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METAL ARTEFACTS OF ZRUBNA/TIMBER-GRAVE CULTURE OF THE NORTH AZOV AREA AS CHRONOLOGICAL INDICATORS*

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The article deals with the problems of relative and absolute chronology of Zrubna/Timber-grave culture of the North Azov Area of the Paleo-metallic epoch. Successfully addressing these questions to understand the regional specificities of the cultural-historical process, but also to correctly describe the nature of inter-regional connections in terms of their dynamics and direction. To date the Zrubna/Timber-grave culture we used the results of comparative-typological analysis. With a significant distance of the Northern Azov Area from the centres of civilizations, such dating acquires the character of a multi-step procedure, the results of which directly depend on the accuracy of the construction of numerous typological comparisons. In determining the absolute dates of Zrubna/Timber-grave culture of the North Azov Area the author is mainly guided by the more adjusted chronological scales, constructed with the help of natural-scientific dating methods. To resolve questions of relative chronology and synchronization of horizons of Zrubna/Timber-grave culture in the North Azov Area with the cultures of the Carpathian-Danube Region the author used so-called chronological indicators – bronze and antimony products. This eventually made it possible to construct a version of the relative and absolute chronology scheme.

Keywords: North Azov Area, Late Bronze Age, Zrubna/Timber-grave culture, relative chronology, absolute chronology.

INTRODUCTION

Problems of absolute dating of Paleo-metallic cultures, including the Circum-Pontic Region, are constantly in the focus of research, as their successful solution allows not only to understand the regional characteristics of the cultural-historical process, but also to correctly describe the nature of inter-regional relations in terms of their dynamics and direction. The use of historical chronology to date cultures, including the Zrubna/Timber-grave culture (hereinafter referred to as ZC), is usually based on the results of comparative typological analysis. With a significant distance of the Northern Azov Area from the centres of civilizations, such dating acquires the character of a multi-step procedure, the results of which directly depend on the accuracy of the construction of numerous typological comparisons.

Comparative analysis of regional periodization schemes increases the reliability of such dating, but is not an independent way of verifying its results. In this situation, the results of absolute dating of cultural heritage, including radiocarbon dating, are of particular importance (*Trifonov 2001*, 71). In determining the absolute dates of ZC of the North Azov Area we will mainly be guided by more adjusted chronological scales, constructed with the help of natural-scientific dating methods. While leaving aside the so-called traditional chronological system, researchers are mainly guided by the fact, that the absolute chronology of Bronze Age Europe has been determined precisely on the radiocarbon dating scale for the past three decades. As the researchers point out, no absolute chronology other than that determined using radiocarbon, dendrochronological and other natural methods exists for modern European Bronze Age archaeology (*Lytvynenko 2009b*, 317). In addition, the authors draw attention to the need for a deeper analysis of the currently available material to draw more conclusions about the synchronization and therefore the absolute chronology of the heritage of ZC. According to R. O. Litvinenko, the systematization and full publication of these materials, as well as their careful comparison with similar artefacts from the Carpathian-Danube Region, Peloponnese and Asia Minor would allow a more reliable development of the issue of the relative chronology of Late Bronze Age cultural formations near the Circum-Pontic Region (*Lytvynenko/Sanzharov/Usachuk 2013*, 194).

METAL ARTEFACTS OF ZRUBNA/TIMBER-GRAVE CULTURE OF THE NORTH AZOV AREA

Metal artefacts are one of the most studied categories of archaeological sources, with fairly extensive literature on their finds, typology and chronology. Metal objects have traditionally attracted the most research attention compared to the evaluation of

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Fig. 1. Distribution map of Zrubna/Timber-grave culture burials of the Northern Azov Area containing metal artefacts.

their production. For a long time, research interest was directed solely towards the study of metalwork and the most mass-produced and expressive category of fixtures – foundry forms. This trend is no longer decisive today, but there remains a sustained interest in the characterization of the most metal-intensive categories of tools of various functional groups and other metalwork, with research in recent decades paying the closest attention to issues of typology and chronology.

Although the range of bronze artefacts in the Late Bronze Age is quite broad, it is a relatively rare category of finds in settlements and burials of ZC in the region under study. The material from the burial grounds of ZC of the North Azov Area can give some information about the development of metal production, especially metalworking. Bronze objects were found only in 44 burial complexes among the massif of 1,515 burials studied, which is about 2.9% of the total. The metal saturation of burials of the ZC in adjacent areas can be shown by the results of cartography (Fig. 1) and the figures given in Tab. 1.

Tab. 1. Metal saturation of Zrubna/Timber-grave culture burials (specific weight %).

Region	Metal--ware	Knives
Lower Dnieper Region	–	2.2%
North Azov area	2.9%	
Interfluve of the Dnieper and the Molochna	3.5%	–
Crimea	4.6%	3.5%
Interfluve of the Orel and Samara	5.5%	3.0%
Eastern Ukrainian forest-steppe	6.0%	–
Lower Don Region	6.4%	0.2%
Siverskyi Donets Region	7.8%	3.3%
Middle Don Region	13%	4.6%
Middle Volga Region	13%	–
Siverskyi Donets (Pokrovsk deposits)	19%	–
Volga-Don Interfluve forest-steppe	–	2.7%
Dnieper-Donets Interfluve	–	1.8%

The general trend of decline in the proportion of burials with metal when moving from north to south can be clearly seen in the cartography of the ZC burials, even for the territorially limited North Azov Area (Fig. 1). Indicative of the frequency of placement in the burials of ZC of the North Azov Area is such a relatively metal-intensive and rare item as a dagger (Fig. 2). According to our revised data, these figures are equal to 0.19 % for the burial grounds of the North Azov Area.

Cartography of the North Azov Sea Region ZC burials containing metal products (especially daggers) has clearly demonstrated a downward trend in the proportion of burials with metal as they move south towards the Sea of Azov (Fig. 3). Thus, the vast majority of burials with metal were concentrated in the southern spurs of the Donetsk Range, in the upper reaches of the Azov Sea Basin, while the burial grounds of the Azov Area proper (Azov Lowland and Upland) are full of bronze artefacts to a much lesser extent. Thus, the very fact of presence of metal objects in the burial inventory of ZC burials in relation to the territory under study can be regarded as a sign of social eccentricity.

Our observations fully confirm the assumption expressed earlier by R. O. Lytvynenko that the population of ZC of the Azov Region in their everyday life felt a certain shortage of metal, in contrast to the populations of the ZC of the Donetsk Range, which had access to the local cuprous sandstones. It was in the copper-ore deposits of the Donetsk Range during the Late Bronze Age that the mining and metallurgical centre associated with the activities of local ZC populations functioned. Obviously, the population of ZC of the Azov Region was not among those who controlled this deposit and therefore was alienated or limited in their ability to produce metal from this raw material base (*Lytvynenko/Andriienko 2013*, 163).

The Azov burials with bronze daggers have already been considered in detail in our previous studies (*Zabavin 2014*). Let us only note that from all burial mounds of ZC of the Northern Azov Region originate 11 daggers of various types (Fig. 4). According to E. Chernich's typology, they are divided into three groups: with rhombic crosshair (7 examples) – types H-28, H-30, H-32; leaf-shaped without crosshair (2 examples) – types H-8, H-10 (*Chernykh 1976*, tab. XXXIV; XXXV); with massive ribbed blade and marked with a hammered petiole crosshair (2 examples). In E. Chernykh's classification, the latter variety is not distinguished as a special type.

