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CULTURAL GENESIS AND ETHNIC PROCESSES IN CENTRAL AND EASTERN EUROPE IN THE 3RD MILLENNIUM BC: YAMNAYA, CORDED WARE, FATYANOVO AND ABASHEVO CULTURES

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Abstract: There are two main hypotheses about the localization of the Indo-European homeland. The first connects the spread of the Indo-Europeans with the migrations of the kurgan cultures of the Ponto-Caspian steppes, primarily the Yamnaya. Therefore, the hypothesis was called "kurgan". The second hypothesis assumes the localization of the Indo-European homeland in the Near East. According to the Kurgan hypothesis, the Yamnaya migration at the beginning of the EBA led to the formation of Corded Ware cultures from the Rhine to the Volga, which caused the spread and formation of modern European dialects. In fact, there are no grounds for assuming the formation of Corded Ware cultures on the Yamnaya basis. They were formed partly on the basis of European Neolithic cultures, partly on the basis of impulses from the steppe zone in the pre-Yamnaya time. There is also no reason to assume that it was this process that led to the formation of the Celto-Italic and Balto-Slavic-Germanic languages. It is more likely that bearers of these cultures spoke Proto-Venetic and Proto-Illyrian languages.

Keywords: *Indo-European problem, Early Bronze Age, Yamnaya migration, Corded Ware cultures, Abashevo, Veneti, Illyrians.*

1. INTRODUCTION

With rare exceptions, the population of modern Europe speaks the languages of the Indo-European family. Moreover, most of the languages of this family are situated in Europe. Therefore, it is no coincidence that the ancient history of Europe is extremely important for solving the Indo-European problem. Currently, there are three main hypotheses about the homeland of the Indo-Europeans. The first relates them to the kurgan cultures of the Eneolithic and EBA[1] of the Ponto-Caspian steppes, therefore it was called the "kurgan hypothesis".[2] According to the second, the Indo-Europeans came to Europe at the beginning of the Neolithic

[1] The following abbreviations are used in the article: EBA – Early Bronze Age, MBA – Middle Bronze Age, EH – Early Helladic period, GAC – Globular Amphorae culture, CWC – Corded Ware culture, TRB – Funnel Beaker culture, BBC – Bell Beaker culture, IE – Indo-European, PIE – Proto-Indo-European.

[2] MALLORY 1989; GIMBUTAS 1956; ANTHONY 2007.

from Asia Minor.[3] Finally, the third assumes the localization of the homeland in the territory of Upper Mesopotamia and the Armenian Plateau.[4]

Until recently, this problem was solved by means of archaeology and linguistics, and there has always been a question of how adequately the archaeological materials reflect the linguistic situation, since it was obvious that they did it not completely. This is caused by the fact that within the framework of this discussion, the spread of some language is forced to be identified with the spread of some archaeological culture within the framework of a monothetic approach to it. However, culture is a more complex phenomenon, and, perhaps, it is more true to discuss these problems within the framework of a polythetic approach, since with the spread of new cultural traditions there could be different processes of interaction with local populations, and different social structures could be formed in which this process was implemented. This is reflected, in particular, in the fact that there are areas where European corded ware is present in burials, but there are no settlements at all, and there are areas where it is found in settlements, but there are no corresponding burials.[5] This is perfectly true, but it makes it difficult for us to reconstruct those linguistic changes that are associated with the spread of some ceramic style or funerary rite. Obviously, the hypothetical penetration of the steppe tribes with the kurgan rite and the new ideology did not necessarily lead to the spread of their language within the CWC area. Even if their dominance is supposed,[6] which has no reliable evidence, this could hardly have caused large-scale language transformations. Nowhere did elite dominance end with this.[7] The exceptions are situations with the spread of languages in nomadic areas, for example, Turkic. However, for Europe, with its large agricultural population, it is difficult to imagine that the conquest of the territory by incomparably smaller groups of steppe people could quickly lead to a change in language. This is unlikely for demographic reasons. But in some regions it was quite possible, in particular, in the Middle Danube, where the number of Yamnaya graves is really large.

In recent years, paleogenetics have joined the discussion of the problem, but the results of their work also allow broad interpretations, although they are perceived by many archaeologists as the final truth. However, paleogenetic studies are unable to provide an unambiguous solution to the problems of ethnic processes, since the results of these studies may be influenced by various factors. At the same time, the results calculated for mtDNA, Y-chromosomes and genome-wide studies based on autosomal markers may differ. For example, among the Slavs, the difference in Y-chromosomes is 7 times higher than in mtDNA. Subsequent comparisons depend on the completeness of the sampling, which is still insignificant for ancient genomes. However, some patterns are quite obvious. In Europe, for example, with its rather similar mtDNA genetic composition, genetic affinity depends primarily on geographic proximity, although language affinity is not much inferior to it. In the Caucasus, the main role is played by the language factor, while among the Turkic people, the geographic one dominates sharply. This situation is partly explained by the fact that related languages are localized in close areas, and the identified deviations find quite logical explanations. The dominance of the language factor among the Balts and Slavs is explained by their rapid expansion over vast areas and the assimilation of the local population. The significance of this factor among the Turkic people is much greater, which, in the presence of a small common ancestral admixture, is explained by the model of "elite dominance", etc. At the same time, if the Western and Eastern Slavs are genetically close, then the southern Slavs differ from them, although common ancestral genomes can be distinguished. The situation in the Caucasus is explained by a long internal development. It is possible to see the differences between individual ethnic groups, but with a very detailed analysis, not yet possible for ancient populations. For example, the Finno-Ugric cluster, as a whole, is included in the pan-European one, but within the latter it stands out quite clearly. Clusters of individual ethnic groups can be distinguished, although their boundaries are blurred. Sometimes in two closely related ethnic groups (e.g. Moldovans and Romanians) we see genetic differences, sometimes large, as in the case of two groups of Mordovians, Erzya and Moksha, despite living in the same region. In many cases, one can assume the influence of some very ancient genetic groups, but the influence of the former substrate is everywhere very strong. In addition, the modern situation is difficult to use in the reconstruction of ancient processes, since there were discrepancies after migrations.[8] Because all these circumstances, it is difficult to compare paleogenetic data with the current situation, but they are not influenced by later processes, and the identification of ancestral genomes in them is more reliable. But to base conclusions about language on this, especially on some kind of marker genome, as is sometimes done, is completely futile, although it is possible to draw some conclusions from this. For example, the G1 haplogroup originated in the Near Eastern Highlands (as indicated by the trend from the maximum values of 0.8 in the west of Iran to 0 in Mongolia), and its wide distribution in Eurasia (Armenia, Central Asia, Bashkiria, Iran, India) is probably connected with the spread of Iranian-speaking peoples. But now it is present among different ethnic groups, although its connection with individual clans or tribal groups is observed: among the Kazakhs – Argyn, among the Armenians – Hamshen, among the Bashkirs – Kangly. As a result, the haplogroup itself is not a marker of specific ethnic groups.[9]

Therefore, the data of archaeology, linguistics and genetics are not equivalent to each other. The only solution in this situation is to reconstruct the large-scale processes on the basis of these disciplines and compare them with each other. If they match, we are able to speak about

[3] RENFREW 1987.
[4] GAMKRELIDZE/IVANOV 1995; GRIGORIEV 2002.
[5] FURHOLT 2019; 2020.
[6] ANTHONY 2007, 360.
[7] HEGGARTY 2015, 618, 619.
[8] BALANOVSKII 2015, 128, 135, 136, 137, 167, 177, 183, 185, 202, 205–208, 211, 212, 230, 240, 259.
[9] BALANOVSKII 2015, 250–256.

the relative reliability of the reconstruction.[10] However, this requirement for the widest possible coverage, both territorial and chronological, often leads to the fact that Indo-European reconstructions use schemes of cultural genesis simplified to such an extent that they do not correspond to the original archaeological material at all. After that another process comes into play. Archaeologists exploring some territory naturally see these inconsistencies, but ignore them, believing that this is excusable given such large-scale approaches, and at the same time they do not doubt the validity of the scheme in general. As a result, we are faced with a series of paradoxical situations and obvious contradictions, which will be discussed below. Thus, in addition to an extremely broad approach, sufficient detail is required, which makes such studies very complex.

A broad comparison of cultural, linguistic and genetic processes in Eurasia showed that culture, genes and languages spread across the continent from south to north. There is no real data on the drift of culture and genes from the steppe to regions from Asia Minor to India inhabited by southern Indo-Europeans (Hittites, Luwians, Palaians, Phrygians, Armenians, Iranians and Indians).[11] This means that the homeland of the Indo-Europeans was in the Near East. This made it possible to focus on individual areas, and the most promising of them was Greece, with its rather early written tradition and many legends reflecting the realities of the Bronze Age. As a result, it was possible to demonstrate that the Greeks migrated to the south of the Balkan Peninsula from Asia Minor.[12] Probably, a little later, the Thracians migrated to the Carpatho-Danubian region from there.[13] In the process of this work, the impression arose that the penetration of the steppe tribes into the north of the Balkans was also associated with the Indo-Europeans, speakers of the Proto-Venetic and Proto-Illyrian languages. This hypothesis was the reason for the present work. In it, we will consider in stages the cultural processes in Southeastern Europe, starting with the late Eneolithic cultures of the North Pontic region and ending with the people of the Fatyanovo and Abashevo cultures who migrated from Central Europe to the east. Such a wide coverage allows us to draw conclusions about the ethnic processes in this period.

2. STEPPE TRIBES IN THE ENEOLITHIC

The Kurgan theory assumes several waves of penetration of the steppe people into Europe, which ended with the Yamnaya migration. The Kurgan tradition originated in the Pontic region in the Middle Eneolithic (3900/3800–3500/3400 BC), when the first mounds with cromlechs and ditches appeared, evolving from earlier structures with small stone structures. Thus, they formed there earlier than in the Volga-Ural steppes, and this phenomenon was partly caused by relations with the Balkan-Carpathian and Caucasian regions.[14] Often the Eneolithic cultures of the Pontic-Caspian steppes are united in the community "Khvalynsk – Sredny Stog". But the Sredny Stog culture has been divided into several cultures. The earliest of them is Skelya, which is synchronous with Gumelnița A2-B1, Varna, Cucuteni A, in the Northern Balkans, Trypolye B-I, the pre-Maikop horizon of the North Caucasus (Meshoko, Miskhaka, Svobodnoye), Khvalynsk and Yamno-Berezhnovka sites of the Volga region. The culture is dated to 4500–4100 BC. In its burials, zoomorphic scepters were found, appearing in the Northeastern Balkans in Suvorovo-type complexes, as well as copper and gold objects of Balkan origins. Only for this stage may we speak of a certain commonality with Khvalynsk, then this unity of the Pontic and Volga steppes decreases.[15] It is interesting that many copper ornaments from the Khvalynsk cemeteries were either Balkan imports from the cultures of Varna, Gumelnița, Karanovo (mainly from the Lower Danube, from the Varna–Black Sea zone), or made according to Balkan samples, which is clearly manifested in their typology, chemical composition and manufacturing technology. Moreover, this is typical not only for these Volga sites, but also for the entire Pontic region and even for the pre-Maikop horizon of the North Caucasus.[16] This reflects a rather typical situation of return impulses, which we will see further in the Eneolithic and EBA, but which periodically took place in later periods.[17]

The next stage is represented by the Sredny Stog culture, synchronous with Trypolye B II/C I, C I, which is dated to 4100–3600 BC, and after that the Dereivka sites appeared, as well as the first kurgans: Kvityana (with extracted burials), Nizhne-Mikhailovka (with ocher-colored burials contracted on their sides), but in all of them the buried are oriented with their heads to E, which was a tradition of the steppe Eurasia. This horizon of cultures is dated to ca. 3700/3600 – 3000 BC, being synchronous with the Trypolye B-II/C-I, C-I, C-II and Cernavoda I, Ib cultures.[18]

In the late Eneolithic (the last third of the 4th millennium BC), a large series of very differentiated groups spread in the North Pontic area, often with burial mounds: Kvityana,[19] late Sredny Stog, Usatovo, Nizhne-Mikhailovka. Recently, the Zhivotilovka-Volchanskoe group has been identified in a large area from the eastern Carpathians to the North Caucasus (Fig. 1). It has a stratigraphic position between the EBA Yamnaya complexes and the Eneolithic ones (Nizhne-Mikhailovka, Sredny Stog and Kvityana sites on the Lower Dnieper and the Konstantinovka ones in the Kuban area). The relationship with the Usatovo monuments in the west is not clear. There are no settlements and flat cemeteries of this group. The monuments are represented by small earth mounds with one burial, sometimes with a ditch.

[10] GRIGORIEV 2002, 15; HEGGARTY 2015, 602; GRIGORIEV 2021a, 188–190.
[11] GRIGORIEV 2021a.
[12] GRIGORIEV 2022.
[13] GRIGORIEV 2021b.
[14] RASSAMAKIN 2012, 294, 299, 303.
[15] RASSAMAKIN 1994, 33–36, 42.
[16] RYNDINA 2010, 234, 241, 242; CHERNYKH 2010, 221, 222, 225.
[17] An example of this is a situation when, at the beginning of the A2b phase, the Seima-Turbino metallurgical tradition penetrated into Central Europe, and soon cheekpieces decorated in the Carpatho-Mycenaean style appeared from the Northern Black Sea region to the Transurals and Western Kazakhstan. But these cheekpieces also have many morphological features borrowed from the Carpathians (GRIGORIEV 2021b).
[18] RASSAMAKIN 1994, 39–44.
[19] This culture is often also called post-Mariupol, but Yu.Ya. Rassamakin objects to this, since all the Eneolithic cultures here are post-Mariupol (RASSAMAKIN 1994, 39).

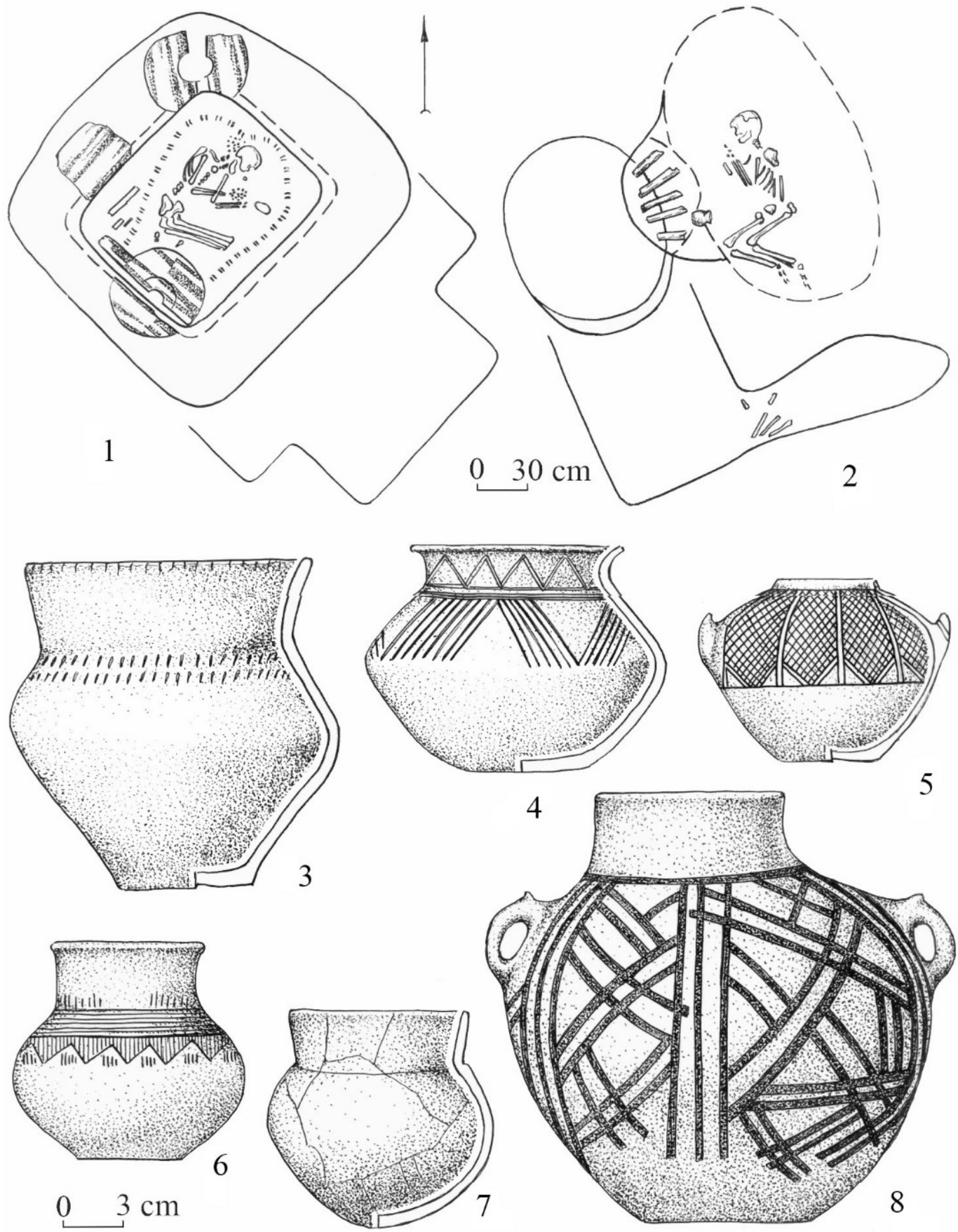

Fig. 1. Late Eneolithic complexes of Zhivotilovka-Volchanskoe. Burials: 1 – Koldyri, k. 14, gr. 7; 2 – Boguslav I, k. 23, gr. 12. Ceramics with parallels in the European cultures of Central Europe (3), Maikop-Novosvobodnaya (4), in the agricultural communitites of the North-West Pontic region (5, 6, 8) and in the Eneolithic steppe complexes (7): 3 – Costești, k. 2, gr. 2; 4 – Sokolovo I, k. 6, gr. 4; 5 – Sokolovo II, k.1, gr. 9; 6 – Gura Bâcului, k. 8, gr. 15; 7 – Kamenka-Dneprovskaya, k. 8, g. 12; 8 – Taraclia II, k. 10, gr. 2 (after MANZURA 2016, figs. 2: 1, 2; 6: 1, 5, 9, 13; 7: 8, 14).

