhkin and published by N. M. Bokii (Bokii 1974). At the time of research, its height was 3.5-4 m, and its diameter was 40 m. Under the mound, there were the remains of a nine-column chamber tomb of rectangular shape, measuring 5.5 × 4.5 m, built on the level of the ancient ground surface. Detailed features and structural elements of the wooden structure are not known, as it was burned in ancient times. Only in the southwestern sector of the mound were fragments excavated of massive wooden logs, 0.25-0.3 m in diameter, laid in a row perpendicular to the tomb wall. In some places, burnt and rotten logs were recorded, lying radially to the centre of the structure (Fig. 7). The ritual hearth had a diameter of about 15 m, and as a result of the fire, the soil at the base of the tomb was baked in some places to a depth of 0.3 m within the tomb, in addition to accompanying objects in the burial, a stone statue of a Scythian warrior made of red granite was found (Bokii 1974, 264). The remains of massive logs and the scale of the hearth indicate the significant size of the original structure. It was quite massive, perhaps even something similar to the one found in the barrow near the village of Vasyne. In both cases, ground-based wooden pillar tombs were used for burial. The simi-

larity of the size of the tomb itself, its orientation, wooden logs laid perpendicular to the walls, and the use of fire in the funeral rite are striking. However, there are significant differences. In the Mederivskyi mound, the logs were laid in a single row near the tomb wall. The authors of the excavations call them a flooring. Around this flooring were tree trunks lying radially (Bokii 1974, 264). The technology of burning a wooden structure was also significantly different, since the tomb of the Mederovskyi barrow was almost completely burned down, and the ancient ground surface was heavily baked.

As already mentioned, both mounds are located at a close distance, have similar features of funerary structures and rites. The iconographic similarity of the stone anthropomorphic stelae is also striking. The time of construction of the barrows is also close. It should be noted that the burial structure studied in Barrow near the village of Vasyne is distinguished by its scale and strength. The special pyramidal structure in the core of the mound is a kind of variant of chamber tombs of Scythian times, which as yet has no direct analogies.

The combination of finds from the barrow near the village of Vasyne and the images on the stele allow us to date the burial in a ground level chamber tomb to the beginning to the first quarter of the V century BC.

The materials of the monument also make it possible to determine the cultural and ethnic attribution of the complex. In the mound near the village of Vasyne, there are seven of the nomadic features identified for the Scythian period by S. Skoryi (Skoryi 2003, 53) burial in a barrow with a ditch built around it; 2) a ground-level wooden structure; 3) the use of fire in the ritual; 4) the remains of a plant mat in the chamber; 5) the remains of meat ritual food; 6) the skeleton of a slave was found in the grave; 7) a stone anthropomorphic statue. Taken together, these features allow us to classify the Vasyne barrow as a purely Scythian steppe monument. It is obvious that a member of Scythian military aristocracy was buried here.

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Beata Polit[1]

SECOND LIFE OF DAMAGED THINGS: REPAIRING AND MODIFYING JEWELLERY FROM THE CRIMEA IN THE SARMATIAN PERIOD

ABSTRACT

Polit B. 2023. Second life of damaged things: Repairing and modifying jewellery from the Crimea in the Sarmatian period. *Sprawozdania Archeologiczne* 75/1, 357-370.

Crimean jewellery from the Sarmatian period (2nd century BC – 4th century AD) includes a small but interesting group of adornments with traces of damage and repair. These artefacts were elements of grave inventories of the people of the Late Scythian and Sarmatian cultures – deposited exclusively in female and child graves. Most of the repaired personal ornaments are earrings and bracelets. Their quality is usually very low. The existence of repairs made jewellery look less attractive and they were limited to modifications allowing their owners to use such adornments again. The general quality of the repairs seems to indicate that they were performed by people lacking expert knowledge of jewellery making.

Keywords: Ukraine, Crimean Peninsula, Sarmatian period, jewellery, repairs
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INTRODUCTION

Metal jewellery from the Crimea in the Sarmatian period (2nd century BC – 4th century AD) is a numerous and diverse group of artefacts. The fact that the people of the Late Scythian and Sarmatian cultures inhabiting this region were fond of jewellery is clearly indicated by archaeological materials. Jewellery is found in the graves from the discussed territory often enough to make us suspect that there was a great disparity between the Crimea and the other settlement zones of the above-mentioned societies (Polit 2022, 175). Owing to project 2014/13/N/HS3/04575, financed by the National Science Centre, it was possible to collect earrings, bracelets, finger rings and band rings and subsequently analyse their typologies and chronologies (Polit 2022). This collection of adornments includes an interesting but small group of artefacts with traces of repair and later modifications. The items in question were discovered at several sites (Fig. 1). Previously, the fact that certain Crimean adornments from the Sarmatian period have such traces of repair did not arouse scholars' interest, although archaeologists attempted to tackle the question of fixing mending other types of artefacts in ancient times (Przychodni 2005; Zagórska-Telega 2017; Treister 2019, further literature there). With this regard, it is vital to discuss the

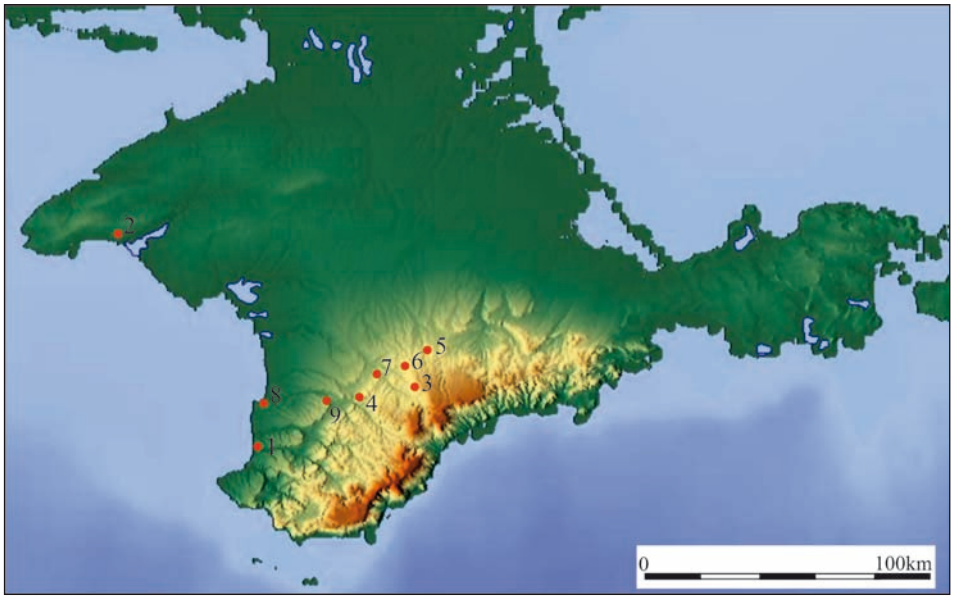

Fig. 1. Map presenting the locations of the Crimean sites mentioned in the article. 1 – Belbek IV (Sevastopol Municipality); 2 – Beliausa (Chornomorske Raion); 3 – Druzhnoe (Simferopol Raion); 4 – Levatki (Simferopol Raion); 5 – Neyzats (Bilohirsk Raion); 6 – Opushki (Simferopol Raion); 7 – Scythian Neapolis (Simferopol); 8 – Ust-Alma (Bakhchysarai Raion); 9 – Zavetnoe (Lenine Raion)
(based on https://maps-for-free.com, illustration by B. Polit)

problem of jewellery repairs – particularly describe their types and attempt to answer who performed them and where. Unfortunately, it is not very possible to conclusively answer the two latter questions.

TYPES OF REPAIRS AND THEIR EXAMPLES

Traces of repairs and modifications are mainly present on earrings and bracelets. In the former category of adornments, they can be found especially on silver specimens. It was mainly the fastenings of earring that were mended. Examples of such an operation are two earrings discovered at the Zavetnoe cemetery (Zaytsev *et al.* 2007, fig. 15: 4; 19: 18). One of them, found in Grave 310 (Niche 1, Burial 1), is made of smooth wire (Fig. 2: 1). One of its ends is bent in the shape of a hook, and the other is broken away. In order to repair the object, a hole was punched in the damaged end. The aperture and the hook formed a new fastening. An identical operation was performed on an earring discovered in Grave 311 (Fig. 2: 2). In both cases, the repair was crudely performed, which resulted in lowering the aesthetic value of the adornments, but at the same time made it possible for their owners to still use them.

The hoops of wire earrings were often damaged as well. These elements were rarely repaired, but a specimen discovered at the Druzhnoe necropolis can serve as an example here (Khrapunov and Masiakin 1998, fig. 3: 11; Khrapunov 2002, fig. 167: 11). The artefact was found in Grave 67 (Niche N, Burial A), dated to the second half of the 3rd century AD. It is made of thin bronze wire, one end of which is bent in the shape of a hook, whereas the other forms a loop. It represents type Polit V/2/A – such jewellery is one of the most common earring types used in the Crimea during the Sarmatian period (Polit 2022, 35). The

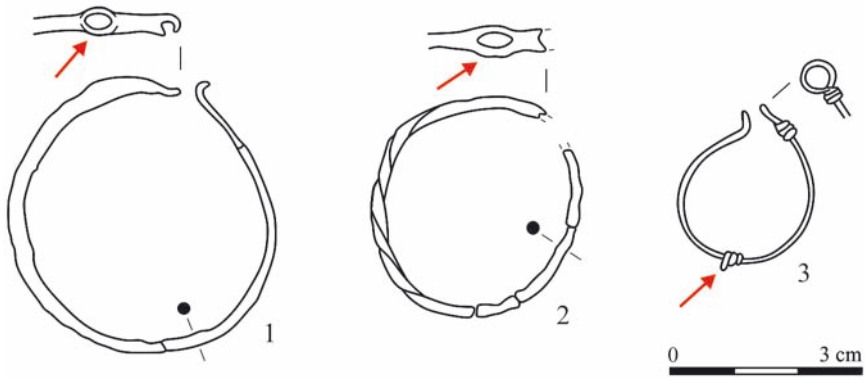

Fig. 2. Examples of earrings with repair marks. 1 – Zavetnoe, Grave 310, Niche 1, Burial 1; 2 – Zavetnoe, Grave 311; 3 – Druzhnoe, Grave 67, Niche N, Burial A
(after 1-2 – Zaytsev *et al.* 2007, fig. 15: 4; 19:18; 3 – Khrapunov 2002, fig. 167: 11)

Fig. 3. Bracelet with repair marks found in Grave 9 (Niche S) from the Opushki necropolis. The scale only applies to the bracelet drawing (drawing by S. Muld, photo by B. Polit)

Fig. 4. Bracelets discovered at the Zavetnoe necropolis, Grave 210. The adornment on the right was extemporaneously repaired (after Bogdanova 1962, pl. 3)

morphology of this adornment indicates that its delicate hoop was damaged and then repaired by binding together its two parts (Fig. 2: 3), which resulted in a slight distortion of the artefact.

Repaired bracelets are usually fractured specimens. They were fixed by permanently joining together their two parts. Such an item was found, *e.g.*, at the Opushki necropolis, on the left hand of one of the women buried in Grave 9 (Niche S). There is a detailed publication on this richly equipped funerary feature with two niches (Khrapunov and Stoyanova 2013, 184-188). The authors of the paper dated the grave from the second half of the 2nd to the first half of the 3rd century AD and, what is important, mentioned that the bracelet had been repaired, although they did not discuss the repair in detail. The bracelet has ends stylised in the shape of viper heads and corresponds to types Polit A/XV/5 and Trufanov A/VI/A (Trufanov 2001, 76; Polit 2022, 100). Its hoop was broken and then repaired by joining together both parts with the use of rivets (Fig. 3). This operation was preceded by slightly hammering the place where both parts meet. The current diameters of the bracelet are 58 × 60 mm, but it was bigger before the damage. This is the only known Crimean adornment repaired with this technique.

Traces of small repairs are present on bracelets with wound ends, which were popular in that period (Fig. 4). Such repairs were mainly performed on broken away ends of adornments with terminals carelessly wound around the hoop. A specimen discovered at the Zavetnoe necropolis, in Grave 210, is an excellent example of this operation (Bogdanova 1962, tabl. 3: 4).

It should be noted that some adornments were modified instead of being repaired. Such operations were mainly carried out on fractured bracelets: one fragment was bent to form a new, small bracelet. Artefacts recycled this way were asymmetrical and had warped hoops (Fig. 5: 1-9). Such objects were mainly found in child graves, *e.g.*, at the necropolises of Beliausa (*e.g.*, Grave 27), Levadki (*e.g.*, Grave 120), Opushki (*e.g.*, Graves 12; 25 and 32) and Ust-Alma (Grave 936) (Stoyanova 2012, fig. 6: 10; 15: 3-4; 23: 2; Dashevskaya 2014, tabl. 47: 28-29; Puzdrovskiy and Trufanov 2017, 81-82, fig. 178: 5; Muld and Antipenko 2019, fig. 1: 4). Such remodelled bracelets were occasionally found in the inventories of graves containing the bodies of young women – they were threaded on fibula needles (Fig. 6). The locations of such fibulae allow us to suspect that they were pinned near the right or left shoulder. Adornments joined this way appeared in the 2nd century AD (*e.g.*, Belbek IV, Grave 231; Scythian Neapolis, Grave 40), and continued to be used until the first half of the 3rd century, which is shown by materials found at the Neyzats cemetery, in Grave 103 (Symonovich 1983, 65; Khrapunov 2007, fig. 4; Guschina and Zhuravlev 2016, 171).

There are cases of Crimean adornments that were damaged and then remodelled into other types of jewellery, which changed their original functions. Items found at the Neyzats cemetery, in Grave 511 are an example of this recycling method (Khrapunov 2013, fig. 73: 25-26). The feature contained two circular artefacts with one pointed and one zoomorphic end. One of them was discovered near the left parietal bone of a man in the *Maturus* age (Burial 1; Fig. 7: a). Another, analogous, artefact was deposited near the right parietal bone of a woman (Burial 2; Fig. 7: b). The locations of these adornments were the reason why scholars referred to them as earrings. At face value, this interpretation appears to be

Fig. 5. Examples of recycled bracelets discovered in child graves. Neyzats:
1 – Grave 76; 2 – Grave 163. Opushki: 3 – Grave 12; 4 – Grave 21; 5-6 – Grave 25; 7 – Grave 32;
8 – Grave 47, Burial 1; 9 – Grave 47, Burial 2 (photo by B. Polit)

correct, but the morphology of the artefacts and the close resemblance of their ends to the terminals of zoomorphic bracelets allow us to suspect that they were originally wrist ornaments. Both artefacts were probably two parts of the same bracelet which was damaged (broken) and then remodelled to form the earrings. This assumption is corroborated by the fact that the adornments were found in the same grave. Nevertheless, metallographic analyses are necessary to definitely solve this puzzle.

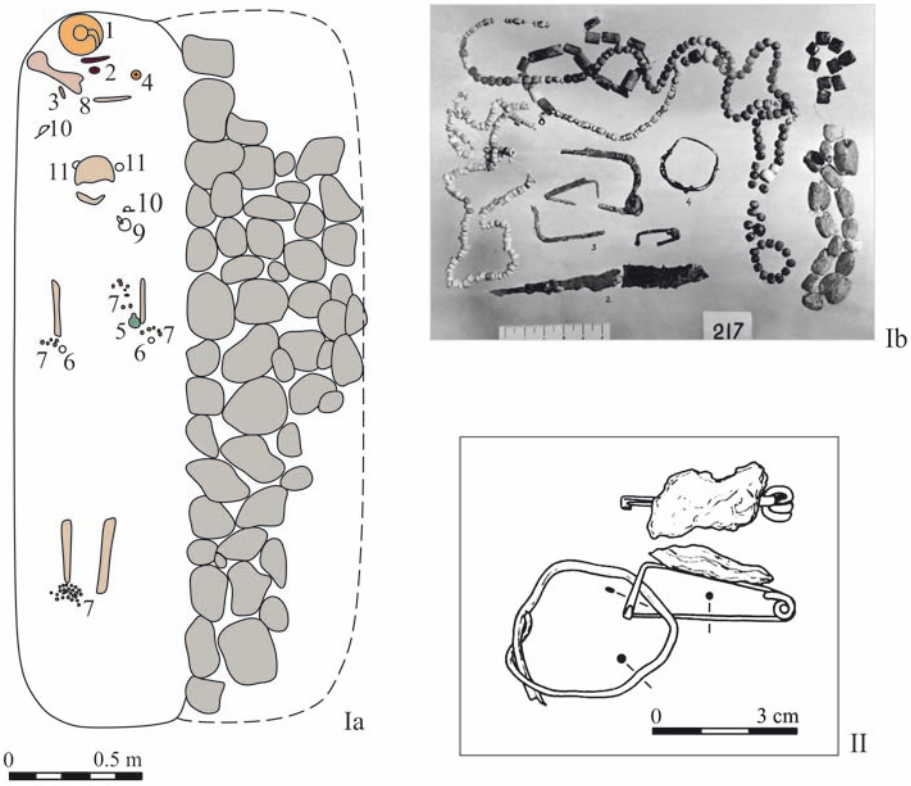

Fig. 6. Examples of modified bracelets threaded on fibula needles.
Ia – plan of Grave 217 from the Zavetnoe necropolis: 1 – pitcher; 2 – parts of a jewel casket; 3 – knife fragment; 4 – spindle whorl; 5 – mirror; 6 – finger rings; 7 – beads; 8 – animal bone; 9 – fibula with a modified bracelet; 10 – fibula; 11 – earrings. Ib – archival photograph of artefacts discovered in Grave 217 from the Zavetnoe necropolis, including a fibula and a modified bracelet that was originally threaded on its needle; II – Neyzats, Grave 92 (after Ia, Ib – Bogdanova 1962, tabl. XVI, II – Khrapunov and Stoyanova 2018, fig. 1: 21)

There are also groups of artefacts that were not repaired – for example, finger rings with bezel classified as types Polit IX and X. The posterior, thinner part of their shank is often damaged and does not have traces of repair.

Undoubtedly, the character of the above-presented repairs and modifications indicates that they were performed after the artefacts were damaged during use. Repairs did not consist of correcting defects during the production process. Most of the repairs and modifications were crudely executed simply by joining and bending adornments or their fragments. They did not require specialist knowledge or tools. Only the bracelet from the Opushki cemetery was fixed with the use of a more sophisticated method. The operation consisted of hammering and abrading the adornment, punching holes in it and joining

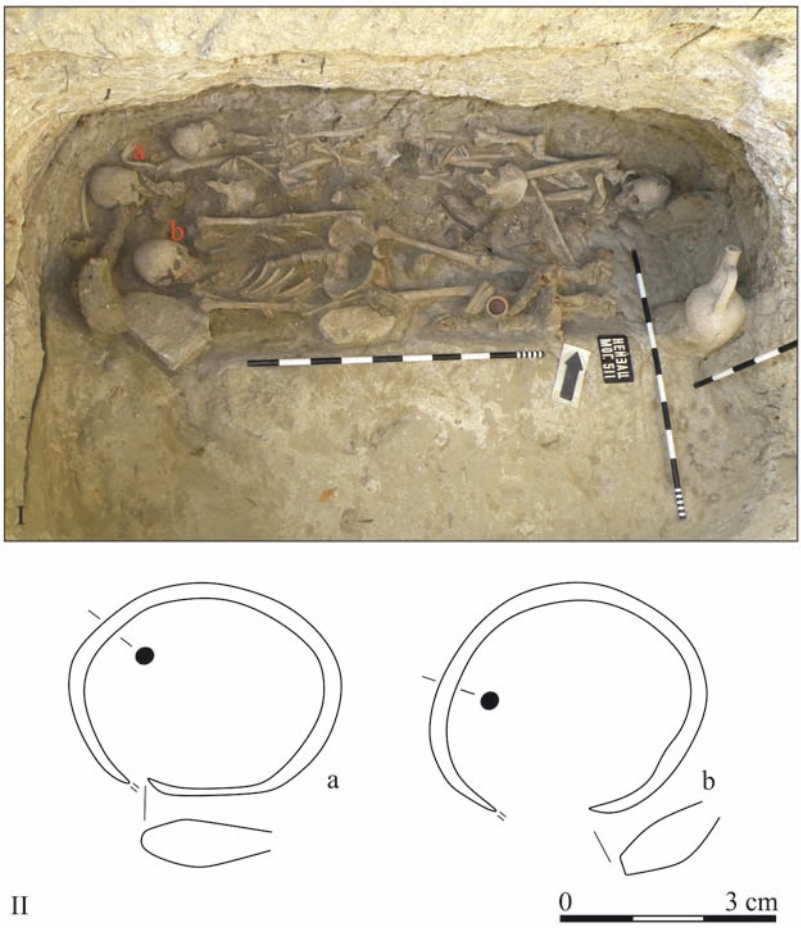

Fig. 7. Recycled jewellery discovered in Grave 511 from the Neyzats necropolis.
I – locations of the adornments in Grave; II – earrings made of a damaged bracelet. Symbols a and b correspond to the markings used in part I (after Polit 2021, fig. 64)

together both ends with rivets. We can suspect that the repair required appropriate knowledge and some specialist tools.

It is possible that the poor quality of the repairs or modifications of small adornments resulted not only from a lack of expert knowledge or specialist tools, but also from the fact that it was impossible to correctly perform such operations. The earrings from Zavetnoe were repaired by fixing one of the broken ends. Restoring the original look of adornments required joining together broken elements, *e.g.*, by soldering. Because of the thinness of the wire used in the production of earrings, the above-mentioned method of restoration could not be performed on this type of adornments. All modifications required changing

the functions of these artefacts. This is probably the reason why other techniques were employed here. Earrings were repaired by punching new holes to serve as fastening elements.

WHO REPAIRED ADORNMENTS?

Jewellery products should be repaired by experts in jewellery craft, because any incompetent operation lowers the aesthetic value and, as a consequence, price of a fixed item. The traces of repair on Sarmatian period jewellery from the Crimea compel us to think why they were performed in such an incompetent manner and who repaired them. This is puzzling because we can suspect that the discussed adornments belonged to women having a stable social position. This is clearly indicated by the inventories of their graves. For example, in the Zavetnoe necropolis, some of the graves contained not only original artefacts (*e.g.*, in the case of Grave 310 [Niche 1, Burial 1] an enamelled Kropotov 16/65 [= Hellström VII.4.4] type fibula and in Grave 311, a Kropotov 16/29 [= Hellström VII.3a] type fibula), but there was also a considerable variety of other adornments found in these features (Kropotov 2010, 308; Hellström 2018, 136, 270). Most probably, the owners of the repaired jewellery were affluent women for whom buying or exchanging damaged adornments was not a problem. They were provided with the services of specialist artisans, so the low quality of the repairs is even more puzzling. We should remember that we know of similar examples of tastelessly repaired adornments from the Sarmatian environment discovered in rich graves. For example, in Burial Mound 55 located in Kalinovka (Volgograd

Fig. 8. Repaired bracelet from Burial Mound 55 (Burial 8) located in Kalinovka (Volgograd Oblast, RU) (after Korolkova 2008, fig. 5)

Oblast, Russia), two spiral, zoomorphic bracelets made of gold were discovered near Burial 8. One of them was damaged and next repaired in ancient times (Fig. 8). It should be noted that – although this operation was not performed in a sophisticated manner – the places of the fracture were properly prepared for further repair with the use of tools and then bent and joined together (Korolkova 2008, fig. 5). What can therefore explain the low quality of the repairs? T. Bochnak and P. Harasim – when discussing the question of repairing weapons in the Przeworsk and Oksywie cultures – reached the conclusion that poorly performed repairs might indicate that the warriors of these two cultures had no access to production and distribution centres, whereas the local artisans had a modest knowledge of this craft in comparison to the makers of the original artefacts (Bochnak and Harasim 2015, 529). In light of the above-presented facts, we should try to guess where such Crimean jewellery workshops might have been localised and think about what was the access of the local population to experts able to perform professional repairs. Undoubtedly, specialist production centres operated in the classical ancient cities in this region, but their presence in barbarian settlements was not confirmed. Nevertheless, new findings concerning jewellery from the Crimea in the Sarmatian period allow the possibility that at least some adornments were produced by the barbarian population, especially simple forms whose origin is linked with local traditions (Polit 2022, 100). If the local artisans produced adornments, there must have been at least minor workshops, which are still to be discovered. We must remember that previous archaeological works were mainly focused on researching cemeteries. Settlements were only sporadically excavated, which could be the reason why we know no workshops from the discussed region. It should be mentioned that most of the necropolises have even several hundreds of burials. Undoubtedly, large settlements must have functioned near such vast cemeteries. We can suspect that they were inhabited by people with high aesthetic tastes, fond of enriching their costume with different types of jewellery. It appears that the high demand for adornments resulted in the presence of people providing access to such products (traders and artisans).

Although we do not know typical goldsmithing tools from the Crimea, some graves contained tools that might have been used in metal processing. Especially worth mentioning is an interesting discovery at the Druzhnoe necropolis (Khrapunov 2002, 43). A set of blacksmith tools was found near the wall of the burial chamber of Grave 78 – dated to the 4th century AD. The report of this assemblage by I. N. Khrapunov mentions that it included a pair of iron pincers, iron hammer, iron anvil, unspecified iron items and two artefacts described as 'moulded stones' (Khrapunov 2002, 4, tabl. 183; 184: 5). A closer look at the items whose function remains unknown allowed us to suspect that one of them – with the remains of a wooden handle – was a file, whereas the other was a riveter (Khrapunov 2002, tabl. 183: 2, 5). The two stones are probably smooth planes. The set of blacksmith tools from the Druzhnoe necropolis is similar to those discovered at sites right across the Middle European *Barbaricum* (*cf.* Kokowski 1981; Żygadło 2002). Iron pincers analogous to those found in Druzhnoe were discovered in the robbed vaulted Grave 272 at the Neyzats

cemetery (Khrapunov 2011, fig. 37: 11). It is possible that this artefact belonged to a set of blacksmith tools, but the rest of the instruments were later stolen from the grave.