An awl and a needle were found once each in the tombs of ZC of the Northern Azov Region (southern spurs of the Donetsk Range). Bronze awl – pointed at both ends, inserted in a handle made of a tubular bone. Bronze needle – round in cross-section, thin pointed rod with an oval eye formed by a bent countersunk loop. The tools in these categories have not been classified typologically (*Chernykh 1976*, 125). In addition, we can mention the products that belong to the structural elements of wooden utensils: bronze or copper overlays or shackles (sometimes with the remains

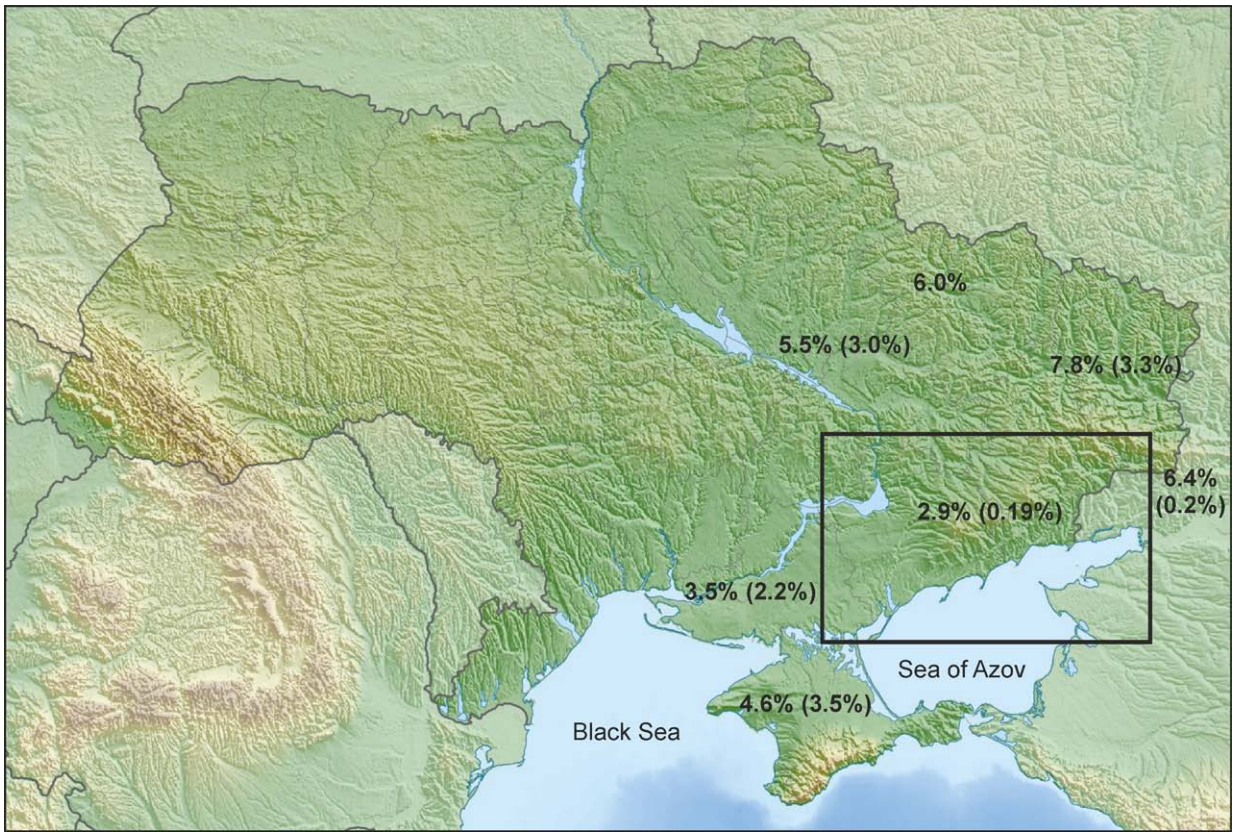

Fig. 2. Saturation with metal (daggers) of the burials of Zrubna/Timber-grave culture of the Northern Azov Region in comparison with the mono-cultural heritage of the adjacent territories (specific weight %).

of wood), nails or rivets, possibly ears for hanging, brackets or staples, which were intended for connecting and fastening wooden parts (Fig. 5: 9). Wooden utensils in funerary complexes are most often identified by these metal elements, which is why they are used the most often for a number of technological and cultural-chronological questions (*Zabavin/Nebrat 2021*, 76, 77).

Various metal jewellery was found in 25 graves. Bronze lock rings are a serial category of funerary equipment. Most of them can be categorised as one type – oval in a turn and a half with curved ends, semi-circular in cross-section. Lock rings may differ somewhat in morphological details and in their size, but in European historiography such items are widely known as so-called Sibinian or Transylvanian-type lock rings (*Bátora 2015*, 67). Out of the total massif of 1,356 burials, which were distributed by chronological horizons, the bronze lock rings were found in 19 complexes (1.4%): I (early) horizon – 7 (10.9%), II (advanced) horizon – 14 (1.7%), III (late) horizon – 1 (0.2%). A total of 28 lock rings of varying degrees of preservation were recorded (Fig. 5: 2, 5–7).

A single pendant is most often found on the deceased, less often a pair. In four graves a necklace (beads) of bronze and antimony was found (Fig. 5: 1, 4), a bronze ring (Fig. 5: 3), a drop-shaped pendant (Fig. 5: 8), a bronze cross piece and a lead ring at the neck were found once each. In two graves lock rings were found together with beads, once a combination of beads and a ring. Special attention should be paid to the bronze ring with spiral flat plates, which was found in burial 10 of barrow 3, investigated near the village Pokrovka, Donetsk Region. The product is made of round wire, the spirals are twisted in opposite directions (*Lytvynenko 1999*, fig. 9: 10).

In 10 cases, graves containing metal jewellers were the main ones in the barrows. In nine cases, the graves with lock rings are identified as adult graves, once they were found in a child and adolescent grave. Only one burial with this category of burial inventory is anthropologically defined as female. The presence of jewellers in the form of bronze bracelets, rings, lock rings, antimony and glass beads in the grave was regarded by R. O. Lytvynenko as purely characteristic of women's burials (*Lytvynenko 1996*, 63).