The pits are rectangular or oval, but there are catacombs[20] (Fig. 1/1, 2) and stone boxes in Ingul and Ingulets valleys. The buried lie contracted on their side, and, despite the small number of anthropological definitions, the presence of sexual differentiation is assumed: those buried on the left side are more often oriented to the NE and E, and on the right are to the S and SE.[21]

The graves contain flint plates, scrapers, stone axes, asymmetric arrows with a straight, concave or beveled base. Ware is represented by pots and amphorae with analogues in Trypolye C2 and the Costeşti-Kasperovtsi group (Figs. 1/5, 6, 8). The second group of ware has origins in the Maikop-Novosvobodnaya complexes (Fig. 1/4), the third in the local Eneolithic cultures of Usatovo, Konstantinovka, Sredny Stog (Fig. 1/7), the fourth group is quite amorphous, and the fifth, common from the Caucasus to the Prut river, is represented by beakers with a flat or rounded bottom, funnel-shaped neck, and parallels in Novosvobodnaya, Funnel Beaker culture (TRB) and Baalberg (Fig. 1/3). It is assumed that these groups were formed on a local basis, with the participation of the Maikop-Novosvobodnaya culture penetrated into the steppe area. Subsequently, it was this group that formed the basis of the Yamnaya culture in the North Popntic area.[22]

3. BUDZHAK CULTURE OF THE YAMNAYA CULTURAL-HISTORICAL AREA

The problem of the formation of Yamnaya culture is very far from being solved. It is widely believed that it was formed on the basis of the Eastern Eneolithic groups of the Khvalynsk culture in the Volga region (5th – 4th millennia BC), as well as sites of the Repin Khutor type, distributed from the Don to the Southern Urals, dated to ca. 3800–3300 BC.[23] And, in the east, indeed, Repin's features were preserved in the Yamnaya culture. However, from the Don to the Dnieper, there are sites of the Sredny Stog type, culturally close, which are also considered as the basis for the Yamnaya formation. In fact, between them and the Yamnaya complexes was this layer of cultures of the last third of the 4th millennium BC, represented by sites of the Zhivotilovka-Volchanskoe group. Besides, usually, when ones talk about the earlier Yamnaya dates in the east, they mean not the Yamnaya sites themselves, but the Repin ones. There are no real grounds for this, as well as grounds for conclusions about the Volga-Ural roots of the Yamnaya culture. It was formed almost simultaneously on the basis of integration of different Eneolithic substrates. This is clearly manifested in the fact that in the west and east, various anthropological and ceramic types have been identified, which shows that there were no noticeable migrations within the Yamnaya community, and the burial rite is a unifying feature. Therefore, it is assumed that the integrating moment was the spread of a new ideology.[24]

The most interesting for us are the Yamnaya groups in the western area, because it was they who influenced the cultural genesis of Europe. They are represented by monuments of the Budzhak culture, which was formed on the basis of various Eneolithic substrates, and was not a Yamnaya population that came from the east (Fig. 2). In addition, the formation of the material complex of its early stage (primarily ceramics) was greatly influenced by the Coţofeni culture of the Carpathian Basin, as well as Kostolac and Ezero II. Monuments of the culture are represented by mounds with ditches surrounding the burial ground, arranged in a circle contracted burials on the back, but also on the right (7.3%) or left (6.1%) side, and this is not related to chronology. The central burials are oriented to the west, while the peripheral ones are oriented along the arc of the circle. In the pits, there are mats and ocher, stone axes and ware in the form of beakers and amphorae with parallels in GAC, CWC, the Balkan cultures Cernavoda II and Ezero, as well as Coţofeni and Kostolac in the Carpathian Basin and Northern Serbia (connections with the latters was most significant at the early stage). There are single vessels of Baden and Funnel Beaker culture, as well as some round-bottomed and egg-shaped vessels of the Yamnaya culture in the Bug-Dnieper interfluve. Remains of wagons were found in 17 burials. The culture has been dated to the interval of 3100–2200 BC.[25] The early part of these dates partly coincides with the interval of the Late Eneolithic Kvityana/Post-Mariupol and Zhivatilovka-Volchanskoe groups, but radiocarbon intervals often overlap one another due to the fact that they show a range of probabilities. However, the coexistence of different complexes can also be assumed.[26]

Therefore, it is possible that the contact of the Late Eneolithic groups with the Balkan-Carpathian populations caused a transformation (cultural and social) in the North-West Pontic region, and social groups appeared there with new stereotypes that coexisted with the former ones. Soon, the steppe populations of the entire North Pontic region began to be included in this system. But the process was certainly more complex, since the presence in the Budzhak culture of burials contracted on the back indicates eastern impulses, where early Yamnaya stereotypes appeared already in the Yamnaya-Berezhnovka sites, synchronous with the above-mentioned Late Eneolithic ones. S.V. Ivanova suggests that the source of these burials in the Budzhak culture was a relatively small group of post-Stog burials in this region.[27] But such burials were characteristic of the late Eneolithic groups in a large area from the Dnieper to the Volga. Therefore, the absolute dominance of this rite in the Yamnaya culture from the Carpathian Basin to the Urals indicates, rather, the massive involvement of eastern populations in this process. The appearance of Anatolian

[20] The earliest catacombs in the region were found in the Skelya culture of the first half of the 5th millennium BC (RASSAMAKIN 2012, 294). But so far there is no way to show the continuity of this tradition until the late Eneolithic time.

[21] Thus, their faces are turned to the south and east, to the "sunny" sector, which, as shown by R.A. Litvinenko (2006), is fundamental to this principle of burials in the Corded Ware cultures.

[22] RASSAMAKIN 1994, 45, 62; MANZURA 2016, 150–163, 167; IVANOVA 2021, 151–156.

[23] MORGUNOVA 2014.

[24] IVANOVA *et alii* 2018, 101, 102, 113, 114, 117, 118, 124; IVANOVA 2021, 286.

[25] IVANOVA 2012, 18–27, 31, 35–39; FRÎNCULEASA *et alii* 2015, 80; IVANOVA *et alii* 2018, 118; IVANOVA 2021, 43–52, 163–170, 279.

[26] IVANOVA 2009, 48–53.

[27] IVANOVA 2021, 156–158.

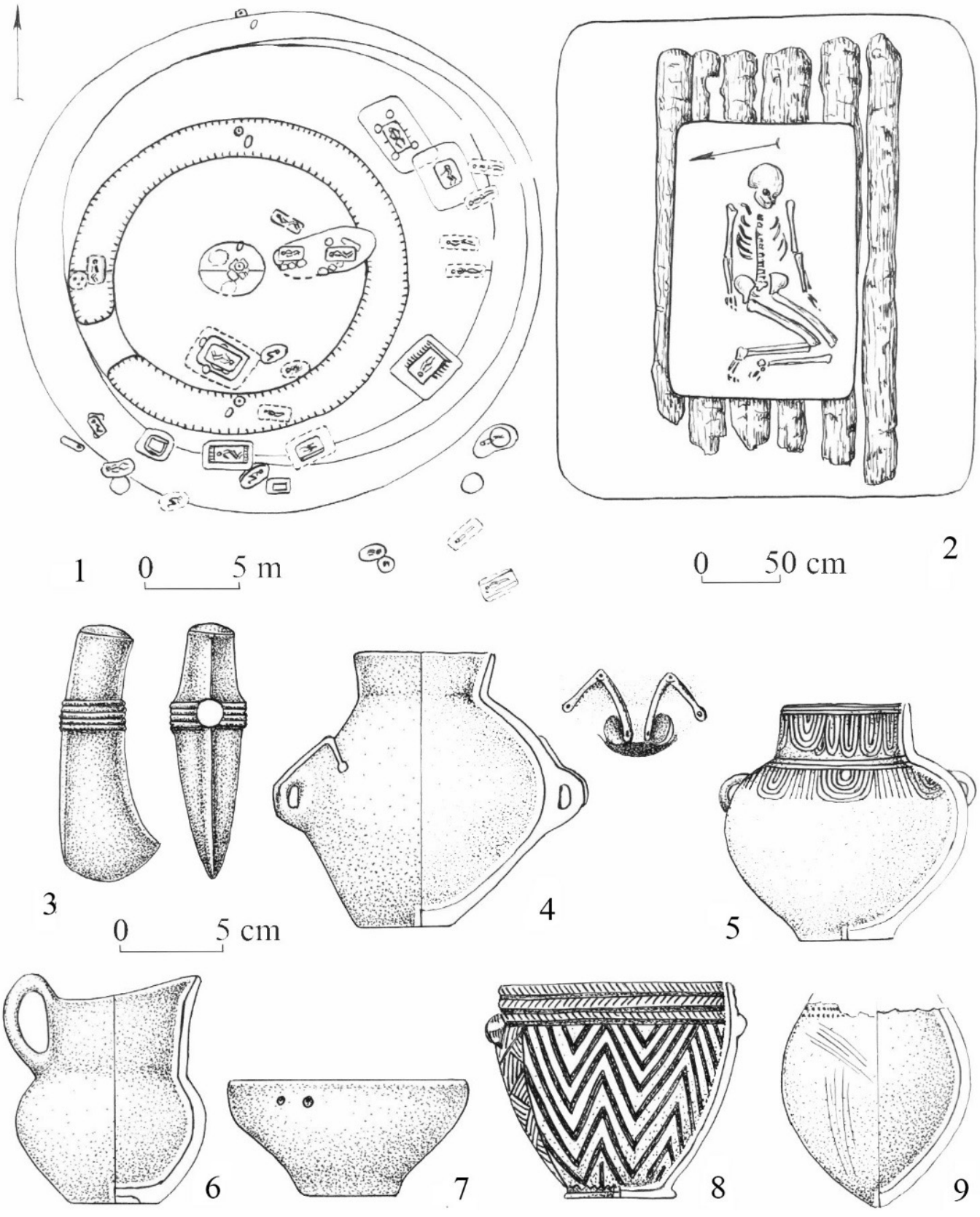

Fig. 2. Budzhak culture: 1 – Olanești, k. 1; 2 – Kubey 1/6; 3 – Baranove 1/10 (after IVANOVA 2021, figs. 2.3: 1; 2.4: 2; 2.10: 3); 4–9 – ceramics (after IVANOVA *et alii* 2018, fig. 8).

genes in the Yamnaya culture of the Dnieper (Ozera) region also requires its explanations. Moreover, their proportion in the Ozera population is noticeably higher than in other Yamnaya groups and Maikop. On the other hand, the Yamnaya people of the North Caucasus, having formed, in general, on the basis of local Eneolithic groups, have about 16% of the ancestors in the European GAC population. One gets the impression that the formation of the Yamnaya

population was much more dynamic, since it involved, in addition to local Eneolithic groups, Central European groups in different proportions, and some flows of genes from Anatolia are recorded.[28] The latter, however, cannot always be reliably distinguished, since Central European farmers already had a high proportion of genes of Anatolian origins.

In addition, these processes cannot be considered in isolation from the Maikop-Novosvobodnaya monuments of the North Caucasus. The Maikop sites proper are earlier; they are synchronous with Late Eneolithic groups in the steppe. Their origin is associated with the migration of people from the Near East.[29] Significant genetic changes also occurred in the Eneolithic groups at this time, and the population of the steppe zone was formed by Eastern European hunter-gatherers (EHG) and a Caucasian population (CHG), who were genetically close to Iranian farmers and who contributed from 43% to a half of the steppe population, and this influx of genes from Transcaucasia began in the Mariupol period.[30] But for Novosvobodnaya, scholars pointed to links with Central Europe, which is manifested primarily in amphorae, and there were attempts to connect its origin with the GAC.[31] Genetic studies have indicated possible links to the TRB.[32] At the same time, pottery with a "staining" surface, typical of Novosvobodnaya, is known in Transcaucasia, in Kakhetia, at sites of Sioni type.[33] Therefore, the Novosvobodnaya complex began to form as early as the Late Eneolithic of the steppe, and included local Eneolithic, Maikop, Near Eastern, and Central European components.[34]

As a result, the process of formation of the Yamnaya culture was probably a rather complex phenomenon, which is still far from being fully understood. But the events of interest to us in Europe began after the completion of this process, since complexes with common Yamnaya features appeared there. Probably, the main actors of these events were not the Yamnaya people of the eastern areas, but the Budzhak culture, since their echoes are manifested mainly in it.[35] At the beginning of the 3rd millennium BC, in the North Pontic region east of the Prut river, Yamnaya burials often contain vessels from Trypolye C2, Horodiștea-Folteşti, Baden-Coțofeni and Makó, and single cremations typical of Coțofeni.[36] But after the penetration of the Yamnaya complex into the Carpatho-Balkan region and the formation of the CWC to the north, early A-amphorae appeared in the Budzhak culture, some with features of the CWC, corded decoration,[37] and there are features of pottery from many North Balkan cultures (Cernavoda II, Folteşti II, Makó-Kosihy-Čaka, Schnekenberg-Glina III, Vučedol, Vinkovci). There are also later types of amphorae. It seems that after the penetration of Yamnaya culture into the Northern Balkans and the Carpathian Basin, a reverse impulse soon followed, and stronger interactions were established with the western regions. Subsequent connections are manifested in the fact that later forms of amphorae and CWC beakers appeared in the Budzhak culture. These last processes cover the period from 2800/2700 BC to the mid-3rd millennium BC.[38]

Thus, a system of so-called "pendulum migrations" was formed in the steppe, when the penetration of steppe groups into the Balkan-Carpathian region ensured not only the penetration of elements of the culture and genes (both steppe and Caucasian-Iranian), but also further cultural relations, population flows, as well as the reverse drift of culture and genes to the North Pontic area, up to the North Caucasus, where Novosvobodnaya arose. And already at the Late Eneolithic stage, the influx of TRB genes from Central Europe into the steppe is possible. Similar processes continued in the EBA, with the influence of the GAC and CWC in the steppe. This ensured the similarity of the genetic composition of the CWC and Yamnaya.[39]