It appears that the above-presented simple repairs and modifications were performed by local people in small – maybe even domestic – workshops. We cannot rule out the possibility that the owners of the adornments – or their partners – carried out these operations. What is interesting, the similar method of repairing the two earrings from the Zavetnoe necropolis – as well as the similar chronologies of Graves 310 and 311 – allow us to suspect that they were repaired by the same person. Only the repair of the bracelet found at the Opushki cemetery might have caused some trouble. It was mended by riveting, which required some knowledge and tools, but still might have been performed in a home workshop. As Treister observed, the technique of riveting was employed across Sarmatia and Scythia. Already in the 2nd-3rd centuries AD, nomads were able to repair vessels with riveted patches (Treister 2019, 319).

CONCLUSIONS

Repaired jewellery can only occasionally be found in the Crimean materials from the Sarmatian period. Nevertheless, it appears that the people of the Late Scythian and Sarmatian cultures repaired damaged adornments. The scarcity of such jewellery in archaeological materials is to a great extent the result of not including information on traces of repair of objects by archaeologists analysing them. Re-examining the published materials for finding traces of repair – which resulted in finding them on certain artefacts – proves this observation correct. We need to bear in mind, however, that some traces of repair might have been overlooked and not included in drawings and descriptions. This is why the number of such items may be much higher. This should not be surprising, as people have been repairing damaged items for ages (*e.g.*, Treister 2019). Still, we must remember that repaired artefacts – especially jewellery – often lost their aesthetic and functional value. They were repaired because of economic reasons. Although the number of adornments discovered across the Crimean Peninsula allows us to suspect that they were easily accessible for people from different social groups, losing or damaging them was not meaningless for their owners. Items of jewellery were material goods whose value depended not only on the price of the used raw materials, but also on labour input, because such artefacts – even not very sophisticated items – must have been produced by artisans with proper skills. If a damaged adornment could be fixed, it was repaired or recycled and reshaped to be worn by a child (Polit 2018, 446-447). The discussed materials clearly indicate that fragments of damaged adornments were reused, and the principle of not wasting products that can be reused was also present in other periods (Skóra 2014, 215, 216; 2020, 96; Mączyński and Polit 2017; Mączyński 2019, 49). It is possible that damaged adornments were treated as scrap metal and recycled by melting.

It is also worth considering if such jewellery was worn every day, or, as items of lesser value, they were mainly deposited in graves. Taking into account the fact that repaired jewellery was discovered in graves along other adornments – sometimes of the same type – we can suspect that it was worn during the lives of the buried persons.

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FROM KYIV TO PEREYASLAVETS (Πρεσθλαβίτζα). THE EARLY MEDIEVAL STONE EGG IMITATIONS AND GLAZED EGG-SHAPED RATTLES FROM DOBRUDJA, ROMANIA

ABSTRACT

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This article focuses on the finds of glazed egg-shaped rattles as well as on egg imitations of chalk and of Roman bricks discovered in Dobrudja and in nearby Varna. It is assumed that they were used in magical and religious rituals connected with fertility and vegetation cults, as well as in apotropaic and healing rites. Chalk imitations dated prevailingly to the 10th century could be relics of a local Christian-pagan syncretism. Glazed items were most probably imports from Kyiv workshops in Kyivan Rus'. The latter should be associated with the presence of people engaging in military operations led by Rus' princes, namely mercenaries and even more probably, with merchants travelling along the waterways leading from the Varangians to the Greeks. This route was most intensively exploited in the time from the middle of the 10th to the middle of the of 11th century, which correlates with the chronology of the layers and graves where these glazed eggs were discovered, their dating points mainly being to the 11th century.

Keywords: Dobrudja, Kyivan Rus, glazed egg-shaped rattles, Early Middle Ages
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1. INTRODUCTION

Dobrudja, a region in Romania called also Lesser Scythia, was a cultural melting pot during the Early Medieval Period. It was first and foremost affected by its localization; it is an area squeezed and limited to the final section of the Lower Danube and its delta. On the east, the Black Sea shore constitutes its natural border; the coastal line running from the north changes from the lagoon type to a sheer cliff of limestone. Solely from the south, the region of Dobrudja does not have any geographical border as it opens up with its wide front toward the Danubian Plain. Having been geographically formed this way, once the Danube River is crossed, its last section is formed into multiple backwater pools enabling an easy river crossing which makes the region a perfect communication artery leading southward. The important geographical element of this region is its biodiversity which permits any settlements to flourish; historically, it was inhabited by populations with post-antique traditions, as well as subsequent waves of peoples migrating here from across the Danube, *i.e.*, Slavs, Bulgarians or Pechenegs (*cf.*, Barnea and Ştefănescu 1971; Rădulescu and Bitoleanu 1984; Bozhilov and Gyuzelev 2004). The area from which the stone egg imitations and glazed egg-shaped rattles analyzed here come from encompasses the territory of today's Dobrudja within its current borders, *i.e.*, its northern part within Romania and the smaller southern part in today's Bulgaria and the neighbourhood of the modern Varna city (Davidova 2011).

2. STONE EGG IMITATION AND GLAZED EGG–SHAPED RATTLES: DESCRIPTION AND ARCHAEOLOGICAL CONTEXT OF THE FINDS

Fourteen ceramic egg-shaped rattles and seven of their fragments from the territory of Dobrudja are known in the literature; they have been found in Byzantine fortresses such as Dinogetia-Gărvan, Tulcea county (Barnea 1967, 327, fig. 149: 12, 13), Hârşova-Carsium, Constanţa county (Paraschiv-Talmaţchi 2017, 278, fig. 5: 3), Păcuiul lui Soare, Constanţa county (the only reference in: Paraschiv-Talmaţchi 2017, 278), a settlement in Nufăru, Tulcea county (Mănucu-Adameşteanu 2018, 111), the cemetery of Isaccea, Tulcea county (Vasiliu 1984). Chalk eggs were discovered within the Christian rock-cut monastery in Murfatlar-Basarabi, county Constanţa (Damian *et al.* 2009, 125, 127, fig. 19: a-c) and also in a pit in Isaccea near the fortress in Noviodunum, Tulcea county (Stănică *et al.* 2010, 208). Additional information in literature on the subject can be found about one more glazed-rattle egg from the settlement in Isaccea as a stray find (Fig 1: 1-6; Vasile 1984, ft. 120). Another three egg-shaped rattles are known from northeastern Bulgaria, more precisely from the area located exactly at the southern border of Dobrudja. In the first source text on the subject, all three glazed egg imitations were attributed to the excavations car-

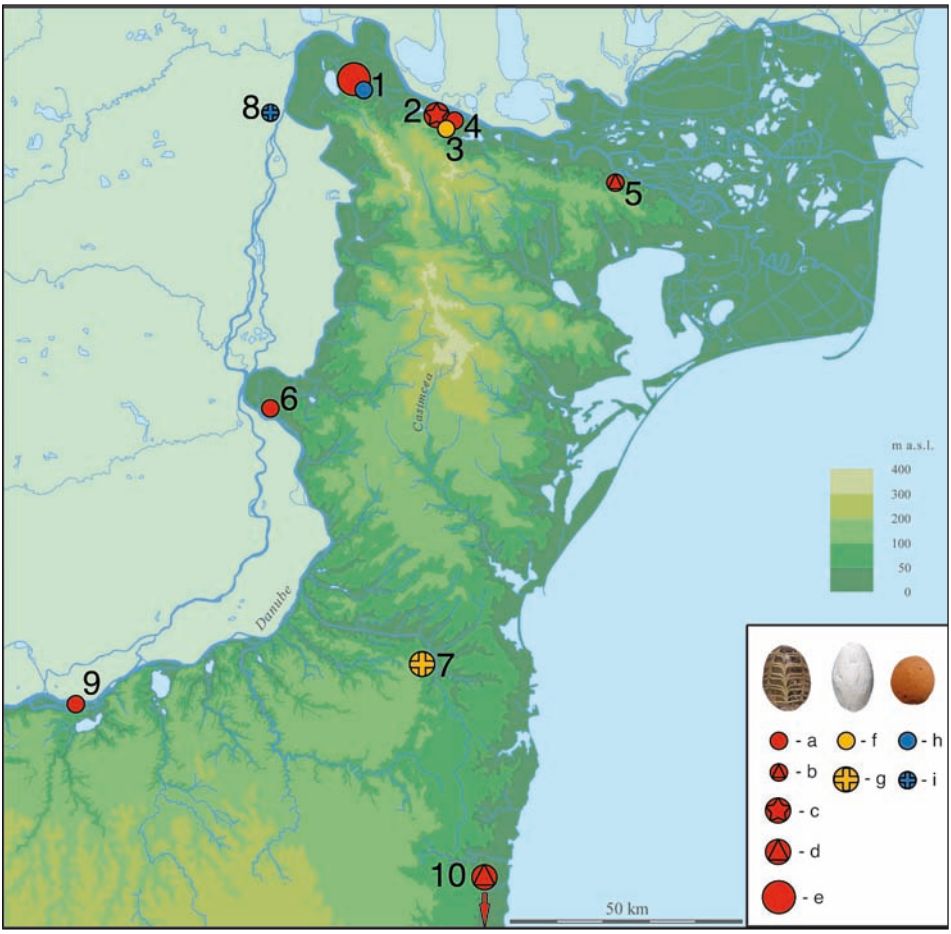

Fig. 1. Glazed egg-shaped rattles from Dobrudja and its vicinity:
1 pc – a) fortress, b) settlement; 2-5 items – c) cemetery, d) settlement; more than 5 items – e) fortress. Egg imitation of chalk: 1 item – f) settlement; g) rock cut monastery; Egg imitation of reused Roman brick: 1 item – h) fortress, i) cemetery.
Romania: 1 – Dinogetia-Gărvan, Tulcea County; 2 – Isaccea-Tumulus IB, Tulcea County; 3 – Isaccea-Lutarie, Tulcea County, 4 – Isaccea-Noviodunum, Tulcea County; 5 – Nufăru, Tulcea County; 6 – Hârşova - Carsium, Constanța County; 7 – Murfatlar-Besarabi, Constanța County; 8 – Brăila, Brăila County; 9 – Păcuiul lui Soare, Constanța County
Bulgaria: 10 – Varna Thermae, Varna Province (drawing B. S. Szmoniewski)

ried out in the 1960s on the Early Medieval cultural layers around the Roman *thermae* in Varna (Fig. 1: 8; Yotov and Pavlova 2004, 85, 95, no. 67). In works published later, however, the place of the discovery of one of the three eggs is described as an inhumation cemetery in Odartsi, in Bulgaria (Yotov 2018, 470, fig. 6.3) yet it is done without relating to any source information. In a monograph on this 11th century cemetery by L. Doncheva-

Fig. 2. Distribution of the Early Medieval glazed egg-shaped rattles in Europe: a – place of the find, b – Kyiv, c – approximate borders of Kyivan Rus, 11th-12th centuries. After Gabriel 2000, changed with B. S. Szmoniewski's supplements. Drawing by K. Rosińska-Balik and B. S. Szmoniewski

Petkova (2005), no information is to be found about this find. Finally, two egg-shaped artefacts should be mentioned, made of the Roman brick and found within the territory of Dobrudja inside the Dinogetia-Gărvan fortress mentioned above (Barnea 1967, 327, 328, fig. 149: 12, 13), as well as one such object discovered in one (?) of the Early Medieval graves unearthed in the area of Brăila (Fig. 1: 1 and 8; Cândea 2010, fig. 1; Yotov 2018, 469, fig. 2: 6). This area is visible from Dinogetia since it is located directly on the opposite bank of Danube, southeast of the river.

Thus, Dobrudja constitutes the third biggest concentration of these artefacts outside the north-western Slavic lands, mostly Polish ones (Bukowska 1958; Gabriel 2000; Ślusarski 2004; Kajkowski 2020), and outside of Kyivan Rus' territories (Makarova 1966; Shovkoplyas 1980; Gabriel 2000; Sushko 2011; Tkachenko 2018). Apart from Dobrudja, glazed egg-shaped ceramic rattles are sporadically discovered within the areas of habitation of the early medieval Baltic tribes (Shiroukhov 2014, 393), in South Scandinavia (Holger 1948, 469, fig. 2: 6), in Moravia (Merínský 2013, 49) and Slovakia (Fig. 2; Fusek 2013; König 2014, 67, 68).

Regarding their parameters, imitation of eggs including the ones that served as rattles are of the size of big hen eggs or duck eggs. Based on some completely preserved samples, it is possible to estimate the range of their maximal diameters from 2.8 cm to 3.7 cm for chalk items and diameter ranges from 2.7 cm to 3.7 cm and their lengths are from 3.5 cm to 5.0 cm for glazed egg-shaped rattles. In regard to their ornamental patterns, and considering here both the presence of such patterns or its lack and the material used, the eggs can be classified as follows:

1) imitation of eggs without any glaze, made of various kinds of limestone as well as of re-used Roman bricks, comprising two variants: a) undecorated; b) decorated ones,

2) glazed egg-shaped rattles a) undecorated b) decorated.

Both those decorated and those lacking decoration were made in the technique of forming clay of good quality tempered by the admixture of fine-grained sand. Only in one case did the clay under the glaze have a white colour because kaolin clay was used for its production, however, in all other cases, the good-quality clay had a colour approximately red and orange (Barnea 1967, 327). The glazed egg-shaped rattles were empty inside and their walls had diversified thickness – so, such an egg inside had a kind of a fusiform chamber in which a clay ball or a stone was enclosed that made a sound when the egg was shaken. Its surface was most frequently covered with an opaque dark-brown, black or dark-green glaze. Many attempts to reconstruct the production cycle of glazed egg-shaped rattles have been proposed in the literature (see Kaczmarek 1998; Łukaszczyk 2014; Sushko 2020, Siemianowska *et al.* in print). Some traces of the forming process that have been documented for the damaged examples point to two possible manufacturing techniques. The first one, more frequently observed in the archaeological evidence, was based on modelling the egg in free-form using joined clay bands starting from the wider end of the egg and proceeding to its narrow end provided with a hole. Objects produced by this technique display, however, a lesser regularity of their form (Makarova 1966, 141; 1967, 42; Kaczmarek 1998, 553). Another technique, experimentally confirmed by J. Kaczmarek, was based on wrapping clay with the addition of sand around a wax core. Objects made this way (Kaczmarek 1998, 553 with references) display a significant regularity of their form. The technique of glazing, however, remains unclear. One hypothesis describing it as fusing the glaze in a furnace after the egg having been dried is to be questioned, because, according to Kaczmarek, "this technique was hardly used during the medieval period, as it

required such a combination of raw materials used as components as to provide that the temperature to be reached to fuse the glaze and fire the clay should be approximately the same" (Kaczmarek 1998, 553). T. Makarova assumed that the clay eggs were dipped in the glaze, and as next, their surface must have been covered by decorative patterns (1966, 141; 1967, 42). In view of her suggestion, it still must be unclear whether the object was dipped in the ready melted glaze or rather, if it was smeared with a mixture of powdered glass diluted in water to be fired (*cf.* Kaczmarek 1998, 554 with references).

Type 1, variant a (Fig. 3: 1-3) – the type 1, variant a includes two items resembling eggs and made of chalk, and also one item shaped approximately like the yolk of an egg and made of a recycled Roman brick. Two chalk eggs lacking decoration were found in a cave churches complex, dug in soft chalk rock and localized on the outskirts of the town of Murfatlar-Basarabi, on the right bank of the former Carasu Valley and at a distance of about 20 km west from the historical district of Constanţa – Tomis. Inside of a part of an already non-existing chalk hill, within a largely extended block with the parameters of 9.5 × 9.5 m., six basilicas (labelled B1-B4, E3 and E5), were hewn in rock along with five galleries (in some of them, inhumation burials were placed), together with other rooms that created a closed sacral system. Basilicas and galleries had their entrances from the north side, and due to the scarcity of space they were situated next to one another and oriented to the east or in south-east direction (Barnea 1962, 189, fig. 8; Damian *et al.* 2009).

The first of the undecorated chalk eggs of a fusiform shape, both 5.9 cm long and 3.7 cm diameter at, was found of basilica B2 (Fig. 3: 1). It is the smallest of the basilicas and can be regarded as a simple basilica with apses; in this case, the apse is oriented to the south-east (Barnea 1962, 192-194; Damian *et al.* 2009, 121, 122, fig. 5: b). Another undecorated egg with a length of 6 cm and diameter of 3.7 cm was found within the foundation outline of basilica B4 (Fig. 3: 2). This basilica is located directly under basilica B3. Similarly, as with the feature B2, the apse was oriented to the south-east. Basilica B4 is also the most interesting structure due to the quantity and diversity of its depictive motives carved in the soft chalk walls (Barnea 1962, 198; Damian *et al.* 2009, 122, fig. 5: c). The chronology of these finds is determined to be 10th century A.D. (Damian *et al.* 2009, 127, fig. 19: a-b). One imitation of an egg made of a re-used brick of the Roman period, approximating to a hen's egg by its size, was discovered within cumulative layers of settlements in the fortress of Dinogetia-Gărvan with the chronology relating to the 11th century (1967, 327, 328). Outside the Dobrudja region but quite close to it, namely in the neighbourhood of Brăila on the other bank of the Danube, south-east of Dinogetia-Gărvan, a similar egg was found, round in its form, and made also of a recycled Roman brick; it was placed probably in one of the inhumation graves dated in 10th-11th centuries (Fig. 3: 3; Cândea 2010, fig.1; Yotov 2018, 469, fig. 2: 6).

Type I, variant b (Fig. 4: 1, 2) – two items can be included in this type. The first of them was discovered in Murfatlar-Basarabi, the rock cut monastery mentioned earlier, more precisely in its sector 6 in one of the backfills after chalk had been quarried. It is

Fig. 3. 1, 2 – Chalk imitation of egg from cut rock monastery in Murfatlar-Basarabi (1 – chapel B2; 2 – trench of the chapel B4); 3 – Roman brick imitation of egg from grave located in Brăila city area (1, 2 – courtesy: Institute of Archaeology Romanian Academy, Bucharest, 3 – after Yotov 2018)

Fig. 4. 1, 2 – Chalk egg imitation from Murfatlar-Basarabi and Isaccea-Lutarie (1 – sector 6; 2 – pit nr 5); 2b – details of the surface engraving (1 – courtesy: Institute of Archaeology Romanian Academy, Bucharest; 2a, b – Eco-Museum Research Institute, Tulcea)

partially preserved, and its surface is richly decorated with a motif of a band consisting of a pattern of bows and triangles – wolf's teeth of different sizes with the preserved parameters of 4.1 cm of length and 3.3 cm in diameter (Fig. 4: 1). The chronology of this item, similarly as in the previously mentioned two eggs, is set in the 10th century (Damian *et al.* 2009, 125, 127, fig. 19: c). Another object made of chalk approximating a hen egg in its size was found in pit 5 in its quarter S2 in the year 2005 during the excavations in the eastern part of the archaeological complex in Isaccea-Lutarie, which is located outside the fortifications (extramuros) of Noviodunum fortress. The analyzed egg is of a small size with a length of 3.6 cm and diameter of 2.8 cm. On its surface, there are several engravings, two of which depict crosses, one is a letter H, and two resemble anchors arranged in opposite directions to each other and joined by their shafts (Fig. 4: 2a-b). Pit 5 along with several other pits, due to the presence of many clay objects inside them as well as Byzantine coins and fragments of glass items has been attributed to the 11th century phase of the site (Stănică *et al.* 2010, 208).

Type IIa. Glazed egg rattle without decoration (Fig. 5: 5). Only one egg-shaped rattle can be included in this group, and it was probably found in Varna in a cultural layer of the Early Medieval Period – in a horizon dated to the end of 10th to the 11th century, in an area where Roman period *thermae* once were (Yotov and Pavlova 2004, 95, fig. 85: 67). The egg was covered with dark-green glaze, now partially rubbed off. Its length is 4.1 cm and its diameter is 3.0 cm.

Type IIb. Glazed Egg rattle with decoration (Figs 5-7). This is the most numerous group regarding the number of discovered items. They are found both in the funerary context and in cultural layers.

Variant 1 (Fig. 5: 1, 3, 4, 6, 7; 6: 2-4; 7: 1) – this variant includes the biggest number of eggs: seven were found in Dobrudja, and two others come from Varna, from its eastern border. Any differences in decoration are insignificant and limited to the thickness of horizontal light-coloured lines forming the feathered patterns obtained by combing and to the precision of applying the motifs onto the surface. They are covered with dark-green or brown glaze, partially decolourised due to the influence of post-depositional factors, and bear ornamental patterns of hues ranging from light to dark yellow. All the items have holes in their bottoms. The largest number (five of the fully preserved eggs) has been found in the early medieval graves in Isaccea; the burials constitute a part of an inhumation cemetery which was dug into the earthwork of a mound from the Roman Period, more precisely, from the first half of the 2nd century AD (Vasiliu 1984, 107, 125, pl. 2).

One item is from Dinogetia-Gărvan, its length is 3.8 cm and its diameter is 3.1 cm. The surface is covered with dark green/brown glaze, additionally decorated by an ornament of a loose circumferential spiral of thin bands of yellow colour that have been feathered at intervals (Fig. 5: 1). In the lower part, at the bottom, there is a small opening. This glazed egg-shaped rattle was discovered in settlement layers of the Roman-Byzantine fortress in Dinogeta-Gărvan; these layers are dated to the 10th-11th centuries (Barnea 1967, 327, fig. 149: 12).

Fig. 5. Glazed egg-shaped rattles. 1, 3 – Dinogetia-Gărvan; 2 – Nufăru; 4 – Hârşova-Carsium; 5-7 – Varna-Roman *Thermae* (1, 3 – cultural layer; 2 – pit; 4 – cultural layer, 5-7 – cultural layer/sunken dwelling destroyed by fire) (1 – courtesy: Eco-Museum Research Institute, Tulcea and 3 – after Barnea 1967, 4 – Paraschiv-Talmaţchi 2020, 5-7, courtesy: Archaeological Museum in Varna)

Fig. 6. Isaccea-Tumulus Ib 1 – Grave 111; 2 – Grave 148; 3 – Grave 148; 4 – Grave 135
(1-4 courtesy: Eco-Museum Research Institute, Tulcea)

Fig. 7. Isaccea-Tumulus Ib 1 – grave 129; 2 – Isaccea-Noviodunum, stray find (courtesy: Eco-Museum Research Institute, Tulcea)

Two glazed egg-shaped rattles, one of them belonging to this variant and the other of type IIb variant 2 (Fig. 6: 1) constituted a part of the grave good assembly of Burial 111, in which an adult person was buried. These items were placed by the left thigh (Vasiliu 1984, 125, pl. 8: 21). The parameters of the egg of this variant are: length 4.5 cm, diameter 3.3 cm (Fig. 6: 2).

In Grave 129, which also belonged to an adult person, one egg was placed by the left thigh. Partially damaged, length 4.6 and 3.1 cm wide (Fig. 7: 1). Apart from this artefact, there was also in the grave a bronze ring (Vasiliu 1984, 126, pl. 8: 19).

Another egg was one of the two elements of the grave good assembly in Burial 135. The adolescent person buried inside was also given a glazed egg-shaped rattle (Fig. 6: 4) by the left thigh (length 4.6 cm and diameter 3.5 cm). Additionally, in this grave there was also a bronze ring of an approximately circular shape and made by twisting two wires (Vasiliu 1984, 127, pl. 8: 18).

In Grave 148, in which an adult was buried, the grave goods included one egg (Fig. 6: 3), length 4.6 cm, diameter 3.1 cm, placed similarly as in the others, by the left thigh (Vasiliu 1984, 127, pl. 8: 17).

Two other glazed egg-shaped rattles bearing similar decoration were found in settlement layers dated to the Early Medieval Period in the times where the fortresses were playing their role for the Byzantine empire, in Dinogetia-Gărvan (Fig. 5: 3) mentioned here several times and in Hârşova-Carsium (Fig. 5: 4). In the first case, as with the rest of such cases, the item was discovered within the layers dated in the 11th – first half of 12th centuries. Its dimensions are: length 4.7 cm and diameter 3.3.cm (Barnea 1967, 327). The glazed egg-shaped rattle from Carsium was unearthed in a part of the early medieval fortress, south of Feature 1/2008, in a cultural layer which can be dated to the period from the second half of the 10th century to the 11th century and perhaps to the beginning of the 12th century based on the evidence of glazed ceramics found there. Its parameters are: the height at 4.75 cm and its diameter at 3.6 cm (Fig. 5:3; Paraschiv-Talmaţchi, 2017, 278).

Another two glazed egg-shaped rattles were found in the early medieval cultural layers dated to the 11th to 12 centuries in the area where Roman *thermae* had been located. The first of these items (4.2 cm long, 3.1 cm diameter) was said to have been found within the Square 1 at a depth of 2.2 cm (Fig. 5: 6). The second item might have been found at the depth of 1.3 cm in a semi-dugout dwelling localized in Square 9 which could have been burnt at the end of the first half of 11th century which was indicated by the finds of 18 Byzantine coins dated in the time from the end of the 10th century but prevailingly in the 1st half of the 11th century It is 3.8 cm long with a diameter of 2.9 cm (Fig. 5: 7) (Yotov 2005, 144, 145, 149, 152: 41-42).

Variant 2 (Figs 6: 1 and 7: 2) – this group includes two glazed egg-shaped rattles. The first of them belonged to a grave good assembly in Burial 111 along with the item type IIb variant 1 described earlier (Fig. 6: 2) (Vasiliu 1984, 125, 8l. 8: 20). It is of irregularly oval shape, with slightly articulated tip, especially one side looks as if during its firing in

the kiln, part of its glaze dribbled toward the bottom. Its parameters are: 5.0 cm long, 3.7 cm diameter (Fig. 6: 1).

Another glazed egg-shaped rattle of this type was accidentally found in the surface layer within the fortress in Isaccea-Noviodunum (Vasiliu 1984, 140, ft. 120). It is of irregular shape, especially in its upper part. It is 4.9 long with a diameter of 3.7 cm (Fig. 7: 2).