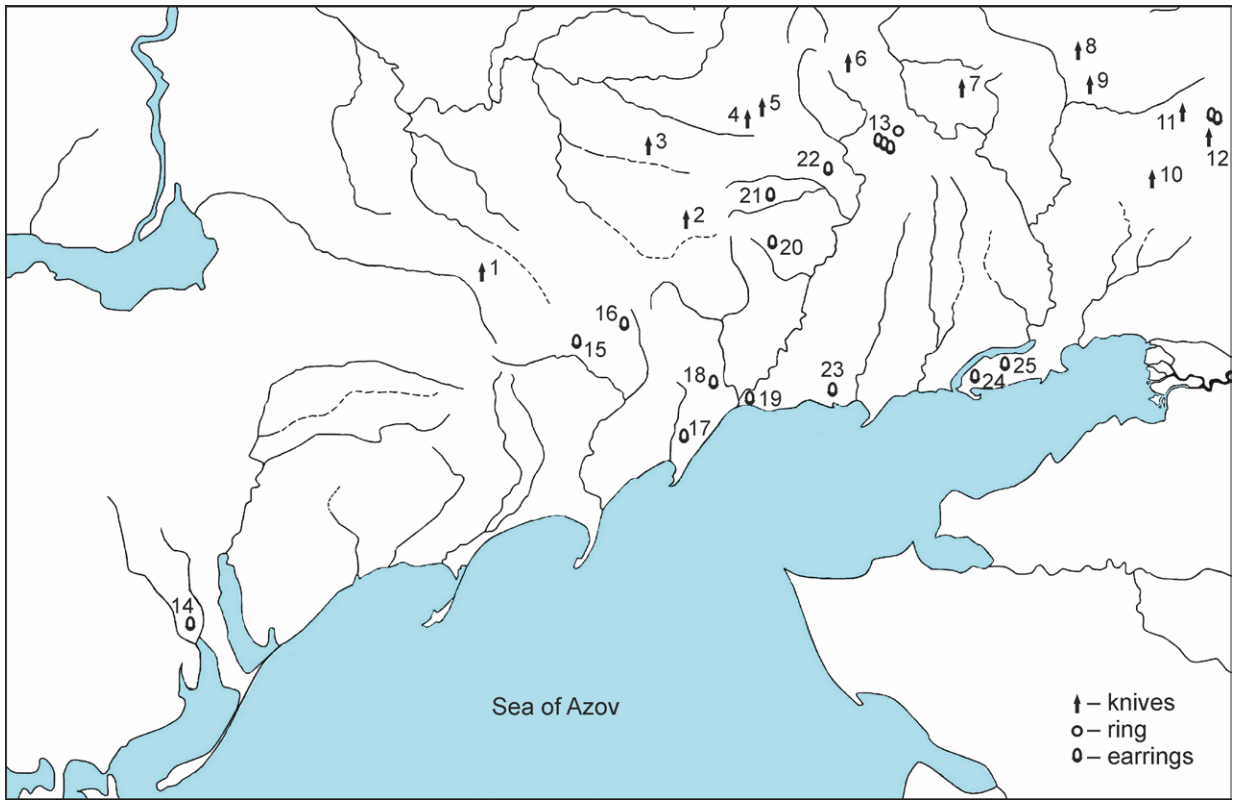

Fig. 3. Distribution map of Zrubna/Timber-grave culture burials of the Northern Azov Area with daggers, earrings and rings: 1 – Basan; 2 – Ivanivka; 3 – Vuhledar; 4 – Tekstylnyk (Donetsk); 5 – Hladkivka; 6 – Khanzhenkove; 7 – Shakhtarsk; 8 – Dubovskyi; 9 – Kalynove; 10 – Klunnikove; 11 – Blahivka; 12 – Astakhove; 13 – Pokrovka; 14 – Davydivka; 15 – Poporizivka; 16 – Kamiani Mohyly; 17 – Ohorodnie; 18 – Staryi Krym; 19 – Azovstal; 20 – Balashivka; 21 – Malyi Kut; 22 – Pishchane; 23 – Bezimenne; 24 – Behlytsia; 25 – Haivka-Kaimakchy.

ISSUES OF RELATIVE CHRONOLOGY AND SYNCHRONIZATION OF THE HORIZONS OF ZRUBNA/TIMBER-GRAVE CULTURE OF THE NORTH AZOV AREA WITH THE CULTURES OF THE CARPATHIAN-DANUBE REGION AND MYCENAEAN GREECE

To establish absolute chronology and to synchronise the horizons of the ZC with the cultures of the Carpathian-Danube Region and Mycenaean Greece, researchers have traditionally drawn attention to western parallels (*Berezanskaya 1990*, 106, 110; *Brovender 2007*, 225, 230–232; *Brovender/Otroschenko 1996*; *Cherednichenko 1977*; *1986*, 63–77; *Hüttel 1981*, 28–30; *Kovaleva 1981*, 32; *Lytvynenko 1994*, 147–153; *Lytvynenko/Sanzharov/Usachuk 2013*, 189; *Müller-Karpe 1980*; *Penner 1998*; *Smirnov/Kuz'mina 1977*, 146–150; *Terenozhkin 1965*; *Vangorodskaya/Bychkov 1987*, 44).

For the study of absolute chronology and synchronization of the Late Bronze Age cultures of the Black Sea Region with the antiquities of South-Eastern Europe and Asia Minor, the key diagnostic complexes are of great importance. Thus, for example, the analysis and comparison of a rare find – an ornamented bone disc, coming from a burial of ZC, studied in a barrow of the Bronze Age on the right bank of the Siverskyi Donets (Shypylivka, barrow 1, burial 1), allowed a number of conclusions. The observation of the kurgan stratigraphy allowed the authors to testify to the chronological succession of this complex after the burial with Pokrovsk features, the ritual-inventory characteristics allow us to attribute the burial with the disk to the burials of the second (middle) chronological horizon of ZC. The closest parallels to the disk found in the Donets burial gave the authors the opportunity to synchronize it with the horizon of LH IIA/SH IIA, or Reinecke BA1 period, which now dates no later than the second half of the 16th c. BC (*Lytvynenko/Sanzharov/Usachuk 2013*, 195).

To determine the absolute and relative chronology of ZC burial grounds, including the heritage of the Northern Azov Region, researchers have traditionally attracted complexes containing metal objects.

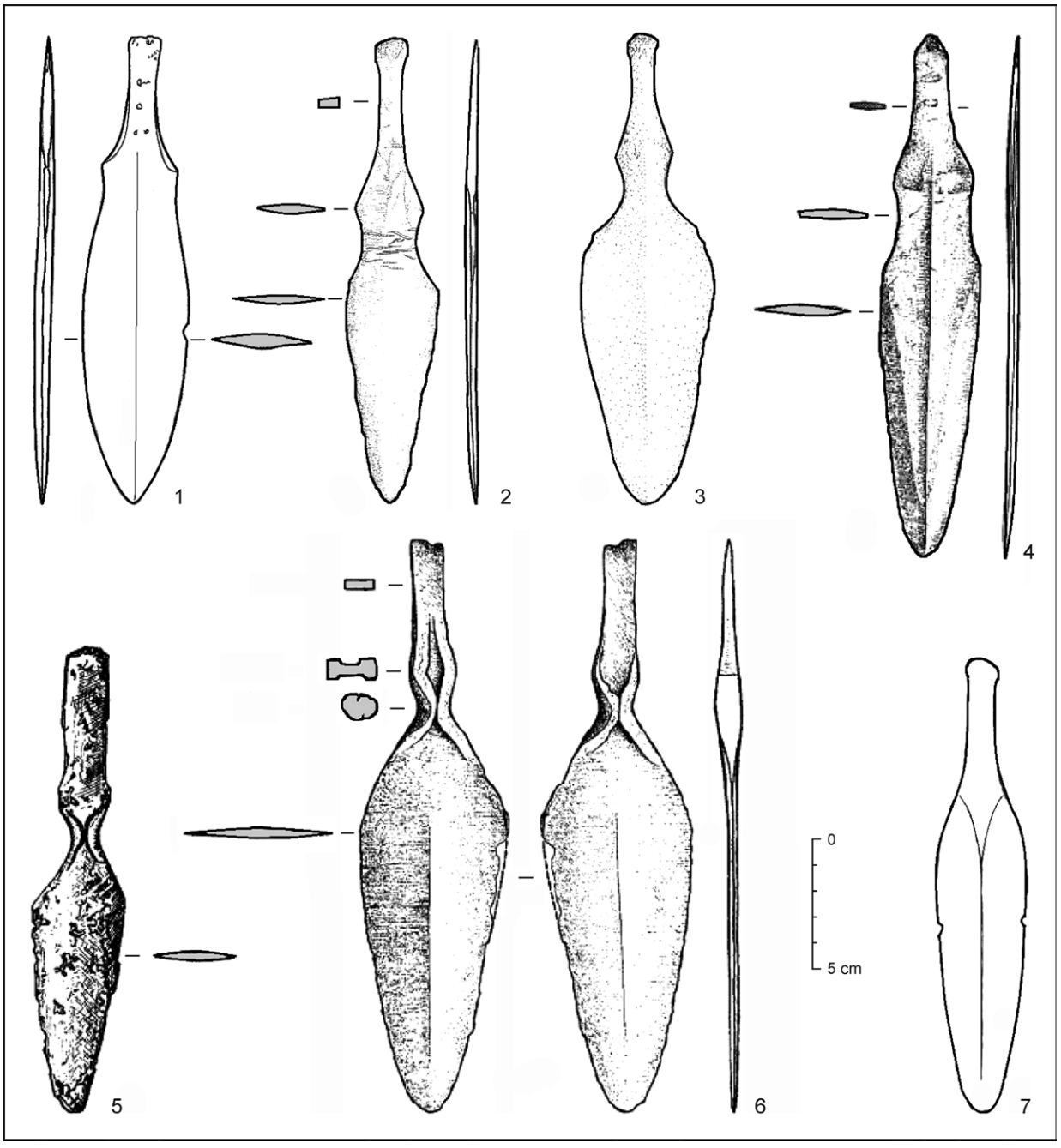

Fig. 4. Metal products of Zrubna/Timber-grave culture of the North Azov Area. 1 – Khanzhenkove; 2 – Vuhledar, barrow 1; 3 – Donetsk 2-3/1; 4 – Shakhtarsk 9/1; 5 – Babakova Mohyla 3/5; 6 – Ivanivka 1/1; 7 – Astakhove 22/8 (1–6 after *Lytvynenko 1999*; 7 after *Evdokimov 1992*).