In contrast, the situation in the Caucasus is completely different; some kind of "Caucasian membrane" functioned there, which ensured the flow of culture and genes in only one direction, from south to north. As a result, there are practically no flows of genes from outside in the Near East.[40]

4. BALKAN-CARPATHIAN AREA

4.1. PRE-YAMNAYA HORIZON OF STEPPE INFLUENCES

The first contacts of the Lower Danube with the steppe (Skelya and Sredny Stog complexes) are dated to the second half of the 5th millennium BC, which corresponds to the time of the North Balkan complexes Pre-Cucuteni III–Trypolye A3 to Cucuteni AB1–Trypolye B1/B2 and Gumelnița A2–B1. As a result, monuments of the Suvorovo-Novodanilovka type appeared on the Lower Danube to Dobruja, represented by ocher burials on the back, contracted or extended, stone fences are occasionally found. There are no settlements of these newcomers, the number of burials is small, their area is rather limited, and they existed together with the local agricultural communities of Cucuteni-Trypolye, Bolgrad-Aldeni, Varna, Kodžadermen-Gumelnița-Karanovo VI, and exchanged with them. Some steppe features penetrated the Balkan complexes of the Cernavoda I type. In the subsequent period, these contacts were extremely limited, and only in the last third of the 4th millennium BC pre-Yamnaya mounds with Baden-Coțofeni pottery appeared.[41]

An early group of these kurgans on the Lower Danube is represented by burials contracted on their side, with a small amount of ocher, and local ware of Trypolye C2, Horodiștea-Folteşti and Baden-Coțofeni types. These were bearers of the Nizhne-Mikhailovka and Kvityana traditions, as well as local populations that borrowed these traditions. Moreover, in Bulgaria they appeared at the same time as

[28] WANG *et alii* 2019, 7, fig. 4.
[29] ANDREEVA 1977.
[30] MATHIESON *et alii* 2015, 500; WANG *et alii* 2019, 1, 3, 7, 9; ALLENTOFT *et alii* 2022, 8–10.
[31] SAFRONOV 1989, 227.
[32] NEDOLUZHKO *et alii* 2014.
[33] MUNCHAEV 1981, 50, 51.
[34] REZEPKIN 2011.
[35] IVANOVA *et alii* 2018, 102.
[36] FRÎNCULEASA *et alii* 2015, 80; HEYD 2016, 67.
[37] See also doubts about the appearance of corded ornament in the Budzhak group from Central Europe (HEYD 2021, 389, 390).
[38] IVANOVA *et alii* 2014; IVANOVA 2021, 177, 178.
[39] IVANOVA *et alii* 2018, 125–135.
[40] GRIGORIEV 2021a.
[41] WŁODARCZAK 2010, 299, 300; HEYD 2016, 56, 58, 59, 67; PREDA-BĂLĂNICĂ *et alii* 2020, 91.

in the North Pontic region, where the cultures of Nizhne-Mikhailovka, Trypolye C and Usatovo, late Kvityana, late Dereivka and Sredny Stog, post-Mariupol, coexisted, and in the east Maikop and Repin Khutor.[42] But in the North Pontic region, some of these complexes have recently been understood as the Zhivatilovka-Volchanskoe group. It is interesting, within the framework of this first wave, the kurgan tradition penetrated even into the west of the Pannonian Plain in Vojvodina. These early burial mounds there contain cremations related to the Baden-Coțofeni tradition and corresponding ware. In addition, kurgans appeared in Baden. These kurgans have been understood as belonging to the Zhivatilovka-Volchanskoe group, although identical materials have not been found there, but their presence is assumed. In Hungary, the pre-Yamnaya phase is also dated to the second half of the 4th millennium BC. The date of these complexes in Vojvodina is ca. 3300–3100 BC. In Bulgaria, it is difficult to determine the date of the pre-Yamnaya horizon, but it also ended ca. 3100/3000 BC.[43] At the same time, ca. 3400–3200 BC, these groups appeared on the southeastern border of Poland, in Podolia and Volhynia, which preceded the formation of the Corded Ware cultures of the early A-horizon there.[44] At the same time, there was an interaction of the bearers of this tradition with Baden and Globular Amphorae cultures, which belong to the same chronological horizon.[45]

As we discussed above, the Zhivatilovka-Volchanskoe complexes, in which European inclusions are widely presented, partly coexisted, partly were later than the above mentioned steppe groups in the Balkan-Carpathian region. Therefore, it is possible that their formation was a stimulus for this migration to the west. The emerging system of relations with the area of origins, complex interactions and social processes further influenced the situation in the steppe for a long time. This partly influenced the formation of the Yamnaya culture, and then a new stage of larger-scale interactions between the steppe and the Balkan-Carpathian region.

4.2. YAMNAYA HORIZON OF STEPPE INFLUENCES

In the late 4th – early 3rd millennium BC, in the period of cultures of Karanovo VI, Cernavoda, Coțofeni and Baden, the Yamnaya penetration into the Balkan-Carpathian region began, associated with migrations from the North-West Pontic region, and the formed new systems of interaction existed for a long time, until the 25th–24th centuries BC. As a result, from the Lower Danube to Pannonia, on the territory of modern Serbia, Bulgaria and Hungary, typical Yamnaya mounds with burials contracted on their backs, the presence of ocher and mats spread. Currently, only the number of mounds studied exceeds 500, and this wave was more numerous than the first, although a longer period should also be taken into account. Pottery in them is represented by local forms, although sometimes there is ware similar to that in the CWC.[46] Discussing the Budzhak culture of the North-West Pontic area, we saw that at this time, the CWC ware also appeared there. If we look at the map (Fig. 3), we will see that these sites are concentrated in areas with vast steppe spaces between the Carpathians and the large valleys of the Dniester, Danube and especially the Tisza.

Some other features are also observed. For example, in Thrace, in the area of the Ezero culture, Yamnaya mounds often contain pottery of the Coțofeni culture in Hungary, which indicates extensive links with other Yamnaya groups from the Coțofeni area.[47] In Thrace and Dobrudja, the rite of these burial mounds is close to the Yamnaya rite, but to the south the cemeteries are already flat, and the process of acculturation took place there faster.[48] In Vojvodina, Yamnaya mounds appeared in the late 4th – early 3rd millennium BC, and they existed until the middle of the 3rd millennium BC. Burials are often made in mounds of the earlier pre-Yamnaya horizon, they contain cremations and ware of the Vučedol culture. At the same time, there are classical Yamnaya burials with wooden ceilings, mats and orientation to the west, but they usually lie on the right side, which is typical of the previous period. In some cases, a combination of Yamnaya and Eneolithic features is guessed in the position of the skeleton. But Yamnaya burials correlate with both early Yamnaya burials and burials of the classical stage of culture in the North Pontic region.[49] This indicates that the assimilation took place of the bearers of the early kurgan tradition, which penetrated the region at the beginning of the last third of the 4th millennium BC, and for a long-time interaction with the original area in the east remained, which ensured the influx of cultural stereotypes that arose there.

This rather general picture led scholars to similar conclusions. Archaeological evidence does not support the idea of a wave of horse-riding nomades who conquered the region and subjugated the local population, bringing the end to "Old Europe" as described by Gimbutas and Anthony,[50] and that they had a decisive influence on European population formation.[51] There was rather a very long infiltration of relatively small groups that coexisted with the local agricultural population. This wave did not spread far, it covered only the Northern Balkans and the Carpathian

[42] FRÎNCULEASA *et alii* 2015, 45, 48, 80, 82, 83.
[43] WŁODARCZAK 2021a, 215, 217, 219, 221, 222, 230, 242, 245.
[44] WŁODARCZAK 2021b, 437, 438.
[45] HEYD 2016, 54.
[46] WŁODARCZAK 2010, 301–303; FRÎNCULEASA *et alii* 2015, 45, 49, 76, 77, 82, 83; KAISER/WINGER 2015, 115, 118, 120, 127, 129; HEYD 2016, 61, 62; IVANOVA *et alii* 2018, 118; PREDA-BĂLĂNICĂ *et alii* 2020, 86–89, 96, 97; HEYD 2021, 385, 386; IVANOVA 2021, 186, 188, 228.
[47] IVANOVA *et alii* 2018, 121.
[48] KAISER/WINGER 2015, 132.
[49] WŁODARCZAK 2021a, 215, 217, 220–225, 232, 235, 237, 239, 245.
[50] GIMBUTAS 1994; ANTHONY 2007. This is also supported by the fact that horses associated with European Corded Ware cultures do not show a genetic profile characteristic of the Volga-Don ancestors of domestic horses, which suggests that the Yamnaya people migrated to Europe without horses (LIBRADO *et alii* 2021, 5). Actually, real evidences on horse breeding in the steppe appeared no earlier than the beginning of the 2nd millennium BC; for the Eneolithic steppe economy, horse breeding was difficult and pointless. In addition, it is possible that the horse was domesticated in the Near East (GRIGORIEV 2021d). The bones of bulls, sheep and horses have been found in burials of the Budzhak culture. But bones of wild animals, aurochs and deer have also been found in an identical context. In addition, there are traces of agriculture in these sites (IVANOVA 2021, 61–66). Therefore, most likely, the horse bones belong to the wild species.
[51] HAAK *et alii* 2015; ALLENTOFT *et alii* 2015.

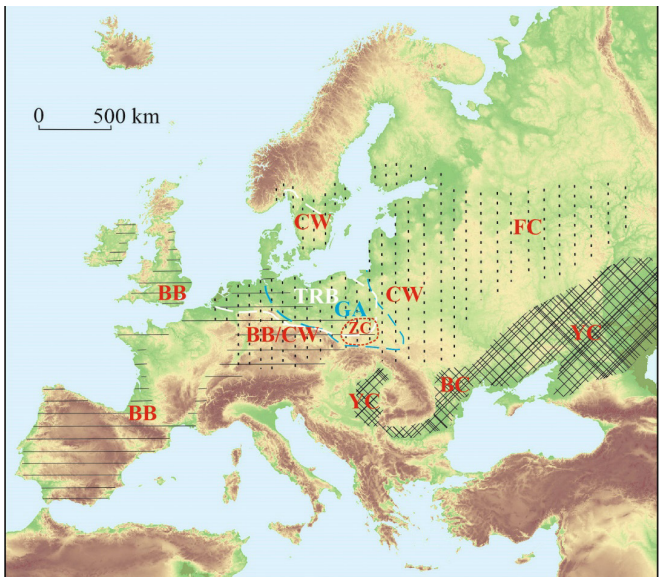

Fig. 3. Areas of the main cultures discussed in the text: BB – Bell Beaker culture; CW – Corded Ware cultures; FC – Fatyanovo-Balanovo area; YC – Yamnaya culture; BC – Budzhak culture; TRB – Funnel Beaker culture; GA – Globular Amphorae culture; ZC – Złota culture.

basin. This contributed to the spread of a certain cultural package in the region, but also to more intensive cattle and sheep breeding.[52] In the Carpathian Basin, the coexistence of the Yamnaya people and local tribes (primarily the Baden and Coțofeni cultures) in different areas is assumed. It is possible that some kind of relationship between mountain and steppe communities was formed. The problem is that there are no Yamnaya settlements in the region. Therefore, the Yamnaya people were either incorporated into local communities, or they pastured their cattle in the winter and spring on the plains, and in the summer they went to the mountains. It is indicative that the buried are represented mainly by men.[53] The latter is also characteristic of the Budzhak culture, but in its burials the ratio of men and women is 2:1, while in northwestern Bulgaria it is 14:3, and in Alföld between Tisza and the Carpathians – 12:3. From this, it is concluded that some specialized groups of the population were resettled.[54] For Vojvodina, it is also assumed that the Yamnaya groups liquidated or marginalized the local sedentary communities.[55] Most researchers explain this penetration by a desire to develop new pastures. An additional reason is an aim to extract copper from ore deposits located in the areas of the Yamnaya sites of this region, and the localization around the Carpathians is caused by the fact that it was the most convenient way from the North-West Pontic area to the Carpathian basin.[56] In my opinion, the metal did not play such an important role in the EBA to carry out such large-scale enterprises, the problem of its supply could be more easily solved by exchange. The localization of the Yamnaya sites between the Carpathians and the valleys of large rivers with their rich floodplains created ideal conditions for seasonal grazing by pastoralists who had no domestic horses, as well as conditions for close interaction with the local agricultural population (Fig. 3).

Chronologically, the appearance of Yamnaya people coincides with significant transformations in Southeastern and Central Europe, where the late stages of the Coțofeni, Baden, Ezero A, Globular Amphore and Funnel Beaker cultures were transformed into other cultures: Vučedol, Somogyvár–Vinkovci, Glina, Schnekenberg, Livezile, Makó-Kosihy-Čaka, Ezero B, and Corded Ware.[57] Actually, this is the basis of the idea that it was the Yamnaya culture that was responsible for the transformations that covered the whole of Europe.

This long process, against the background of a large local agricultural population, conflicts with the conclusions of paleogenetics about the massive Yamnaya migration to Europe, which necessitated the search for explanatory models. Since the Yamnaya sites in Central and Southeastern Europe belong to a long period from 3100 to 2500 BC, the actual number of migrants from the steppe was small, there was constant interaction with the original areas, and this led to a gradual increase of the steppe genetic component. But this did not lead to a sharp change in the culture: Yamnaya culture was transformed under the influence of the local substrate, since each time these inflows were small. At the same time, there must have been some area in which this ethnic component accumulated, which cannot be determined.[58] Without this, it would be difficult to assume the spread of the language. On the one hand, the dissemination of ideas is impossible without the migration of their bearers. On the other hand, the cultural package and socially significant features were spread, and this did not always happen along with the spread of the language. But in this case, we may talk about a certain colonization of new regions, and their permanent connections with the original area.[59] However, the intrusion of Indo-European dialects into Europe during this period requires evidence. We must not forget that this was preceded by another migration wave, which could already have brought the IE language. This Eneolithic flow has already contributed to the penetration of the Iranian-Caucasian genes into Europe, and the role of the Yamnaya people in European cultural genesis is greatly exaggerated. Already in the pre-Yamnaya time, the steppe people penetrated, interacted with the locals, formed social ties, established contacts with their homeland, some of them returned, and new groups could arrive from there, as a result of which the processes of cultural genesis and the spread of languages were extremely slow.[60] This becomes apparent when we turn to the next problem: the formation of Corded Ware cultures.

[52] KAISER/WINGER 2015, 115, 130, 132, 136; FRÎNCULEASA *et alii* 2015, 84, 85; HEYD 2016, 63, 64, 65, 68, 69; PREDA-BĂLĂNICĂ *et alii* 2020, 96, 97; IVANOVA 2021, 185, 284.
[53] DANI 2011, 26, 36; GERLING *et alii* 2012, 1099, 1107, 1109.
[54] WŁODARCZAK 2010, 301; IVANOVA 2021, 255.
[55] WŁODARCZAK 2021a, 245.
[56] IVANOVA 2021, 258–261.
[57] DANI 2011, 25; GERLING *et alii* 2012, 1098; FRÎNCULEASA *et alii* 2015, 84; HEYD 2016, 53, 54.
[58] KAISER 2016, 32, 35–37, 39, 40.
[59] IVANOVA *et alii* 2018, 107–112; IVANOVA 2021, 184.
[60] KAISER 2016, 33; IVANOVA *et alii* 2018, 101–105, 118–120.

5. CULTURAL TRANSFORMATIONS IN NORTHERN EUROPE IN THE 3RD MILLENNIUM BC

Previously, in the northern part of Europe, the dominant factor was the Funnel Beaker Culture (TRB), dated from the last third of the 5th to the early 3rd millennium BC, which is characterized by megalithic tombs and collective burials. Around the middle of the 4th millennium BC, on its basis the formation of the Globular Amphorae culture (GAC) began. The latter coexisted with the TRB for a very long time, but also with later complexes of the Corded Ware culture (CWC). This coexistence with chronologically earlier cultural formations, and subsequently with the Bell Beaker culture (BBC), is characteristic of the CWC in all regions except Switzerland.[61] This is partly caused by problems of chronology, partly by the real coexistence of different cultural stereotypes. It is important for us that all these cultural groups demonstrate, albeit to varying degrees, certain connections with the steppe cultures and with the Fatyanovo culture of the forest zone of Eastern Europe.