Variant 3 (Fig. 5: 2) – One egg of this type with dark green glaze on its surface and with the thread decoration of approximately lemon colour. This decoration is made with very low precision. It is 3.5 cm high with the parameter of 2.7 cm. Found in a waste pit in Nufăru, strada Bisericii (Church street). In this pit, numerous fragments of ceramic vessels were also unearthed, as well as a spindle whorl made of the Ovruch pyrophyllite slate. The whole content of the waste pit is dated to the time between the end of the 11th century and the first decades of the 12th century, no later than the year 1122 (Manucu 2018, 111).

3. FUNCTION AND SOCIAL SIGNIFICANCE

The auite significant role and social impact of the glazed egg-shaped rattles in Slavic communities is indicated by the fact that in the case of Dobrudja, they are found on the sites which bore a great importance for the defence, administration or trade exchange of the region. These sites are mostly localized along the right banks of the Danube (Dinogetia, Isaccea, Noviodunum and Carsium), as well as on the coasts of the Black Sea (Varna) – namely, along the very important military and trade route leading to Constantinople. Let us then consider how the contemporary inhabitants of this region could have perceived these egg-shaped rattles. It is beyond any doubt that in Central and East Europe during the Early Medieval Period, in their various forms ranging from a natural egg through egg-shaped stones to glazed clay rattles, eggs in general constituted an outstanding element of both spiritual and material culture of Early Slavic communities.

Could these kind of artefacts be perceived in a similar way also around the lower run of Danube? With the above question, another one arises: who were the owners of the egg-shaped rattles?

An egg has always enjoyed a deep symbolic meaning mainly in connection to its being associated with a new life, fertility, renewal (Newall 1971; Newall 1984), and for a traditional society, it represented a kind of "life condensed" as it was cleverly put by Kazimierz Moszyński *in statu nascendi* (Moszyński 1967, 316). The process of life being formed inside an egg finds its reflection in many cosmogonic myths (Kowalski 1998, 172). In the case of territories occupied by Slavic settlements, a certain archaism and prehistoric character of the motive of the world hatched from the cosmic egg has been pointed out (Toporow 1977). Moreover, Adrian Mianecki maintains that according to this archaic Slavic cosmogony, the world is hatched from the egg without any forces coming from outside, including any divine entities, therefore without any involvement of gods (Mianecki 2010, 178-182; Mianecki 2011, 139).

Much has already been written on the subject of the possible functions of these egg-shaped objects made of stone or glazed clay, especially specimens from the territories settled by Slavs. A part of these interpretations, including ones that saw in them toys or amulets against vampires (Rabiega 1949, 119; Hensel 1984, 120, 121) has already been rejected (*cf.,* Kajkowski 2020, 33, 34). However, there are still some researchers who interpret them as toys (Sushko, 2018, 87, 91, fig. 3: 1, 2). Considering various places of depositing the analyzed products, such as settlements and fortresses, burials and a rock cut monastery, it must be stressed that all the cases should be treated individually yet associated with the sphere of magic and rites. Especially in regard to the evidence coming from settlements and fortresses, and in other territories with compact Slavic settlements also from hillforts, the finds of egg shells or glazed egg-shaped rattles have been the subject of some rich and sophisticated interpretations. Based on ethnographic evidence, they are mostly associated with fertility rites reflecting vegetative and human reproduction processes, with healing treatments, undoing charms, or with initiation rituals (Moszyński 1967, 280, 286, 316, 441, 513; Wawrzeniuk 2004, 144, 211-212; Kajkowski 2020, 70).

Eggs were especially important within the annual spring ceremoniality in the pre-Christian tradition (new year rites), and subsequently, within the Eastern rites at the beginning of the ecclesiastical year (Rybakov 1981, 33; 1987, 668-670; Mianecki 2010, 174). In spring, eggs were used to spark new life by the means of quite a range of ritual activities, including adding them to seed corn, inserting them in furrows and patches of fields with the intention to ensure good harvest; putting them under fruit trees (Niewiadomski 1989). The colours used to paint traditional Easter eggs also bear important symbolic meanings. The use of green and red was closely related to the vegetation symbolism of nature and human life. On the other hand, the yellow colour referred to solar symbolism (Mianecki 2010, 174). In the latter case, it is probably a reference to the egg as a symbol of the sun in the beliefs of the Eastern Slavs (Shovkoplyas 1980, 97).

Evidently, these artefacts had a great apotropaic significance. Their possession may have been intended to provide protection of households against thunderstrikes or to ward off evil powers; they may have been intended to protect their owner against an "evil eye" or functioned as some kind of charm (Stawska 2006, 140; Kajkowski 2020, 34). Remaining with the subject of households, one more usage of eggs shells and glazed egg-shaped rattles should be mentioned, namely as foundation deposits because clearly some of them are found in just this context, for example under the floor of a semi-sunken dwelling (Kajkowski 2020, 57, 58). However, in the view of the lack of the exact information about the context and conditions of finding glazed egg-shaped rattles in the analyzed region, we are unable to draw any firm conclusions on their original purposes. The available information at our disposal for the objects discussed in this paper is of relatively limited use in this respect, we can only state that one glazed egg-shaped rattle and another one made of chalk covered with engravings were found in waste pits. Some other glazed items were discovered inside a semi sunken dwelling destroyed by fire and localized on the site of the Roman *thermae* in Varna.

It may be suggested that the chalk egg and the glazed egg-shaped rattle thrown into the waste pit are remnants of the purification rite widely known in folk medicine and based on rolling an egg along the body of an ill person, and in the case of applying the method to animals, it aims at increasing their body volumes and making them fine-looking and healthy (Antoniewicz 1913, 183; Moszyński 1967, 28). Thus, in order to neutralize an illness which would have been transferred from an ill human to an egg, just as in the case of neutralizing other kinds of bad spells and charms, such eggs or their shells, or their stone or clay imitations, were afterward dug into the ground on different spots, for example in fields (Antoniewicz 1913, 183).

An undoubtedly important role was played by an egg as such, and as a symbol, also in the form of egg imitations made of Roman brick or as glazed items, in the cult of deceased ancestors. The custom of putting glazed egg-shaped rattles into graves is confirmed by archaeological evidence from multiple early medieval cemeteries spread across territories populated by the North-western Slavic tribes as well as by Eastern Slavs. In the case of the egg imitations made of Roman brick, they were quite an isolated find. It was probably believed that giving eggs and their glazed clay imitations to relatives' graves by the magic power spellbound in them would protect the peace of the deceased, ward off evil powers from them and at the same time, it would prohibit their return to the world of the living (Kowalski 1998, 174). To conclude, it must be said that the presence of an egg or its imitation inside a burial represents a symbol of the belief in rebirth, resurrection, and eternal life (Wrzesińska and Wrzesiński, 2000, 110). Following this line of reasoning, one must notice that an egg becomes an element which is able to bind this life and the afterlife together in the rite of passage and is therefore the sign of life's victory over death; it becomes a symbol of an immortal soul, especially in the pagan concept of soul (*cf.,* Wrzesińska and Wrzesiński 2000, 107-113; Bator 2000, 126, 127).

One should also mention here a custom of rolling eggs along graves, by the means of which souls of the deceased could be granted life residing inside an egg (Moszyński 1967, 280). Within the circle of the Orthodox tradition, eggs are consumed in the cemetery at the graves of ancestors mainly during spring rites, furthermore they were placed in a coffin or in the hands of the deceased in Polish and Russian Folkore (Niewiadomski 1989, 66; Mianecki 2010, 177).

In contrast, in the burials within territories of the settlements of the North-western Slavs, resurrection eggs were most frequently placed close to the feet of the deceased and sometimes near their waist or skull (Kajkowski 2020, 32, table 1). In the cemetery of Isaccea, some other regularity of their depositing is observed, namely placing them by the left thigh. In the light of recent interpretations, the arrangement of grave good assembly must have had a great significance. A part of such principles was associated with usage practices *i.e.*, with the possibilities of using the items after death, whilst other items were placed there with non-pragmatic purposes (Kościelecki 2000, 74). Therefore, the arrangement of grave goods is a "reflection of the eschatological imaginarium" (Kajkowski 2020, 32). Per-

haps placing resurrection eggs by the thighs of the deceased was associated with the place of their body where grave goods were given to equip them for their journey to the otherworld, as it may be the case with the grave goods placed at their feet (Kajkowski 2020, 35, fig. 1). Evoking more examples of using eggs within the eschatological perspective in Slavic folklore would exceed the frames of this work, especially in the view of a rather small number of funerary finds of eggs and their imitations.

Considering the conditions and contexts in which such artefacts are found, *i.e.*, in close proximity to a craftsmen's centre in Kruszwica in Poland, J. Kaczmarek associated the glazed egg-shaped rattles with magical rituals performed by craftsmen as a part of the production cycle (Kaczmarek 1998, 558). The eggs could have been in the possession of a person who was capable of transforming matter by the means of fire, for example, and therefore deeply rooted in the sphere of the sacrum (Kajkowski 2020, 56, with references). Due to the lack of evidence that would confirm any intensive production on the sites where the analyzed artefacts were found, it is difficult to see how the evidence supports such an interpretation.

The final aspect of the discussion on the role played by egg-shaped rattles and their imitations in the settlement and funerary contexts, some recent musicological research on the subject of these rattles must be mentioned. In the light of this research, sounds coming out of them during shaking can be placed on the very threshold level between those audible phenomena and infrasonic ones. Thus, the human perception of the sounds must have been very limited if not rudimentary while "the most clear range of the sound frequencies from such rattle is placed outside of the reach of human hearing range" (Gruszczyńska-Ziółkowska and Tatoń 2021, 126, 127). This research has also shown that the round hole placed at the bottom or base of the egg, having a proper size and joined with the inside, could find its purpose in adjusting narrow frequency bands, which could be visibly observed on spectrometers. These frequency bands were registered on levels of about 1 kHz. The chamber provided with the hole leading inside it through which the air gets in enables acchieving a resonance effect, such as in any Helmholtz resonator (Gruszczyńska-Ziółkowska and Tatoń 2021, 117, 118; Tatoń 2021, 84-86). Therefore, the hole at the base of glazed egg-shaped rattles, apart from the inevitable purpose in the production process (the product was bedded with its help during its being formed), served also to strengthen the sound produced by the rattle. It remains an open question though with what purpose the rattle was shaken if its sound was hardly audible for a human ear. Taking into account the complexity of early medieval Slavic peoples' spiritual sphere, it is possible to suggest that apart from warding evil spirits off, such sounds could have aimed at revoking ancestral or other spirits from otherworld to attend the rites, so the sound frequencies that were hardly within the human reach but still certain to be produced could have been believed to be perceived by non-human inhabitants of the otherworld. According to Kajkowski, the audibility of such sound frequencies accessible to animals, especially dogs, could be connected to their role in the Early Medieval Slavic eschatological perspective of the passage to the otherworld

(*cf.,* Kajkowski 2020, 51). One cannot exclude that this type of sounds aimed at calling a guide (a psychopomp), who is to take the soul of the deceased to the underworld after death.

The last context to be mentioned are the chalk eggs discovered in the rock cut monastery complex of Murfatlar-Basarabi. The location of this find and its chronology speaks for regarding it as a quite unique one. They should be seen as the earliest known egg imitations, and what makes the find even more significant, they were discovered in a Christian context. It is worth mentioning that egg imitations made of limestone have been discovered on several sites in Poland, among others in strongholds: Czermno (Florkiewicz 2016, no. 276, fig. 22: 3), Sąsiadka-Sutiejsk (Chudzik 2013, 124), Opole and Wrocław (Pankiewicz and Siemianowska 2020, 65, fig. 9: g-j) and made of clay in Kyiv, Ukraine (Sushko 2020, 107, ryc. 2; 16-19). On the surfaces of some of them, there are notches and hollows interpreted by some researchers as ornamental patterns. The rest of them, *e.g.*, those from Opole and Wrocław, are considered to be limestone models made of local stone from Opole deposits (Pankiewicz and Siemianowska 2020, 65 with references).

Returning to the subject of the Murfatlar-Basarabi finds, as mentioned above, they are the earliest egg imitations in the area in question, especially when taking into consideration the accuracy of dating of the complex which, by the way, is doubted by some, "but all scholars agree in dating its existence to the 900s (Curta 1999, 136). How, therefore, could their occurrence within the cave monasticism context be explained? Undoubtedly, they were used in rites since besides the chalk eggs, a cross was also found there, made of the same material and decorated with notches arranged into triangles and a rhombus, as well as fragments of liturgical (eucharistic) chalices (Damian 2015, pl. 28: 4). Therefore, we might focus on the resurrectional symbolic of an egg, since an egg is, according to the words of Andrzej Wierciński, "relatively homogenuous inside, transforming into the most complicated living organism" (Wierciński 1997, 59). An apparently dead chalk egg could include (and be regarded as) a symbol of life, which certainly can be referred to the resurrection of Christ.

4. IMPORT OR LOCAL PRODUCT?

As proven as it is in the case of chalk eggs or those made of a recycled brick (observed only in Dobrudja) to be local products, this is not so certain in the case of glazed examples. It is widely assumed that the glazed egg-shaped rattles, and especially those with bodies made of white kaolin types of clay, as well as those of clay of various red hues, were products of workshops in Rus', particularly localized in southern Rus' in and around Kyiv which is indicated by the density of finds in this territory (Fig. 8: 1-5; Hilczerówna 1950, 13, 15; see also Makarova 1967, 37). Another concentration of such sites can be observed far away from the borders of Kyivan Rus', namely in Silesia, in Greater Poland and in Kuyavia (Fig. 2; Ślusarski 2004, 80-83; Siemianowska 2008, 71, 72). In the case of Kyivan workshops,

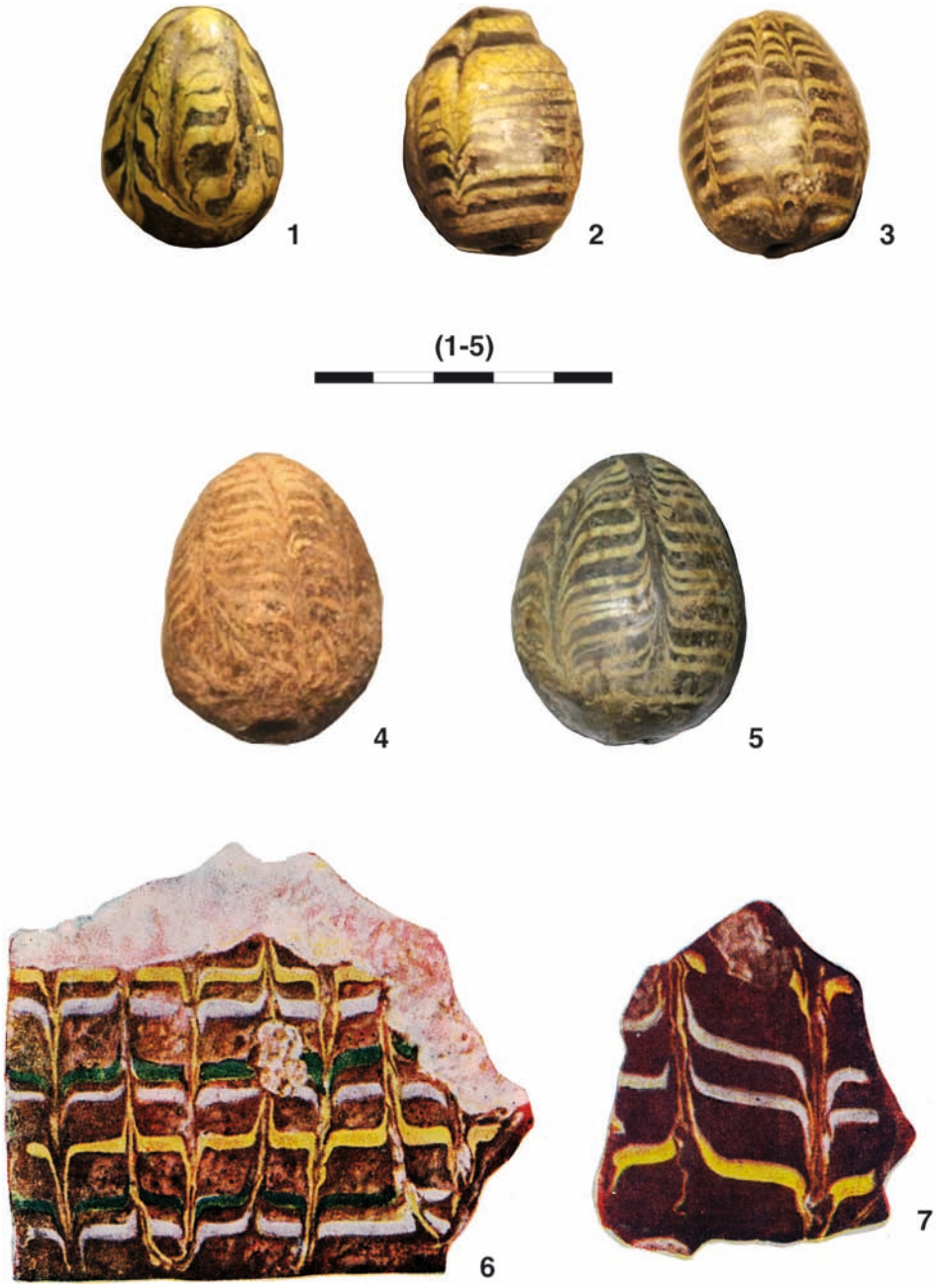

Fig. 8. 1-5 – some examples of the Early Medieval glazed egg-shaped rattles from Kyiv, and 6, 7 – 12th Century glazed ceramic tiles from Belgorod Kyivsky (Ukraine) (1-5 Authors' photo, 6-7 after Rybakov 1948, without scale)

their production must have constituted a collateral branch of production of glazed tiles (Fig. 8: 6-7; Rybakov 1948, 439). On the other hand, over the finds from Polish lands there is a heated discussion as to their origins. A great majority of researchers tends to the option of regarding them as products of local glassmaking or pottery workshops modelled after products from Kyivan Rus' (Ślusarski 2004, 80-83; Siemianowska 2008, 71, 72; Gruszczyńska-Ziółkowska and Tatoń 2021, 106; Pankiewicz and Siemianowska 2020, 65). It is therefore not suitable to regard a part of those products as imports from the East, but it should be seen more widely, as connected with much more comprehensive influx of thoughts, ideas, technologies conveyed by a travelling specialized craftsman (Siemianowska *et al*. in print).

4.1. Eggs of chalk and re-used Roman bricks

In the case of imitations from Murfatlar-Basarabi and also from Dinogeta-Gărvan and Brăila, as it was mentioned earlier, they should be regarded as local products which is indicated by their material: chalk and Roman bricks. However, our attention should be drawn by the finds from the sacral complex which is a place of particular interest. Firstly, its location near the Stone Dike in Dobrudja, the largest work of fortification in tenth-century Bulgaria (Curta 2019, 229), which was completed by a system of reinforcements consisting of 26 forts located in the distance from about 3 to 5 km and aiming at protection against raids and incursions of Magyars and Pechenegs (Curta 1999). Secondly, the character and diversity of the engravings left on their walls, of the multilingual inscriptions in different alphabets, ranging from Turkic runes, Cyrillic and glagolitic characters, to Old Church Slavonic Greek and possibly Bulgar languages, or the rich scope of depictions such as: crosses, ships, trees, ladders, dragons, plows (Curta 2019, 235). Both the inscriptions and depictions are the endless topic of discussions over their interpretations (Popkonstantinov 1987; Georgiev 2004). Not going into their details which would exceed the frames of this work, we want to focus our attention on the fact that a part of the symbols, such as a dragon or a ship, is interpreted through the prism of Christian symbolism (Curta 2019, 233, 234), or as the evidence for the presence of Varangians in Dobrudja, who „may have been in the service of Kyivan prince Sviatoslav, during his ambition campaign that started in 968" (Spinei 2009, 54). The very complex, according to F. Curta, was well organized and modelled after lavra, namely consisting of cells of hermits separated by a church or a chapel (Curta 2019, 235). The fact of the presence of the engraved images such as boots, though, it is true, less numerous than in the monastery in Ravna (Bulgaria), indicate that the complex of Murfatlar-Basarabi could well be linked to pilgrimage. Who those pilgrims were though, it is hard to define, most probably they were of different ethnic origin, as it is suggested by the multilingual inscriptions (*cf*., Atanasov 1996). They could have been travelling monks, or laymen too (Kostova 1994-1995, 165).

Thus, the question remains open when we should search for the beginnings of the tradition of making egg imitations out of chalk in this part of Southeast Europe. The custom

of giving eggs as grave goods was well known in Dobrudja and in the neighboring territories, also on the northern side of the Danube where 3 cremation burials and 55 inhumation burials were documented as including eggs as grave goods in the bi-ritual cemeteries dated in the end of 7th century (Komatarova-Balinova 2012, tabl. 3 and 5). What is interesting, a concentration of burials with grave good assemblies including eggs could be noted north of Danube in southern Muntenia, in the cemeteries of Sultana and Izvorul located in a close distance from each other (Fiedler 1992, Abb. 111). In the case of the territories lying in the basin of the middle Danube, the custom of giving eggs to graves is known in Avar cemeteries where it „can be observed throughout the Avar Age and it is not limited geographically to certain region, however (Tugya 2016, 2017, 217, fig. 5.1). In a later period, the territorial extent of the occurrence of graves containing eggs increased and included cemeteries localized in territories populated by Slavs and Magyars, especially starting in the end of 10th century (Dragotă 2014; Smetánka 2014).

Concluding this discussion on the subject of the origins of chalk imitations of eggs in Murfatlar-Basarabi, we have to consider them as possibly made by a local monk, by a pagan, or by a pilgrim, similarly as in the case of the engravings and inscriptions. Regarding the locations of their discoveries, as well as the same material used to produce egg imitations and other cult objects (cross, fragments of liturgical (eucharistic) chalices), it seems most appropriate to associate them with the resurrectional symbolic.

4.2. Glazed egg-shaped rattles

On the other hand, in the case of glazed egg-shaped rattles, they are most probably imports; however, one cannot exclude the possibility of their being local products. Yet, due to the lack of any documented remnants of specialized pottery workshops or glassmaking workshops in Dobrudja from the Middle Byzantine Period, it is rather unlikely. It is true, however, that several kilns were discovered in Nufăru as well as in Păcuiul lui Soare, both dated in 11th c., but only local pottery was burnt in them whilst glazed products were imported from Constantinople (Curta 2006, 295 with references).

4.3. Probable centres of production and distribution

The most probable direction to search for places of their production seem to be workshops in town centres in Rus', especially Kyivan Rus'. If their production in the workshops across today's Poland is confirmed (as the work of travelling craftsmen), the direction of their trade leading from the latter workshops to such a distant destination as Dobrudja seems highly unlikely as there were no intensive trade bonds nor cultural contacts between Polish territories and Dobrudja, but there certainly were such between Dobrudja and Kyivan Rus'. The whole picture of contacts and relations of Dobrudja with the areas around the middle course of the Dnipro are completed by such finds as of those of the spindle

whorls made of shale from Ovruch (now Ukraine) or miniature axes (Yotov 2005, 144, 145, 147, 148, fig. 1-38; 2018, 468-470, fig. 4, 5, 6:1) along with belt strap ends, swords, sword pommels, sword scabbard chapes and axes discovered in the territories of Dobrudja and north-eastern Bulgaria; they are associated with the presence of Vikings, Ruthenians, Varangians and even with "the Pechenegs, who had direct commercial and military contacts with the Kyivan state in the tenth and early 11th centuries, and since the 1050s they stayed south of the Danube" (Yotov 2003; 2007, 326). However, in the case of the last group of products, it is hardly possible to consider them as "ethnically distinguishing" for Scandinavians (*cf.,* Hillerdal 2006, 101; Mägi 2008, 26). The issue of contacts between Scandinavia and Rus' during the Viking age as well as their role in building of statehood in Rus' are the subject of endless debate among archaeologists as well as historians. As is indicated by written sources and archaeological evidence, these contacts were intensive but limited to the time between the middle of the 8th and the 11th centuries (Hillerdal 2006, 94). The far-reaching contacts mentioned above between Scandinavian centres and Kyivan Rus' with the territories we focus on here. and located on the middle course of the Danube is generally associated with "the Route from the Varangians to the Greeks" described in the Kyivan Chronicles dated to the beginning of the twelfth century, and with the significant role of Varangians as mercenaries in the armies under the command of the Great Princes of the Rus' (Androshchuk 2013, 117-125; Spinei 2009, 98, 99). Not going into a detailed chronology of these contacts which would exceed the frames of this work (*cf.,* Spinei 2009, 89, 98, 99), it should be stressed however that these territories were of special interest for Rus' princes, especially in the times of Sviatoslav's reign (945-972) after his "landing south of the Danube, in the summer of 968" (Spinei 2009, 98). The far-reaching plans relating to the lower course of the Danube were expressed by the Great Prince of the Rus' in the presence of his mother Princess Olga and boyars, in words diligently noted in the Kyivan Chronicles: "I do not care to remain in Kyiv, but should prefer to live in Pereyaslavets on the Danube, since that is the centre of my realm, where all riches are concentrated; gold, silks, wine, and various fruits from Greece, silver and horses from Hungary and Bohemia, and from Rus' furs, wax, honey, and slaves" (Cross, Sherbowitz-Wetzor 1953, 86). These plans were confounded by the Prince's policies against Byzantium which resulted in his defeat ending his struggle against the Byzantine army of the emperor John I Tzimiskes, who, as the result of a brilliantly organized campaign, finally caused Sviatoslav to surrender and to return the lands on the right bank of the Danube. During the next year, the Kyivan prince died from the hands of Pechenegs on the Dnipro Rapids 972 (Spinei 2009, 99). Considering Sviatoslav's plans to transfer his capital to the bank on the lower Danube and his activity in this territory, we can easily assume that along with the Great Prince and his military retinue, some other people must have accompanied them coming from the north, from townships in Rus' and especially from Kyiv. Presumably, a part of them remained there after the Prince's defeat and his withdrawal across the Danube; most probably there were merchants among them as well as mercenaries or craftsmen. Possible re-

mains of their presence can be traced in the remains of wooden (oak) constructions of buildings, of enclosures like wattle fences, the wooden mortar or some small items for daily use and cult objects found in the Byzantine fortress in Nufaru, (Damian and Vasile 2011; Madgearu 2013, 93). Those who have discovered the constructions associate them with the presence of Varangians or Vikings on the site (Damian and Vasile 2011, 277) quoting examples of Scandinavian wooden constructions to compare them with, which has resulted in terming these structures in literature as "a varangian street" (Yotov 2007, 323, fig. 2). Considering this complexity of the issue, the so called "Varangian problem", such an interpretation does not really seem to be very convincing, when we remember that analogical remnants of wooden constructions as well as wooden objects were found on many sites discovered in the territories populated by Slavs, where, like as at Nufăru (however outside the walls of the Byzantine fortress) also glazed egg-shaped rattles were found, for example in Kyiv, Ukraine (Tolochko 1981, 63-94; Sahaydak 1991, 31-51, fig. 11-17, 21-23) or in Opole, Poland (Gediga 2002, 161-172, Barnycz Gupieniec 2000). It is worth noting here that the manner of constructing wooden buildings from the Viking period and Early Middle Ages in Denmark differs from the one evident in the remains of constructions discovered in Nufăru (*cf.,* Barnycz-Gupieniec 1987).