Daggers

Thus, Ya. P. Gershkovich regarding the daggers, originating from the excavations on the Donetsk Ridge (the interfluve of the Lozova and Vilkhova rivers), with a leaf-shaped blade with the largest extension at its base, separated from the petiole by an interceptor, notes that such products are typical for the centre of metalworking of ZC. The author also mentions the closest analogies of the clay moulds for their manufacture, which originate from the ZC settlements in the Siverskyi Donets and Don basins (*Gershkovich 1996*, 165).

A foundry form with a negative of a similar knife was found in dwelling 11 at Usov Lake settlement. A ^{14}C date of 1270 ± 50 BC was obtained for this dwelling (*Berezanskaya 1990*, 107, fig. 15: 2). Foundry forms with negatives of similar daggers were also

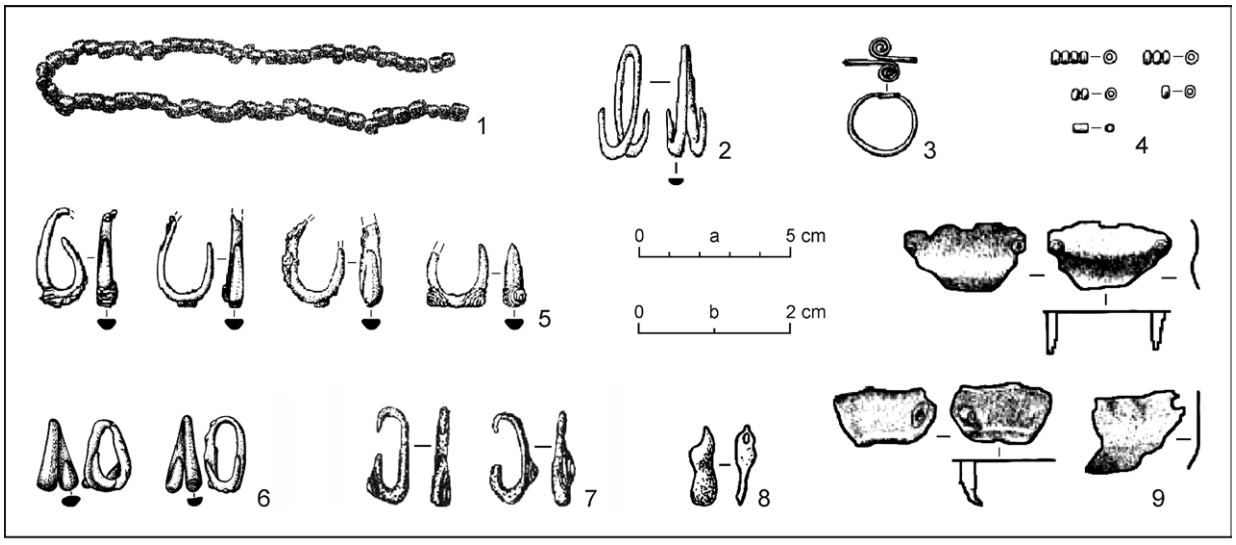

Fig. 5. Metal products of Zrubna/Timber-grave culture of the North Azov Area. 1, 2 – Astakhove 19/5; 3, 4 – Pokrovka 3/10; 5 – Pokrovka 3/2; 6 – Bezimenne 4/2; 7 – Malyi Kut 2/2; 8 – Pishchane 2/1; 9 – Novoukrainka 3/7 (1, 2 after *Evdokimov 1992*; 3–7 after *Lytvynenko 1999*; 8 after *Bratchenko 1997*; 9 after *Tarasenko 2012*). Scale: a – 1–7; b – 8.

found in the settlement of Mosolovka (*Priakhin/Savrasov 1989*, fig. 16: 5). Analysis of wood from the base and filling of the pit of one of the dwellings here gave two dates ^{14}C – 1530 ± 40 and 1370 ± 40 BC (*Priakhin 1993*, 91). Thus, Ya. P. Gershkovich, taking into account these dates, determines the age of such daggers within the late 16th/early 15th–late 14th/early 13th c. BC (*Gershkovich 1996*, 166).

The chronological framework of the developed stage of ZC of the Siverskyi Donets basin R. O. Lytvynenko in earlier works, based on the time of existence of daggers with a flat stop and citing the relevant parallels, determines the 15th–the beginning of the 14th c. BC. In general, correlates with the antiquities of late Hellas and the Central European period BB2 (BC1) according to Reinecke's scheme (*Lytvynenko 1994*, 167).

Rings

To date, in the steppe zone of Ukraine, in the area of the ZC community, only five complexes are known that contained rings with spiral shields (*Lysenko 2005*, 32, 33; *Lytvynenko 1999*, 14). Including two similar products originate from ZC complexes, studied on the Siverskyi Donets (*Lytvynenko 1993*, fig. 5: 6; *1994*, fig. 86: 6, 7). Bronze rings made of thin split wire, round in cross-section, sometimes found in burials of Pokrovsk-Zrubna culture (hereinafter referred to as PZC; *Otroschenko 2013*, 162).

On the territory of Ukraine, products similar to the bronze ring with spiral shields from the Azov burial (Pokrovka, barrow 3, burial 10), were also found on the objects belonging to the Trzciniec-Komariv culture (hereinafter referred to as TKC) of the Trzciniec cultural complex (hereinafter referred to as TCC). These items are usually categorised in terms of size into neck jewellery, bracelets and rings. Bronze wire products with ends twisted into spiral shields were widespread in the Middle and Late Bronze Age also in Central Europe (Maďarovce culture, Otomani-Füzesabony cultural complex – OFCC, kurgan cultures and others). In Poland, such jewellery is typical for the Trzciniec culture, some finds (from the treasures) are attributed to the early Lusatian Culture (*Lysenko 2005*, 25). For example, a jewellery item similar to a bronze ring found in a burial near the village of Pokrovka was discovered in a necropolis of Monteoru culture studied near the village of Sărata Monteoru in Romania (*Bârzu 1989*, 66, 67, fig. 68: 1). Similar rings are also known in Bronze Age cultures in Austria (*Neugebauer 1994*, fig. 10: 13).

M. M. Cherednichenko attributed the rings with spiral shields to the senior stage of the early (Pokrovsk or Archaic) period of the ZC. The researcher cited close analogies in the Monteoru culture of the Carpathian-Danube basin, where similar products exist for two periods (Hänsel FD III–MD I or Reinecke BA2–BB1; *Cherednichenko 1977*, 4, fig. 3: 7; *1986*, 65). *V. V. Otroschenko* (*2001*, fig. 31) attributes such rings of the Siverskyi Donets to the first stage of the PZC. *R. O. Lytvynenko* (*1999*, 14, fig. 13) attributes the above-mentioned products to the early (Pokrovsk) stage of ZC and correlates them with the first stratigraphic horizon of ZC cemeteries of the North-Eastern Azov Region.

The mapping of neck rings, bracelets and rings with spiral shields allowed the researchers to conclude that almost all of them come from the sites of the Komariv line of development of the TCC. Based on the fact that today in the steppe zone of Ukraine, in the area of the ZC community, only five complexes containing rings with spiral shields are known, S. Lysenko concludes that these artefacts: *'clearly foreign and probably the result of contacts with cultures from the Carpathian-Danube Region, where dozens, if not hundreds, of similar objects are known, and with the TCC formed under their influence'* (*Lysenko 2005*, 32, 33). Thus, the sites of the Middle Dnieper with neck rings, bracelets and rings with spiral shields based on radiocarbon dates ^{14}C are attributed by the author to the Teklinsky horizon of the Kyiv-Cherkassy group of the TCC and dated to the period 1500–1400 BC (*Lysenko 2001*, 13).

Indeed, in the Carpathian-Danube Region, rings are considered a fairly common category of treasure finds (*Furmánek 1977*; *2004*, fig. 209) and in graves where they were usually found in a functional position on finger bones (*Bátora 2015*, 73). Among the oldest are rings in the shape of a willow leaf, rings of simple round wire and double wire rings with a loop back. They are also known in the Nitra culture in south-western Slovakia. In the classical and final phase of Maďarovce culture, a new type of bronze rings appeared, represented by rings made of narrow square or lens-shaped strips with spirally twisted ends of round cross-section (*Bátora 2000*, tab. 2: 22; *2018*, fig. 135: 5). Similar rings are also widely known in the OFCC, widespread in Slovakia, Hungary and Romania (*Olexa/Nováček 2015*, 34, fig. 12: 1–5; *2017*, 34, fig. 9: 2, 4, 6).