5.1. GLOBULAR AMPHORAE CULTURE

The GAC is dated to 3500–2200 BC, although most of the sites belong to the first half of the 3rd millennium BC.[62] It was formed initially in Kuyavia, in northern Poland, on the basis of the TRB, but its material culture also shows connections with the more southern Cernavoda III-Boleraz and Baden cultures. Particularly noticeable connections with Baden fall on the last quarter of the 4th millennium BC,[63] which chronologically coincides with the horizon of the early kurgan culture in the Northern Balkans. In general, the territory of culture corresponds to the TRB area, without only its Scandinavian part. At the same time, TRB enclaves often remained in this territory. For example, in Greater Poland, TRB groups lived at the very beginning of the 3rd millennium BC.[64] In Kuyavia, GAC groups existed almost until 2200 BC, coexisting with CWC and BBC, and many its traditions survived to the Trzyniec horizon.[65]

There is a tendency for GAC to spread to the east, but this was not necessarily caused by migrations. In the South-Eastern Baltic from the 4th millennium BC to 2200 BC there was Narva culture, whose site have GAC inclusions, and there are traces of the spread of cattle breeding and agriculture there, but these were limited penetrations of the early 3rd millennium BC, caused by interest in the extraction of amber, started by the Narva people. This caused further close relations with the central and western regions of the GAC and the appearance of amber objects there. The latter also appeared on the sites of Złota, CWC, and TRB, and everywhere these complexes with amber belong to the period 3000–2700 BC. At the same time, individual migrations and marriage ties are supposed.[66] The latter may have caused the gene influx from the northeast revealed for this period (see below). However, the CWC influence in this area was more significant, which caused the formation of the Pamariu culture no later than the second quarter of the 3rd millennium BC. And it should be remembered that CWC already has many GAC features, which makes it difficult to identify in mixed complexes.[67]

Rare GAC elements are also present to the south. This culture penetrated into southeastern Poland by the beginning of the 3rd millennium BC, which then affected the cultural genesis of Złota and CWC.[68] On the Upper Dnieper, these are two burials in the cemetery of Turinščina near Smolensk (2630–2400 BC). Some features are also present in the Middle Dnieper culture, which was formed ca. 2700–2650 BC, although in general it belongs to the CWC complex. Thus, everywhere in the forest zone of Eastern Europe, the CWC tribes played the main role in cultural genesis, but GAC elements are also present everywhere.[69] However, there is an opinion that there are no pure GAC complexes in this area, there is an admixture of features in sites with characteristics of CWC and Neman culture, and the early CWC was the source of amphorae.[70] Actually, it was this culture that underlay the subsequent cultural genesis of the vast area of the forest zone from the Lower Rhine to the Volga and Kama (Fig. 3).

5.2. CWC CHRONOLOGY

First of all, we must discuss problems of the CWC chronology. The difficulties of this chronology are related to the fact that it is based on samples from unstratified burials, and Bayesian statistics cannot be used; therefore, it depends on the quality of the analyzes themselves, which are few in many regions, and in others the most dates are old. At the same time, the calibration curve forms a plateau at the beginning (2900–2750 BC) and at the end (2470–2200 BC) of the period. As a result, the radiocarbon chronology does not fully correspond to the stages identified typologically, which can be explained both by defects in this chronology, and by the longer existence of some forms considered as early ones, or by the asynchrony of similar types in different areas.[71] On the Swiss settlements dated by the dedrochronological method, beakers with a short neck are present from 2725 BC, beakers with the S-shaped profile appear from 2625 BC, and ornaments in the form of double cord with notches under it (which are sometimes considered as a chronological indicator) are present in all phases.[72] Therefore, it can be assumed that these signs do not work, but it is possible that this is the local originality. Similarly, although in the Krakow-Sandomierz group 350 burials have been studied, and five phases are distinguished based on typology and stratigraphy, they have not been reliably verified by radiocarbon dating.[73]

[61] FURHOLT 2003, 123.
[62] SZMYT 2003, 402.
[63] HEYD 2016, 74.
[64] CZEBRESZUK/SZMYT 2008, 221.
[65] CZEBRESZUK 1991, 115, 116, 126; CZEBRESZUK/SZMYT 2012, 169, 170.
[66] SZMYT 2003, p. 403, 404–408; WŁODARCZAK 2017, 316; CHARNYAŬSKI/VAITOVICH 2019, 615–618.
[67] SZMYT 2003, 408; CHARNYAŬSKI/VAITOVICH 2019, 618.
[68] WŁODARCZAK 2021b, 438.
[69] SZMYT 2003, 409–412.
[70] VAITOVICH 2020, 96, 98.
[71] FURHOLT 2003, 16–20, 41, 45–48, 51, 119, 121, 122; WŁODARCZAK 2012, 128.
[72] FURHOLT 2003, 62, 67.
[73] BUDZISZEWSKI/WŁODARCZAK 2011, 56.

Often the differences are not caused by chronology. Even within Lesser Poland, there are several territorial groups with specific shapes of beakers.[74] Accordingly, this does not allow local chronologies to be extended to the entire CWC territory. As a result, all dates below are fairly rough.

In Lesser Poland, the CWC dates fall within the interval of 3000/2900–2300 BC, and to the north of the Carpathians, the CWC ended ca. 2480 BC. Thus, CWC in Poland began ca. the end of Baden and for some time coexisted with the GAC, which is confirmed by sites of the Złota type with its mixed forms. In parallel, in some areas, TRB populations probably persisted.[75] The early phases of the CWC in Poland (1, 2 in Kuyavia and I, II in Lesser Poland) are dated to ca. 2800–2600 BC, moreover, phase I, synchronous with the pan-European A-horizon, can be dated to 2700 BC (after which more active blurring of GAC groups and their infusion into CWC began), the younger phase (subphase IIIA) – ca. 2600/2550–2450/2400 BC, and the final – ca. 2400–2200 BC, when coexistence with the BBC is visible. The Złota culture is formed within the framework of phase I, and phase II of CWC, with which it is also synchronous, is formed partly under its influence.[76] On the Middle Elbe – Saale, the CWC dates are in the interval 2700–2200/2000 BC, in Southern Germany 28/27 centuries BC – ca. 2200/2000 BC, and in Bohemia 2620–2200 BC. The dates in the Netherlands are rather rough: 2900/2600 – 2400/2300 BC. Thus, the time slope of dates from east to west is evident, with earlier dates in Poland.[77] This corresponds to a gradual decrease to the west of the proportion of amphorae, which were borrowed from the GAC. It is assumed that already in the period 3050 – 2900 BC early Corded Ware cultures extended to the Rhine, and from 2700/2600 BC they become the dominant factor from the Rhine to the Volga (Fig. 3).[78]

In Switzerland, according to dendrochronology, the CWC is dated from ca. 2700 BC to 2420/2417 BC.[79] Given these dates and those of Southern Germany (ca. 2725 BC), it has been suggested that this spread took about 200 years.[80] But, in my opinion, the process was more rapid. In the Alpine zone, the CWC dendrodates actually show the interval of 2725–2450/2420 BC, but radiocarbon dates do that of 2880–2200 BC.[81] In principle, this reflects the usual situation of older and wider intervals of radiocarbon dates. There are dendrodates from Lower Saxony: 2844–2737 BC, which is older than in Switzerland, however, the chronological difference is not so great. Subsequent studies have proposed a later interval for Lesser Poland, 2800/2700–2400 BC,[82] which fits into the general trend of gradual shift of radiocarbon dates towards dendrochronology. Therefore, this process of the CWC expansion could be quite fast. The chronology of individual stages is less clear if we link it to the Alpine dendrochronology. In Switzerland, the early CWC phase has been dated to 2718–2675 BC, and the dates of the middle phase fall within the interval of 2625–2568 BC.[83] Therefore, it can be assumed that this older phase is close to the A-horizon; therefore, it ended at ca. mid-27th century BC, but it is difficult to say how synchronous the A-horizon was in all CWC areas. This is later than radiocarbon dates, which is, however, a common situation.

The Corded Ware Culture of Lesser Poland ended ca. 2300–2200 BC.[84] In the pre-Alpine zone, according to dendrodates from Ludwigshafen-Seehalde (2418 BC), the CWC ended ca. late 25th century BC. In Switzerland, from the end of the 25th century BC, there is no dendrodate, since the lake settlements were abandoned due to climate change. In Holland and Baden-Württemberg, the CWC persisted until the late 3rd millennium BC, coexisting with the BBC, but everywhere except Northern Europe the upper CWC dates are not yet reliable.[85] Previously, the beginning of epi-corded cultures in southeastern Poland (proto-Mierzanowice) was dated to the period 2300–2200 BC, early Mierzanowice to 2200–2020 BC, and classical Mierzanowice from 2000 BC.[86] Later, based on AMS dates, the proto-Mierzanowice phase was dated to 2450–2300 BC, and the early Mierzhanovice phase to 2300–2100/2050 BC. Thus, its beginning is close to the appearance of the Bell Beaker traditions, but then this culture coexisted with the later CWC complexes, which increases the uncertainty of the final dates of the latter. In the early part of this last period, the BBC of Lesser Poland gradually disappeared, and the late part of the period corresponds to the Veselé type.[87]

5.3. ZŁOTA CULTURE

The Złota culture appeared in the north of Lesser Poland simultaneously with the early phase of the CWC and is dated to 2900/2800–2650/2550 BC. It combines features of GAC, CWC, and even Baden and TRB. The ceramic forms of GAC and CWC are indistinguishable in this case (Fig. 4/7), since they demonstrate an intermediate position, and form a single series.[88]

Therefore, the culture is considered as a mixed complex from traditions of the GAC and the pan-European A-horizon of the CWC. However, at the end of the 4th millennium BC, the GAC penetrated into this area, and the Yamnaya culture appeared on its borders. As a result, kurgans occurred in the early complexes of the CWC, in Złota and the late GAC of this region. There are also TRB features in the culture, and southern impulses are quite clearly visible in the Baden-Coțofeni, late Trypolye and Usatovo forms (imprints of a double cord in the upper part, characteristic of early Thuringian amphorae, bowls, etc.). This complex appeared earlier than the beginning of the CWC formation, respectively, the latter process does not correspond to its

[74] WŁODARCZAK 2006, 79, 80.
[75] FURHOLT 2003, 22–26, 32, 34, 41.
[76] WŁODARCZAK 2006, 123, 136; FURHOLT 2008, 18–22; WLODARCZAK 2017, 277, 285.
[77] FURHOLT 2003, 42, 48, 55, 76, 90, 100; WŁODARCZAK 2012, 133.
[78] HEYD 2021, 393, 395.
[79] EBERSCHWEILER 1999, 39, 40; GROSS-KLEE 1999, 55.
[80] FURHOLT 2003, 119.
[81] FURHOLT 2003, 57, 63, 64; SUTER 2008, 335; WŁODARCZAK 2012, 131, 132.
[82] BUDZISZEWSKI/WŁODARCZAK 2011, 56.
[83] WLODARCZAK 2012, 131.
[84] HÄUSLER 2014, 98.
[85] WŁODARCZAK 2012, 134, 136.
[86] FURHOLT 2003, 35, 36.
[87] GÓRSKI *et alii* 2013, 113–117.
[88] WŁODARCZAK 2001, 108; FURHOLT 2003, 31; WŁODARCZAK 2006, 159; FURHOLT 2008, 1, 4, 11, 15; WŁODARCZAK 2017, 300.

traditional understanding as a fast spread of the A-horizon traditions. It was more complex and multidimensional.[89] A specific feature of Złota is the presence of sexual differentiation of burials, which is characteristic of the CWC and absent in the Yamnaya culture, but men lie on the right side with their heads to the NW, and women on the left, with their heads to the SE.[90] Thus, the faces of the buried were turned to the southern sector, like those in CWC and the Zhivotilovka-Volchanskoe group, which previously appeared on the southern border of this region. Taking into account the features of Baden and Tripolye, we may assume some southern impulses in the culture formation.

Another parallel with them is the burials in pits with niches. They are characteristic of the CWC in Lesser Poland, where more than 120 have been identified. They appeared at the beginning of phase II (when the influences of GAC and Złota are noticeable), but they are also typical for the next phase III, existing until the end of the culture (these phases can be combined into the CWC group Krakow-Sandomierz). In general, they are dated to 2600–2400/2300 BC. But the earliest pits with niches in Złota belong to the period 2900–2800 BC. In fact, these are catacombs consisting of shafts, from which a small corridor leads to an oval or round burial chamber (Fig. 4/2). The entrance to the chamber is closed with a partition made of clay or wood. The buried lie contracted on their side and on their back, with orientation along the lines W–E and N–S (with the latter direction predominating), but their face is turned to the shaft entrance. Men usually lie on their right side, and women on their left, while in all types of burials, including those buried on their back, there was a desire to turn their face to E.[91] In these CWC and Złota catacombs scholars see similarities to the North Pontic ones.[92] Therefore, they are considered as eastern influences, and they are really close to the Pontic catacombs and catacomb structures of the Eastern Mediterranean. There are also hypotheses about the local origins of this rite, since apart from the shape of the structures, there are no other similarities with the Catacomb culture of the Pontic region, moreover, chronologically, they appeared much earlier, in the Yamnaya period.[93] The MBA catacombs of the Pontic region, indeed, cannot be considered as a parallel. But the catacombs of Jericho in the Eastern Mediterranean may not be considered too, although typologically and ritually they are very close.[94] However, they belong to the EB IV period, which in the traditional chronology is dated to 2400/2300–2000 BC. In radiocarbon chronology, its beginning was previously estimated at ca. 2500 BC,[95] but thanks to studies of earlier and later layers in Jericho, the interval has been corrected to 2300–2000 BC, which is closer to the traditional chronology.[96] Therefore, these catacombs could not be the prototype of pits with niche in Poland. But we should pay attention to the fact that the catacombs and burials in niche in the late 4th millennium BC were known in the Zhivotilovka-Volchanskoe group (Fig. 1/2).[97] The catacombs of Poland probably cannot be explained by any single process, since they differ typologically. The CWC catacombs are T-shaped, and they are closer to the steppe ones. At the same time, elements of the Middle Dnieper culture appeared in southeastern Poland; therefore, in this case, migration to the region from the east, from the border area of the Middle Dnieper and Catacomb cultures, is assumed. But the Złota catacombs are more diverse, and in previous times such a construction was known only in the Zhivotilovka-Volchanskoe group. Therefore, all Polish catacombs originated from the Pontic zone, but as a result of two different processes.[98]

5.4. YAMNAYA FEATURES IN CWC

There are old and generally accepted ideas that the Yamnaya culture played an important role in the CWC formation, changing the tradition of collective burials in this area. A number of common features made this reconstruction possible: kurgans, individual contracted burials oriented along the W–E line, simple pot-shaped or beaker-shaped ware with corded or carved decoration, simple spiral-shaped copper ornaments, ornaments made from animal teeth and bones, a significant proportion of cattle breeding, and the rarity of settlements. But such types of ornaments are widespread in this period, and there are no exact ceramic parallels. There are many fundamental differences: in the Yamnaya culture there is no sexual differentiation of the buried, no amphorae and battle axes. In addition, the early phases of cultures are relatively synchronous. Therefore, some similarities may be caused not by the CWC formation, but by its contacts with the Yamnaya area of the Carpathian Basin.[99] In addition, a number of features that are considered as steppe in the CWC (for example, kurgans) appeared in Europe as early as 4000 BC. Finally, there are no large mounds in the CWC, common in the Yamnaya culture, the mounds are usually small.[100] Ukrainian scholars list many Yamnaya-Catacomb features in the CWC: catacombs, arrowheads with a concave base, some other objects, contracted on the back burials; however, they also indicate that there is no Yamnaya ware in the CWC complexes, and most possible contacts are dated to the late Yamnaya period, to the end of the 3rd millennium BC. Even at this stage, no reliable relations may be found.[101] An important difference is that the Yamnaya burials contain very few grave goods. It is fundamental, that the Yamnaya complexes are characterized by contracted burials on the back, and the CWC people were buried on the side, burials contracted on their back are very rare.[102] But just the burials on the side are characteristic of the Zhivotilovka-Volchanskoe group. The presence of axes in the CWC burials

[89] WŁODARCZAK 2008, 513–519, 524, 531, 532; 2021b, 438, 440.
[90] HÄUSLER 2014, 88.
[91] WŁODARCZAK 2006, 53–55, 58, 59, 61, 63, 98, 99, 105, 121, 162; 2017, 302, 303.
[92] KLOCHKO *et alii* 2014, 391, 392.
[93] WŁODARCZAK 2006, 57, 106, 135, 159; 2017, 297.
[94] KENYON 1971.
[95] REGEV *et alii* 2012, 560, 561.
[96] NIGRO *et alii* 2019, 25, 28.
[97] MANZURA 2016, 155.
[98] WŁODARCZAK 2008, 519–522; WŁODARCZAK 2021b, 441, 446, 449, 450.
[99] BUCHVALDEK 1986, 494; KLEIN 2017, 366, 367, 373; WŁODARCZAK 2017, 306, 307; IVANOVA *et alii* 2018, 133; HEYD 2021, 387.
[100] WŁODARCZAK 2010, 301, 305.
[101] KLOCHKO et alii 2014, 391–398; KOS'KO/RAZUMOV 2014, 399, 400.
[102] WŁODARCZAK 2010, 306.