It is difficult to agree with the attempts to associate the toponym Pereslavitsa mentioned in the Kyivan Chronicles with the fortress in Nufăru containing the remains of wooden constructions (Yotov 2007, 323, fig. 2; 2018, 468, fig. 1: 1-2) since the archaeological data indicate the foundation of the fortress being shortly after the year 971. Therefore, during this time, Sviatosław must have resided in Dorostolon (modern Silistra) which then fell into John I Tzimiskes' hands (Madgearu 2013, 102-103, fig. 5) The "large number of amber artefacts" referred to in the literature but not yet published, and "particularly imports and luxury goods indicate a flourishing life in this fortified settlement during the 11th century" (Damian and Vasile 2011, ft. 14; Madgearu 2013, 102-104, fig. 5) which suggests the commercial character of the fortress, apart from the military one, especially when considering its perfect (from the strategic point of view) location on the Saint George branch of the Danube. It must be mentioned in this context that amber products were also found in graves in the Isaccea cemetery where glazed egg-shaped rattles, mentioned earlier, were discovered (Truică *et al.* 2012, table 1, fig. 2: G). We should rather prefer P. Diaconu's suggestion that Sviatoslav's residence, the one to which he planned to transfer his capital, must be searched in Preslav – the Bulgarian Capital (now in north-eastern Bulgaria), and the second segment in the compound „on the Danube" refers to a broader geographic concept rather than it refers to a certain place located on the very bank of the river (Diaconu 1965, 37-43; 1987, 284-286; Madgearu 2013, 92). The finds of glazed egg-shaped rattles in the layers of some Byzantine fortresses such as Dinogetia, Noviodunum, Carsium could be associated with the presence of Rus' inhabitants and Varangians in the ranks of the Byzantine army; the artefacts were kept there because of their apotropaic qualities described earlier. The presence of mercenaries coming from the North was nothing strange

due to the extensive demand for fresh forces, especially for Ruthenians and Varangians during the "period of the "Reconquest" (956-1025), a time when the Empire was in desperate need of large quantities of able-bodied and experienced soldiers to conduct its wars in the East and the Balkans" (Theotokis 2014, 125). Such a permission for their presence was presumably expressed by one of the entries in the Rus'-Byzantine treaty from the year 944 handed down to us in the Kyivan Chronicles, and by which an obligation was put on Great Price Igor to the following: "If our government shall desire of you military assistance for use against our adversaries, they shall communicate with your Great Prince, and he shall send us as many soldiers as we require (Cross and Sherbowitz-Wetzor 1953, 76; Theotokis 2014, 130). It cannot be excluded that along with mercenaries and merchants, also their families arrived on the banks of the lower Danube. It remains an open question whether or not a part of them, or their descendants, were buried in the mounds of Isaccea, near the fortress of Noviodunum. In one of these mounds from the 2nd century (Tumulus IB) with a diameter of about 37 m located in the eastern part of its embankment, 63 inhumation graves were excavated after it had been primarily used. The graves were oriented on the W-E axis, with the head of the deceased directed west; of those graves, four contained egg-shaped rattles. Several graves were dug in a similar mound (Tumulus IA) oriented perpendicularly to the first one, but unfortunately not yet fully explored. It should be mentioned here that the two mounds were located at a distance of about 300 meters from a flat inhumation cemetery, as it is suggested by a contemporary inventory. The graves dug into the side of Tumulus IB, apart from three instances of child graves, in all other cases in which they could be examined and identified, were all burials of adults. The majority (38) of the graves are without any grave good assemblages but those provided with accompanying objects (25) seem to be related to female burials (unfortunately, we have no detailed anthropological analysis with gender distinctions of the deceased) such as glass products (bracelets, beads, rings, silverware as rings or products of bronze such as rings or belt buckles). In the group of burials with grave goods, the above-mentioned four graves are included in which as many as five egg-shaped ceramic rattles were found (Fig. 9). There is some regularity to be observed in placing them by the left thigh. In one case, (Grave 111) there were two eggs included, in another two graves, apart from egg-shaped rattles, rings were deposited (Graves 129 and 135). Only in one instant, in Grave 148, there was a single egg-shaped rattle. Considering the grave good assemblies from the rest of the burials in this mound, it has to be stated that those described above are rather exceptional. It fits in some regularity observed in graves including egg-shaped rattles and found in early medieval cemeteries from the territories settled by Slavs, this regularity being their rare occurrence inside burials. It may be the confirmation of the thesis about an exceptional character of such items which means that not everyone could afford such a grave good and moreover, the very gesture of depositing an egg-shaped rattle into a grave could have been, in some cases, an indicator of a "special" social rank of the deceased in the local social structure (*cf.,* Kajkowski 2020, 44). Yet another view on the burials with glazed egg-shaped rattles is

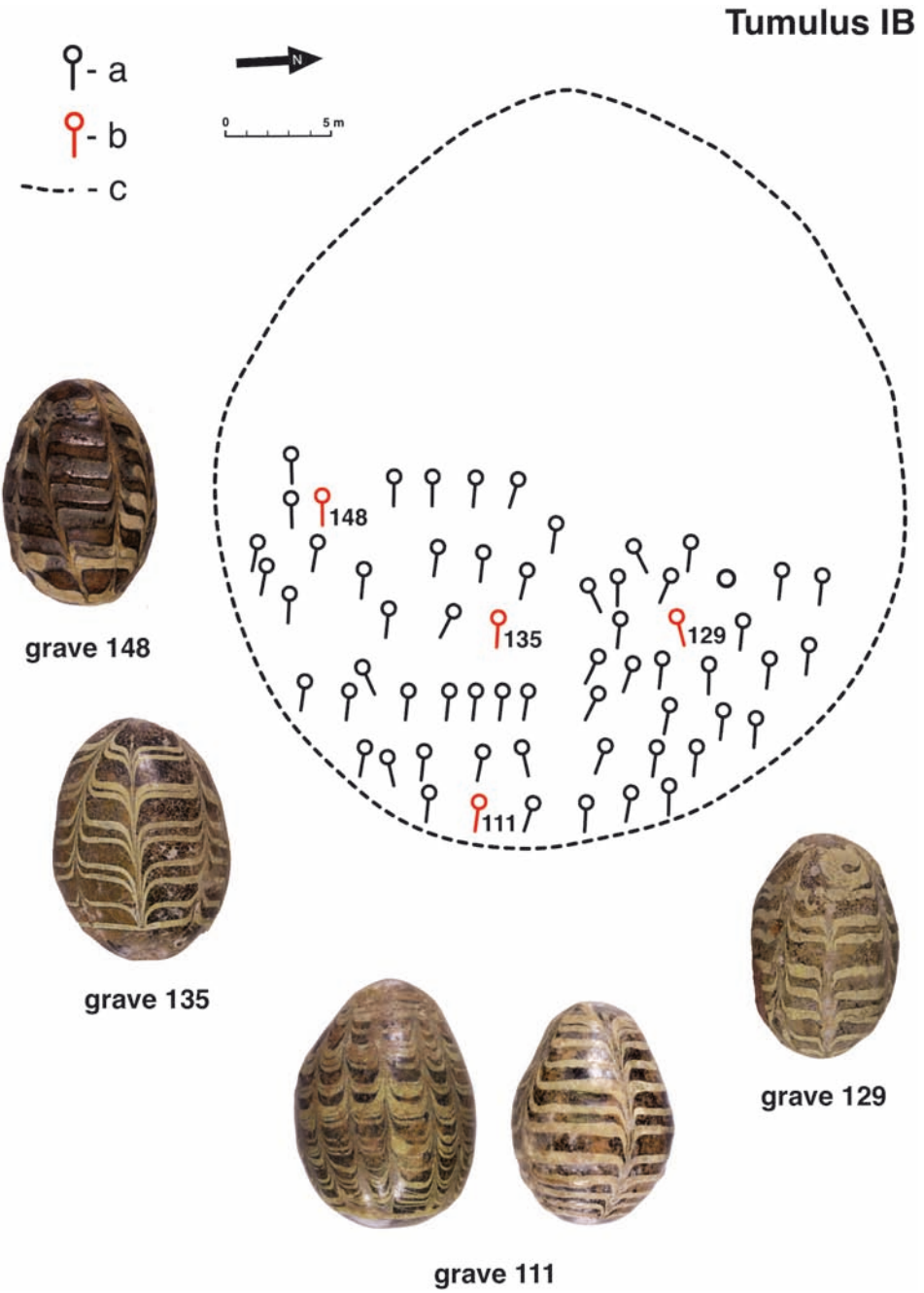

Fig. 9. Isaccea – layout of the tumulus IB: a – grave; b – grave with glazed egg rattles, c – border of the Tumulus (drawing B. S. Szmoniewski, after Vasiliu 1984)

possible in the context of manifesting cultural differences, when we apply Ch. Hillerdale's definition of ethnicity which is intriguing by its simplicity and defining ethnicity to be a consciousness of being different from others and of belonging together (Hillerdall 2006, 88). Perceiving the graves and the mound from this perspective, we can notice their very clear distinction differing them also from the nearby flat graves cemetery from the same period. Apart from the presence of egg-shaped rattles which do not occur outside graves of the Slavic settlement territories, it is a quite striking fact that it was a mound of Roman Period that was used as a location for the burials. It should be mentioned here that the phenomenon is not exceptional in Dobrudja, yet it is typical mainly for nomadic populations (Szmoniewski 2013). Because of this, the secondary use of the mound as a burying ground may indicate, apart from the continuity of burial location, also a common funeral tradition which was represented by the burial mound, a tradition adapted to local circumstances and finally, it probably indicates kinship of the buried people.

Therefore, a part of the graves, and especially those including egg-shaped rattles, may serve as an example of a syncretism of two traditions: the older i.e. the pagan one and the younger, Christian one. In the first instance, the presence of grave good inventory including especially egg imitations in the form of egg-shaped rattles which evoked rather idolatric associations and integrating graves into the previously existing mound may present an evidence of a pagan mentality. On the other hand, the Christian custom is indirectly shown by placing the deceased heads oriented toward the west, whereby it should be observed that such orientation in burials in territories settled by East Slavs can be found also in non-Christian burials (Liwoch 2018, 96, ft. 70). It should be underlined that in the nearby flat grave cemetery in which Christian cult objects like crosses were discovered, the bodies were oriented also with their heads toward the west. Returning to the subject of the pagan tradition of raising mounds by East Slavs, it was so strong that, opposite to the Roman Church, the Orthodox Church, as it was brilliantly observed by Radosław Liwoch, "accepted its existence for at least two centuries after the official baptism of Rus'..." (Liwoch 2018, 96, ft. 70).

Finally, the fact should be invoked that apart from the water way "from the Varangians to the Greeks", there was also a land route leading to Byzantium. The evidence of such a journey to Constantinople by a land route (which is not surprising since in the light of the analysis of a Scandinavian runic inscription, Greece/Byzantium was the most preferred destination, Källström 2016) is provided by an 11th century runestone from Sjonhem on the isle of Gotland on the Baltic Sea. This runestone erected by Rodvisl and Rodavl, the parents, in memory of their dead son, Rodfos the merchant, who, probably during his commercial trip, was robbed of his possessions and killed in the land of the Vlachs (Blakumen), which is localized north of the lower Danube (Pintescu 2001, 4-5; Curta 2006, 303-304; Spinei 2009, 54). It should be mentioned here that glazed egg-shaped rattles have been found on the isle of Gotland and in Southern Sweden (Arbman 1946, 436, fig. 1; Gabriel 2000, abb. 47).

Considering all the facts mentioned above, the lower course of the Danube in the times between 10th and 11th centuries seems to have been a very busy and thriving region where, according to the reported words of Sviatoslav I, all trade was concentrated with each and every valuable kind of goods flowing in from each side of the world; one type of those goods were glazed egg-shaped rattles (*cf.*, Konovalova and Perkhavko 2000).

5. SUMMARY AND CONCLUSIONS

In the territories analysed in this work, four egg imitations of chalk and two imitations of Roman brick, 14 fully preserved ones and seven fragments of glazed egg-shaped rattles have been found so far. Considering the localization of the finds, one should associate their function, similarly as it has been done for some other territories where such items are discovered (*cf.*, Kajkowski 2020) with magical and religious rituals connected with fertility cults, with apotropaic and healing practices. Three chalk imitations found in Murfatlar-Basarabi complex should most probably be associated with the symbolism of resurrection while the example made of chalk and covered with engravings found in a pit in Nufăru, along with some imitations made a recycled Roman brick should be regarded as local products. Glazed egg-shaped rattles discovered in the settlement, inside the fortress and in the cemetery, are most probably all imports from Kyivan Rus' workshops. Their rare occurrence inside burials, in only one cemetery in Isaccea, indicates the special position of this accompanied individual within their social group, but on the other hand, it could be a benchmark of their foreign ethnic background. The identical placement of the eggs in all of the graves seems to be pointing to a common funeral tradition, however, due to the lack of DNA examinations, it cannot be proven whether these deceased persons were related to each other. Integrating the graves in a large mound of the Roman Period could also be perceived as a sign of common tradition and continuity of their burying ground. Obviously, the finds of egg-shaped rattles could be associated with some presence of people engaged in military operations undertaken by the Grand Princes of Kyiv, mercenaries, or, more probably, merchants travelling along widely understood waterways and being of different ethnicities, from Varangians to Greeks. This episode limited to the time frames from the middle of the 10th to the middle of the 11th centuries correlates with the dating (mainly in the 11th century) of graves and layers in which glazed egg-shaped rattles were unearthed. On the other hand, chalk egg imitations dated earlier, namely to the 10th century seem to be related to some local tradition.

In the light of the remarks presented above, it should be stated that any further egg imitations of chalk and recycled bricks as well as glazed egg-shaped rattles from the analyzed territories will constitute an interesting contribution to any further studies into intercultural contacts in and around Dobrudja during the Early Medieval Period.

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DISCUSSIONS AND POLEMICS

Denys Grechko[1]

WESTERN FRONTIER OF THE ARCHAIC SCYTHIA: TYPO-CHRONOLOGY VS RADIOCARBON DATING

ABSTRACT

Grechko D. 2023. Western frontier of the Archaic Scythia: typo-chronology vs radiocarbon dating. *Sprawozdania Archeologiczne* 75/1, 405-436.

One of the key issues in the chronology of Late Hallstatt period is the so-called Hallstatt plateau in the calibration curve extending the calibrated range of single dates to *c.* 800-400 BC. Analysis of the ^{14}C dates of the ash-hill from the Chotyniec hillfort, indicate its dating to the time range, which does not exceed the interval of 780-469 BC. Typological analysis of the artefact collection allows us to date the ash-hill to the middle of the 7th – the first third of the 6th century BC (HaC2-HaD1). This dating corresponds to the Early Scythian time and chronology of the Western Podillian group. The analysis of material culture allows us to indicate the immediate closeness of the Chotyniec agglomeration to the Western Podillian group.

Keywords: Central Europe, Tarnobrzeg Lusatian Culture, East European Forest-Steppe groups, Late Hallstatt period, chronology, typo-chronology, radiocarbon dating

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INTRODUCTION

Unification of regional chronological schemes remains one of the key issues in Early Iron Age archaeology of Central Europe. The cornerstone of the ongoing discussion on the chronology of Late Hallstatt period is the so-called Hallstatt plateau in the radiocarbon calibration curve extending the range of single dates to c. 800-400 BC, which complicates our understanding of various demographic, social and cultural phenomena. Pure radiocarbon dating of several complexes may exceed the duration of the whole Late Hallstatt period. Bottom-up approaches to data systematization transfers the issue of sites' chronology to the calendar dating of cultures, periods *etc.* Certainly, we must consider a multi-proxy approach to sites' chronology.

The article focuses on the critical analysis of Chotyniec hillfort radiocarbon chronology and artefact dating, and balancing both approaches. The study discusses the radiocarbon dates obtained for "Scythian" culture and Tarnobrzeg Lusatian culture (further – TLC) with the re-assessment of methods applied to the chronology of key sites in the ongoing discussion, and cross-regional dating of narrow-ranged artefact dating. Specific focus on the Chotyniec hillfort in South-Eastern Poland, the chronology, duration and meaning of which is being actively debated, enables evaluation of the utility of the radiocarbon and typo-chronological approaches to the sites dated in the range of *c.* 800-400 BC. Detailed chronology makes it possible to trace complex dynamic processes in Late Hallstatt Central Europe.

The territory of the modern Ukrainian Forest-Steppe during the Early Iron Age was a part of the Central Europe in cultural terms, similar to the borderland with a different culture of the Steppe. The Central European area during the Hallstatt period was divided into two zones – Hallstatt, genetically related to Urnfield, and the territory populated by tribes related to Trzciniec Circle communities of the Late Bronze Age, namely the Lusatian culture and the tribes of the Ukrainian Dniestr-Dnipro Forest-Steppe.

In turn, the territory of modern Poland in the 7th–6th century BC was the frontier between the Hallstatt world and the tribes of the Forest-Steppe and Steppe of Eastern Europe (Fig. 1). Western Poland belonged to the Hallstatt zone (Gediga 2010; Gediga *et al.* 2020), and a part of south-eastern Poland was a part of the Forest-Steppe zone (Trybała-Zawiślak 2020, 58). Katarzyna Trybała-Zawiślak has aptly described the geographical location of the Chotyniec agglomeration: "the location of the settlement in Chotyniec can be treated as a "gateway" to the world remaining in the east under Scythian domination" (Trybała-Zawiślak 2020, 58) and "Many researchers have noted the location of the Chotyniec agglomeration within the so-called Przemyśl Gate, which is a natural western extension of the East European Forest-Steppe" (*e.g.*, Trybała-Zawiślak 2019, 280). As Sylwester Czopek rightly points out, the border between these two worlds passed through the territory of modern Poland (Czopek 2021, 377).

The interest of archaeologists in a wide range of issues of interaction between the tribes of Central and Eastern Europe during the Early Iron Age decreased for a certain period.

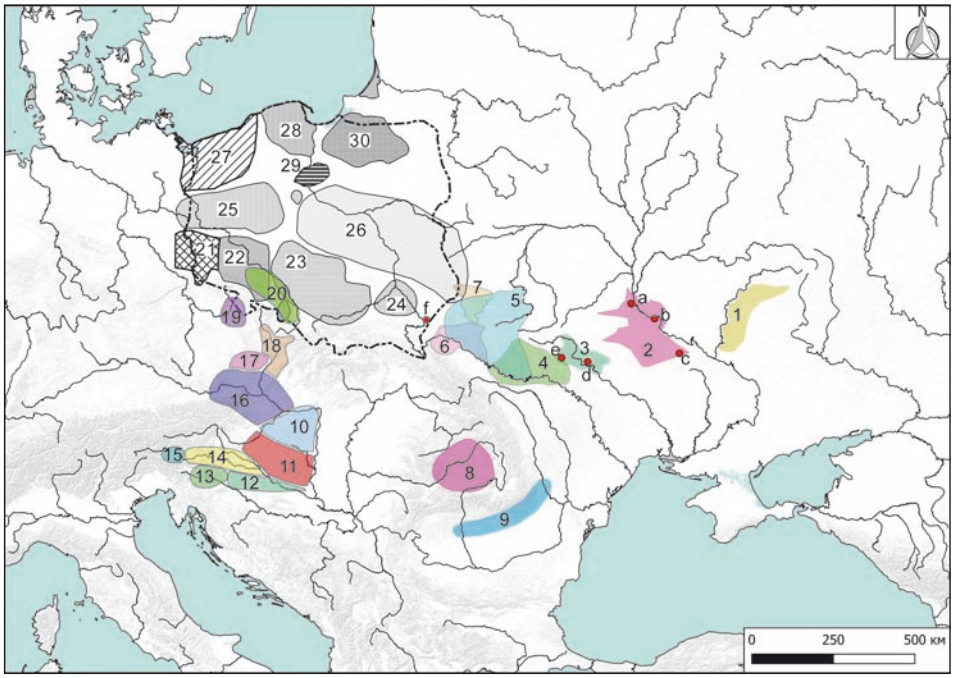

Fig. 1. Main cultural groups and sites of the midlle VII – middle of VI centures BCE in Central and Eastern Europe. Groups: 1 – Vorskla group; 2 –Kyiv-Cherkassy group; 3 – Eastern Podolian group; 4 – Western Podolian group; 5 – Vysocka culture; 6 – Cherepin-Lagodiv group; 7 – Lezhnica group; 8 – Transylvanian group; 9 – Ferigile group; Eastern Hallstatt: 10 – North-East Pannonian group; 11 – South-West Pannonian group; 12 – Kaptol group; 13 – Lower-Cranian group; 14 – Sulmtal group; 15 – Frög; 16 – Kelenderberg group; 17 – Horákov group; 18 – Platěnice group; 19 – Silesian-Platěnice group (Platěnice part); 20 – North-East group; Lusatian culture: 21 – Saxon-Lusatian group; 22- Silesian group; 23 – Upper Silesia – Lesser Polish group; 24 – Tarnobrzeg group; 25 – Western Greater Polish group; 26 – Eastern group; 27 – Western Pomeranian group; 28 – East Pomeranian (Kashubian); 29 – Chelmno group; 30 – Warmia-Masuria group. Hillforts: a – Khotiv; b – Trakhtemiriv; c – Motronin; d – Nemyriv; e – Severynivka; f – Chotyniec (Golec and Fojtík 2020; Gedl 1975; Czopek 2020; Grechko 2021b)

Therefore, it is important that this topic is attracting a wide range of researchers again. In addition to this, except for the so-called "Scythian" campaigns to Central Europe, researchers have drawn attention to the wide contacts of tribes of the Forest-Steppe of Eastern Europe with the tribes of the Lusatian culture and cultural groups of Eastern and South-Eastern Hallstatt (Bruyako 2005; Daragan 2011; Bandrivskiy 2014; Shramko and Zadnikov 2021). The main role of the Scythians in campaigns to the Lusatian and Eastern Hallstatt lands raises doubts. The participation of the Transcaucasia tribes in these campaigns seems to me to be more well-argued (Melankhlens, Sigyns, Gelons, *etc.*; Grechko 2021b, 23). An important role in the work on these issues in this is played by the large-scale research by a group of scientists from the University of Rzeszów leaded by Sylwester

Czopek. This group is conducting research on a unique site – the Chotyniec hillfort and the other sites of this agglomeration (Czopek 2019; 2021; Trybała-Zawiślak 2019).

Publication of evidence from the Chotyniec hillfort coincided in time with the revision of the dating of the "Scythian" campaigns in Central Europe by the author of this article (Grechko 2020a). It was nomadic raids that left excellent chronological markers in the archaeological contexts of Eastern Hallstatt and Lusatian sites, *i.e.*, the arrowheads of the so-called "Scythian type", which were deposited at the same time during the assaults of the fortifications and can be considered exactly bundles of arrowheads. This is the main thing that are part of the "pillars" of the "chronological bridge" that can connect the European chronological system of P. Reinecke and "Scythian" chronology of 6th century BC.

Thus, we can now use the materials of the contact zone of the TLC tribes and the population of Chotyniec as part of the ethno-cultural massif of the tribes of the Ukrainian Forest-Steppe in south-eastern Poland as the "building material" of the first "spans" from East to West (Grechko 2020b, 587-597).

Furthermore, the evidence for creation of the "chronological bridge" between the materials of the Western Podillian group (further – WPG) of sites includes primarily products of Eastern Hallstatt origin (Mogilov 2020, 152, 153) and from other Forest-Steppe contexts (Daragan 2011, 595, 610-617; Shramko and Zadnikov 2021, 123-132). This exchange took place most actively during the middle of the VII–the first third of the 6th century BC. After the "Scythian" campaigns the contacts of the tribes of the Eastern European Forest-Steppe with the cultural groups of Central Europe actually ended.

It is such a pleasure and important at the same time that my discussion article (Grechko 2020b) attracted the attention of Sylwester Czopek (Czopek 2021). My version was the "external" point of view on the chronology of the III phase of the TLC and on certain issues in the context of chronology and periodization of the ethnocultural interaction of the different cultural ethnic groups throughout the Late Hallstatt period. That is why I was looking forward to the reaction of experts with an "internal" point of view to the proposed ideas. The responses I received and clarified position of Sylwester Czopek further convinced me that we are on the right track, and only in close scientific cooperation can we find a consensus, which will correspond to the current state of the source base and the cognitive possibilities of archaeology.

In this article, I will continue the discussion with a slight change in focus to dating by different methods and cultural identity of the Chotyniec hillfort.

TYPO-CHRONOLOGICAL DATING OF THE CHOTYNIEC AGGLOMERATION

Considerable attention of Sylwester Czopek has been devoted to the chronology of the Chotyniec hillfort (Czopek 2019, 126-127; 2021, 379-384). Investigations at the ash-hill resulted in a representative collection of artefacts, including antique imports, analysis of which makes possible the establishment of the time of its functioning.

The *arrowheads* are characterized in the article of Marcin Burghardt (Burghardt 2020). The analysis and dating are generally uncontroversial and it can be agreed that the collection of 38 tips (Fig. 2: C) can be dated to the Kelermes period (further – KP) dated between the middle of the 7th–middle of the 6thcentury BC (Burghardt 2020, 352).