In the regions east of the Northern Azov Area, bronze rings are also known in the sites of a fairly wide chronological range. Similar bronze rings made of wire with an S-shaped shield are presented in large numbers in the materials of the Alakul culture (*Kalieva/Kolbina/Logvin 2016*, 177; *Tigeeva/Novikov/Shilov 2016*, fig. 2), as well as in the sites of Sintashta and Petrovka cultures (*Gening/Zdanovich/Gening 1992*, fig. 126: 18–20; 184: 2; *Kadyrbaev/Kurmankulov 1992*, fig. 76: 21; *Potemkina 1985*, fig. 82: 5–7; *Sotnikova 1990*, 25).

Metallographic analysis revealed a technological scheme with the predominance of high-temperature modes, which was used for the manufacture of jewellery of the Alakul cemetery. The raw material was tin bronze. The technology of manufacturing rings is unified and consists in obtaining a blank by forging on a special rounded mandrel, withdrawing, flattening and giving the appropriate shape to the product. The production of spiral shields was carried out by winding on a thin rod. Rings were formed from a bar on an anvil with a rounded groove. In the process of forging, the wire was drawn and given a semi-circular shape, as well as the shield was formed by winding (*Tigeeva/Novikov/Shilov 2016*, 26, 27).

Regarding such a category of jewellery as bronze rings with spiral shields, R. O. Lytvynenko notes that their dating possibilities are far from ambiguous. Already in the burials of ZC of the Siverskyi Donets these items are known both in the complexes of the Pokrovsk and developed stages. To the east of the Donets, they are known in sites of a fairly wide chronological range. Therefore, there is no point in relying on eastern analogies dating back to between the 17th and 12th c. BC, the researcher believes. Following M. M. Cherednichenko, the author also drew attention to the western, Danube parallels, dated between Hänsel FD III–MD I or Reinecke BA2–BB1, corresponding to the 17th–16th c. BC.

Lock rings

Sibinian-type lock rings are one of the characteristic jewellers of the Bronze Age. Analogies of this type can be found throughout the Carpathian region (*Mozsolics 1973*, 51; *Stejskalová 1999*, 88). Judging by the funerary finds from Nižná Myšľa in eastern Slovakia, such bronze lock rings are considered to be rather feminine jewellery. Finds of Sibinian-type gold lock rings are more often found in men's graves. They were worn as part of a headdress, as pendants on a headband where they clattered or tinkled as you walked, or as hair decoration, so they can be considered part of ancient costume (*Olexa/Nováček 2012*, 275). The authors consider it unlikely that this type of jewellery would be used as the current earrings (although their shape might suggest so), as the thickness of the wire they are made of makes it almost impossible to do so (*Olexa/Nováček 2013*, 39).

Indeed, by analogy with the rings widespread in the Carpathian-Danube Region, it can also be assumed, that Sibinian-type lock rings, found in 19 complexes of the ZC of the Northern Azov Region, are clearly foreign to this area and are probably the result of multiple contacts with the cultures of the region, where hundreds, if not thousands, of similar items are known. The use of Sibinian-type lock rings as jewellery and costume elements can be clearly traced in dynamics on the example of the OFCC burial ground in Nižná Myšľa in eastern Slovakia.

Of the first 310 graves identified by the authors of the research as belonging to the pre-classic phase (BA1/BA2 and BA2), 66 burials contained such

objects. The collection has a total of 248 bronze Sibinian-type lock rings and six gold counterparts (*Olexa/Nováček 2013*, 38, 39, fig. 32; 33). In the following classic period (BA2/BA3–BA3), we observe a sharp decrease in their numbers: only five complexes out of 189 graves contained earrings, and only four of them had lock rings (*Olexa/Nováček 2015*, 34, fig. 12: 7–10). In the third block of burials at Nižná Myšľa burial ground, only the complexes of the late classic phase of OFCC (BA3) are represented, which date from 1900–1600 BC. Here, out of 293 graves examined, 13 lock rings were found in eight burial complexes (*Olexa/Nováček 2017*, 14, 33, fig. 9: 1, 3, 5).

Researchers also provide a number of analogies of similar finds in the Carpathian area, and they come not only from burial complexes, but are also known from settlements and treasures. Similar findings correlate with the Reinecke BA2/BA3–BB1 periods (*Vladár/Oravkinová 2015*, 445). Among others, lock rings of the Sibinian-type are known from Bronze Age treasures in Ukraine, in Transcarpathia (*Kobal 2000*, 58, 59).

The extremely rich fund of finds together with stratigraphic observations made it possible to develop an internal chronology of Maďarovce culture and divide its development into three phases:

1. Early (transitional) phase Únětice-Maďarovce (half of the stage BA2);
2. Classical phase (end of the stage BA2);
3. Late phase (stage BB1).

In absolute chronology, it is possible to date the Maďarovce culture on the basis of ^{14}C data obtained at the cemetery in Jelšovce (*Bátora 2000*; *Görsdorf/Marková/Furmánek 2004*) and in the fortified settlements of Hoste and Rybník (*Bátora/Rassmann 2008*) to the period 1730–1450 cal. BC:

- Early phase – 1730–1700 cal. BC;
- Classical phase – 1700–1500 cal. BC;
- Late phase – 1500–1450 cal. BC (*Bátora/Vladár 2015*, 37).

A new six-step periodization model has been proposed for the OFCC, based on data from excavations in recent years:

1. Old Otomani level (BA1);
2. Pre-classical level (BA1/BA2 and BA2);
3. Early classical level (BA2/BA3);
4. Late classical level (BA3);
5. Post-classical level (BB1);
6. Fading level (BB1/BB2 [BC1]).

Thus, in absolute dates, the time of existence of the OFCC falls in the range of 1800–1400 cal. BC (*Jaeger/Stróżyk/Olexa* 2022; *Olexa/Nováček 2013*, 12).

Absolute dating of the oval lock rings of the Sibinian-type with bent ends on the territory of the steppe Ukraine is established by analogies in the Danube complexes of Reinecke BA2–BB1 period or 17th–16th c. BC by K. Randsborg (*Cherednichenko 1977*, 12; *Randsborg 1991*). However, researchers note that such jewellery has existed in the steppes of Eastern Europe for somewhat longer (*Lytvynenko 1994*, 159). D. Kushtan also draws attention to the western parallels. The author considers the grooved lock rings with one-and-a-half turns and rings with spiral shields to be characteristic of the third period of the Central European treasures of Kosziderpadlás. This period corresponds to the late stage of the Otomani-Füzesabony culture, dated to the periods Hänsel MD II–III or BB1–BB2 (BC1), according to Reinecke's scheme (*Kushtan 2013b*, 170).

Beads

Small beads of antimony are also characteristic of the PZC, in contrast to the classical Abashevo culture, where there was jewellery made of arsenic bronze and silver (*Gorbunov 1976*; *Kuz'mina 1992*, 49–58). Hundreds of antimony products, mostly beads, were found in the graves of the PZC on the Lower Volga (*Malov 1992*, 8). They are also known in Pokrovsk-type burials in eastern Ukraine (*Kravets/Posrednikov 1990*, 12, 73, fig. 18a; *Lytvynenko 1995*, 77).

Researchers mention 13 locations with Late Bronze Age jewellery – pendants made of antimony in burials, noting the highest concentration of them in the Don-Volga interfluve (*Lun'kov/Lun'kova 2005*). The presence of jewellery in the burial inventory in the form of paste and antimony beads is considered to be a symptomatic feature of the early burials of the ZC and the tradition of Pokrovsk-type sites (*Lytvynenko 1999*, 14). Given the fact that there are no known antimony deposits in Ukraine, V. V. Otroschenko suggested that the raw materials or finished products were imported (*Otroschenko 2013*, 163).