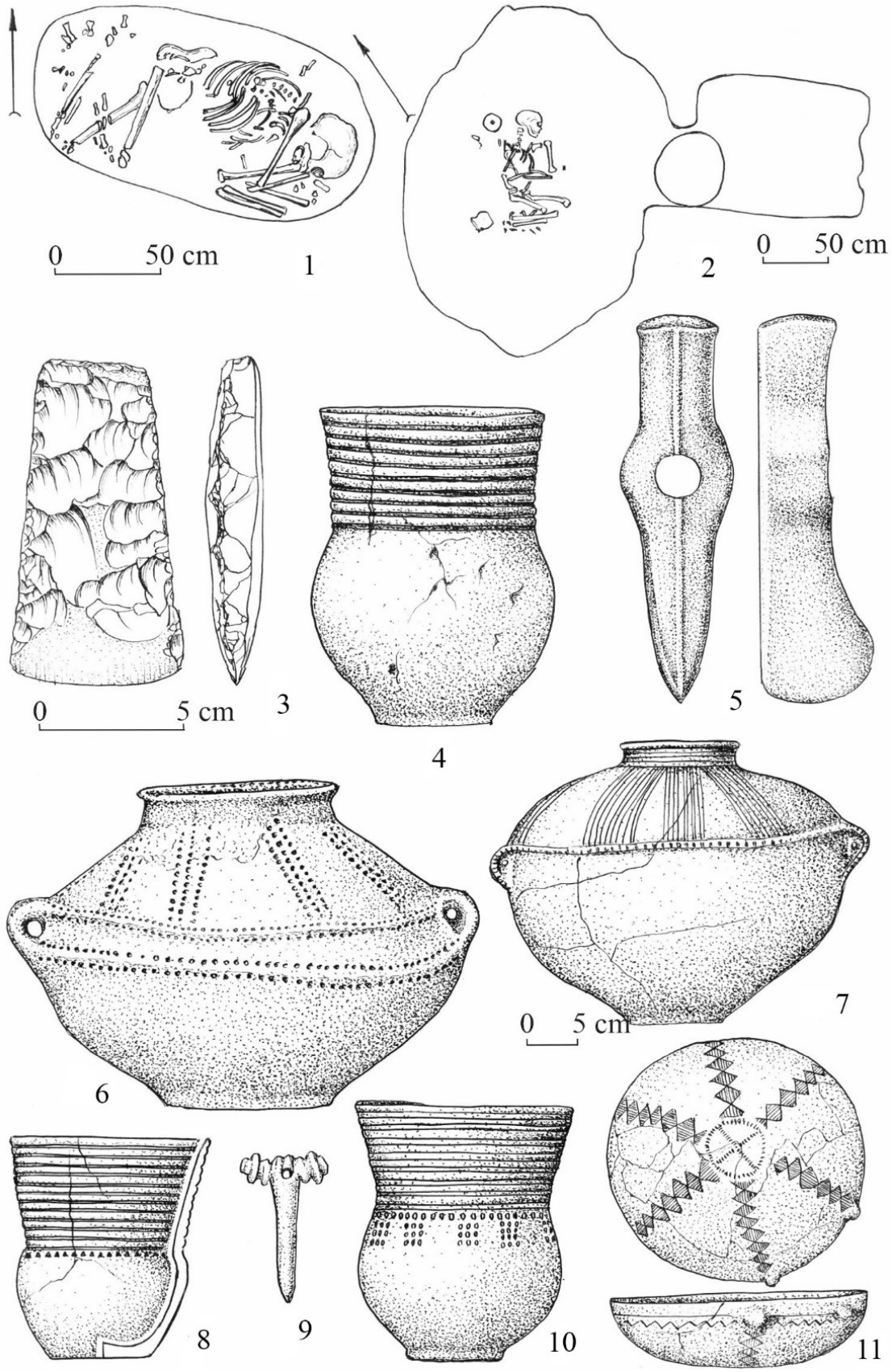

Fig. 4. Corded Ware cultures: 1 – Kalbsrieth grave (Kalheim) (HEYD 2021, fig. 9); 2 – Złota culture, Samborca, gr. 23 (WLODARCZAK 2006, rys. 27); 3 – Pełczyska, gr. 50/2002 (BUDZISZEWSKI/WLODARCZAK 2011, Abb. 5: 1); 4 – Flintbek (HEYD 2021, fig. 5: 3); 5 – Hijken, gr. I (FURHOLT 2003, Taf. 202: 4); 6 – Erfurt, med. Acad. (Furholt 2003, Taf. 79: 7); 7 – Złota culture (WŁODARCZAK 2006, rys. 44: 3); 8 – Krusza Zamková (Heyd 2021, fig. 5: 5); 9 – Bleckendorf (FURHOLT 2003, Taf. 73: 5); 10 – (WŁODARCZAK 2006, rys. 44: 14); 11 – Großbrembach, Furborner Linde, gr. 2/73 (FURHOLT 2003, Taf. 87: 6).

and their absence in the Yamnaya burials is often cited as a difference. In fact, in the Budzhak culture, axes are well represented. And there is one axe from Baranove 1/10 (Fig. 2/3), which, in my opinion, is close to the A-axes of CWC, but parallels in Ezero and Yunatsite are also suggested to it, and it is assumed that the presence of axes in the early phase of the Budzhak culture is explained precisely by the Balkan influence.[103]

There is another indicative feature: the early CWC horizon is characterized by single burials under mounds, as in the Late Eneolithic cultures of the steppe, while in the westernmost Yamnaya group, the Budzhak, the central burial is often supplemented by peripheral burials arranged in a circle.

Many scholars believe that the CWC is not connected neither with the Yamnaya culture, nor with the horizon of the early kurgan cultures, and it was formed from the TRB, Swedish battle axes cultures, and Danish Single burials.[104] Since sexual differentiation is an important indicator, there were attempts to find the local roots of this phenomenon. In Southern Germany and Sweden, in the early horizon of the Single Burials culture (since 3000/2900 BC) contracted male burials without pottery appeared, oriented along the W–E line. In Southern Germany the buried lie on the right side, and in Sweden on the left. In the TRB cemeteries of Walterniengburg and Bernburg (between Leipzig and Magdeburg) there are right-sided burials without ceramics and left-sided ones with ceramics. Therefore, it has been suggested that this rite appeared already in the TRB.[105] Perhaps that is why Włodarchak considers this custom as a return to the European Eneolithic traditions of the 5th – early 4th millennia BC.[106] In these cemeteries, this situation is indeed recorded, but there are no anthropological definitions, and occasionally burials under kurgans are found. In addition, these cemeteries were excavated as early as the beginning of the 20th century, and there are many problems with dating. On the basis of typological and statistical analysis, the material from this region has been divided into several phases, and these cemeteries belong to the latest phases of TRB-MES IV/V, which are dated to ca. 3300–2800 BC.[107] Thus, they are synchronous with the appearance in the Balkan-Carpathian region of the early burial mounds of the late Eneolithic. Therefore, in my opinion, these materials allow us to assume very limited contacts between the Late Eneolithic steppe groups and the TRB groups in Germany, but not the local roots of this rite. Heyd drew attention to the similarity of this rite with the rites in the Zhivotilovka-Volchanskoe complexes,[108] and taking into account the presence of some burial mounds, this similarity may not be accidental. This, probably, explains the limited presence of cultural elements and genes of the TRB in the North Pontic area up to the North Caucasus. However, the CWC formation occurred somewhat later and was associated with other processes.

[103] IVANOVA 2021, figs. 2.10, 168, 176.
[104] HÄUSLER 2014, 114; KLEIN 2017, 373.
[105] FURHOLT 2003, 119, 124.
[106] WŁODARCZAK 2017, 305.
[107] MÜLLER 2001, 321, 362, 363, 365, 366, 358, 360, 365, 426, Abb. 261.
[108] HEYD 2021, 390.

5.5. THE FORMATION OF CWC

There is an early (ca. 2900/2800–2750 BC) so-called A-horizon of CWC, with common forms over large areas, with specific gracile axes with a round cross-section and a butt, a blade extended downwards, a reinforced hole for a handle, often with a "casting seam"; A-amphorae, A-beakers, pots with wavy rollers; rectangular pits under mounds with individual contracted burials with sexual differentiation, when men were buried on the right side with their heads to the west, and women on the left side with their heads to the east, and the faces of both were directed to south (Fig. 4). This set is presented differently in individual regions (in particular, A-axes originated, possibly, in Jutland, from where they spread to Poland, and they are absent in other regions), and the only universal type is tall and gracile S-shaped beakers, decorated with horizontal ornaments made by cord and notches on the upper part of the vessel.[109] Flint axes (Fig. 4/3) in Lesser Poland are absent from burials of the early phase, they appeared only from phase II, and up to phase IIIa their shape does not change significantly.[110] Thus, they appeared later than polished A-axes.

There is a serious problem in understanding the CWC formation. Since this coincides with the penetration of the Yamnaya culture into Europe, it is generally accepted that its role in the CWC formation was significant. However, the CWC ceramic complex contains many local features of the TRB and GAC (beakers, amphorae, corded ornamentation).[111] At the same time, there is an assumption that amphorae came from the Baden traditions, and already GAC had some contacts with the steppe. At the same time, in southeastern Poland, the Złota culture played a decisive role in the CWC formation, and Baden influences were carried out not directly into the CWC, but through Złota.[112] Judging by the radiocarbon dates and characteristics of cultural features, the CWC formation and the emergence of the kurgan rite in it began in the southeastern part of the area, and was associated with local substrates and impulses from the Carpatho-Danubian region, the subsequent integration of features from different areas, and not with the spread of traditions of the A-horizon from the central areas of the culture.[113]

Thus, the main features of the early CWC cannot be borrowed from the Yamnaya or Usatovo cultures. Despite widespread misconceptions on this topic, they have Central European roots, and the CWC area is quite close to the TRB area. A feature of this era was the emergence of a wide network of communications,[114] probably migrations, but nothing reminds of the coming of conquering warriors

[109] FURHOLT 2003, 13, 119, 120; WŁODARCZAK 2006, 156; LITVINENKO 2006, 228–231; WŁODARCZAK 2017, 293, 294, 306, 307; HÄUSLER 2014, 87, 98.
[110] BUDZISZEWSKI/WŁODARCZAK 2011, 57, 58.
[111] BUCHVALDEK 1986, 495; FURHOLT 2003, 119, 124, 125; 2008, 20; HÄUSLER 2014, 83, 88, 98; HEYD 2016, 75.
[112] WŁODARCZAK 2006, 82, 90, 159; 2008, 522, 525.
[113] WŁODARCZAK 2010, 309, 318.
[114] These broad links are clearly visible in all regions. For example, in Lesser Poland, from the very beginning of this period and later, there is amber from the north, flint from Volhynia, and pottery comparable to that of the Baden circle. But CWC ware from other areas is also very common, although the reason of this is unclear (WŁODARCZAK 2017, 301, 318, 321).

from the steppe, although some parallels with the steppe (mounds and contracted burials) may be found, and there is evidence of the Yamnaya penetration into Central Europe. Therefore, when explaining this phenomenon, the main ideas are reduced to the spread in the local socio-economic and cultural environment of new social relations and a new ideology brought from the steppe. M. Furholt associates their appearance with the complex of single burials (SGBR), which, according to paleogenetic data, correlates with the steppe ancestors, but in general it is assumed that many rapid changes occurred without population movement.[115]

The general process of this time was a sharp reduction in the number of settlements (which is considered as an increase in mobility), although not in all areas. In particular, settlements are well presented in Switzerland, as well as in the coastal areas of Poland, the Eastern Baltic, the Netherlands and southern Norway.[116] Since that time, for example, Neolithic economy (cows and sheep) spread throughout Poland, but there is no evidence of farming, possibly due to the lack of settlements.[117]

In my opinion, these changes were impossible without migrating people, although in some cases this is not excluded. However, even the spread of lifestyle and fashion could be associated with the spatial spread of some ethnic group. In particular, the spread of forms such as beakers is seen as the spread of collective drinking and eating customs. In the same vein, Hayd sees the spread of dark polished ware with flutes of the Cernavoda III and Boleraz types, as well as the penetration of Bratislava-type bowls from the Danube into Greece. At the same time, local everyday forms of ware were preserved everywhere.[118] In fact, we see similar processes in Greece in the EH period, and they mark just the spread of the Greeks, and the very slow assimilation of the local population, lasted for many years.[119] Migrating collectives could well be bearers of fashion and the new lifestyle. It is also interesting that in the CWC of Southeastern Poland there is a disproportion between the number of male and female burials, which is typical for Yamnaya burials in the Carpatho-Danube basin,[120] which, as in the case of the Yamnaya people of the Carpathian Basin, may indicate that predominantly men took part in the migrations.

It is indicative that in the initial phase of this period, single burials under mounds spread everywhere, the so-called SGBR complex, which formed the Corded Ware cultures. Judging by the rite and genetics, it was connected with the steppe, but not with the Yamnaya culture, which lack sexual differentiation.[121] This complex is culturally differentiated. In Germany, these are the Kalbsrith graves with kurgan burials on the right side, oriented to the west.[122] In Jutland, there is a transition from the collective TRB burials to single burials without ceramics with a W–E orientation.[123] For Jutland, this period is determined by ca. 2900–2800 BC, and in Northern Germany and Holland ca. 2800 BC, but this is based on older dates with strong deviations.[124]

In Southeastern Poland, the CWC occurred ca. 2900–2800 BC, transforming from GAC under the influence of impulses of the earlier CWC from neighboring areas, as well as the Złota culture. Initially, it coexisted with Baden and TRB, and ca. 2700–2600 BC local CWC groups were formed, existed until 2350–2250 BC. It is noteworthy that there are very few early amphorae of type AI associated with kurgans, amphorae with handles on the shoulder predominate. There are generally few materials of phase I (pan-European A-horizon) in this area,[125] which is explained by the preservation of the Złota traditions. Kurgans were present in Poland from the very beginning, and were most characteristic of the southeastern areas, as well as the early period (2800–2600 BC). Then their number is reduced and flat cemeteries spread. In 2400–2300 BC mounds completely disappear. Skeletons in the graves more often lie on their back, less often on their side, are oriented along the W–E line, and sexual differentiation is observed: males on the right side, females on the left. To the north, in Greater Poland, Kuyavia and Pomerania, links with Central Germany are more expressed and, to an even greater extent, with the Single Burials culture of the northern CWC province. There were also contacts with GAC.[126] It is possible that the presence of burials on the back in the southeast is associated with contacts with the Yamnaya population. But such features as mounds, burials on the side facing south with sexual differentiation, find parallels in the Late Eneolithic steppe kurgans.