It is worth noting that one of the two arrowheads of the Zhabotyn type had poorly preserved blades (Fig. 2: C, 4) (Burghardt 2020, 335, fig. 7, 4). Therefore, there is no complete confidence in its asymmetric rhombicity. The general outline of the second specimen (Fig. 2: C, 3) is as follows, and its point was probably destroyed by a blow on a solid object (Burghardt 2020, 335, fig. 7, 3). Marcin Burghardt rightly points out that the finds of single items of this type together with the classic Kelermes arrowheads are anachronisms and indicate the dating of the collection to no earlier than the middle of the 7th century BC (Burghardt 2020, 345, 346). According to my periodization, this is the first phase of KP, which is characterized by continuing of using some artefacts of the Pre-Scythian time (Grechko 2013, 134-150; 2021a, 15-17).

What is important is a conclusion based only on facts: "Summing up, it can be concluded that the collection of arrowheads from Chotyniec, found in two different (utility?) levels of the ash-hill, can be considered as a homogeneous assemblage" (Burghardt 2020, 350). The hypothetical selection of two horizons by the arrowheads does not seem to be supported by the context of finds of different types in different horizons (Burghardt 2020, 351).

Bone arrowheads with a square section (Fig. 2: C, 29, 30) have analogies in Burial 1 of the Trinka necropolis, where there were also found biconical beads (Levitskiy and Kashuba 2009, 257-263). They are also widely represented in burials and settlements of the WPG (Fig. 2: B, 11) (Mogilov 2020, 144, fig. 6-49, 64, 111-112, 139, 148, 152-154) and burials of the Transylvanian group (Vulpe 1990, Taf. 42, D; 44, B, C; 45, A; 46, B, C). It is also possible to emphasize their uniqueness specifically for the Middle Dniester and Transylvania, although they are also known in other burials of the Dnipro Forest-Steppe.

Adornments. This category of material culture of the population that left the is dated by researchers to a wider chronological range than the items of weapons (Czopek 2019, 133). The pin collection, consisting of 21 items (Fig. 3: 1-19), was thoroughly analyzed in a special article (Adamik-Proksa and Ocadryga-Tokarczyk 2021). The researchers suggested dating the main array of pins to the end of the 7th–the beginning of the 6th century BC and refer the vast majority of them to Early Scythian time (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 157).

According to the researchers, one pin (Fig. 3: 19) does not significantly correspond to the dating of the other products and was assigned to the type 24 according to V. G. Petrenko and, respectively, dated to the 4th century BC (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 153, 156, fig. 2:4). Given that such pins are characteristic of Scythian burials exclusively in the Steppe, this exception can have two completely logical explanations: this is not a type 24 pin, but a deformed pin (?) with a small mushroom-shaped top or simply a blank product,

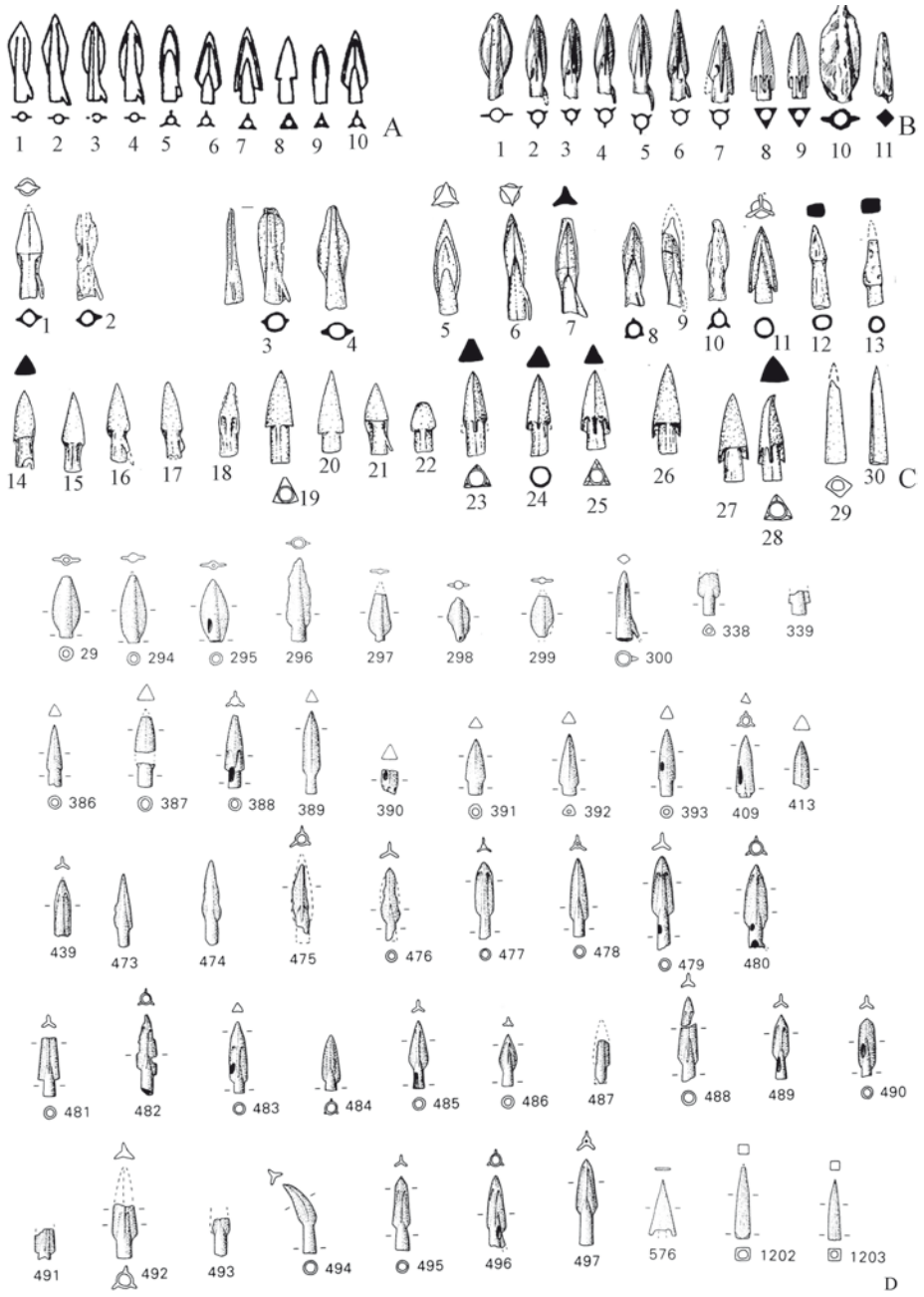

Fig. 2. Arrowheads from the Western Podolian group burials. A – Lenkovtsy, kurgan (after Smirnova 1993: fig. 1: 1-10); B – Dolyniany, kurgan 2 (after Mogilov 2020, 144: рис. 6, 54-64), C – Chotyniec (Burghardt 2020); D – Wicina (the numbers correspond with the numbers in the catalog – Gedl 2014)

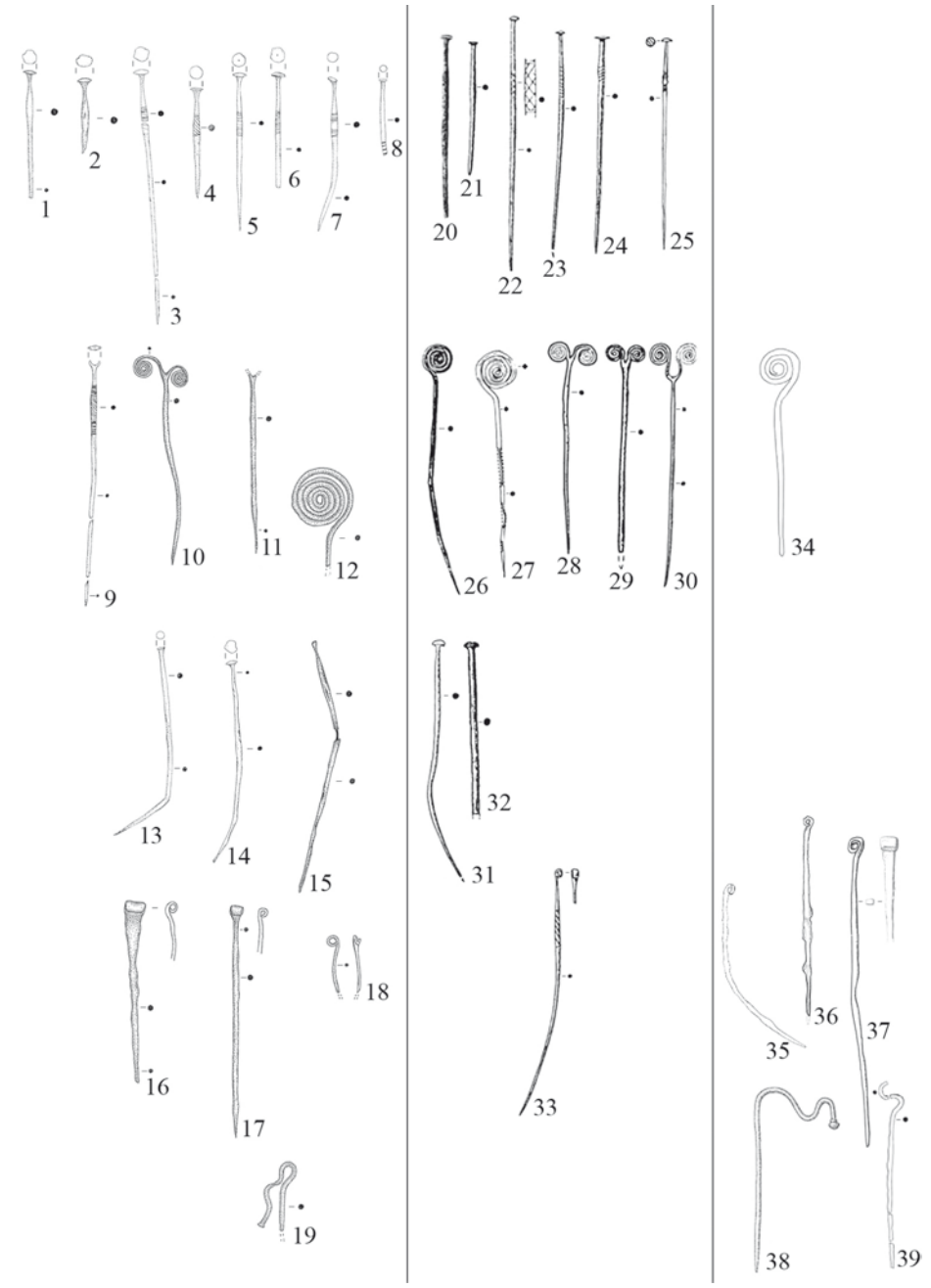

Fig. 3. Pins from Chotyniec ash-hill (1-19), Western Podolian (20-33) and other cultural groups (34-39) (Adamik-Proksa and Ocadryga-Tokarczyk 2021; Mogilov 2021; Golec and Fojtík 2020; Bandrivskiy 2014; Krushelnitska 1976; Lifantii and Shelekhan 2018)

since even in the picture there are visible traces of artificial deformations (impact?) and in the description it is stated that it is "załamana" (broken). The second possible interpretation of this artefact is that before us is an Eastern Hallstatt product, which is known in Moravian burials in complexes of the period HaC2 (Fig. 3: 38-39) (Golec and Fojtík 2020, 110-111, 113, fig. 36, 15). The product could belong to the early group of pins from an ash-hill and can be dated to the middle-third quarter of the 7th century BC.

According to the authors of the article, a few more pins fall out of a chronologically complete collection (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 154-157). It is not possible to agree that the bronze pins (Fig. 3: 4, 8, 13) (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 149, fig. 1: 1, 4, 6, 154-155) generally date to the whole 6th century BC, because they are characteristic for the Early Scythian period. A bronze pin with the ends formed by a cut and rolled up (Fig. 3: 18) is broadly dated to the 6th-3rd centuries BC (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 157, fig. 2: 9). Products of a similar shape, which would date back to the second half of the 6th-5th centuries BC are made of iron (Grechko 2010, 98, 99). The bronze pins with a loop-shaped head are more characteristic of the Zhabotyn period (Andrienko 1996, 353-367).

The iron pins with the ends formed by a cut and rolled up (Fig. 3: 16-17) (Adamik-Proksa and Ocadryga-Tokarczyk 2021,157, fig. 2: 5, 7-8) are indeed quite common and have a broad dating. They cannot be used as a chronological indicator and an argument for other assumptions. The dating of products with wide dates is traditionally limited to those parts of the chronological intervals where they overlap with the dates of reliable chronological markers.

Direct analogies to the iron pins with the ends unbuttoned and rolled up come from the Severynivka hillfort (Fig. 3: 35-36) (Lifantii and Shelekhan 2016,257, fig. 1: 32 44) and are dated exclusively to the Early Scythian period. In addition, the dating of the settlement does not go beyond the second quarter of the 6th century BC (Boltryk *et al.* 2021, 30). Taking into account the fact that all reliably dated materials from both layers of the ash-hill are not dated beyond the middle of the 7th–the first half (third?) of the 6th century BC, this associates these products with this period of time.

Relative to the lower date of the beginning of the functioning of the ash-hill, it can be noted that there are specimens of pins that can be dated even earlier than the end of the 7th century BC (Fig. 3: 1-2) (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 154, 149, fig. 1: 2, 9) and related to the time around the middle of the 7th century (Early KP) as well as single type arrowheads of Zhabotyn type (Andrienko 1996, 357). The researchers limit the lower chronological boundary of the functioning of the ash-hill to the end of the 7th century BC (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 168). However, in the analysis of these pins, analogies are given among the materials of the Pre-Scythian period (Adamik-Proksa, Ocadryga-Tokarczyk 2021, 154). This allows us to agree with colleagues that the time of the beginning of functioning of the ash-hill can be dated to around the middle of the 7th century BC (Czopek 2021, 379).

It is worth noting two pins made of wire with heads in the form of two spiral discs (Fig. 3: 10, 11) (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 151, fig. 2: 1, 2). For the Eastern European Forest-Steppe, some types of pins are quite specific for certain groups (Grechko 2010, 98, 99). These two pins are characteristic of the WPG (Fig. 3: 28-30) (Smirnova 2006, 74), which is important in further cultural interpretation of the CA.

During the analysis of the pins, there is also a noticeable tendency to adjust the dating of archaeological materials to coincide with the ^{14}C, and not the other way around (Adamik-Proksa and Ocadryga-Tokarczyk 2021 157, 162-163). In general, the collection of pins, as well as arrowheads, is chronologically homogeneous.

Pins are not only chronological indicators, but they serve as ethnoarchaeological markers of trines, to which I have already devoted several works (Grechko 2010, 98, 99; 2021, 18, 19). The authors of the article note that as an ethnocultural marker, the complex of pins corresponds to the Forest-Steppe variant of the Scythian culture without further clarification (Adamik-Proksa and Ocadryga-Tokarczyk 2021, 163). Although the "external" point of view immediately indicated to me the identity of the set from the WPG. This is indicated by the presence of very specific pins with double spirals, which among the Forest-Steppe population groups are found only in the WPG and is a specific characteristic of this group (Fig. 3) (Smirnova 2006, 74). The only specimen of such pin was found in TLC at a distance of 100 km from Chotyniec on the San (Kłyżów, Site 2) (Trybała-Zawiślak 2012, 165, pl. 35: 7). A similar shape of pins was quite common from the Caucasus to Western Europe (Maciejewski 2019, 25, fig 5). Therefore, we are talking about comparisons with neighbouring related tribal groups.

The researchers of Chotyniec certainly attribute this population group to the Forest-Steppe people (Czopek 2021, 381-383). A comparison of the pins with other Forest-Steppe groups makes it possible to single out the undisputed main contender for the "closest relative". The Chotyniec hillfort pin complex is fully comparable with those of the WPG, considering the very specific products with double spirals.

The ash-hill of Chotyniec attracted close attention with massive finds of fragments of Greek amphorae in the "heart of the Europe" (Czopek 2019, 126, 127; Trybała-Zawiślak 2019, 268-272), which is extremely rare for Lusatian and Eastern Hallstatt contexts. Here it is worth noting that for Forest-Steppe sites of the Scythian period in the territory of Ukraine, such finds are mass material, and Chotyniec belongs precisely to this circle of monuments. The dating of the same Klazomenian amphorae today is established within the limits of the end of the 7th–the first third of the 6th centuries BC (Monakhov 2003, 45; Sergin 2004, 173-175). The set of amphorae fully corresponds with the finds in the Ivan-Puste and Zalissia settlements of the WPG (Daragan 2009, 119-147). This may indicate that the CH belongs to this exchange network with the ancient colonies of the Lower Bug region, which passed along the watershed of the left bank of the Dniester to Central Europe (Trybała-Zawiślak 2020, 107).

The thick-walled vessels with black surface of Hallstatt ware are important as in the case of the findings at the Nemyriv hillfort (Czopek 2021, 379, 380; Smirnova *et al.* 2018, 227, 231), the Trakhtemyriv settlement and the Ivan-Puste and Zalissia settlements (Daragan 2011, 525). Fragments of similar vessels were found in dugout 1-2 of the Nemyriv hillfort together with fragments of Greek imports, which allows them to be attributed to the phase III.1.3. of Nemyriv (Smirnova *et al.* 2018, 227, 231). We can agree with Sylwester Czopek that this vessel together with the arrowheads and pins allow us to assume the beginning of the functioning of Chotyniec in the second half of the 7th century BC (Czopek 2021, 379, 383).

It is worth noting that the artefacts and stratigraphy do not seem to correspond to the chronology of the 250–300-year functioning of the ash-hill. Using the example of the ash-hills of the Western Fortification of the Bilsk hillfort, Iryna Shramko came to the conclusion that the vast majority of ash-hills were formed in a period less than about 75 years, two were around 75 years old, and only ash-hill No. 5 (about 150 years old) is an exception (Shramko 2012, 171).

Therefore, the excavators of the Chotyniec hillfort are making attempts to explain the absence of late chronological stratigraphic layers by a post-deposition process, *i.e.*, the destruction of the upper late layers by ploughing, *etc.* (Burghardt 2020, 351). Regarding the last argument, that the layers of the second half of the 6th–3rd centuries BC were destroyed by ploughing (Czopek and Krąpiec 2020, 1609), I note that these layers are not traced on the slopes of the ash-hill on its edge, and these layers are well preserved according to the stratigraphy (Czopek and Krąpiec 2020, 1602, fig. 4). The periphery of ash-hills always contains later layers and complexes, which are fixed at the level of the ancient horizon. In addition, artefacts from destroyed layers remain in the ploughed layer with a slight displacement. For example, outside the ash-hills of the Western Fortification of the Bilsk hillfort, undisturbed layers from the latest period of existence of the fortification (the first half of the 5th century BC) were recorded under the ploughed layer by ploughing on the site of the ash-hill, which destroyed the mound itself. The presence of horizons of the second half of the 6th–the first half of the 5th centuries BC is always clearly visible in the complex of material culture, including antique imports and arrowheads. I will give an example of how the materials of this time should have looked at the CH hillfort, if it had functioned after the Early Scythian period during the second half of the 6th–first half of the 5th century BC. When the ash-hill No. 13 was investigated in 2008, the main preserved layers belong to the Early Scythian period and the transition period (horizons Band V according to I. B. Shramko). However, findings from the upper layers indicate the use of an ash-hill until the middle of the 5th century BC (Fig. 4) (Zadnikov 2009, 50-52).

Therefore, I consider the option of destruction without any traces and artefacts of the ash-hill layers, which would have been formed for more than 200 years, extremely unlikely. At the same time, I agree with Sylwester Czopek that we cannot completely exclude the presence of later layers in the unexplored part of the settlement (Czopek 2021, 383). Although, judging by the lack of traces of repair of the rampart and the cultural layer outside the ash-hill, the chances of such a discovery are minimal.

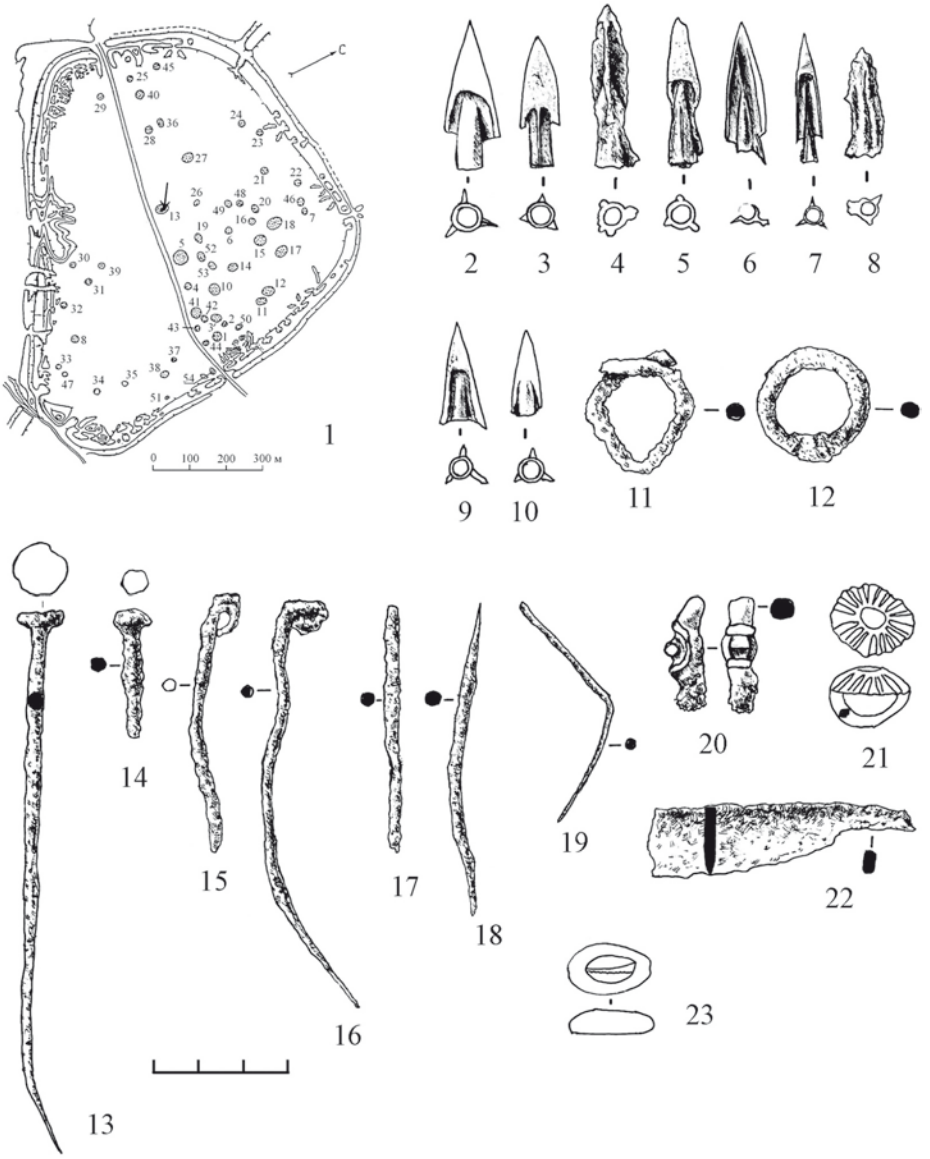

Fig. 4. Materials from the ash-hill No. 13, the Western fortification of Bilsk hillfort (Zadnikov 2009, 50-52)

The settlement Hruszowice, Site 2 and the Chotyniec hillfort functioned at a very similar period as the results of radiocarbon dating of these sites show. Radiocarbon dates from the settlement Hruszowice, Site 2 cover the time range from the 10th to the 5th century BC (Adamik-Proksa *et al.* 2022, 267). The majority of the radiocarbon dates obtained from

Site 2 in Hruszowice belong to the period from the 6th to the 5th century BC. The situation is similar with the Chotyniec hillfort: "At the same time, the sites yielded no artefacts (especially metal objects) that could be unambiguously linked to this stage" (Adamik-Proksa *et al.* 2022, 268). Substantial parts of the settlements near Hruszowice have been excavated and we cannot expect to find the layers or complexes of the second half of the 6th–5th century BC. I suppose that the situation with unexcavated area of the Chotyniec hillfort will be the same.

Therefore, typological analysis and stratigraphic observations allow us to draw conclusions on the relatively short period of operation of the ash-hill of the Chotyniec hillfort. The complex of finds is completely homogeneous with the presence of some archaic elements, which allows us to date the ash-hill to the middle of the 7th– the first third of the 6th centuries BC (Fig. 5).

CHOTYNIEC HILLFORT RADIOCARBON DATING

The issues of absolute the absolute chronology of Hallstatt C and D sites are caused by the so-called Hallstatt calibration plateau, which has actively been discussed since the early 1980s (Pearson *et al.* 1983). Labelled as "the 1st millennium BC radiocarbon disaster" (Baillie and Pilcher 1983), this plateau on the calibration curve results in wide calibrated ranges extended from *c.* 750 to *c.* 400 cal. BC. Various attempts to overcome these issues include combining ^{14}C dating with dendrochronology, stratigraphic or typological information (Rose *et al.* 2022) and wiggle-matching analysis (several ^{14}C dates for the same wooden sample corresponding to individual tree-rings) (Trias *et al.* 2020). However, precise absolute chronology of sites referred to the analyzed time period remains problematic.

Information was recently published on a cremation burial with biconical beads, which was investigated on the western edge of the Volyn' Upland (Mikulin, Site 9, trench IV/2017, Feature 13). Radiocarbon dating only allowed its creation to be dated within the limits The Hallstatt calibration plateau:"At the same time, despite the objective impossibility of obtaining samples whose ^{14}C measurements would precisely determine the *terminus a quo* of the burial itself, the modelling implemented allowed the confidence interval for this event to be shifted from about 780-550 to about 610-340 BC (68.2%)" (Chmielewski *et al.* 2021, 558).