As noted by researchers, the territory of the Middle Dnieper Area at the beginning of the developed stage of the Late Bronze Age (Berezhnovka-Maevka Zrubna culture-I; hereinafter referred to as BMZC) continued to receive products of the Don-Volga-Ural metalwork centre of the PZC. Starting from the stage of BMZC-II, Loboikivka's own metal processing centre, covering the Middle Dnieper and the basin of the Siverskyi Donets, whose raw material base was copper sandstones of Donbass, began to actively operate in the region. In addition, finds

of metalwork from other centres of the Eurasian metallurgical province (Northern Black Sea region, Volga-Kama, Southern Urals, Northern and Central Kazakhstan, Altai) have also been recorded in the region. The sites of the early stage of BMZC-I are synchronized with the horizon of the Central European treasures of Kosziderpadlás (BB1–BB2 [C1]), and the developed stage of BMZC-II with the Late Bronze Age (BC2–BD) – horizon Ópályi-Uriu-Domăneşti (*Kushtan 2013a*, 80–85).

SCHEME OF RELATIVE AND ABSOLUTE CHRONOLOGY OF ZRUBNA/TIMBER-GRAVE CULTURE OF THE NORTH AZOV AREA

In the Northern Azov region, as it was already mentioned, there are no bright sights of the Pokrovsk-type. There are only a few burials with weak features of the PZC in the ritual-inventory complex. This allowed R. O. Lytvynenko to synchronize them with the end of the early–the beginning of the developed stage of the burial grounds of the Siverskyi Donets. Thus, these complexes were recognized as the earliest for the Azov ZC and they follow the burials of the BCC in time (*Lytvynenko 1994*, 168; *Otroschenko 2002*, 17).

There was an overlapping of Pokrovsk features onto the late layer of BCC sites rather than a gradual change of cultures – Babine culture (Dnieper-Don Babine culture III [DDBC] + Dnieper-Prut Babine culture [DPBC] – PZC – BMZC). Since Pokrovsk features are rather implicit in ZC sites of the North Azov Area, they disappeared very quickly at the beginning of their early stage (*Zabavin/Bulyk 2020*, 32).

The time of the BMZC finale is reliably dated thanks to the synchronization of the Loboikivka hoard finds (*Leskov 1981*) with the hoard horizon of the Ópályi-Uriu-Domăneşti of Carpathian Basin (period Reinecke BC2–BD). This chronological boundary, according to V. V. Otroschenko, is now represented not only by a characteristic complex of metal objects, but also by an expressive funerary ritual at the elite level (*Otroschenko 2001*, 162). The turn of 13th–12th c. BC, when the Bilozirsk culture was formed, was the final milestone for the BMZC and ZC community as a whole (*Otroschenko 1999*; *Otroschenko/Vovk 2001*, 70). According to V. A. Romashko, *'destruction of the BMZC and, simultaneously, the formation of the Boguslav/Bilozirsk culture occurs within the chronological framework of the Proto-BB stage (second half of the 13th–beginning of the 12th c. BC), corresponding to the formation of the final cultural and chronological horizon of the Bronze Age in Eurasia'* (*Romashko 2013*, 217).

The absolute chronology of the burial grounds of the log culture of the Northern Azov region is in full accordance with the ^{14}C dates of the preceding and subsequent archaeological formations. The existing ^{14}C dates formally delineate a chronological range for the BCC as a whole within the 22nd–mid-18th c. BC. At the same time, the later phases of the BCC (IIB-III stages of the DDBC) are generally synchronous with the Middle European period BA2, or FD III, or the beginning of the Middle Hellas (MH I), which have absolute dates of about 2000–1800 cal. BC. The latest sites of the BCC, mainly local variants of the DPBC, can be synchronized with the Petrovka culture (or the Petrovka stage of the Alakul culture), the ^{14}C dates of which are 1940–1690 cal. BC (*Lytvynenko 2009a*; *2009b*, 321).

The horizon of the Middle Don-Siverskyi Donets and Lower Volga region is provided with ^{14}C radiocarbon dates in the interval 1900–1600 cal. BC (*Trifonov 2001*, tab. 1; 2). A small series of ^{14}C dates for the Lower and Middle Dnieper and Siverskyi Donets BMZC outlines a range between 1524–1175 cal. BC (*Chernykh/Polin/Otroshchenko 2003*, tab. 1). At the same time, the latest date packages for the Kartamysh micro-district of the BMZC allowed to lower the initial date of this culture by at least a century. Five radiocarbon dates were obtained from the bones of animals from the technogenic site of the Chervone Lake mine. On average, the calibrated dates fit into the 16th c. BC. With a probability of 1σ, the date range covers 1681–1447 BC, and with a probability of 2σ range 1741–1411 BC (*Brovender/Otroschenko/Priakhin 2010*, 92).

The materials of BMZC of the Middle Dnieper are contextually related to the sites of the Malopolovetske-type (Kyiv-Cherkassy group of the TCC; *Lysenko 2005*, 44), which allows researchers to extrapolate these dates to the BMZC (1600–1400 BC; *Chernykh/Polin/Otroshchenko 2003*, 334; *Lytvynenko 2009a*).

Migration transformation gradually affected the burial rite of ZC tribes inhabiting the Azov steppe, especially if the infiltration process was going on not instantly but within a certain period. Thus, at the final stage of ZC development in the North Azov Area, there was a deviation from the traditional burial rite, which inevitably led to a loss of cultural identity. In terms of archaeology, it led to the disappearance of the culture itself. With the disappearance of ZC mound rite in the region under research at the break of the 13th–12th c. BC, ZC itself disappeared. Having appreciably decreased, the population of the Azov steppe did not completely vanished. Life was going on in particular settlements, though in a different cultural environment. The emergence of new cultural formations based on ZC genetic background (Boguslav/Bilozirsk

Fig. 6. Scheme of relative and absolute (^{14}C cal. BC) chronology of Zrubna/Timber-grave culture of the North Azov Area.

<table>
<tr><th>Absolute dates BC</th><th>Reinecke</th><th>Hänsel</th><th colspan="2">Archaeological cultures</th></tr>
<tr><td rowspan="2">1200</td><td>HA1</td><td>SD II</td><td colspan="2">Post-Zrubna/Timber-Grave culture block
(Boguslav/Bilozirsk culture + Otradne culture)</td></tr>
<tr><td rowspan="2">1400</td><td>BD</td><td>SD I</td><td>III
Horizon</td><td rowspan="3">Zrubna/Timber-Grave culture
of the North Azov Area</td></tr>
<tr><td>BC2
BB2 (C1)</td><td>MD III</td><td>II
Horizon</td></tr>
<tr><td>1600</td><td>BB1</td><td>MD II</td><td>I
Horizon</td></tr>
<tr><td>1700</td><td>BA3</td><td>MD I</td><td colspan="2">Babine cultural circle
(Dnieper-Don Babine cultural + Dnieper-Prut Babine cultural)</td></tr>
</table>

and Otradne cultures) in the 13th c. BC marked the final of ZC in the region under research (*Zabavin/Bulyk 2020*, 31).

The absolute chronology of the next horizon of post-ZC cultural formations properly cuts off the upper date of the existence of ZC in the studied region. According to V. A. Romashko, the formation of the Boguslav/Bilozirsk culture in the Northern Azov region takes place in the last decades of the 13th c. BC. The chronology of the Boguslav/Bilozirsk culture stages proposed by the researcher is generally confirmed by the available radiocarbon dates of the Late Bronze Age sites in Eastern Europe. Directly or indirectly, the author synchronizes the materials of the early period of the Boguslav/Bilozirsk culture with such chronologically close cultures as the late Noua, Koslogeni, Cherkaskul and others. Also synchronizes with the treasures of the Uriu – Domăneşti horizon (Reinecke BC2–BD), the culture of the Danube and Hungary burial mounds, the Mycenaean period SH III B, Troy VIIa. It is also noted that a similar stage, which combines the features of ZC and post-ZC time, is distinguished by archaeologists from the Volga Region (the ZC-Khvalynsk stage of the Khvalynsk culture) and dates back to the 13th–12th c. BC (*Romashko 2013*, 208–212).