In the later CWC phases, orientations of men to N (NW) and women to E (NE) appeared. In this period, in the BBC, Unetice, Straubing, Singen, etc., N-S orientations are characteristic, which is associated with the Bell Beaker influence. At the same time, the principle of bipolarity was preserved. It is also characteristic of the Battle axes culture in Sweden and the northern group of the Middle Dnieper culture (men on the left side oriented to the north, women on the right side oriented to the south), and this transformation can be considered as a relatively late feature.[127] In Poland, the CWC at stage IIIC transformed into proto-Mierzanowice and is partially synchronous with it, since contacts are traced from 2350/2300 BC. The origins of this new culture are probably to be found in the southwest, in Eastern Silesia and Moravia.[128] Probably, this was also caused by the Bell Beaker pressure.

Therefore, in my opinion, in the early CWC stages there are features that were characteristic of the late Eneolithic steppe complexes: small mounds, single burials

[115] FURHOLT 2003, 129; WŁODARCZAK 2006, 156, 157, 160; HEYD 2016, 78; WŁODARCZAK 2017, 286, 306, 307; HÄUSLER 2014, 84, 93, 113; FURHOLT 2019; 2020.
[116] WŁODARCZAK 2017, 287, 289, 325; FURHOLT 2019, 118; CZEBRESZUK *et alii* 2019, 1; CZEBRESZUK/SZMYT 2008, 221, 222.
[117] WŁODARCZAK 2017, 309, 310.
[118] HEYD 2016, 71–74.
[119] GRIGORIEV 2022.
[120] WŁODARCZAK 2010, 306.
[121] HÄUSLER 2014, 86; NORDQVIST, HEYD 2020, 83, 85.
[122] HÄUSLER 2014, 114; HEYD 2021, 392.
[123] FURHOLT 2003, 119.
[124] WŁODARCZAK 2012, 133.
[125] HÄUSLER 2014, 90, 92; WŁODARCZAK 2001, 108, 109; WŁODARCZAK 2006, 82, 89, 90, 91, 159, 160.
[126] WŁODARCZAK 2017, 278, 284, 293–298.
[127] HÄUSLER 2014, 94, 94.
[128] WŁODARCZAK 2006, 118, 161; WŁODARCZAK 2021b, 450, 451.

contracted on their sides with sexual differentiation, facing the southeastern sector, burials in niches. But in south-eastern Poland, contacts with the Yamnaya people are recorded already at an early stage, which become more expressed at the developed stage, and at the late stage with BBC. At the same time, the processes of cultural genesis were extremely slow, and early and late cultural traditions coexisted for hundreds of years. Therefore, for sure, the spread of languages was also extremely slow.

5.6. CWC GENETICS

This situation is well illustrated by genetic studies. The modern population of Europe is genetically different from the first farmers who came from Anatolia, who show similarities only with the peoples of the Near East, and to a lesser extent with the Czechs, Slovaks, Slovenes and Croats. In other populations, their genetic heritage was eroded by later processes. There is a pattern of increasing the proportion of this Anatolian component from the Baltic (30%) to the Mediterranean (90%). Two other components, the earlier hunter-gatherers of Europe and the population of the European part of Russia and Siberia, are more expressed in the eastern regions.[129] An indicative pattern is observed: Anatolian genes dominate sharply in the Early Neolithic populations, but then, within the Neolithic, the genes of European hunters and gatherers grow.[130] This means that the assimilation of the local population took place, but it was extremely slow. We may again assume from this that the spread of new languages was slow too.

The situation changed in the Late Neolithic and the beginning of the Bronze Age, when the genetic composition of Europeans quickly drifted towards the modern one. The similarity of the introduced genetic component with the gene pool of the Yamnaya culture in the Eastern European steppes was revealed, and a conclusion was made about the massive Yamnaya migration to Europe.[131] This opinion has become dominant, and this explains the spread of the Indo-Europeans from the steppe (which, by the way, the authors of these works did not insist on), although a closer examination shows that there are many significant contradictions. Compared to the Neolithic population, the proportion of western hunters continues to grow (hence, they were not fully assimilated until that time), but the proportion of eastern hunters and gatherers increases sharply, which is typical for the Yamnaya culture. As a result, the CWC gene pool is 73% common with the Yamnaya gene pool. However, these are synchronous neighboring cultures, therefore, this similarity goes back to some unclear common substrate. In addition, this similarity is determined on the basis of autosomal markers, and if we turn to haplogroups, the situation changes. Among Yamnaya and CWC people, the most common (60%) haplogroups are R1a and R1b, which are widely presented in modern Europe, but the first haplogroup prevailed among CWC people, while the second haplogroup prevailed among the Yamnaya people, which is not consistent with such a huge "Yamnaya" contribution to this population. In addition, this contribution is somehow higher in the north than in the south. Maps of genetic distances with modern populations show that almost the whole of Europe is comparable to the CWC, and a moderate similarity to the Yamnaya is observed only in Eastern Europe. Therefore, there were certainly changes in the gene pool caused by migrations, but their connection with Yamnaya is not proved. The actual gene flow was more complex. Rather, populations genetically close to the Yamnaya, which have not yet been identified by paleogenetic studies, could have migrated.[132] Besides, "the spread of steppe-related ancestry throughout Europe was predominantly mediated through groups that were already admixed with GAC-related farmer groups of the eastern European plains".[133] All this is consistent with archaeological data indicating the spread of the CWC from Poland and its formation on the basis of local Neolithic substrates, primarily GAC, as well as an earlier steppe component.

These are common processes in Europe, but if we narrow the focus of consideration and turn to Central Europe, where CWC was formed, then there were three genetically different groups in the previous time. Most intriguing is that the Globular Amphore people, who according to archaeological data seems to have some contacts with the steppe cultures, are genetically comparable to the former Neolithic populations, and do not carry the steppe genes that appear only in the CWC.[134] With the formation of the latter ca. 2900 BC, steppe ancestors appear in the region, accounting to 75% of the population, which is distributed in Europe. However, they, judging by the Y-chromosomes, are not comparable with the Yamnaya proper. Therefore, it is impossible to connect them with the penetration of the Yamnaya culture, although they were some people from the east. Then in Central Europe there was an influx of genes from the northeast, primarily female, which is explained by some social processes.[135] As a result, a genetic pool is formed, similar to CWC and Yamnaya, but with an admixture of other sources. At the same time, there are no archaeological differences between burials with and without steppe ancestors.[136] Therefore, a very small group of CWC people may be considered as direct descendants of the Yamnaya people, but the majority are rather descendants of other earlier steppe groups. And we see one more process: the number of steppe ancestors among the Corded Ware people increases later, which may be explained either by a repeated impulse or by the preservation of relations with the original area.[137] This is clearly seen in the example of individual regions: in southeastern Poland, the proportion of steppe ancestors is higher than in the population in Lower

[129] BALANOVSKII 2015, 288, 289, 293.
[130] TASSI *et alii* 2017, 6; PAPAC *et alii* 2021, 1, 2.
[131] HAAK *et alii* 2015; ALLENTOFT *et alii* 2015.
[132] BALANOVSKY 2019, 168, 169; BALANOVSKII 2015, 303–309.
[133] ALLENTOFT *et alii* 2022, 12.
[134] TASSI *et alii* 2017, 1, 5, 6, 7, 8.
[135] Above, we discussed the intense connections of Central Europe with the northeast through the amber trade. But one should also take into account the obvious movement of the early CWC to the northeast. And this reverse flow of genes indicates the preservation of relations with the original areas, which we repeatedly see in other materials.
[136] PAPAC *et alii* 2021, 1, 2, 5, 6, 9, 10.
[137] HEYD 2021, 387, 398.

Poland.[138] Perhaps this is due to active interaction with the Yamnaya culture already after the CWC formation, which is also reflected in archaeological sources.

An important pattern: the steppe genes were brought to Central Europe primarily by men, and this migration had a much lesser effect on the mtDNA of Bronze Age Europeans. In addition, it affected only the eastern part of Central Europe, being little reflected in the west in the Bell Beaker populations.[139] In the west and in southern Poland, the maternal lineages (mtDNA) of the CWC populations are associated primarily with the local Neolithic people, while in the Eastern Baltic the proportion of steppe genes is quite noticeable, which indicates that women also participated in the CWC migrations in these regions.[140] This picture is quite consistent with the disproportion between male and female burials noted by archaeologists. But this also indicates that in the formation of the eastern CWC groups, including Fatyanovo, a large role should have been played by the southern groups, including those from the Yamnaya area in the Carpathian basin. Actually, on the basis of archaeological materials, we have more reason to connect Fatyanovo with the southern regions of Poland.

However, there is a paradox for which no explanation has been found: against the background of the absence of specific lineages of the Yamnaya culture in southern Poland, genetic affinity with the Afanasievo population of southern Siberia has been revealed.[141] However, the Afanasievo culture was not formed as a result of eastward Yamnaya migration, the real parallels of its ceramic complex are not Yamnaya, but the late Eneolithic complexes of the Volga region.[142] This fully corresponds to the interval of radiocarbon dates of the Afanasievo culture: 3700–2500 BC.[143] It may be a bit older due to the reservoir effect and old dates, but in any case, a significant part of it falls on the pre-Yamnaya period. Therefore, this paradox may be explained by the relationship of the earlier Eneolithic substrate.

Another feature that I would like to draw attention to is the slow change in the genetic profile. This is especially evident in the Neolithic, but even during the formation of the Corded Ware people, genetically different groups were preserved, and their relative unification occurred throughout the entire CWC period.

5.7. GENERAL PROCESSES IN CENTRAL EUROPE IN THE 3RD MILLENNIUM BC

Thus, on the basis of archaeological and paleogenetic evidences, we can reconstruct the cultural processes that took place in the steppes of Eastern Europe, in Southeastern and Central Europe in the 4th – 3rd millennia BC. The Eneolithic population of the steppe contained up to half of the genes of the Iranian-Caucasian ancestors, which is quite consistent with the hypothesis of the Near Eastern origins of the Indo-Europeans. The Maikop phenomenon also points to the penetration of the southern component into the steppe. Migrations of the steppe tribes in the 5th millennium BC to the northeast of the Balkan Peninsula were insignificant and did not affect the cultural situation in the region at all. Therefore, we cannot suspect any changes in the ethnic picture of Europe behind this process. A noticeable penetration occurred in the last third of the 4th millennium BC, when Late Eneolithic steppe complexes penetrated into the north of the Balkans and the Carpathian basin, and a system of interaction of these migrants with the original area in the North Pontic region was established, which spread up to the North Caucasus, and contributed to formation of Novosvobodnaya. This population interacted with the GAC and TRB tribes living north of the Carpathians, as well as with the Northern Balkan groups, which ensured the flow of some cultural traditions and genes to the east. However, initially these processes were not intensive.

The next stage of interactions began at the turn of the 4th/3rd millennia BC, when the Yamnaya cultural-historical area formed from the Carpathians to the Urals. Everywhere this was the result of integration of local Eneolithic groups, but in the Pontic region the influence of European cultures is tangible, one may allow some movements of the eastern proto-Yamnaya tribes to the west and new impulses from the Caucasus or the Near East. In many ways, probably, similar features were caused not only by this, but also by the spread of new social systems and wide communications. Therefore, there is no guarantee that the Yamnaya tribes everywhere spoke similar dialects.

People in the western flank of this cultural association (first of all, the Budzhak culture) most intensively contacted the European world, and it is from here that new, more massive migrations to the north of the Balkans and to the Carpatho-Danube basin began, which started already at an early stage of the culture. It can be assumed that just this led to the displacement of the first wave of migrants to the north (more precisely, the population formed as a result of their contacts with the local people). This explains the paradox that the CWC formation coincides in time with the Yamnaya penetration into Southeastern Europe, but the Yamnaya features and genes are poorely presented in the CWC. It was formed on the local GAC and TRB basis, but included significant elements of the pre-Yamnaya kurgan cultures and Baden. The role played by the traditions of single burials under kurgans in the CWC formation, the connection of these migrations (fixed by both archeology and genetics), mainly with the male part of the population, allows us to suppose the formation of social structures with some dominance of these migrants. But more important was the expansion of relations and the constant feeding of this process from the east. When these groups moved to the northeast, connections with the original areas were preserved. In any case, this process was very slow. We have no right to represent it in such a way that the newcomers immediately, within 100–200 years, spread some Indo-European language throughout the European continent, and this must be taken into account when discussing the dialectal division of the IE languages in Europe.

[138] LINDERHOLM *et alii* 2020, 1, 7.
[139] SCORRANO *et alii* 2021.
[140] JURAS *et alii* 2018, 7, 8; LINDERHOLM *et alii* 2020, 1, 4.
[141] LINDERHOLM *et alii* 2020, 6, 8.
[142] MOCHALOV 2008, 38, 40.
[143] MOLODIN *et alii* 2014.

This second, more massive wave, had another consequence. The appearance of these populations in the Danube region was preceded by the cultures of the Baden Circle, spread from the Lower Danube to Lake Constance. In the late 4th – early 3rd millennia BC, similar cultural features also appeared in northwestern Anatolia, and at that time some GAC features appeared in southeastern Europe, but the steppe cultures did not participate in this drift.[144] Migrations to Anatolia were carried out in two streams, at the end of the Chalcolithic and in the EBA, at the stage of Kumtepe I, and Troy II.[145] As a result of the first flow, cultural features with parallels, first of all, in the northeastern part of the Balkans (Varna, Gumelnița, Salkuța, Mariță, Veselinovo, Cucuteni A) appeared in Anatolia, although some parallels are also noted in Serbia.[146] But the impulse from the same region contributed to the formation of the EH I culture in Greece.[147] The statement of this fact will be extremely important for subsequent ethnic reconstructions.

6. FATYANOVO AND BALANOVO CULTURES

6.1. FATYANOVO ORIGINS

The easternmost groups of Corded Ware cultures are Fatyanovo and Balanovo (Figs. 3, 5). The first is situated from the upper reaches of the Dvina along the entire basins of the Oka and the upper Volga. The second is located in the east, in the area where the Kama flows into the Volga. There is a generally accepted opinion that they were formed as a result of migration of CWC people to the east, the steppe tribes did not participate in their cultural genesis, and it was this migration that led to the spread of cattle breeding in the forest zone of Eastern Europe.[148] This has been reliably confirmed by genetic analyses. Despite the fact that Fatyanovo pottery is found in the settlements of the local Neolithic Volosovo culture,[149] its people, like the Yamnaya people, did not play any role in the origins of Fatyanovo people, who were genetically very close to the CWC population.[150]

The Fatyanovo monuments are mainly represented by flat cemeteries, in which the buried contracted on their side are laid according to the principle of sexual biritualism: in the Yaroslavl Volga region, men usually lie on their right side with their heads to the west and southwest, women on their left side, with heads to the northeast. In all cases, the faces of buried turned south and southeast. In the west, in the Moscow-Klyazma group, orientations to the west prevail, and on the Volga to the southwest, which is considered as a chronological sign reflecting the eastward movement. There are traces of fire in the pits, possibly occasional cremations.[151] In general, the Fatyanovo rite is seen as descending from the CWC rite.[152] R.A. Litvinenko showed that in case of the bipolar rite, it was fundamental to turn the face in a certain direction, and among the Fatyanovo people, the faces of men and women were turned mainly in the southern sunny direction, which was also characteristic of the Corded Ware people.[153]

The ware has perfect CWC parallels (Fig. 5/2–5). It is represented by amphorae (in some instances spherical) with high or low necks, with and without handles; pots with an S-shaped profile, beakers, bowls; often the surface is polished. Important types are axes, both polished stone and flint (Fig. 5/6–8). And both groups are typologically related to the CWC axes. Other objects made on flint plates and flakes are also common: knives, chisels, scrapers. Pendants made of bird bones and animal teeth have wide parallels, including those in the CWC. Three bone hammer-shaped pins were found, one of which has parallels in the Corded Ware culture of Europe (Figs. 4/9; 5/14), as well as a horn pin with a nail-like head. Occasionally there are beads and pendants made of amber.[154]

The complexes contain a series of metal objects: an axe, a spearhead with an open socket, pendants in 1.5 revolutions with a forged shield, sometimes with a rib on the outer side (so-called willow-leaf), pendants made of double wire forged at the ends, simple pendants made of narrow plates or round wire, "eyeglasses-shaped" pendant, tube-shaped pendants, tubes coiled in a spiral from copper tape, ornamented cuff-shaped bracelets made of wide plates (Fig. 5/9–13). It is assumed that the metal appeared only at a late stage of the culture.[155] These are typical European objects of the A1 period, the so-called *Blech- und Drahtindustrie*, especially those with a willow-leaf shield. The "willow-leaf industry" is characteristic of the CWC.[156]

Thus, the whole complex of material culture and funeral rituals of Fatyanovo and Balanovo have perfect parallels in the Corded Ware cultures of Europe, which indicates migration. It is difficult to say whether the Fatyanovo people saved communications with their original area, as we saw above in other examples. Based on the finds of amber in the burials, one can only assume communications with the Eastern Baltic.