The absolute chronology of Chotyniec is based on 18 radiocarbon dates obtained in the Laboratory of Absolute Dating in Skała and Cracow, Poland for the ash-hill (Czopek 2021; Czopek and Krąpiec, 2020). This set includes three AMS and 15 largely overlapping conventional radiocarbon dates made from charred wood samples (Fig. 5). The approach presented by Sylwester Czopek and Marek Krąpiec (2020) naturally attempts to overcome the issue of wide calibrated ranges resulting from conventional dating and calibration curve effects with the application of Bayesian modelling.

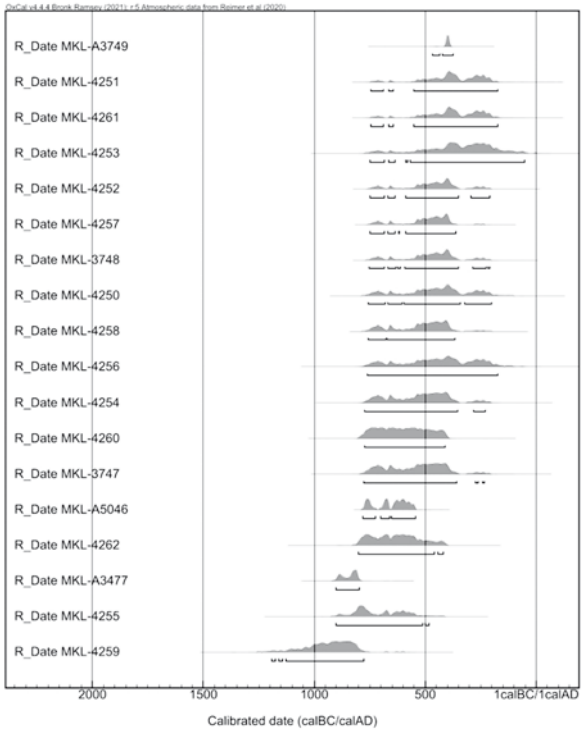

Fig. 5. Radiocarbon dates obtained for Zolnik in Choryniec (raw data is derived from Czopek, 2021; Czopek and Krąpiec, 2020). Dates were calibrated according to the IntCal20 Nothern Hemisphere atmospheric curve (Reimer *et al.* 2020) in OxCal, version 4.4.4 (Bronk Ramsey 2021)

Since the Bayesian approach to radiocarbon dating is based on user-inputted model chronology (*e.g.*, Harper, 2021), it is important to focus on the possible interpretations of the ash-hill. Sylwester Czopek and Marek Krąpiec (2020) interpret the earth and clay layers of the analyzed feature as being formed as a stratigraphic sequence. Three dates (MKL-4259, MKL-A3477 and MKL-4255) in their scheme are considered as predating the ash-hill. Two more dates (MKL-4262 and MKL-4260) are associated with the ash-hill's 'Phase 1'. The other ten dates are referred to its 'Phase 2', while the 'youngest' date is associated with the 'Phase 2'. An AMS radiocarbon date (MKL-A5046) obtained later is referred to the time of feature's construction (Czopek 2021, 380, 381).

Experience in research on ash-hills (Gershkovich 2004, 106-108, fig. 2) suggests an alternative explanation for the formation process of such features (Fig. 6).

According to the stratigraphy and planigraphy of ash-hills, such features could initially have functioned as houses. Their abandonment could have included ritual destruction, followed by covering remains of a dwelling with soil from the surrounding area. For

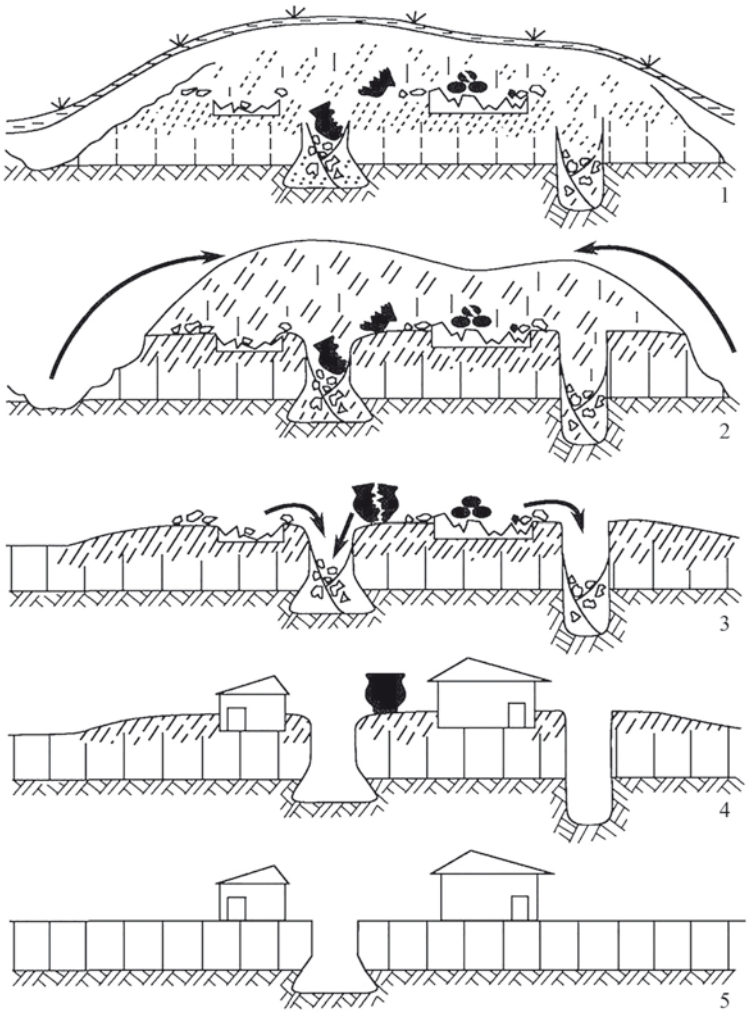

Fig. 6. Scheme of the formation of ash-hills of the Belogrudovka type (Gershkovich 2004)

instance, the construction, functioning and abandonment of a house resulted in ash-hill formation may be exemplified by the excavations on Tzarina Mogyla tract in 2016-2017. The dwelling at this site collapsed in a fire, the temperature of which was high enough to fire the clay of the walls. Further on, the area with collapsed walls was turned into a garbage place accumulating ash from ovens and open fire-places, bones, pottery fragments *etc.* Later development of the site structure resulted in the construction of a rampart above the ash-hill. The finds from the dwelling remains and ash stratum are dated to the end of the 7th– the middle of the 6th centuries BC (Grechko *et al.* 2018, 42-74). Numerous fragments of

burnt daub come from the excavations of the majority of the Forest-Steppe hillforts and settlements (for example: Ganina 1965, 106; 1984, 69). Considering the experimental research on house destruction, which confirmed the deliberate burning of dwellings, the issue of ritual house abandonment among populations of the Eastern European Forest-Steppe is a promising topic for further research.

The initial functioning of the discovered ash-hill in Chotyniec as a house is confirmed by the significant amount of burnt daub (nearly 30,000 fragments) coming from its excavations (Fig. 7) (Czopek *et al.* 2017, 299, fig. 15; Czopek 2019, 125).

Covering the wooden construction of walls with clay in the Iron Age does not surprise when considering the recently increasing evidence on long-term traditions of wattle-and-daub architecture in the Neolithic and Bronze Age of Central Europe (*e.g.*, Balcer 2012; Bánnfy and Höhler-Brockmann 2020; Diachenko *et al.* 2021; Jaeger and Stróżyk 2015; Pastor Quiles 2022). Field observations and experimental research identify the degree and duration of heat effects as two factors conditioning formation of the burnt daub (*e.g.*, Chernovol 2012; Johnston *et al.* 2018; 2019). High temperature impacting the construction over relatively short time does not result in burnt daub preservation. Low temperature, even impacting the construction during a relatively long time, leads to the preservation of its elements as layers of clay. In our case, this evidence suggests house burning as a component of its ritual abandonment.

Fig. 7. The burnt daub from ash-hill of the Chotyniec hillfort (Czopek *et al.* 2017)

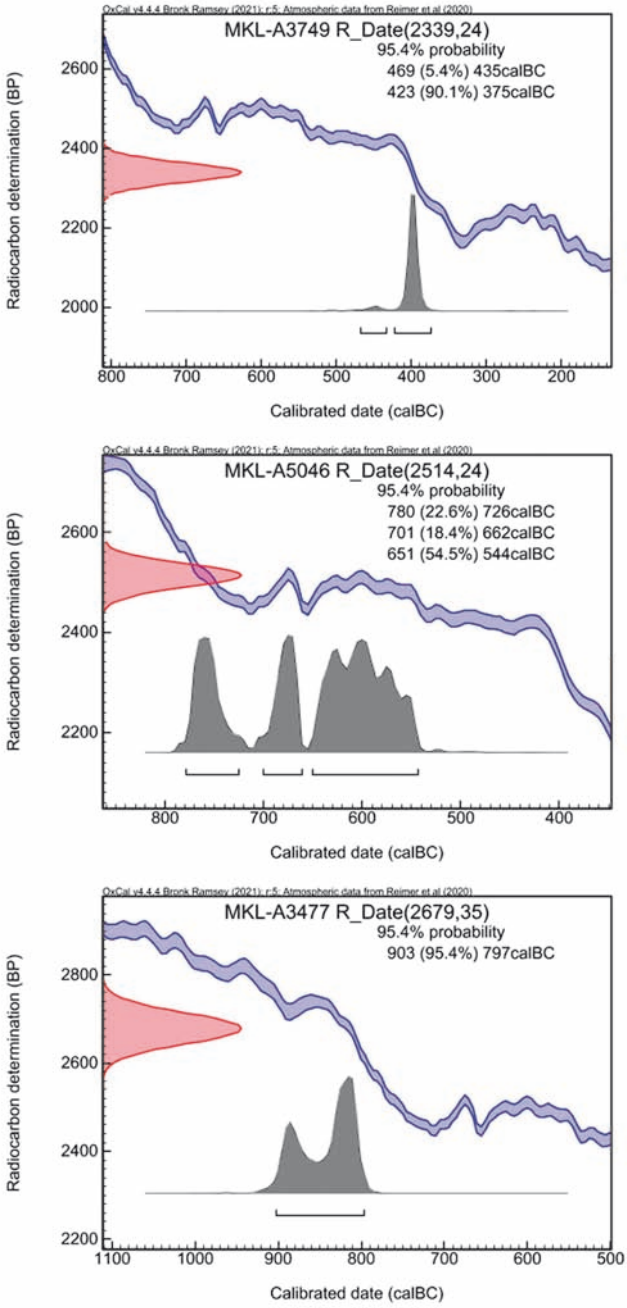

Fig. 8. AMS radiocarbon dating of Zolnik Chotyniec (raw data is derived from Czopek 2021; Czopek and Krąpiec 2020). Dates were calibrated according to the IntCal20 Nothern Hemisphere atmospheric curve (Reimer *et al.* 2020) in OxCal, version 4.4.4 (Bronk Ramsey 2021)

The important details of house burning and covering its remains with soil from surrounding area may be addressed referencing the experiment in building, burning and excavation of the model of Eneolithic Cucuteni-Trypillia wattle-and-daub house in Nebelivka, Ukraine (Johnston *et al.* 2018; 2019). The collapse of the walls in this experiment did not occur simultaneously. Instead, wall sections were falling one after the other. It is also important to underline that the bottom part of the windward wall was standing for the longest time, even despite a high overall temperature of house burning. Moreover, a good preservation of a significant amount of the burnt daub requires an additional fuel usage, which indicates the deliberate (ritual) house burning (Johnston *et al.* 2019).

After recording the house model's burning process, its remains were covered with soil by the local workers. Further excavations have shown that this resulted in multiple redepositions. Therefore, despite the general stratigraphic sequence reflecting the house destruction process, it is impossible to associate every single piece of charcoal with the house building (elements of wooden construction) or burning (additional fuel) (Johnston *et al.* 2018).

Extrapolation of this evidence to the ash-hill in Chotyniec mostly excludes the association between charcoal samples and feature's layers (where clay layers, most probably, represent the remains of walls burnt in low heating). A single stratigraphic "phase" may include charcoals associated with house construction, functioning (charcoals and ash accumulated outside the dwelling and redeposited to its remains with soil), and destruction. For instance, the "oldest" MKL-A3477 and MKL-4259 dates may either reflect natural event(s) predating the site, or the impact of the "old wood effect". The "youngest" MKL-4251 sample corresponds to the Layer 3 which postdates ash-hill's functioning in the scheme proposed by Sylwester Czopek and Marek Krąpiec (2020). However, this date may also be referred to the preceding "phases" based on the presented understanding of the ash-hill formation process.

To sum up, consideration of the "old wood effect" and various assumptions based on "good guesses" regarding the association of a particular sample to the time of dwelling construction, burning or ritual abandonment results in different dating of these "phases" with the application of Bayesian modelling. In order to avoid such "good guesses", the most general conclusions regarding the Chotyniec absolute chronology are derived from the distribution of three AMS radiocarbon dates (Fig. 8). The oldest (MKL-A3477; 903-797 BC) and the youngest (MKL-A3749; 469-375 BC) ones, both not associated with archaeological evidence at the site, respectively, predate and postdate the hillfort's functioning. One more date (MKL-A5046) indicates the house construction in the range of 780-544 BC.

Thus, the Chotyniec ash-hill is dated to the time range, which does not exceed the interval of 780-469 BC. Given the commonly known but often forgotten fact that one date represents a particular second of a particular minute, month and year, all the other dates fit this interval. The only exception is represented by the MKL-4259 date reflecting

a natural event predating the site or caused by the "old wood effect" (Fig. 8). Precise dating of the site's functioning is possible only through consideration of archaeological chronological indicators.

THE PLACE OF THE CHOTYNIEC HILLFORT IN THE CULTURAL-CHRONOLOGICAL SYSTEM OF THE EARLY IRON AGE SITES IN CENTRAL AND EASTERN EUROPE

On the basis of the analysis of neighbouring cultural groups of the late Hallstatt period (first of all Cherepin-Lagodivand Lezhnica groups), Sylwester Czopek considers two main variants of interpretation of the Chotyniec hillfort. The first approach presumes its separation into "the Chotyniec complex" distinguished from the WPG. According to the researcher this is supported by the fact that, although both groups came at the same time, but the CA existed longer. The second approach is to recognize the Chotyniec hillfort as part of the WPG. The territorial discontinuity maybe explained by the poor state of exploration of the intermediate territory (Czopek 2021, 99).

The above data indicate that today there are no reliable grounds for dating the existence of the Chotyniec agglomeration beyond the middle of the 7th – the first half (third?) of the 6th century BC. This is fully consistent with the Early Scythian time and WPG dating. After I have defined my position on the dating of the Chotyniec hillfort, it is important to concentrate on defining this group of sites among synchronous cultural groups.

Sylwester Czopek rightly notes that the historical fate and time of functioning of Forest-Steppe settlements was different (Czopek 2021, 383). For the Motronin hillfort, the upper chronological limit is set within the first half of the 5th century BC (Bessonova and Skoryi 2001, 125), and for the Khotiv hillfort – the third quarter of the 6th century BC (Daragan 2005, 260, 261) or the last quarter of the 6th century BC (Kravchenko 2017, 120). The Trakhtemyriv settlement has a fairly clear date of the end of functioning as a result of the assault and also does not survive the middle of the 6th century BC (Fialko and Boltryk 2003, 89). It is worth noting that these hillforts are located in the Dnipro Forest-Steppe Right Bank (Fig. 1).

For the Eastern Podillian group and WPG, the situation looks somewhat different. Sites of both groups do not survive to the middle of the 6th century BC.

Western Podillian group (WPG). The time of functioning of the group was determined by G. Smirnova to around the middle of the 7th – beginning of the 5th centuries BC. The upper (later) date was based only on one complex from Verkhnikh Panevtsov. A. D. Mogilov argued that this complex was re-dated to the first half – the middle of the 6th century BC (Mogilov 2010, 124). In addition, G. Smirnova noted that no other late materials were found, neither in the graves, nor in the settlements on the Middle Dniestr (Smirnova 1993, 116; 2006). Greek pottery from the settlements of the WPG was considered by M. Daragan

and dated to the middle of the 6th century BC (Daragan 2009, 123, 124). M. Bandrivskyi dates the latest sites of the WPG (stage IIIb) to first quarter of the 6th century BC (Bandrivskiy 2014, 308).

Eastern Podillian group. In the first comprehensive publication of the latest research, the dating of the Severynivka hillfort from the end of the 7th century to the end of the 5th century BC (Ignaczak *et al.* 2016) looks like a technical error; the upper chronological limit of this fortification is established in the specialist work as not later than the second quarter of the 6th century BC (Boltryk, Ignaczak, Lifantii, Shelekhan 2021, 30). Accordingly, the materials of the Severynivka hillfort, as well as Nemyriv (Smirnova *et al.* 2018, 235), do not exceed the first half of the 6th century BC.

In general, it is worth noting the absence of traces of repair of the rampart of the Chotyniec hillfort (Czopek *et al.* 2017, figs 8 and 9), which would have occurred if the hillfort had been functioning for 250-300 years (Czopek and Krąpiec, 2020, 1609). Here it is also worth noting that the lower chronological limit near the middle of the 7th century BC is unlikely to be suppressed, because fortifications are not characteristic for the Zhabotyn period and only open settlements are known (Daragan 2011, 734-737). Large hillforts, including Chotyniec (with its area of about 30 hectares), arise no earlier than the second half of the 7th century BC (Daragan 2011, 738-740). The Chotyniec hillfort in terms of parameters has the closest analogues on the Middle Dniestr – Rukhotyn (Mogilov 2010, 121, fig. 14: 2).

The emergence of the Chotyniec agglomeration cantered on the hillfort fully corresponds to the main trends of ethno-cultural development and socio-cultural transformations in the environment of the Forest-Steppe population of the Early Scythian period. This also applies to the upper chronological limit of the functioning of the Chotyniec hillfort. Today, there are no reliable arguments that would confirm its functioning after the middle (the end of the first third?) of the 6th century BC, which corresponds to the rhythms of the development of settlement structures of the Dniestr-Dnipro Forest-Steppe (the disappearance of both Podillian groups).

We must emphasize that we are talking about the end of the existence of the sites of the Forest-Steppe population of the so-called Scythian cultural circle in the territory of southeastern Poland. Regarding the continued functioning of the Chotyniec "enclave" in the second half of the 6th–4th centuries BC (Czopek 2021, 384), I will note the following. No materials from this time have yet been found at the Chotyniec hillfort and Hruszowice settlement (Adamik-Proksa *et al.* 2022, 268).

In this context, the TLC site Grodzisko Dolne Site 22 deserves attention (Czopek 2007). Indeed, this site includes materials that were not discovered in Chotyniec. This is precisely what indicates that the Chotyniec enclave as a site of the Forest-Steppe population ceases to function, while Site 22 in Grodzisko Dolne (TLC) continues (starts?) to function. The presence in Grodzisko Dolne, Site 22 of Forest-Steppe eastern elements may just indicate that at least partially the Chotyniec population merged into the local TLC group and was gradually assimilated.

The available material analyzed above and other data indicate a synchronous emergence of Chotyniec agglomeration and the WPG. In addition to pins with double spiral heads from the Chotyniec hillfort, pins from Hruszowice Site 2 settlement "are known from the inventories of the WPG of the Early Scythian culture", and "whose decoration is generally exclusive for the artefacts of the WPG of the «Early Scythian culture» (comp. Smirnova 2004, 423, 424)" (Adamik-Proksa 2022, 280, 281, 392, pl. 84: 2).

Iron pins with rolled plain ends are interesting. Similar items are unknown in the WPG but are known among the materials of the Cherepin-Lagodiv group (Fig. 2: 37) (Krushelnitska 1976, 41, fig. 39, 20) and Late Vysocka culture (Bandrivskiy 2014, fig. 85: 1, 2; 94: 8). This indicates a close interaction of these tribal groups of the region.

Pins as an important ethno-tribal marker indicate the closest proximity of the population that left ash-hill to the WPG and contacts with neighbouring Cherepin-Lagodiv group populations.

In the mound of the Chotyniec ash-hill a large amount of burnt clay plaster was found (Fig. 7) (Czopek *et al.* 2017, 299, fig. 15; Czopek 2019, 125), which may indicate that the ash-hill, as in most cases in the Forest-Steppe, represents the remains of a wattle-and-daub construction, possibly a dwelling. It is worth noting that no traces of ritual activities (altars and sacrifices) were found, and the materials have a pronounced domestic character (garbage). Ground-level dwellings of wattle-and-daub construction are well known in the WPG, for example at Zalissia and Ivan-Puste (Ganina 1965, 106; 1984, 69). The WPG, like the Chotyniec hillfort, arose as a result of the movement of the Forest-Steppe population to the west at the beginning of the Early Scythian period (Mogilov 2020, 135).

Given the similar sets of amphorae (dating and sources) with the above settlements, the Chotyniec hillfort was a part of a trade (exchange) route from the Greeks to Central Europe which runs along the Dnister-San line, and was very important for Baltic-Pontic contacts during the Early Iron Age (Czopek 2019, 123; Trybała-Zawiślak 2020, 107). Logic suggests that this could be the reason for the removal of the Chotyniec hillfort by tribes related to the WPG population to such a distance from the main range. At the same time, it cannot be ruled out that the situation will change with the start of active research on the sites of the Early Iron Age in the region of modern Lviv.

The term "Chotyniec enclave" is very apt, but it is too early to state the degree of isolation and specificity of the territory of the Lviv region without further research of the Early Iron Age sites and to answer the question of which group's enclave is the Chotyniec hillfort.

Campaigns to Central Europe. In addition to the same processes that led to the emergence of a group, the groups also have a similar ending. For some time, the researchers have assumed the participation of the WPG population in campaigns in the Lusatian and Eastern Hallstatt lands (Chochorowski 2014, 43). The researchers of the Chotyniec assume the participation of its population in these actions of nomads (Czopek 2021, 384). Sylwester Czopek supports M. Burghardt's conclusion (Burghardt 2020, 353), that arrow-

heads from the Chotyniec ash-hill are similar to those found in Wicina (Czopek 2021, 384). I cannot agree with the proposed opinion. I should again draw the attention of researchers to my article, where arrowheads from the layers of destruction are analyzed (Grechko 2020a). The arrowheads of the ash-hill of the Chotyniec hillfort do not belong to the time of the destruction of hillforts in the Lusatian and Eastern Hallstatt lands, but fully correspond to the Kelermes period (Fig. 2: A, B) (Grechko 2013, 133-154; 2020a, 12-19). The complete absence of arrowheads in the collection, even of the transition period (Fig. 2: D), as in the settlements and hillforts of the WPG, once again indicates that these groups did not experience nomadic migrations to the west. It is very likely that the end of the Chotyniec hillfort and both Podillian groups is precisely connected with this global destabilization of the military-political situation around the middle of the 6th century BC in the broad areas of Eurasia.

It is interesting to consider the probable participation of the population of Chotyniec hillfort in the campaign to the west along the northern slopes of the Carpathians. This direction of movement of nomads is known in the Middle Ages (Świętosławski 1997) and should be taken into account in the reconstructions, since I preferred following Jan Chochorowski regarding the way to Wicina through Moravia and "Štramberk-Kotouč-Čertovadíra" (Chochorowski 2014, 32).

It is quite probable that the movement by different vectors, even simultaneous movement of different groups of nomads (Fialko and Boltryk 2003, 352). It is worth noting that, in addition to nomads from the Transcaucasia, semi-nomads of the Forest-Steppe could most likely take part in the campaign. The participation of the settled agricultural population of the Forest-Steppe raises serious doubts. Further research will show if the residents of the Chotyniec agglomeration were victims of or forced (?) participants in the aggression. The only important conclusion is that after the campaigns, nobody returned to the Chotyniec hillfort.

TLC tribes: life without Chotyniec (HaD2-3)

TLC tribes definitely continued inhabiting the region during the HaD2-3, which stands out due to finds typical for the Vekerzug culture. I have already indicated that complexes of the Tarnobrzeg Lusatian culture of this time (Obojna-Zaosie, Burial 10; Trójczyce, Burial 102; Ulanów-Zwolaki, Łagiewniki, Burial 7/59) could be distinguished by the presence of specific types of arrowheads in the burials (Gedl 2014, 57, 58) typical for the Vekerzug culture (the Vitova Mohyla horizon and the first phase of the Middle Scythian time according to D. S. Grechko 2016a; 2016b; 2020b). The issue of the population density of the TLC region after the "Scythian" campaigns and the disappearance of the Chotyniec agglomeration requires a special study.

This horizon includes materials from the TLC with Grodzisko Dolne, Site 22 (Czopek 2007). The ceramic complex of this site has the following characteristics: there is practi-

cally no sticky roller, cauldron-shaped pots dominate, almost all the pots have a rusty outer surface -about 56% (Czopek 2007, 183, tab. 9), bowls with pin holes and rollers are single, like this type of cooking ware in general (Czopek 2007, pl. 14, 15, 20, 37: 2). It is interesting that a significant percentage of vessels with a rusted surface is known in the Lezhnica group. L. Krushelnitska pointed out the proximity of similar ceramics in the adjacent territories of Poland, the left-bank of the Western Bug, Hrubieszów County (Krushelnitska 1976, 63-65). There are no dated materials in the materials of the Lezhnica group. It was dated to the Pre-Scythian and Early Scythian times according to the ceramic complex (Krushelnitska 1976, 67-69). The ceramics with a rusted surface are represented among the ceramic complex of the Shankiv Yar settlement (Kozak 2012, 25-27). D. Kozak interpreted the cultural group to which this settlement belongs as a "new cultural community encompassing part of the Tarnobrzeg group of the Lusatian culture, the Lusatian culture in the basin of the Bug River, western Volhynia and a part of the Circumcarpathia" (Kozak 2012, 34, 35). A. Bardetskyi notes "that the ceramic style of the Khrinniki sites is a style of the Western model, the focus of which was the South Baltic basin, and represented in the Late Bronze Age and the Early Iron Age by the Lusatian culture... It is telling in this context that in the following eras, the natives of these territories also brought to Volyn' ceramics with a rusted surface (Pomeranian, Przeworsk, and Wielbark cultures)" (Bardetskyi 2019, 18, 19). The researcher proposed considering Shankiv Yar and Lezhnica-type sites as the Lezhnica horizon of the Ulvivets-Lezhnica group of Lusatian culture (Bardetskyi 2019, 20, 21). TLC researchers point out an important thing: "The abovementioned Tarnobrzeg group of the Lusatian culture in its youngest phase has similar characteristics" like "Volhynian culture of the Early Iron Age" (the Khrinniki type according D. Kozak) (Czopek 2021, 91).