On the Lower Don and in the North-Eastern Azov burials of the 12th–10th c. BC V. Potapov identified a separate post-ZC chronological horizon (in later works – Otradne culture; *Potapov 1997*, 128; *1998*). The Otradne culture covers the region of the Lower Don, steppe Ciscaucasia and the Lower Volga. As a result of the analysis of the inventory fund of the Otradne culture of the final Bronze Age, the researcher identified a number of peculiar cultural and chronological markers that appear before the 12th c. BC on a large territory and continue to exist in the final period of the Bronze Age (*Potapov 2007*). In general, as noted by the researchers, the early sites of the Late Bronze Age are simultaneous with the sites of the late Hellenistic period (LH III C), synchronous with the horizon of the Central European treasures Kurd-Kisapati-Cincu-Suseni (periods Hänsel SD and Reinecke HA1) and date back to the 12th–first half of the 11th c. BC (*Kushtan 2013b*, 176).

Using comparative-typological and natural methods, D. Kushtan developed a chronology of the main stages of the region of Central Ukraine (Middle Dnieper) in the Late Bronze Age. Given that there is currently an inconsistency between the traditional dates of Late Bronze Age sites and calibrated radiocarbon dates, the author cites both variants. Thus, the chronological framework of the 'ZC-Sabotynivka' stage is defined by the 15th–13th c. BC, which according to the new calibrated radiocarbon dates corresponds to 1700–1300 cal. BC. There are two stages within the 'ZC-Sabotynivka' time:

- BMZC-I – traditionally dated to the 15th–late 14th c. BC; ^{14}C dates 1700–1500 BC;
- BMZC-II – traditionally dated to the late 14th–13th c. BC; ^{14}C dates 1500–1300 BC (*Kushtan 2013a*, 84, tab. 1).

The obtained dates do not contradict the time of functioning of the Donetsk mining and metallurgical centre during the two periods of the BMZC (15th–13th c. BC; *Otroschenko 2003*, 51), taking into account the fact that the population of this culture mainly consumed the products of this centre

(*Brovender 2001*, 13–16; *Tatarinov 1977*). Based on a fairly presentable package of radiocarbon dates (37) of settlement and burial monuments of BMZC of the Dnipro-Don interfluve, including from the territory of the Donetsk mining and metallurgical centre, the first period of BMZC dates back to the 17th (possibly the end of the 18th c. BC) – 15th c. BC, and the second period to the 15th –13th c. BC (*Brovender 2016*, 18).

Thus, the fund of finds-chronological indicators in combination with stratigraphic observations allowed to develop an internal chronology of ZC of the Northern Azov region and to divide its development into three stages. The scheme of relative and absolute chronology is summarized in Fig. 6.

CONCLUSIONS

Summing up the above facts and taking into account the positive experience of predecessors, we can state the following. The lower limit of the existence of ZC of the Northern Azov region is quite reliably limited to the upper dates of the existence of the Babine cultural circle. The later phases of the DDBC are generally synchronous with the Middle European period BA2a, or FD III, or the early Middle Helladic (MH I), with absolute dates of about 2000–1800 cal. BC. The most recent Babine cultural sites, mainly local variants of the DPBC, can be synchronized with the Petrovka culture (or the Petrovka stage of the Alakul culture), ^{14}C dating (1940–1690 cal. BC).

The absolute chronology of the next horizon of close-in-time cultural formations (Boguslav/Bilozirsk culture in the western part of the studied region and Otradne culture in the eastern part) properly cuts off the upper date of the existence of ZC in the Northern Azov Region (13th–early 12th c. BC).

Due to the comparative-typological and natural methods, as well as the method of extrapolation using objects-chronological indicators (bronze daggers, grooved lock rings of the Sibinian-type, rings with spiral shields, antimony beads), the chronological framework of ZC culture of the Northern Azov Region is determined within 1700–1200 BC. The fund of finds, together with stratigraphic observations, allowed us to develop an internal chronology of the culture we studied and divide its development into three phases:

- I (early) horizon – 1700–1600 cal. BC (level BA2/BB1 according to Reinecke's scheme or MD II according to Hänsel's scheme);
- II (developed) horizon – 1600–1400 cal. BC (level BB1/BB2 [C1]) according to Reinecke's scheme or MD III according to Hänsel's scheme);
- III (late) horizon – 1400–1200 cal. BC (BC2/BD level according to Reinecke's scheme or SD I according to Hänsel's scheme).

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Kovové artefakty zrubovej kultúry v severnom Priazovsku ako chronologické indikátory

Viačeslav Zabavin

SÚHRN

Štúdia sa zaoberá otázkami súvisiacimi s problematikou relatívnej a absolútnej chronológie zrubovej kultúry v severnom Priazovsku z obdobia paleometalu. Úspešné riešenie týchto otázok umožňuje nielen pochopiť regionálne osobitosti kultúrno-historického procesu, ale aj správne opísať charakter medziregionálnych vzťahov z hľadiska ich dynamiky a smerovania. Použitie historickej chronológie na datovanie predliterárnych kultúr, vrátane kultúry zrubovej, sa zvyčajne zakladá na výsledkoch komparatívnej a typologickej analýzy. Vzhľadom na značnú vzdialenosť územia severného Priazovska od civilizačných centier, sa takéto datovanie stáva viacstupňovým postupom, ktorého výsledky priamo závisia od presnosti početných typologických porovnaní. Porovnávacia analýza regionálnych periodizácií zvyšuje spoľahlivosť takéhoto datovania, ale nie je nezávislým spôsobom overovania jeho výsledkov. V tejto situácii majú osobitný význam výsledky absolútneho datovania kultúrnych pamiatok vrátane rádiouhlíkového datovania. Pri určovaní absolútnych dát zrubovej kultúry v severnom Priazovsku sa autor príspevku zameriava najmä na upravené chronologické stupnice vytvorené pomocou prírodovedných datovacích metód.

Kovové výrobky sú jednou z najpreskúmanejších kategórií archeologických prameňov a ich typológii a chronológii je venovaná pomerne rozsiahla literatúra. Už tradične priťahujú vyššiu pozornosť výskumníkov v porovnaní s výskumom techniky ich výroby. Pretrváva záujem o charakteristiku rôznych kategórií nástrojov a ich delenie do funkčných skupín. Aj v štúdiách z posledných desaťročí sa najväčšia pozornosť venuje otázkam typológie a chronológie.

Napriek tomu, že sortiment bronzových výrobkov z neskorej doby bronzovej je pomerne široký, ide o zriedkavú kategóriu nálezov na sídliskách a pohrebiskách zrubovej kultúry v skúmanom regióne. Z celkového počtu 1515 preskúmaných hrobov v severnom Priazovsku, boli bronzové predmety zaznamenané len v 44 hroboch,

čo predstavuje asi 2,9 % z celkového počtu. Pre riešenie otázok relatívnej a absolútnej chronológie, ako aj synchronizácie zrubovej kultúry v severnom Priazovsku s kultúrami karpatsko-podunajskými a s mykénskym Gréckom, sú kľúčové nálezové celky obsahujúce bronzové a antimónové artefakty.

Príspevok sa zameriava na nálezy bronzových dýk v severnom Priazovsku. Tento typ artefaktu, náročný z hľadiska spotreby kovu, má osobitý význam pri datovaní hrobov zrubovej kultúry.

Kovové ozdoby rôzneho typu sa našli v 25 hroboch na skúmanom území. Rozšíreným typom inventára sú bronzové záušnice (tzv. sibinského alebo sedmohradského typu). Z 1356 hrobov z rôznych chronologických horizontov zrubovej kultúry sa vyskytovali v 19 súboroch (1,4 %). Celkovo sa v nich objavilo 28 kusov rôzneho stupňa zachovania. Tieto záušnice sú jednou z charakteristických ozdôb doby bronzovej a analógie tohto typu sa nachádzajú v celej karpatskej oblasti.