[144] HEYD 2016, 54, 55, 75. This did not involve Baden populations as a whole. This culture began to form ca. 3700/3650–3500 BC, but then spread widely up to Lake Constance, forming enclaves. However, even its main area is shifted to the west relative to the possible area of migration to the southeast. It is also indicative that at this time, ca. beginning of the 3rd millennium BC, there was a disintegration of Baden and the formation of post-Baden cultures (HORVÁTH/SVINGOR 2015, 20, 21). Perhaps this was caused by the Yamnaya penetration into the Danube region.

[145] MELLAART 1971, 371–386.

[146] PARZINGER 1993, 264–266, ÖZDOGAN 1991, 218–220; YAKAR 1991, 248, 253; GRIGORIEV 2002, 352–354, 356.

[147] MARAN 1998, 157, 428; ALRAM-STERN 2004, 154, 155; 2014; GRIGORIEV 2022.

[148] KRAINOV 1987, 65, 74; NORDQVIST/HEYD 2020, 65, 66, 79, 85; HEYD 2021, 403.

[149] KRAINOV 1987, 61.

[150] NORDQVIST/HEYD 2020, 80, 81; SAAG *et alii* 2021, 1, 6, 8, 9.

[151] In previous times, there was no such ritual in the region. It is possible that its occurance was caused by the participation in the migration of some small groups from the Danube region.

[152] KRAINOV 1987, 59, 64, 73; KRAINOV/GADZYATSKAYA 1987, 6, 11, 12; HÄUSLER 2014, 112; NORDQVIST/HEYD 2020, 65, 69; BOL'SHOV 2010, 5.

[153] LITVINENKO 2006.

[154] KRAINOV 1987, 65–68; KRAINOV/GADZYATSKAYA 1987, 15–19, 30–34; NORDQVIST/HEYD 2020, 72, 74, 76, 77.

[155] KRAINOV 1987, 70; KRAINOV/GADZYATSKAYA 1987, 35, 36.

[156] KLOCHKO/KLOCHKO 2013, 41.

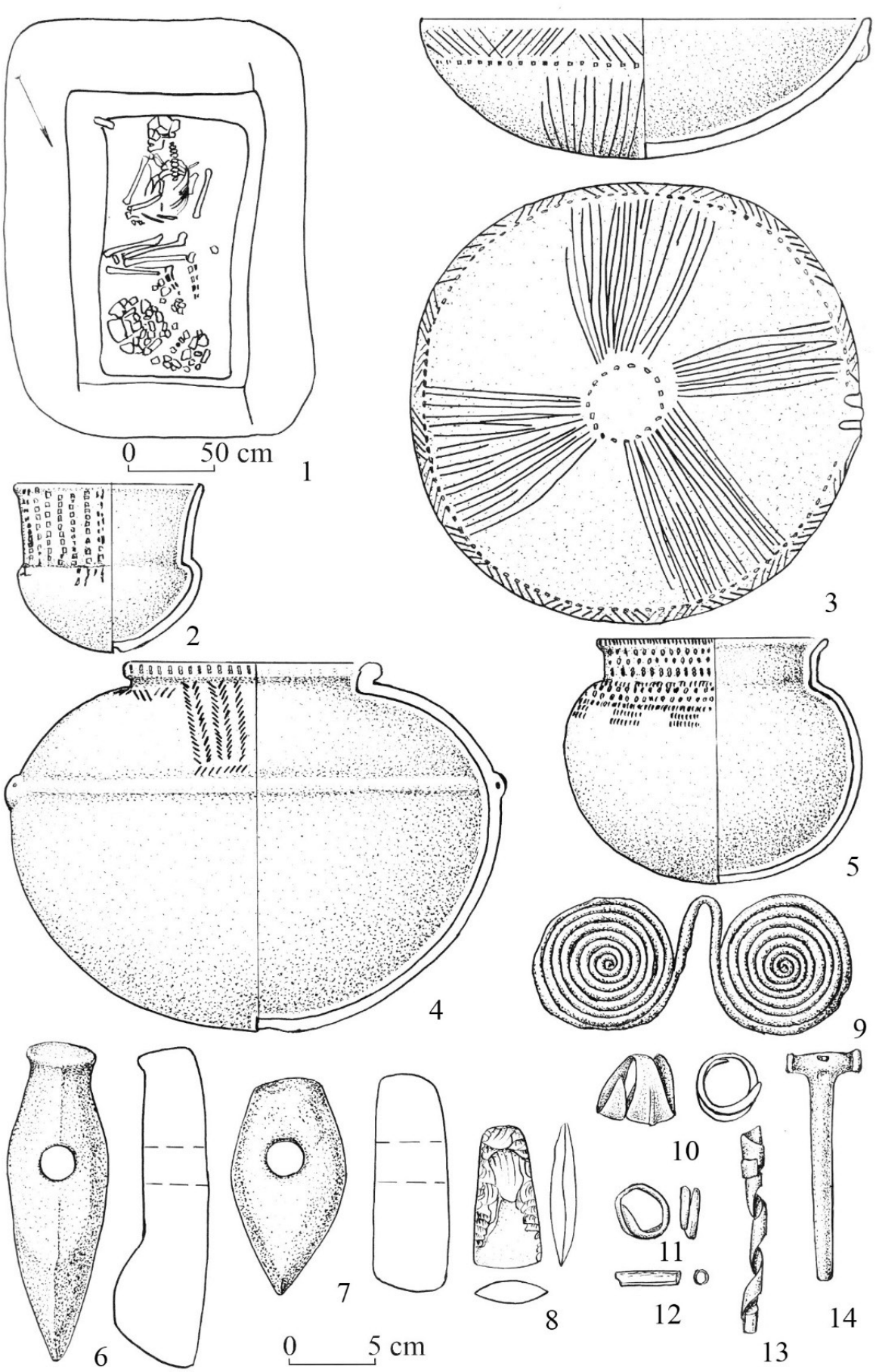

Fig. 5. Fatyanovo culture: 1, 3, 5 – Nikultsinsky cemetery; 2, 4, 14 – Voronkovskiy cemetery; 6–13 – Volosovo-Danilovsky cemetery (after KRAINOV/GADZATSKAYA 1987, fig. 28a: 33; 28b: 16, 28; Table 5: 7, 11; 53: 1, 7; 57: 18; 63: 27; 66: 4, 21, 30, 36, 51).

6.2. FATYANOVO AND BALANOVO CHRONOLOGY

Earlier, the beginning of the Fatyanovo culture was dated from the turn of the 3rd/2nd millennia BC.[157] Ideas about the periodization of culture and particular types of objects (e.g., axes, ware) are not based on stratigraphy, but on the idea that it spread from west to east. Therefore, western local groups formed earlier, while eastern (Balanovo) later, and this became the basis for distinguishing stages.[158] But the identified stages, in my opinion, are speculative and confusing. For example, the appearance of high-necked vessels with the S-shaped profile and corded decoration is attributed to the early Ivanovogorsky stage, and the appearance of amphorae to the next Nikultsinsky stage,[159] but the amphorae are present in the earliest CWC complexes.

Despite these problems, it is assumed that the culture was formed no later than other CWC. The end of its existence is unclear, probably the last centuries of the 3rd millennium BC.[160] Unfortunately, for this period it is difficult to clarify the dates using metal objects: many of these types existed for a long time from the Eneolithic to the Bronze Age.[161] It was assumed that since elements of the early A-horizon of the CWC are poorly represented even in Western Ukraine and the Middle Dnieper, they cannot be expected in the Fatyanovo culture at all.[162] This assumption is confirmed if we turn to more detailed comparisons of the Fatyanovo complex.

In Lesser Poland, rare burials of Phase I are associated with kurgans, and flat cemeteries appeared at the beginning of Phase II, although kurgans are known in phase III.[163] This is close to the Fatyanovo rite, but in this region, from the III phase, mainly burials oriented along the N–S axis, as well as burials in niches, spread. And in this phase, ceramics appeared that are different from Fatyanovo. Thus, basing on the burial rite, it is possible to date the beginning of Fatyanovo from the beginning of phase II to the beginning of phase III of the CWC.

Many Fatyanovo ceramic forms were present both in the CWC and GAC complexes. But GAC beakers are usually low and those in CWC are high. Handles on GAC amphorae are more often located on the shoulder or neck, while in CWC on the body, which is considered as an important distinguishing feature. At the same time, ornaments in the form of groups of vertical lines, which are also known in the Fatyanovo culture, are characteristic of the eastern GAC group. In the well-stratified CWC sites in Switzerland, metopic ornamentation is found from the earliest phase.[164] In Lesser Poland, in rare materials of phase I amphorae are usual, with handles in the greatest expansion of the body, and ornaments of grouped vertical impressions are found on them.[165] Amphorae with 2–4 handles on the neck are sometimes found in the early CWC, but they are typical in later phases.[166] Since these are not typical for Fatyanovo, handles are located in the middle part of the body, ornaments from groups of vertical lines are known on amphorae, Fatyanovo beakers are relatively low, although sometimes they have a high neck, Fatyanovo forms are closer to CWC than to GAC, but we can assume their relatively early position. However, in the pan-European A-horizon, the CWC beakers have high proportions and the S-shaped profile. Although cylindrical-necked beakers are also found, they spread later, as did funnel-necked beakers. At the same time, in many areas, ceramic forms of the A-horizon could be preserved for a long time, and there are significant regional differences, which makes it difficult to attribute the complexes to specific stages.[167] In general, in my opinion, Fatyanovo is a later occurrence relative to the A-horizon, together with the Krakow-Sandomierz group of Lesser Poland, when flat cemeteries spread, but this cannot be too separated from the early horizon.

Dating of axes is more problematic, since their typology in Fatyanovo is chronologically poorly substantiated.[168] Axes typical for the A-horizon (with the "casting seam" and the elongated blade)[169] are known in both the Fatyanovo and Balanovo cultures.[170] However, these axes are also present in the relatively late CWC phase IIIa, but from this phase, burials oriented along the north-south line began to spread, and a little later, vessels with straight walls (in Poland and Germany they are dated to the interval of 2620–2200 BC), which is not typical for Fatyanovo. Likewise, type I axes (similar to the Fatyanovo hammer-shaped axes) are known in the early horizon, but existed for a long time, disappearing in Poland only at the beginning of phase IIIB.[171] In Lesser Poland, from phase II, Silesian axes of types B1 and B4, with a hole in the middle part, spread.[172] They have direct analogies in the Fatyanovo axes.[173] In the later CWC phase IIIB in Poland, axes with a displaced hole appeared,[174] which also have parallels in Fatyanovo. Therefore, it is possible that, like the finds of amber, this is a sign of the preservation of relations with the original area, but this assumption must be tested on ceramic material. Against this hypothesis is the fact that in this phase of the Polish CWC, amphorae with handles on shoulders and vessels with straight walls appeared,[175] which are not found in Fatyanovo, but present later in Abashevo. However, it should be borne in mind that if the A-axe is a universal type, many other types may have regional, and not just chronological features.[176] Flint axes in Lesser Poland appeared only from phase II: a tetrahedral section with wide blades, amorphous finds, often with a trihedral section, there are two dihedral forms. The surface treatment is often incomplete, and only the blade had been polished. From phase IIIb, thick axes with a cross-section

[157] KRAINOV/GADZYATSKAYA 1987, 38.
[158] KRAINOV 1987, 63, 72, 73; NORDQVIST/HEYD 2020, 68.
[159] KRAINOV/GADZYATSKAYA 1987, 39, 40.
[160] NORDQVIST/HEYD 2020, 65, 69.
[161] For more details, see GRIGORIEV 2019.
[162] BUCHVALDEK 1986, 490.
[163] WŁODARCZAK 2006, 98, 105, 160; BUDZISZEWSKI/WŁODARCZAK 2011, 56.
[164] FURHOLT 2003, 67; 2008, 11, 14.
[165] WŁODARCZAK 2006, 90.
[166] FURHOLT 2003, 32.
[167] FURHOLT 2003, 13, 29, 30, 37, 39, 119; WLODARCZAK 2017, 318.
[168] NORDQVIST/HEYD 2020, 74.
[169] FURHOLT 2003, 13.
[170] See KRAINOV 1987, 66, fig. 25; BADER/KHALIKOV 1987, Fig. 37.
[171] FURHOLT 2003, 30–32, 122; WŁODARCZAK 2006, 118.
[172] WŁODARCZAK 2006, 91, tab. XXII.
[173] See KRAINOV 1987, fig. 25.
[174] WŁODARCZAK 2006, 110.
[175] WŁODARCZAK 2006, 109, 117.
[176] WŁODARCZAK 2017, 313, 314.

tapering towards the neck and more carefully worked surfaces spread.[177] The Fatyanovo flint axes are close to the axes of phases II and IIIa.[178] Therefore, basing on axes, as well as ceramics, we may date Fatyanovo not earlier than the beginning of the II phase of the CWC.

It is more difficult to determine the original area. Sometimes, based on the geographical principle, the Middle Dnieper culture is included in it, but I see no typological grounds for this idea. It would be most logical to see the roots of Fatyanovo in the Eastern Baltic, where the corded culture of Rzucewo formed on the A-horizon basis, but in it the bipolar orientations of the buried are different: women on the left side to N, men on the right to S, and its ceramics are incompatible with Fatyanovo ones. More comparable are low beakers and globular short-necked amphorae from the CWC in Belarus.[179] A-axes, known in Fatyanovo, are present only in Jutland and Poland. In addition, in Poland, after the early phase, handles on amphorae are not typical, which does not fit into the general trend of the CWC.[180] Handles are extremely rare in Fatyanovo, so the roots of Fatyanovo should be sought precisely in Poland and associated with the end of phase I or the beginning of phase II, immediately after the end of the European A-horizon. At that time, some processes were taking place in Poland, due to the influences of the Złota and Globular Amphorae cultures.[181]

This dating is also confirmed by radiocarbon analyses. Phases I, II in Poland fall within the interval of ca. 2800–2600 BC.[182] Taking into account the fact that there are very few sites of Phase I, the transition between these phases should be dated to ca. 2750–2700 BC. In the Fatyanovo culture of the western areas, the dates are divided into two groups: older (2750–2500 BC) and younger (2300–1900 BC), and it is assumed that young dates are the result of laboratory errors.[183] Thus, the formation of the Fatyanovo culture started shortly after the end of the CWC A-horizon. However, if we link the Fatyanovo beginning to the Alpine dendrochronology, then its probable date, taking into account the above reservations about the synchronization of the end of the early phase of the CWC in Switzerland with the end of the pan-European A-horizon, will be after the mid-27th century BC. But at this stage it is still too unreliable.