The arrowhead from the Shankiv Yar settlement (Kozak 2012, 31, fig. 10: 4) indicates the synchronicity of the materials from Grodzisko Dolne, Site 22 and the dating of the Vitova Mohyla horizon (530/520 BC, HaD2). This indicates similar trends in the development of eastern and southeastern Lusatian culture groups after the nomadic campaigns around the middle of the 6th century BC.

It can be observed that sites with rusted ware reflect the strengthening of the South Baltic influence (Pomeranian, Cloche graves) (Bardetskyi 2019, 18, 19) in the second half of the 6th – beginning of the 5th centuries BC, which is consistent with the HaD2-3 phase. The strengthening of influence was also associated with the direct migration of the Pomeranian population to the south and the formation of syncretic population groups during the 7th century BC – Cloche graves (Fig. 9) (Dzięgielewski 2016, 22), and in the Bug basin and Transnistrian region, it is fixed by the appearance of the Lezhnica group of sites, which also has an eastern Forest-Steppe component. Even further south, this influence is detectable on the sites of the youngest phase of the TLC (like Grodzisko Dolne, Site 22).

The period after the campaigns and the abandonment of Chotyniec agglomeration may be worth highlighting in the period of development of TLC III 1b or suppressing phase

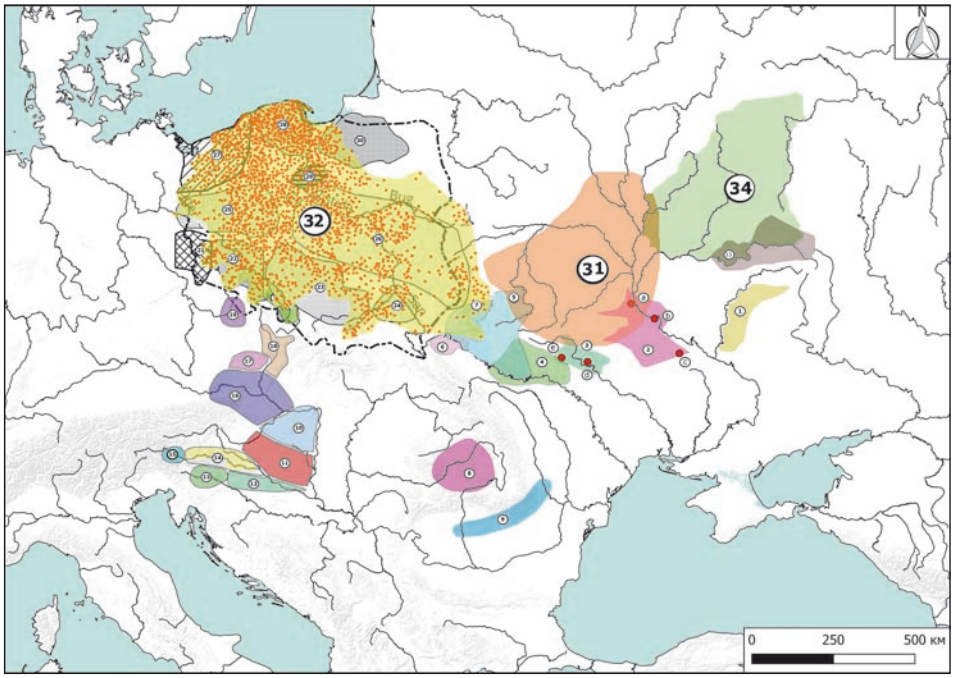

Fig. 9. The movement of the "forest" cultures to the south (HaD2-LtA) comparing with previous period (Fig. 1). 31 – Mylograd culture; 32 – Pomeranian culture and area of the penetration of their cariers (Dzięgielewski 2016); 33 – Seym group; 34 – Yukhnove culture (http://www.encyclopediaofukraine.com/display.asp?linkpath=pages%5CY%5CU%5CYukhnoveculture.htm)

III/2 to the second half of the 6th–5th centuries BCE, which does not contradict the dating of chronological indicators from the complexes of the late phase of TLC (arrowheads). This topic needs special research.

Researchers in recent years have not considered climate change to be the main factor in the migration of Pomeranian tribes to the south (Dzięgielewski 2010, 173; Trybała-Zawiślak 2019, 356, 357). One of the main reasons for the movement to the south was a significant increase in the number of the population of the Pomeranian culture during the HaD, and it was the lack of agricultural land that could push the movement to the south (Dzięgielewski 2010, 189). It is interesting that the migration took place to the territory of the TLC tribes, which occupied identical ecological niches (Czopek 2005; Trybała-Zawiślak 2019, 356), which should definitely lead to a conflict. If we do not take into account the climatic factor as the main trigger for the movement of the Pomeranian tribes to the south, it can be assumed that this movement could be due to the weakening of the Lusatian tribes due to the campaigns of nomads around the middle of the 6th century BC. This could have attracted an excess of Pomeranian population. In this context, the changes

in the composition of livestock of the Pomeranian culture (the main role was played by sheep, goat and horse) in burial traditions (the use of parts of animal carcasses) look interesting, which rightly evoked analogies with the spiritual culture of nomadic peoples (Czopek 2005b, 225, 226; Trybała-Zawiślak 2019, 356). These significant changes are characteristic of the post-migration HaD2-3 in Central Europe, which will certainly be at the centre of future discussions.

It can be concluded that the migrations of nomads to Central Europe in the middle of the 6th century BC, which were connected with climate change (Grechko *et al.* 2021, 338, 339), significantly shaped the ethno-cultural map and gave impetus to new trends in the development of the tribes of entire regions. For the territory of modern Poland and Volyn this was reflected in crisis phenomena among Lusatian tribes, the penetration of Pomeranian population groups to the south, and the formation of new syncretic population groups (Dzięgielewski 2016, 32).

Not later than the V century BC, the part of the former territory of the Eastern Podillian group was occupied by forest tribes of the Mylograd culture (Fig. 9; Lobay 1977; Bardetskiy 2019). The activation of the forest population is recorded in the Dnipro region as well. It was at this time that the infiltration of the population took place, which left sites of the Pidhirtsi type (a variant of the Mylograd culture?), in the second half of the 6th century BC to the south (Maksimov and Petrovskaya 2008). Perhaps the Forest-Steppe tribes suffered much more as a result of nomadic campaigns through their lands, which allowed the Forest tribes to start moving south. But this is the subject of my future special study. The continuation of a similar vector of development in the 3rd century BC was the formation of Zarubinets culture.

CONCLUSIONS

1. Dating of the Chotyniec hillfort according to archaeological evidence (typo-chronological approach) does not cause difficulties because the material culture complex is homogeneous. The typological analysis of the collection allows us to conclude on the relatively short period of operation of the ash-hill of the Chotyniec hillfort. The complex of finds makes it possible to date the ash-hill to the middle of the 7th–the first third of the 6th century BC. Revision of dating and determination of individual types of pins do not allow us to consider them as reliable grounds for asserting that the object functioned up to the 4th century BC.

2. Analysis of ^{14}C dating of the Chotyniec, show that we can date it to the time range, which does not exceed the interval of 780–469 BC. It is important to emphasize that the real absolute dating of the ash-hill can refer to any part of this interval. The dating proposed above according to archaeological data (typo-chronological approach) fully corresponds to the specified range.

Therefore, the typo-chronological approach narrows the radiocarbon dating of Chotyniec functioning to the middle of the 7th – the first third of the 6th century BC.

In my opinion, preference should be given to the dating of artefacts, and ^{14}C dating should be used as an auxiliary method for determining the absolute dating of the Chotyniec, given the impossibility of specifying the dating through the so-called Hallstatt calibration plateau.

The above data indicate that today there are no reliable grounds for dating the existence of the Chotyniec agglomeration beyond the middle of the 7th – the first half (third?) of the 6th century BC (HaC2-HaD1). This is fully consistent with the Early Scythian time and WPG dating. The analysis of material culture allows us to talk about the closest proximity of the Chotyniec hillfort to the WPG. Nowadays the term "Chotyniec enclave" is aptly used. Only new studies of the Early Iron Age sites of the territory and group will give an answer to the question whether it was an enclave of the WPG.

3. Clarifying the time of the disappearance of the Chotyniec hillfort allows us to more clearly characterize the changes that took place in the region after the campaigns to the west around the middle of the 6th century BC (HaD2-3). The enclave of the Forest-Steppe population near Chotyniec ceased to function. The population of TLC and neighbouring groups of the Lusatian culture were left in place, but the appearance of a crisis in the development of the settlement structure and material culture are clearly visible. Eastern and northern elements are clearly visible among the materials of the Lusatian settlements of this time. The strengthening of the eastern component can be explained by the assimilation of the Forest-Steppe population after the disappearance of the Chotyniec hillfort, the WPG and Eastern Podillian group. The northern component is associated with the beginning of the penetration of the forest Pomeranian population to the south in the area affected by the nomadic campaigns on the lands of Lusatian and Mylograd tribes to the territory of the Eastern Podillian group and the Kyiv Dnipro region.

Such reconstructions would be impossible if we believed in the existence of the Chotyniec hillfort before the 6th century BC according to ^{14}C Dating. This, once again, confirms the superiority of dating according to archaeology **(**typo-chronological approach) within the so-called Hallstatt calibration plateau time range.

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CHRONICLE

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"SCIENCE HAS LOST A VERY GOOD RESEARCHER, BUT WE HAVE LOST A DEAR FRIEND": IN MEMORY OF MYKOLA MAYORCHAK (1992-2023)

In the life of each of us, there are fateful meetings that are engraved in the memory and heart forever. Talented, extraordinary, honest, sincere – that was Mykola Mayorchak. It is very difficult to speak in the past tense about the young, erudite, intelligent colleague with the best human qualities...

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On Pentecost Soul Saturday, the archaeological and historical community of Lviv was shaken by terrible news. On June 2, 2023, Mykola Mayorchak, the commander of the grenade launcher unit of the fire support platoon of the mountain assault company, was killed in the Bakhmut area near Bilohorivka. While performing a combat mission, the Hero came under enemy mortar fire.

Mykola was born on July 1, 1992, in the village of Vovkiv, Lviv region. He studied at the Vovkiv secondary school and continued his education at the Peremyshliany school-gymnasium. Later he graduated from the I. Franko Lviv National University. Already in his student years, while studying at the Faculty of History, he chose the vector of his scientific interests. This was favoured by archaeological practice and an irresistible thirst for new knowledge. In 2017, Mykola became part of the staff of the Lviv Historical Museum, first as a junior researcher, and from 2018 to 2023 in the position of senior researcher. Mykola was engaged in scientific research and studied the collection of classical antiquity in the Museum's stores. He worked on the catalogue "Античні пам'ятки фондової групи „Археологія" Львівського історичного музею [Monuments of Classical Antiquity in the Archaeology Collections of the Lviv Historical Museum]", and participated in the creation of numerous exhibitions, in particular, as one of the curators of the exhibition "Шляхами древніх цивілізацій [On the path of the Ancient civilizations]" (2020). In order to popularize the sites, he was an active participant in international seminars and conferences.

Being an active field researcher and having experience in archaeological surveys and excavations, he carefully conducted field explorations and carefully processed the obtained material. In particular, since 2019, he had been actively engaged in archaeological surveys under the "Program of Archaeological Research of the Lviv Historical Museum". In the same year, he received an award from the Lviv Regional State Administration – "For high professionalism, significant contribution to the development of the museum activity, preservation of the cultural heritage". He published in co-authorship with S. Terskyi, O. Kutsenyak, and N. Demskyi several articles, in particular, "Пам'ятки давнього населення північно-західних відрогів Гологір (розвідки 2019 р.) [Sites of the ancient population of the northwestern spurs of the Holohory Mountains (surveys of 2019)]", "Археологічні дослідження в межиріччі Західного Бугу та Гнилої Липи (попереднє повідомлення про результати польового сезону 2019 р.) [Research of archaeological sites of the northwestern spurs of the Holohory Mountains (preliminary report on the results of the 2019 field season)]", "Археологічні дослідження в межиріччі Західного Бугу та Гнилої Липи [Archaeological research in the area between the Zakhidnyi Buh and Hnyla Lypa Rivers]", "Пам'ятки ранньомодерної доби в околицях с. Словіта (за даними археологічних експедицій ЛІМ) [Sites of the Early Modern era in the vicinity of the Slovita village (according to archaeological expeditions of the Lviv Historical Museum)]", "Рука з Мишкова: сучасний стан та перспективи дослідження [The hand from Myshkov: current state and prospects of research]".

Since 2021, Mykola Mayorchak had been a graduate student of the Department of Archaeology of the I. Krypiakevych Institute of Ukrainian Studies of the National Academy of

Sciences of Ukraine. He came to the department as an already qualified researcher, with work experience, his own scientific developments, and a clear understanding that he wanted to deal with the history of the population of the Lypytska culture in the territory of Eastern Sub-Carpathian and Western Podillia regions. In the first months of his studies, he actively worked on material and had many plans for publications. But shortly after the topic of his dissertation was approved and the graduate studies began, the morning of February 24 came, which divided life into before and after.

Mykola did not hesitate to go to defend his homeland. He could have stayed, he could have continued his research, he could have, but he decided otherwise... If we are talking about the War, he went without hesitation in the first days. When colleagues asked: "Can't you wait a little longer?", Mykola answered: "I can't! When, if not now?!". His innate responsibility did not allow him to simply leave the Museum. He organized all his working moments and completed ongoing scientific work. Even when he was in the military barracks or in the trenches, Mykola never forgot about his favourite work, about the Department of Archeology and the Museum. Having the opportunity to call – he always did it. And if there was a free moment, he wrote. In addition to talking about life and conditions, we discussed work issues and planned a chapter for a collective monograph dedicated to the sites of Lypytska culture, new articles in scientific journals, and the topics of reports at the conferences. He never forgot about the Lviv Historical Museum and had many plans to popularize the Museum after the War.

On June 2, 2023, Mykola came under mortar fire in the area of Bilohorivka. His life ended, and the entire universe ended with him... "Science has lost a very good researcher, but we have lost a dear friend", wrote Włodzimierz Antoniewicz over a hundred years ago, in memory of Volodymyr Hrebenyak. History, unfortunately, has repeated itself. Ukrainian archaeology, museology, his family, and loved ones again suffer an irreparable loss, caused by the same Moscow enemy...

He was a caring son for his mother, and a loving husband for his young wife. In the memory of everyone who knew him, he remains as a highly professional researcher, a sensitive, benevolent, and wise person. We will remember his sincere smile, calm tone of voice, incredible responsibility in everything he did, and attentiveness to the needs of colleagues and friends. He was a real «light» in this world, with a big heart and soul.

Eternal honour and ever-bright memory, our Hero!

Thank you, we appreciate, respect, and remember you, Friend!!!

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ANDRII FYLYPCHUK (1989-2023) IN MEMORIAM

In the late 1960s, psychologist Elisabeth Kübler-Ross identified five stages of grief: denial, anger, bargaining, depression, and finally acceptance. Everything seems OK, but it is impossible to get used to some losses and to forget them – unacceptable, no matter how hard time tries to dull the pain and memory of them. Among such unacceptable losses is the death, in the terrible war of Russia against Ukraine, of Andrii Fylypchuk. He was such an incredibly erudite and bright personality, persistent and determined, a talented archaeologist, researcher and medievalist, and a brave volunteer of the Armed Forces of Ukraine.

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The field of scientific interests of the young but experienced researcher was archaeology and the early history of the Slavs, the fortifications of the hillforts of the Raikovets culture in the Ukrainian Sub-Carpathian region, and the antiquities of the Plisnesk archaeological complex. The researcher wrote more than 150 scientific and popular science publications dedicated to these topics, including six monographs. With the death of Andrii Fylypchuk, not only did his family and friends suffer a painful loss, but so also did archaeological science. His untimely death deprived the Ukrainian State as a whole of a sincere patriot, which he remained until his last breath, defending its sovereignty in Slobozhanschyna – more than 1,250 km from his home, where a beloved wife and a son waited for him.

Andrii Fylypchuk was born on September 25, 1989, in the village of Khyshevychi, Lviv region, in the family of a famous Slavist-archaeologist, PhD in Archaeology, later director of the Institute of Archaeology of the Ivan Franko National University of Lviv, Mykhailo Fylypchuk and Maria Fylypchuk. From early childhood, he was immersed in the world of archaeology and history; with incredible interest he listened to his father's fascinating stories about the ancient past, and with each subsequent book from the large home library that he read, he became more confident in the choice of his future profession. The young man visited archaeological excavations for the first time at the age of eleven, where during the research of the ancient city-state of Olbia (from the Ancient Greek Ὀλβία – happy) he learned true happiness – to be an archaeologist. Andrii repeatedly participated in his father's expeditions, and since 2003 he had been a permanent participant in the Plisnesk archaeological expedition. Shortly before his tragic death, he noted that two-thirds of his life was connected with Plisnesk.

After graduating from Koropuzh Secondary School, in 2006, without any hesitation, Andrii Fylypchuk entered the Faculty of History of the Ivan Franko National University of Lviv, from which he eventually graduated with honours, obtaining a master's degree in archaeology. In the doctoral course, at the same university, he worked from 2011 to 2014 on the dissertation "Археологічні пам'ятки празько-корчацької культури в басейнах рік Прут та Дністер" [Archaeological sites of the Prague-Korchak culture in the basins of the Prut and Dniester rivers],supervised by Dr Natalia Bilas).

The result of these studies was the monograph "Склавини V-VII ст. на Дністрі і Пруті". [The Sclaveni of the V-II centuries on the Dnister and Prut rivers]. Lviv, 2021. This work is devoted to the study of archaeological sites of the Prague culture, which the researcher identified with historical Sclaveni. It contains a theoretical and methodological analysis of the accumulated source base, covering the main categories of archaeological sites of the third quarter of the 1st millennium AD, discusses the debatable problems of the origin of the Prague culture, the emergence and functioning of early Slavic hillforts, certain aspects of the chronology and periodization of the archaeological material of the 5th-7th centuries. Andrii Fylypchuk concluded that the system of settlement in Dnister region in the early Slavic period, characteristics of the topography, and structure of the economy of

sites of the 2nd-5th and 5th-7th centuries demonstrates the lack of local foundations for the formation of Prague culture there. Therefore, the Sclaveni most likely came to the region of the Dnister and Prut from the territory of Volyn' and Polissia. At the beginning of the 5th century in the region of the Upper and Middle Dnister region, they occupied territories that had previously been inhabited by the population of the Upper Dnister variant of the Chernyakhiv culture (the latter, most likely, represented a certain group of Antes of the Late Roman period). Supporting the thesis that the Prague culture developed into the Raykovets culture, the scholar divides the sites of the second half of the 1st millennium AD in the Prut and Dnister regions into "pre-hillfort" (5th-8th centuries) and "hillfort" periods of the development of Slavic culture. He also distinguishes two stages of the first period – the migration (early 5th – middle of 7th century) and stabilization processes (second half of 7th century – 8th century).

Andrii was very active. He worked a lot. During 2010-2011, he worked as a researcher at the PE "Center for Monument Preservation Research", and in 2015 as an assistant at the Department of History of the Middle Ages and Byzantine Studies, as well as a researcher at the Research Department of the Ivan Franko National University of Lviv. He was a member of the Union of Archaeologists of Ukraine and the community organization "Pidhirtsi-Sholom". In 2012, he conducted his own field survey on the territory of Lviv, Ternopil and

Ivano-Frankivsk regions. Erudite and eloquent, he was one of the best tour guides in Lviv's dungeons.

But, without a doubt, Andrii's main passion, like his father Mykhailo Fylypchuk's, was Plisnesk – a unique archaeological site of the early and late Middle Ages, located on the border of Sub-Carpathian and Volhynian land. Having not missed a single field season on the site since the age of thirteen, Andrii became an integral part of it. In 2015, he made great efforts to create The Historical and Cultural Reserve "Ancient Plisnesk", where he worked as the deputy director for scientific work. Since then, he led separate expeditions there, and after the sudden death of Mykhailo Fylypchuk in 2016, he headed the Plisnesk archaeological expedition.

The figure of Mykhailo Fylypchuk, as a father, teacher and researcher of Plisnesk settlement, was decisive in Andrii's life. The first edition of the newly collection of papers on the reserve, of which Andrii became the editor-in-chief, was dedicated to his memory ("Пліснеські старожитності. Збірник наукових праць Адміністрації історико-культурного заповідника "Давній Пліснеськ" на пошану Михайла Андрійовича Филипчука [Plisnesk Antiquities. Collection of studies of Administration of Historical and Cultural Reserve "Ancient Plisnesk" in honour of Mykhailo Andriiovych Fylypchuk]", Lviv: 2016). And in 2021, based on his father's archives, Andrii published the report "Збірку матеріалів археологічних досліджень Михайла Филипчука (1955-2016) [A collection of Mykhailo Fylypchuk's (1955-2016) archaeological research materials]. Lviv, 2021. In it he collected little-known, mostly unpublished materials of his archaeological research on the site.

As Andrii Fylypchuk noted, after his father's death, he "in a certain way was left alone with his ideas". But the persistent researcher made a promise to himself that his father's work would not be lost in vain and began truly titanic work on "implementing his idea of 'breaking Plisnesk into parts and reassembling it' and, in simple words, summing it up, publishing it and interpreting it in line with of our vision, the historical development of Plisnesk, including in the context of the state-building processes of a thousand years ago".

Pursuing the mentioned goal, the archaeologist worked frantically, starting work at 4 a.m! And running ahead, I will say that he succeeded, even faster than he himself hoped: "With God's help, with the help of my colleagues at work, on the expedition, with the help of my wife, we did it". During six and a half years of unceasing work, Andrii Fylypchuk published five monographs dedicated to Plisnesk antiquities. Four of them were co-authored with Mykhailo Fylypchuk and his own wife, a researcher of cult sites of the 7th-13th centuries in the Sub-Carpathian region, Dr Halyna Fylypchuk.

The mentioned works are detailed reviews of certain basic scientific problems, the names of which eloquently correspond to the content of each of them: "Культовий центр VII-X ст. давнього Пліснеська (археологія та історія) [The cult center of the 7th-10th centuries of ancient Plisnesk (archaeology and history)]. Lviv, 2021; "Археологія курганного могильника давнього Пліснеська (дослідження 1940, 1946, 1949, 1980, 2007, 2015-

2017, 2020 pp. [Archaeology of the barrow cemetery of ancient Plisnesk (research 1940, 1946, 1949, 1980, 2007, 2015-2017, 2020)], Lviv, 2021; "Археологія християнських некрополів літописного Пліснеська [Archaeology of the Christian necropolises of the chronicle Plisnesk]", Lviv, 2020; "Археологія фортифікацій давнього Пліснеська [Archaeology of the fortifications of ancient Plisnesk]", Lviv, 2021.

The last monograph, "Давній Пліснеськ. Нариси [Ancient Plisnesk. Essays]", Lviv, 2022, a printed copy of which Andrii Fylypchuk received while at the front, summed up this series of thorough publications. The book is devoted to summarizing the most important issues of the archaeology and history of the Plisnesk archaeological complex. The earliest antiquities of this site are represented by materials of the Trypillia and Vysotsk cultures. Of course, the sites of the medieval era are most vividly presented here: the cult pagan center of the 7th-10th centuries, the hillfort of the 9th-10th (Slavic) and 12th-13th centuries (Rus') periods, grave sites of the 11th-13th centuries. The book is a kind of short summary, but at the same time, it is a continuation of the work started by the long-term leader of the Plisnesk archaeological expedition – Mykhailo Fylypchuk, and the large cohort of researchers who have ever worked at the site. With it, Andrii Fylypchuk summed up his own scientific career, a fact that he declared himself in an epilogue, indicating that he considered that he had fulfilled his duty to his father. It is symbolic that Andrii wrote it on December 19, on the birthday of his father...

However, archaeology is a science that is not chosen, it chooses the researcher

itself and does not let go until the last one. Thus, while already serving in the Armed Forces of Ukraine, where Andrii Fylypchuk volunteered immediately after the start of the full-scale Russian attack on Ukraine on February 24, 2022, archaeological finds continued to find him during shifts, repeatedly coming into view from the surface of the tired Ukrainian land. Comrades at the front later recalled that even while digging trenches, Andrii enthusiastically talked about the finds of ancient ceramics and their history.

In the Armed Forces of Ukraine, Andrii Fylypchuk served as part of the 103rd separate brigade of the Territorial Defense Forces. He fought in the hottest positions in Luhansk and Donetsk regions. At the front, he mastered the professions of a combat medic and a SPG-9 gunner. He was determined and courageous. During one of our last conversations, to my request to protect himself, he replied that in fact he was terribly worried not for himself, but for his family, because when he was so far from them and during the performance of combat missions he was without communication, he didn't know if they are safe... He loved his family above all else. He went to fight in order to protect them! At the same time, despite all the horrors of war and trials that he had to overcome every day, he always found a moment for self-improvement. At the front, he read a lot and even improved his English, amusingly pretending to have an accent.

The Hero died on February 2, 2023 in bloody battles on the outskirts of the city of Kreminna in the Luhansk Region at the age of 33, in the rank of senior soldier. He was buried in the Heroes of Ukraine Memorial Complex of the Lychakiv Cemetery on February 10.

On November 8, Andrii Fylypchuk was posthumously awarded the Order of Courage of III Class by the Decree of the President of Ukraine No 741/2023, for special courage shown in the defence of the sovereignty and territorial integrity of Ukraine and his selfless performance of military duty.

Apart from all the virtues that Andrii was endowed with, I will also forever remember him as a wonderful, bright person, a cheerful and sincere friend whom I had the honour of knowing since 2010. A talented colleague with whom I spent several archaeological seasons in Plisnesk. The person from whose hands I received initiation into archaeology, during my first expedition...

Rest in peace, my dear friend!
Thanks for all!