Bronzové prstene so špirálovými ružicami sa na území Ukrajiny objavili na pohrebisku zrubovej kultúry v Pokrovke (mohyla 3, hrob 10) a vyskytli sa aj na lokalitách patriacich k trziniecko-komarovskej kultúre (trziniecky kultúrny okruh). Tento typ nálezu bol rozšírený aj v strednej a mladšej dobe bronzovej v strednej Európe.

Dôkladné porovnanie chronologicky citlivých kovových artefaktov zrubovej kultúry v severnom Priazovsku s podobnými artefaktmi karpatsko-dunajskej, peloponézskej a maloázijskej oblasti, umožnilo spoľahlivejšie rozvinúť otázku chronológie kultúrnych formácií neskorej doby bronzovej cirkumpontického regiónu. Na základe toho bola vytvorená schéma relatívnej a absolútnej chronológie zrubovej kultúry v severnom Priazovsku.

Vďaka komparatívno-typologickým a prírodovedným metódam, ako aj extrapolačnej metóde s využitím chronologicky citlivých predmetov (bronzové dýky, závesky tzv. sibinského alebo sedmohradského typu, prstene so špirálovitými ružicami, antimónové koráliky) možno chronologický rámec zrubovej kultúry v severnom Priazovsku stanoviť v rozmedzí rokov 1700–1200 BC. Začiatok tohto obdobia sa kryje so zánikom babinského kultúrneho okruhu a koniec so vznikom kultúrnych útvarov neskorej doby bronzovej. Tieto kultúry sú geneticky príbuzné so zrubovou kultúrou (boguslavsko-bilozerská kultúra v západnej a otradnenská kultúra vo východnej časti skúmaného regiónu). Súbor nálezov spolu so stratigrafickými pozorovaniami umožnil vypracovať vnútornú chronológiu zrubovej kultúry a rozdeliť jej vývoj do troch fáz:

- I (včasný) horizont – 1700–1600 BC cal. (stupne BA2/BB1 podľa Reineckeho schémy alebo MD II podľa Hänselovej schémy);
- II (rozvinutý) horizont – 1600–1400 BC cal. (stupne BB1/BB2 [C1] podľa Reineckeho schémy alebo MD III podľa Hänselovej schémy);
- III (neskorý) horizont – 1400–1200 cal. BC. (stupne BC2/BD podľa Reineckeho schémy alebo SD I podľa Hänselovej schémy).

Вироби з металу Зрубної культури Північного Приазов'я як хронологічні індикатори

В'ячеслав Забавін

РЕЗЮМЕ

У статті розглянуті питання, пов'язані з проблемами відносної та абсолютної хронології зрубної культури Північного Приазов'я (рис. 1–3) доби палеометалу. Успішне розв'язання цих питань дозволяє не тільки зрозуміти регіональні особливості культурно-історичного процесу, а й коректно описати характер міжрегіональних зв'язків з точки зору їх динаміки та напрямку. В основі використання історичної хронології для датування безписемних культур, у тому числі й зрубної культури, як правило, знаходяться результати порівняльно-типологічного аналізу. При значній віддаленості території Північного Приазов'я від центрів цивілізацій таке датування набуває характеру багатоступінчастої процедури, результати якої прямо залежать від точності побудови численних типологічних порівнянь. Порівняльний аналіз регіональних періодизацій підвищує достовірність такого датування, але не є незалежним способом перевірки його результатів. У такій ситуації особливого значення набувають результати абсолютного датування пам'яток культур, у тому числі методом радіовуглецевого датування. При визначенні абсолютних дат зрубної культури Північного Приазов'я автор в основному орієнтується на більш скориговані між собою хронологічні шкали, побудовані за допомогою природничо-наукових методів датування.

Вироби з металу є однією з найбільш вивчених категорій археологічних джерел, знахідкам, типології і хронології яких присвячена досить велика література. Металеві вироби традиційно привертали

переважну увагу дослідників, в порівнянні з оцінкою їх виробництва. Зберігається стабільний інтерес до характеристики найбільш металомістких категорій знарядь різних функціональних груп та інших виробів з металу, при цьому в дослідженнях останніх десятиліть найпильніша увага приділяється саме питанням типології й хронології.

Незважаючи на те, що асортимент бронзових виробів в епоху бронзи досить широкий, на поселеннях та в похованнях зрубної культури регіону, що досліджується, це відносно рідкісна категорія знахідок. Так, серед масиву досліджених 1515 захоронень зрубної культури Північного Приазов'я бронзові предмети зафіксовано лише в 44 поховальних комплексах, що складає близько 2,9% від загальної кількості. Для дослідження проблем абсолютної хронології та синхронізації культур бронзового віку Надчорномор'я зі старожитностями Південно-Східної Європи та Малої Азії важливе значення мають ключові діагностичні комплекси. Для вирішення питань відносної хронології та синхронізації горизонтів зрубної культури Північного Приазов'я з культурами Карпато-Подунав'я та Мікенської Греції автором використано так звані хроноіндикатори – вироби з бронзи та сурми.

Враховуючи металоємність, нечисленність і особливу важливість в процесі хронологічних побудов даного виду поховального інвентарю, в статті розглянуті бронзові ножі (рис. 4), що знайдені на території Північного Приазов'я в похованнях зрубної культури. Незважаючи на те, що асортимент бронзових виробів в епоху пізньої бронзи був досить широкий, на поселеннях і в похованнях зрубної культури досліджуваного регіону це відносно рідкісна категорія знахідок. Комплекси, що містять бронзові ножі, залучаються для визначення абсолютної та відносної хронології могильників зрубної спільності.

Різноманітні прикраси з металу (рис. 5) були виявлені в 25 приазовських похованнях. Серійною категорією інвентарю є бронзові скроневі підвіски. З 1356 поховань, розподілених за горизонтами, бронзові скроневі підвіски зафіксовано в 19 (1,4%) комплексах. Загалом у них зафіксовано 28 підвісок різного ступеня збереженості. Сибінські або трансільванські сережки – одна з характерних прикрас епохи бронзи. Аналогії підвіскам цього типу також можна знайти на всій території Карпатського регіону.

На теренах України вироби, аналогічні бронзовій каблучці зі спіральними щитками з приазовського поховання (Покровка, курган 3, поховання 10), також знайдені на пам'ятках, що відносяться до тшинецько-комарівської культури (тшинецького культурного кола). Вироби з бронзового дроту з кінцями, завитими в спіральні щитки, також були широко поширені в епоху бронзи на території Центральної Європи.

Ретельне зіставлення металевих артефактів – хронологічних індикаторів зрубної культури Північного Приазов'я з аналогічними артефактами Карпато-Подунав'я, Пелопоннесу та Малої Азії дозволило надійніше розробити питання відносної та абсолютної хронології культурних утворень пізнього бронзового віку циркумпонтійського регіону. Таким чином, вибудована схема відносної та абсолютної хронології зрубної культури Північного Приазов'я.

Завдяки порівняльно-типологічному та природничим методам, а також методу екстраполяції з використанням предметів-хроноіндикаторів (бронзові ножі, жолобчасті скроневі підвіски у півтора оберти та (сибінського або трансільванського типу), персні зі спіральними шитками, сурм'яний бісер) хронологічні рамки зрубної культури Північного Приазов'я визначаються в межах 1700–1200 рр. до н.е. Початок окресленого періоду збігається з завершенням існування культурного кола Бабине, а кінець – формуванням культурних утворень фінальної бронзи, генетично пов'язаних зі зрубним світом (богуславсько-білозерська культура – в західній частині досліджуваного регіону, отрадненська культура – в східній частині). Фонд знахідок разом зі стратиграфічними спостереженнями дали змогу виробити внутрішню хронологію досліджуваної нами культури і поділити її розвиток на три фази (рис. 6):

- I (ранній) горизонт 1700–1600 BC cal. (рівень BB1 за схемою Reinecke або MD II за схемою Hänsel);
- II (розвинений) горизонт 1600–1400 BC cal. (рівень BB2 [BC1] за схемою Reinecke або MD III за схемою Hänsel);
- III (пізній) горизонт 1400–1200 BC cal. (рівень BC2/BD за схемою Reinecke або SD I за схемою Hänsel).