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ARCHAEOLOGY OF UKRAINE DURING THE YEARS OF INDEPENDENCE. A BRIEF OVERVIEW OF THE LONG-AWAITED PUBLICATION*

The story of one book. At the end of 2022, a new popular science publication "Arkheolohiya Ukrayiny za roky nezalezhnosti [Archaeology of Ukraine during the years of Independence]" was published. This book was edited by Yakiv Hershkovich and Denys Grechko (Kyiv: Institute of Archaeology of the National Academy of Sciences of Ukraine, 2022, 448 p.). The project has its own history, which dates back for several years, from the initial idea to the final publication, accompanied by presentations in a number of cities in Ukraine and abroad. In this book, the authors – professional archaeologists – tried to explain in simple words the complex processes of archaeological research in the field and in the office.

The idea of the need to report in a popular form to employers (that is, the citizens of Ukraine, from whose taxes many institutions exist), first came from Denys Grechko (this researcher is now engaged in the defence of the Independence of Ukraine in the Armed Forces). Such projects traditionally appear before certain anniversaries, and it was the same in this case. In 2015, on the eve of the 25th anniversary of the restoration of independence of Ukraine, the scientist proposed to the members of the Ukrainian public organiza-

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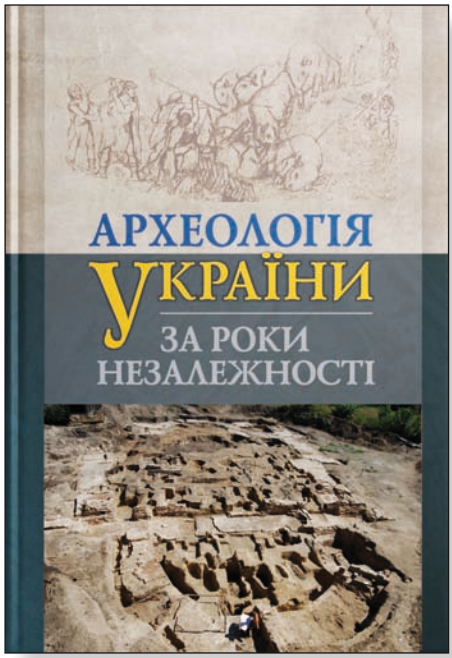

tion "Union of Archaeologists of Ukraine" (UAU) to prepare a popular science publication with 25 essays describing the most interesting materials. This would have served to acquaint the readers with the achievements of archaeologists of independent Ukraine. This idea did not come into fruition at that time.

The second occasion that "naturally" led to the issue being brought up for a second time was on the eve of the 30th anniversary of the restoration of Ukraine's Independence. That time, at the end of 2020, Denys Grechko's proposal received support, and work on creating the popular science essays began. Of course, the idea was transformed not only quantitatively, but also qualitatively. The initial idea was to have a series of essays, their number corresponding to that of the years since the restoration of the Independence of Ukraine. The second approach was a slightly different, more systematic one. This was to use the publication to highlight interesting facts of all periods of the Ukrainian archaeology. This is how a new concept of structure arose. The material was to begin with an introductory "Words to the Reader" and consist of several thematic chronological blocks, which were later entitled "Ukraine's earliest past: the Stone Age", "Eneolithic – Bronze Age", "Early Iron Age (from the Cimmerians to the Sarmatians)", "Cities and States of Antiquity", "From the Venedi up to the Antes", "From the Middle Ages to the Early Modern". Each of the blocks mentioned was to have a similar structure, which was eventually implemented. Such a unit begins with an introduction from the "curators" with a map for the relevant period, which visualizes the study of sites in general and those discussed in the book, and

each unit contains several essays about these sites, and ends with a list of recommended reading.

Such modifications to the format render it impossible to create essays about all the studies performed during 30 years after the restoration of Ukraine's Independence. Personally, I consider it impossible to perform such a task at all. The subjective criterion of "the most interesting materials" of the original concept also had to be rejected. Therefore, the working group faced the difficult task of creating more or less balanced blocks about each of the periods. The geography of the sites discussed covers the entire territory of Ukraine. The description of these sites and results of their study over 30 years through the efforts of hundreds of scientists, led to a diversity of the styles of the essays. In the end, almost 50 scientists took part in the project as authors of texts in this volume.

The preparation of materials for the publication began at the end of 2021, and the work went quickly, lasting about five months and ended at the beginning of February 2022. But the layout did not make it to the printing house. On February 24, 2022, the Russian federation launched a full-scale brutal war against Ukraine. War criminals began to destroy cities and kill people. Not to mention their plans… Naturally, the boundless grief this act of aggression generated, increased the need to bring the project to its logical conclusion, and colleagues from abroad rallied to help. In the end, thanks to the support of the German Archaeological Institute, the project was implemented, and the book was published at the end of 2022. Thanks to the comprehensive support of the UAU and the Institute of Archaeology NAS of Ukraine, as well as due to the active work of the archaeological community, several presentations took place in Kyiv and other cities of Ukraine. The only presentation outside of Ukraine took place in the capital of Poland – Warsaw, on March 15, 2023. The platform for this was kindly provided by the Department of Archaeology of the University of Warsaw.

Copies of the books were distributed free of charge in museums, local libraries, universities, *etc.* in Ukraine in order to provide as full access as possible to interested readers. Thanks to volunteer activities, a large number of books reached Ukraine's closest western neighbours. Poland, as the nearest neighbouring country, with which Ukraine has good neighborly ties, as well as close professional archaeological relations, naturally received the largest number of copies. The reader can get acquainted with the book in such scientific institutions as University of Warsaw; National Museum in Warsaw; Adam Mickiewicz University in Poznań; Poznań Archaeological Museum; Jagiellonian University in Kraków; Archaeological Museum in Kraków; Institute of Archaeology and Ethnology of the Polish Academy of Sciences; Foundation of the Rzeszów Archaeological Center, University of Rzeszów; Maria Curie-Skłodowska University in Lublin.

Nowadays, anyone who wants can get acquainted with the electronic version of the project on the pages of the website of All-Ukrainian public organization "Union of Archaeologists of Ukraine" SAU by following the link below:
http://www.vgosau.kiev.ua/load_books/30-arh.pdf.

Content. The key to most books is usually the introductory article to the publication; this book is no exception. On the first pages there is a "***Word to the Reader***", which was prepared by the editorial board of this publication. It briefly reflects the modern history of the development of archaeological science during the years of the restoration of Independence, mentions the main institutions working in this field, lists foreign scientific centres with which Ukrainian archaeologists cooperate, and tells about other scientific directions, mostly collaboration with the naturalistic disciplines, which significantly supplement our knowledge of the past. This small, four-page article appears to be the most complete publicly available report that highlights the multidisciplinary activities and collaborations of Ukrainian archaeologists.

The first block, about the Stone Age in the territory of Ukraine, "***Ukraine's earliest past: the Stone Age***", opens with an introduction by Leonid Zaliznyak with the telling title "Turning the first pages of history: ancient gatherers and hunters". The author summed up the results of archaeological research on the sites of the Stone Age, the development of scientific opinion on this matter, and also presented a brief history of the ancient gatherers and hunters themselves. Separate pages of the most ancient past in the territory of Ukraine are represented in six essays mainly about Palaeolithic sites: in the vicinity of Medzhibyzh settlement in Khmelnytskyi Oblast, in the Crimea (the essay contains mentions of nine localities), in the central part of Ukraine (Andriivka 4, Vys and Troyanove 4), Amvrosiivka in Donetsk Oblast, and Gintsi in Poltava Oblast. The essay on the most ancient past in the central part of Ukraine also contains interesting information about the Neolithic site of Dobryanka, where both burials and a settlement were investigated. This block of essays concludes with paper with the characteristic title "The primordial crossroad of cultural paths", about an exceptional monument in the south of mainland Ukraine, Kamyana Mohyla, with a review of data from the period of 10 thousand years ago.

The next chronological stage, presented under the title "***Eneolithic – Bronze Age***", began with an address to the reader of "Sights of ancient cattlemen, farmers and metallurgists" by Yakiv Hershkovich and Oleksandr Dyachenko. The authors mostly focused on the history of this difficult period, helping the reader to get a general idea of the cultural processes that took place in the territory of Ukraine at that time. The block contains seven essays, in which such a bright phenomenon as the Trypillia culture occupies a prominent place — five essays are dedicated to it. For the most part, they represent quite familiar settlements and materials from them. However, one of the essays describes a rather exceptional "atypical" site for the Trypillia culture, namely the Verteba Cave, located among gypsum rocks on the left bank of the Dnister. The archaeological studies conducted there not only significantly enriched our knowledge of the material culture of the ancient inhabitants, but also provided valuable material for anthropological research, which is quite rare for representatives of the Trypillia culture. Another essay describes the sensational discovery of 2015: as researchers report, the first workshop of ancient metallurgists of the Trypillia period was discovered in investigations in the Old City in Kamianets-Podilskyi.

The essay "Kartamiskyi mining and metallurgical complex of the Bronze Age" is also devoted to the issues of metallurgy. In it, the authors describe the Kartamiskyi microdistrict of mining and foundry sites near the village of Novozvanivka (Severodonetsk district, Luhansk Oblast). It includes four mines, a large man-made site for processing copper ore, and two settlements of miners-metallurgists of the late Bronze Age from the 17th up to the 13th–12th centuries BC. The Sura-Oba mound, which during its research was named "the Ukrainian Stonehenge" in the media due to its dense ring of stone slabs (almost 70 blocks), is described in an essay bearing the same name. It refers to burials from the Eneolithic to Sarmatian times.

The block "***Early Iron Age (from the Cimmerians to the Sarmatians)***" is opened by the essay by Denys Grechko "In the footsteps of the first nomads and their settled neighbours". It is based on the history of the study of sites of the early Iron Age, during the 1st millennium BC to the beginning of the 1st millennium AD, where the history of research on Scythian monuments takes a prominent place. The first in the block about individual sites is an essay about a unique monument of the Scythian era the Bilske gorodische which was called the city of Gelon by Borys Shramko. Centuries-long attention to this complex, which since 1958 has been transformed into continuous systematic archaeological research, has led to the accumulation of a huge amount of materials and data. As in the previous sections of this publication, this one also has a certain "leitmotif" – the study of mounds. Four essays out of the seven are devoted to this topic. Two essays about the Sarmatians are the final ones in the block and according to chronology. One of them is dedicated to the archaeological studies of the Late Scythian archaeological expedition of the Institute of Archaeology of the National Academy of Sciences of Ukraine at the complex (a hillfort and burial ground) near the village of Chervonyi Mayak in the Kherson Oblast. The other represents a unique male burial of the Sarmatian elite in the Mykolayiv Oblast.

A separate block, "***Cities and States of Antiquity***" begins with the introductory article "Ancient Greeks in the South of Ukraine" by Tetyana Shevchenko; the author made a brief review of the history of ancient Greeks on the territory of Ukraine. This part of the publication can probably be considered "the most systematic", since it consists of four essays, corresponding to four ancient cities within the Northern Black Sea region: Borysthenes, Pontian Olbia, Tauric Chersonesos and Tyras. They highlight the history of these polises, some achievements of archaeology at the monuments, examples of architecture and material culture are given.

The block under the general title "***From the Venedi up to the Antes***" turned out to be more diverse. It begins with the introduction by Oleg Petrauskas "On the Eastern borders of the European Barbaricum". The author briefly outlined the main milestones in the history of research on the sites of the last quarter of the 1st millennium BC to the first half of the 1st millennium AD, and mentioned outstanding researchers of this period. The block consists of seven essays about individual sites. Three of them are devoted to archaeological complexes of settlement(s) and burials nearby: Dacian culture – Mala Kopanya in Trans-

carpathia; Chernyakhiv culture – Komariv in Transnistria, and Viytenky in Kharkiv Oblast. Two more essays are devoted to exceptional burials: the burial ground left by western warriors on the Seym River, and the burial of the Swabian "prince" in western Pobuzhha. Long-term excavations of the settlement of the Germans (Wielbark culture) in Styr and the diligent work of researchers led to the appearance of a number of reconstructions based on materials from that site. The latter is described in a separate essay. One of the essays, "200 Miles from the Limes: Romans on the Dniester", refers to the recent discovery of a rather unique complex of buildings, direct analogies of which, according to the authors, are known only in the Roman provinces and Italy, and are designated as buildings with warm floors.

The block "***From the Middle Ages to Early Modern***" turned out to be the largest and the most variegated. It consists of 17 essays, and begins with an address to the reader from Yuriy Pugolovok and Yevhen Synytsia, with the telling title "From the Union of Tribes to the National State". The authors outlined the periodization of the specified period, focused in more detail on the archaeological cultures of the first half of the 1st millennium AD, and also gave a brief reference from the time of the restoration of the Independence of Ukraine about archaeological research on sites dated in the range from the 5th century up to the 17th century, and personalities thanks to whom these studies take place.

The larger number of essays caused the largest variety of "genres" in this section. In this block, readers will find information on various "treasures", large-scale reviews of studies of historical cities of Ukraine, essays on excavations of individual sites, material on the study of Christian sacred places, *etc.*

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The inclusion of QR codes leading to educational YouTube channels, documentaries, and 3D-models of archaeology objects are nice additions to the book. I am sure that such a popular publication will be of great interest to a wide range of readers.

Translation by Oleksander KOVALCHUK

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REVIEWS AND SHORT REVIEW NOTES

Roman Berest[1], Natalia Bulyk[2]

THE HISTORICAL AND CULTURAL HERITAGE OF THE BERNARDINE MONASTERY IN DUBNO

(Review) Vira Hupalo, *Bernardynskyi monastyr u Dubni ta funeralna kultura Volynskoi shliakhty u XVII – pershii polovyni XIX st. (za materialamy arkheolohichnykh doslidzhen)* [Bernardine monastery in Dubno and the funerary culture of the Volhynian nobility in the 17th – the first half of the 19th centuries)]. Lviv 2022: Prostir M, pp. 704.

In the history and culture of Ukraine, there are many so-called "white spots" that hide, distort, or falsely highlight important historical events, activities of personalities, societies, brotherhoods, communities, and different military, public, religious, and other associations. The post-Medieval and Early Modern era are particularly complex and multifaceted. For the population of Ukraine, the period of the 16th century is associated with the absence of a national state, the difficult situation of the Ukrainian church, the spread of the Reformation, Catholicism, the dominance of the clergy in society, *etc.* At the same time, the Early Modern era is characterized by certain changes and innovations in social life. Among them, the activity of the Polish-Lithuanian Commonwealth on the Ukrainian lands, the adoption, and consequences of the Union of Brest, the establishment of the Order of Saint Basil the Great, the introduction of reforms by Metropolitan Velamin Rutski, the opening, and activity of universities, collegia, fraternal schools, several influential Catholic, Orthodox, and Protestant orders, *etc.*

Under the dominant influence of Russian politics and ideology, many important issues in the history of modern Ukraine have remained outside the attention of official historical

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science until recently. The Modern era brought new ideas, opinions, traditions, discoveries, achievements, and interpretations from the West to Ukrainian lands. Through the prism of modern philosophical views, the Modern era can be considered as a specific ensemble of particular socio-cultural norms, views, and practices that arose as a result of the implementation of the leading ideas of the Renaissance, Enlightenment, and Modern era.

The work reviewed here by a modern Ukrainian archaeologist, doctor of historical sciences, senior researcher of the Institute of Ukrainian Studies of the National Academy of Sciences of Ukraine Vira Hupalo (2022) is devoted to one of the important, little-known, and difficult issues of this complex period. This comprehensive historical and archaeological work (704 p.) on the Bernardine monastery in Dubno, and in particular on the funerary culture of the Volhynian nobility in the 17th – the first half of the 19th centuries, was prepared based on the results of the archaeological research carried out by the author, but also using written, ethnographic, cartographic, iconographic, and other sources. The uniqueness of this work resulted from the fact that it is the first solid attempt in Ukrainian historiography based on one site to research, estimate, classify, summarize and analyze the context of archaeological finds of funerary culture, belonging to different periods of the Modern era. The work is well illustrated with various groups of documents, plans, schemes, photos of personalities, finds, photographs of the process of archaeological research, *etc*. It consists of the author's foreword, seven chapters, conclusions, a list of used sources and literature, and is also supplemented with appendices, a catalog, a list of abbreviations, and an English-language summary, which in the end amounts to over 77 printed pages.

In the foreword, the author makes a small excursion into the problems of the emergence, distribution, and research of the historical and cultural heritage of Latin monasticism in Eastern Europe. Based on information from the works of J. Kowalczyk, S. Rychkov, M. Kurzej, A. Betlej, and other historical and contemporary authors, the researcher noted that only in the lands of Western Volyn' at the end of the 18th century, there were 48 Latin monastic houses, 140 churches, and many castle chapels (p. 10). Most of them have not yet been examined by archaeologists.

The first chapter of V. Hupalo's monographic study is devoted to the characteristics of the source base and historiography of research. There is no doubt that the difficulty of searching for written sources in archival institutions is caused by changes in the subordination of the monastery to different provinces (Polish, Lithuanian, Russian) in different periods of history. However, the author was able to find valuable information and materials about the foundation and activities of the monastery in the archives of the Sanguszkos and the Bernardines in Kraków, in the library of the Theological Seminary in Warsaw, in the Russian State Historical Archive in St. Petersburg, in the state archives of the Zhytomyr and Ternopil regions, in the collections of the Lviv National Museum of Art and many other Ukrainian and foreign archival institutions and libraries.

A special group of the source base includes the results of archaeological research. The peculiarity of the discovered artefacts result from the features of research carried out in

different places of the sacral complex, in particular, in crypts, regular ground burials under the floor of the nave, in the narthex, and outside the church building. It should be noted that the discovered osteological material and grave goods (clothes, shoes, jewellery, decorations, *etc.*), christograms, epitaphs, etc., provided a large amount of scientific information that can be used to write works related to archaeological science, for example, on history, ethnology, anthropology, philology, medicine, culture, which raises the scientific interdisciplinary significance of the work.

Regarding the historiography of research, Vira Hupalo approached the interpretation of the studied period in a rather sophisticated way, starting with the influence of the Enlightenment, which, in her opinion, created the conditions for a "fresh look" at the place of man in society (p. 17). We can agree with this, but we must note that Enlightenment represents a later stage already. It was preceded by the Renaissance, which found its specific expression in architecture, art, and ultimately in various types of creativity. As for the Enlightenment, it did not support religion. Many famous scholars associated with this intellectual movement (for example René Descartes) spoke from the position of deism, *i.e.*, the simultaneous acceptance of material and spiritual principles as the basis of existence, or became atheists, which contradicted many religious canons. The researcher critically approached the assessment of historiography. In her opinion, the first descriptions of Dubno belong to Józef IgnacyKraszewski, who in 1840 in Vilnius published a two-volume work in Polish "Memories about Volyn', Polissya and Lithuania". The work has a descriptive nature in the presentation of the material and many inaccuracies, some of which were emphasized by V. Hupalo (p. 17).

Among the works of Russian authors devoted to the Dubno monastery, the researcher managed to find several rare publications. In particular, the work of Józef Dunin-Karwicki, where information about the rebuilding of the church and monastery, the reconstruction of its premises, which took place after the destruction in 1795 of the Polish-Lithuanian Commonwealth by Russia and the annexation of Right-Bank Ukraine as a result is mentioned briefly (Dunin-Karwicki 1893, 43); in the publication of M. Luchytskii, the reader's attention is focused on the forced repurposing of the Catholic monastery in Dubno into an Orthodox one (Luchytskii 1876, 387-389); M. Teodorovych collected interesting historical and statistical data about churches and monasteries in Volhynia, including the monastery in Dubno (Teodorovych 1889), etc.

However, V. Hupalo associates the first professional survey of the architectural ensemble of the monastery in Dubno with the name of the Polish engineer Alexander Pawłowski. It was he was the first among researchers to make a professional architectural description of the monastery, drew up a situational plan of the monument, which he supplemented with pictures and photographs (p. 21). Many of those buildings are long gone or exist in a rebuilt form.

Logically concluding the review of historiography, the researcher moves on to her own interpretation of the history of the urban complex in Dubno and the appearance of the

church and Bernardynian monastery in Dubno. This is represented by a separate unit in the second section of her work. First of all, she reasonably pays attention to the surrounding landscape and various natural factors that often decisively influenced the appearance of settlements in the Old Rus` period. According to the archaeological data, the fortified settlement of Dubno appeared at the end of the 10th-11th centuries.

In terms of historical topography, a *posad*, a *dytynets*, cult, residential, industrial, economic, and other buildings are distinguished within the settlement (Pryshchepa 2013, 105). The first mention of Dubno on the pages of the Hypatian Codex is dated back to 1100. Based on the results of previous research on the historical topography of Dubno, in particular the publications of Yu. Pshenychnyi (2015), P. Rychkov (2012), B. Pryschepa, and others the author made a unified attempt to reconstruct the earliest development of the city and places in it of the Bernardine monastery. For the reader's visual imagination of the appearance of the city at the end of the 19th century, the work contains several images of the monastery, streets, residential and religious buildings, fortifications, and other structures of the city.

Patronage was of great importance for the activity of the monastery, to which the author devotes a special place in the book. The custodians of the monastery belong to the rich and respectable Ostrogski, Zasławski, Lubomirski, and Sanguszko families, who periodically made generous donations to the monastery. But at the end of the 18th century, Russia destroyed the Commonwealth and robbed most of its possessions. Then the Bernardynian monastery of Dubno fell under the Russian yoke and remained in it until the end of World War I. The researcher claims that it was not just a period of great decline (religious, economic, social, national, cultural), but of wild Russian tyranny, when everything non-Russian was brutally suppressed, the Catholic clergy were forced to swear allegiance to the Russian tsar, the Russian language was imposed, and the de-structurization and reorganization of all structures, including the monastery were carried out with using of forceful methods (pp. 61–69).

The third section of the work "Architecture of the church-monastery complex" is valuable for its content and research results. The author unified the plan prepared by O. Pawłowsky (1865), critically supplemented it with the information provided by P. Bohdziewicz (1872), visitation materials, and data of other authors. Using this plan, she indicated the places and years of excavations conducted by her from 1995 till 2007 (p. 76). She examined in detail the infill, material, and construction features of the foundations of the church, crypts, support pillars, and other structures located in different parts of the building. A separate subsection of the third chapter of the monograph includes the results of research on the complex of monastic cells and their undercrofts. At the beginning of the chapter is the subsection devoted to the characteristics of the architectural decoration of the facade, the interiors of the church (the collection of 18th-century icons is extremely rich), the complex of monastic cells, the fresco wall painting of the temple, *etc.* In our opinion, the work successfully combines modern and old photographs, architectural drawings from

Russian, Polish, and Ukrainian archival institutions, private collections, and researchers' publications.

Special attention is deserved by chapter 4, which is devoted to the main results of archaeological research on burial sites. The author divided them into separate groups (graves dug in the earth, underground burials, private tombs, and crypts). It seems that each group represents an expression of a certain social level of the buried. The chapter is supplemented by numerous colour photos, drawings, plans, and diagrams.

In the next, fifth chapter of the monograph, the researcher gives a detailed description of the grave goods. Different models of coffins are distinguished, and the peculiarities and variety of their decoration are indicated. A special place is given to the study of christograms and monograms that were deposited on coffins. Headdresses, shoes, and clothing of various categories of the deceased were examined in detail, which demonstrates the cohabitation of various ethnocultural heritages (Rusyn, Polish, Western European). The materials of the clothing, headdresses, shoes, and body coverings found in the burials, which vary in price, indicate the buried persons belonged to different property and social groups. Archaeological finds, and numerous photos from contemporary paintings became the basis for the reconstruction of the clothing of the Modern era. In particular, *zhupans*, *kontusze*, *ferezie*, *delie*, and other items were identified in the men's secular burials (pp. 305-336). According to ethnography, the women's clothing made of expensive fabrics in a refined style of Western Europe of the 16th-19th centuries is equally interesting (pp. 342-359).

A separate group of the funerary culture of the sites consists of uniforms of representatives of various social groups. According to certain characteristics, the researcher classifies them in a logical scheme (including voivodeship, military, monks of the Military Order of Malta, etc.), provides a detailed description, and existing analogies. The grave goods complement the burial significantly. First of all, there were various medallions, crosses, insignia, and rosaries with the body. Most of them were important for the popularization of monastic orders (Bernardines, Carmelites, Jesuits, Dominicans, *etc.*), religious rites (Christmas, Easter, *etc.*), veneration of saints, etc. In many burials, items such as scapulars, wearable icons, reliquaries, rings, personal items (cold weapons, firearms, tinderboxes, metal keys, etc.), different coins, and other items were discovered.

The author named the sixth chapter of the monograph "Identification of persons". Based on written sources and archaeological materials from the middle of the 17th century till the beginning of the second half of the 19th century, she chronologically managed to identify 178 people buried in different parts of the monastery. Among them were novices, artisan brothers, musicians, choristers, ordinary monks, fathers, and higher clergy. A separate part of the chapter is devoted to the burial of founders, collators, benefactors, etc. From a large number of secular burials, it was possible to establish the names of only 46 people. Most of them represent ruling families, nobility, patrons, and donators.

The author concludes her research with the seventh chapter "Funeral Ritual: Spiritual Background and Scenario". Using numerous works, and general ideas of medieval theo-

logical doctrines, the author covers the current problems of death. Considerable attention is paid to the issue of the formation of the image of a "good death". Preparation of living wills for burial, transfer of movable property and real estate, as well as monetary donations, are practiced often. The author distinguishes different types of death, and that they can be divided into two main groups: unexpected and expected. The category of expected death is described in detail in this chapter (the last service on the body, preparation of the burial place, preparation of the coffin, farewell ceremony, funeral procession, mourning decoration of the temple, posthumous tribute, *etc.*).

In conclusion, we should note that the monograph of Vira Hupalo is a valuable piece of modern, comprehensive, fundamental, and multifaceted scientific research. Based on one site and the analogies found, the author obtained unique data, widely used various methods of scientific research, supplemented archaeological material with written and other sources, and involved specialists from various fields for cooperation, which really expands the scientific significance and prospects of applying the results of this work in the study of history. the historical and cultural heritage of the Polish and Ukrainian people of the Modern era.

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