6.3. BALANOVO

In the Middle Volga, in the area where the Kama flows into it, Balanovo culture (close to Fatyanovo) is localized, represented by settlements, flat cemeteries and kurgans, and it is assumed that the kurgans appeared in it only at the end of the early Balanovo stage, which was previously dated from the late 3rd – early 2nd millennia BC, and the next stages (Atlikasy, Osh-Pando and Khulasyuch) were dated up to the 9th century BC. The culture is also characterized by the bipolar funeral rite: women on the left side with their heads to E, men on the right, with their heads in the meridional direction. The ceramics are quite comparable with those of Fatyanovo: globular and turnip-shaped amphorae with a narrow and low neck, sometimes with handles, bomb-shaped vessels with a round body and high neck, typical of the early period, bowls. Stone inventory is also quite comparable: drilled stone axes (including type A) and wedge-shaped axes, knives, scrapers, mattocks, arrowheads, etc. Copper objects are represented by spearheads, axes, styloid arrows, adzes, awls, needles, pendant rings, earrings, and tubes.[184]

There is a problem with the Balanovo sites understanding. Some scholars believe that it should be considered as a territorial culture within the Fatyanovo-Balanovo community. Their similarity is especially evident when comparing the Fatyanovo sites with those of the early Balanovo stage.[185] However, the identification of stages is also not convincing. An analysis of the Balanovo and Atlikasy materials shows their significant similarity, as well as the similarity with the Fatyanovo ones. Therefore, simultaneous penetration into the forest zone of Eastern Europe by the Fatyanovo, Balanovo and Atlikasy groups is supposed, and the latter differ mainly in the presence of kurgans,[186] which also took place in the original area of Europe. And this point of view seems to me quite legitimate, since the presence of archaic amphorae, as well as A-axes, makes it possible to assume the synchronous appearance of the Fatyanovo and Balanovo cultures. Nevertheless, it is likely that the Balanovo culture existed for a long time, and survived until the Abashevo time, when in Eastern Europe there was a series of new impulses from Central Europe associated with the Corded Ware cultures, but also with a new factor that appeared in Europe, the Bell Beaker culture.

7. BELL BEAKER CULTURE

7.1. THE BELL BEAKER ORIGINS

The Bell Beaker Culture (BBC) is a completely different cultural bloc. It was formed ca. 27th century BC in the west of Iberia, where it had a local cultural and genetic basis, and in the period 2600–2400 BC it distributed widely along the Atlantic and Mediterranean coasts to the Lower Rhine and southern France, and up the Rhone to Switzerland (Fig. 3). As a result, contacts between the bearers of this culture and the CWC people began in the North and North-East.[187] Based on dendrochronology, early maritime beakers appeared on the Upper Rhine in Switzerland ca. 2500 BC, and according to the dendrodates of the Wädenswil settlement ca. 2571/69 BC.[188] Thus, this movement was fast, and it determined the situation of the 24th – 22nd centuries BC in many areas.

In Poland, the BBC spread since ca. 2400/2300 BC. There are two enclaves: in the basins of the Oder (Silesia) and the Vistula (Little Poland). A classic BBC set appeared:

[177] WŁODARCZAK 2006, 91; BUDZISZEWSKI/WŁODARCZAK 2011, 57, 60.
[178] See KRAINOV 1987, fig. 26.
[179] HÄUSLER 2014, 101, 103, 107, 108, 110, Abb. 9, 12, 14.
[180] FURHOLT 2003, 119, 121.
[181] WŁODARCZAK 2006, 99.
[182] WLODARCZAK 2017, 285.
[183] KRENKE 2019, 114.
[184] BADER 1987, 76–82, fig. 37.
[185] KRAINOV/GADZYATSKAYA 1987, 40, 42; BOL'SHOV 2010, 4, 5.
[186] BOL'SHOV 2010, 6–10.
[187] WŁODARCZAK 2012, 134, 136; HEYD 2016, 78; HEYD *et alii* 2018, 4, 7; HEYD 2021, 398, 399, 403.
[188] HEYD 2021, 401; EBERSCHWEILER 1999, 39, 48, 49; GROSS-KLEE 1999, 60; SUTER 2008, 336, 339.

fundamentally new ware, bronze daggers, stone wrist-guards and bone V-perforated buttons, etc. However, the funeral rite can be viewed as a modification of the CWC rite, as it demonstrates a gender dichotomy. However, it differs from the CWC by a double negation of the previous criteria: the former association of the man on the right is replaced by the position of the man on the left side with an orientation to the north. The women are oriented to the south and lie on the right side. In southern Poland, migration from Moravia and Bohemia is supposed to be the reason for the appearance of this complex, and this is also evident from different anthropology. In Northern Poland, the region's traditional links with Northern Germany and Jutland are more visible, and there is a smooth evolution of the former CWC groups. At the same time, the Iwno culture formed in northern Poland, which reflects the features of the BBC, Single Burials culture and, to a lesser extent, of the Unětice culture. In addition to flat cemeteries, there are kurgans.[189] Since that time, settlements reappeared in Poland in those areas where they were not represented in the CWC, but these settlements are small, reflecting small families, and possibly seasonal in nature.[190]

And here again we are faced with extremely slow rates of cultural assimilation. In northern Poland, even in the second half of the 3rd millennium BC, the enclaves of the GAC, CWC and the Single Burials culture are preserved. From the middle of the period (ca. 2300 BC) the influence of the Unětice culture is clearly manifested in Silesia, and in Lesser Poland coexistence with Mierzanowice. But in general, here, as elsewhere in the east, the BBC ceased to exist earlier, ca. 2300/2200 BC, giving way to Mierzanovice culture, and in the very south Unětice culture.[191]

7.2. THE BELL BEAKER GENETICS

Additional information about the processes during this period is provided by paleogenetic data. After the discovery of "steppe" genes not only in the CWC population, but also in the BBC,[192] it began to seem that this marks the spread of the steppe culture to the west, which made it possible to associate this with the spread of the Indo-Europeans. However, the steppe ancestors are characteristic of the Bell Beaker people to an incomparably lesser degree. The BB people in Iberia were genetically close to the preceding local populations, as well as the people of this culture in the northern regions inherited genes of local people. Therefore, migrations in the case of the spread of BBC in continental Europe are excluded. But in Britain, with the coming of the BBC complex ca. 2450 BC there was an almost complete change of population. And in this case, the spread of this tradition is associated with a powerful migration.[193] The situation in Central Europe is of fundamental importance, for which additional data have recently been received. Bohemia's BB samples show continuity with the CWC, but these are only three female samples. In the late BBC (since 2400 BC), an increase of genes characteristic of the Middle Eneolithic is recorded. Thus, the genetic contribution from the West, as we might assume from the western roots of the culture, is absent. The population of the pre-classical Unětice culture was formed on the late BBC basis, but for the beginning of the EBA, a powerful gene flow from the northeast is revealed, which is associated with the Y-chromosomes lineages. The classical Unětice culture retains the former diversity of lineages presented in pre-classical Unětice and local Eneolithic populations.[194] Thus, at the regional level, no influx of western genes is found either, and the influx of genes from the northeast at this time is of interest, since Unětice influence is manifested in this period in the late BBC and the Iwno culture in Poland. From this we can conclude that the situation of relations with the original area was quite typical for the entire period. It is indicative that in Poland there was a genetic break between the CWC and the Bell Beaker people. The BBC population in southern Poland is closer to the BBC population in Central Europe, which marks the migration from this region.[195]

8. ABASHEVO

The Abashevo culture occupies large areas, and it is divided into Middle Volga, Don-Volga (mainly in the Middle Don), and Ural Abashevo. There are ideas about the formation of Abashevo in the Middle Don, from where the culture spread to the Middle Volga, and at a later stage shifts to the Volga-Vyatka interfluve. But during a long time in most regions, the variants of this culture are synchronous.[196] In my opinion, there are no grounds for such judgments, since most of the Don Abashevo sites are represented by late types that appeared at the end of the Sintashta culture and belong to the early Srubnaya Pokrovsk period. Its formation is associated with the eastern impulses of the Ural Abashevo and Sintashta cultures. The Ural Abashevo culture is secondary in comparison with the Middle Volga culture, although it coexisted with the latter for a long time. But it is difficult to judge the synchronization reliably since there is no internal Abashevo chronology.[197]

Therefore, when discussing the Abashevo origin, the problems of the Middle Volga Abashevo should be discussed. There are almost no settlements of this culture, it is represented by kurgans with burials contracted on their back, oriented to the E and SE. Under the kurgans there are fences or ditches. Ceramic set is represented by bell-shaped vessels and bowls, small angular vessels with an outcurved rim, jars with vertical walls. Abashevo has a rich set of metal objects, especially ornaments, which includes: rosette-shaped plaques, "eyeglasses-shaped" and flattened silver grooved pendants in 1.5 revolution, rings, tubular and fluted pendants. Bracelets in cross-section are round, quadrangular,

[189] MAKAROWICZ 2003, 137, 138, 143, 145, 152; CZEBRESZUK/SZMYT 2012, 157, 158; HÄUSLER 2014, 96; WŁODARCZAK 2017, 276, 279, 296, 297, 308.
[190] MAKAROWICZ 2003, 143; WŁODARCZAK, 2017, 326.
[191] MAKAROWICZ 2003, 151, fig. 13; CZEBRESZUK/SZMYT 2012, 158, 170; WŁODARCZAK 2017, 286; HEYD *et alii* 2018, 6.
[192] HAAK *et alii* 2015, 207, 210, 211; MATHIESON *et alii* 2017, 10.
[193] OLALDE *et alii* 2018; SCORRANO *et alii* 2021.
[194] PAPAC *et alii* 2021, 6–10.
[195] LINDERHOLM *et alii* 2020, 5, 7, 8.
[196] PRYAKHIN/KHALIKOV 1987, 130; BOL'SHOV 2003, 91; 2008, 1267.
[197] SOLOV'EV 2000, 62.

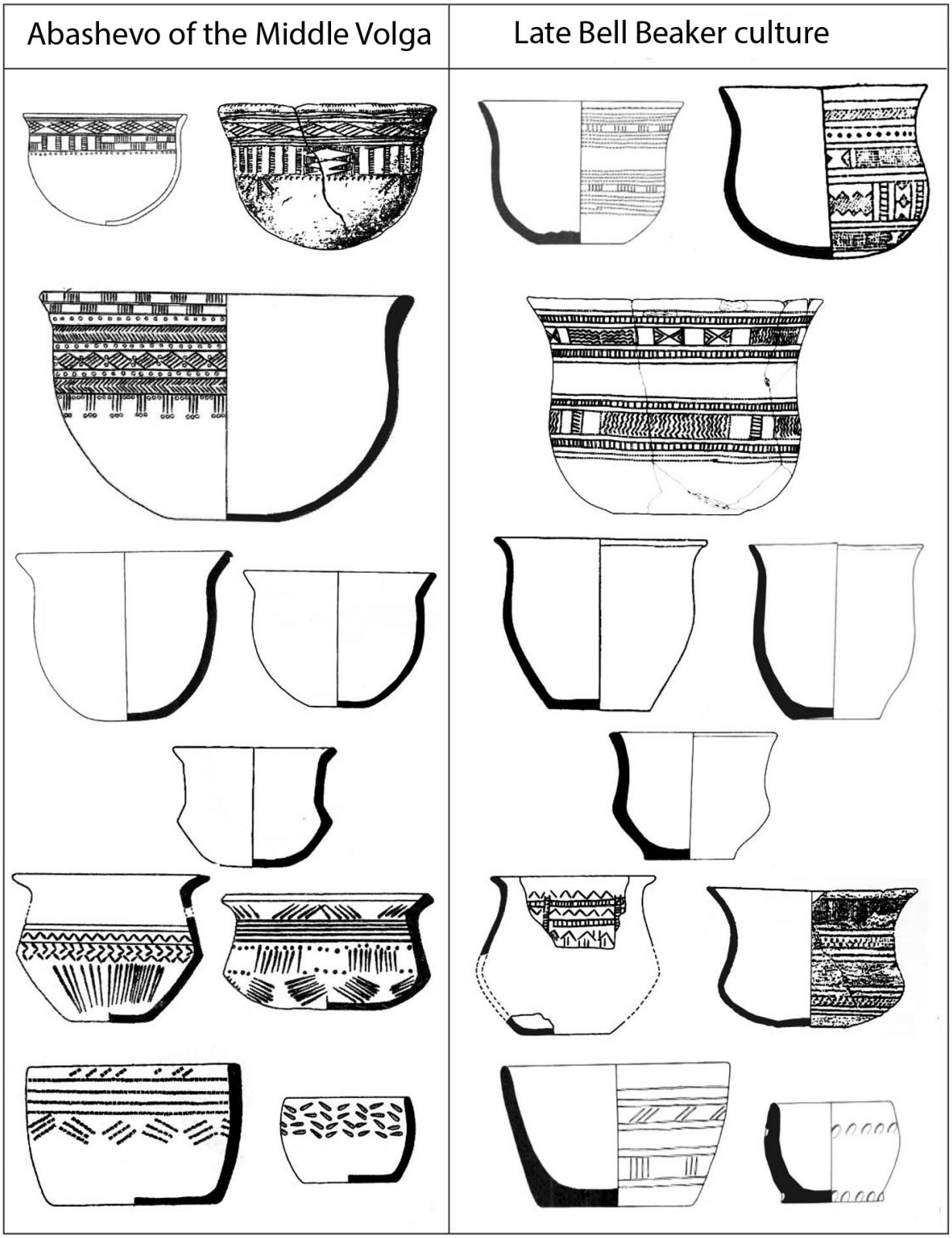

Fig. 6. Pottery of the Middle Volga Abashevo culture and of the late Bell Beaker culture in Central Europe (after MIMOKHOD 2022, fig. 4).

triangular grooved, various wire rings with curved ends, awls and plate knives. Flint objects are represented by scrapers and arrowheads of the shapes known in the Corded Ware cultures.[198]

Because of the lack of settlements, the stratigraphic position of Abashevo is not clear. It is assumed that at an early stage Abashevo coexisted with the late Volosovo,

[198] PRYAKHIN/KHALIKOV 1987, 129; BOL'SHOV 2003, 89–91; SOLOV'EV 2000, 63, 65, 66.

Balanovo and Atlikasy cultures.[199] However, areas of the last two cultures coincide with the Abashevo area, so Abashevo has a later chronological position relative to the Fatyanovo-Balanovo sites.[200]

The ideas always dominated about the local formation of the Middle Volga Abashevo culture on the Fatyanovo-Balanovo basis, although there were also rather vague ideas about a western impulse, since Abashevo differs from Fatyanovo both in ritual and in ceramics. In recent years, the works of R.A. Mimokhod show the connection of the Middle Volga Abashevo culture with the Bell Beaker culture of Central Europe, where a large number of similar features have been revealed. First of all, this is a specific kurgan rite with pillar fences around the burial site and burials contracted on their back, but there are no burials with sexual differentiation typical for the BBC. In Eastern Europe, contracted burials on the back are known in the much earlier Yamnaya culture, but the position of the legs is different. In the BBC, burials on the side are typical, but in the Czech Republic, southern Germany, and, to a lesser extent, in the southern half of Poland, burials on the back are known, and with a similar position of the hands; in Moravia, circular post fences are also known. The only difference is that the cemeteries in the BBC are flat.[201] However, in reality, mounds with ring ditches are found in the BBC of Central Europe. In particular, although flat cemeteries predominate, mounds are found in burial groups A and B of Moravia and Lower Austria; but in groups which are regarded as later (C–E) they are unknown.[202] A combination of flat and kurgan cemeteries is also known in the Iwno culture in northern Poland.[203]

There are many parallels in ceramics. First of all, these are the most typical bell-shaped vessels, vessels with a high expanding neck and a rib in the lower third of the body, pots with a short bell-shaped neck and a rib in the central part of the body, low beakers with a sharply expanding neck and a rib in the lower part, and various types of jars. The ornaments and the technique of their application are similar. Metope ornaments are especially remarkable (Fig. 6).[204] In Moravia and Lower Austria, the BBC stages (A, B, C, D) are distinguished based on typological considerations, but they are poorly documented by stratigraphy. Ornamental motifs, identical to those in Abashevo, are more typical for stages A and B of the Eneolithic, and less so for stages C and D of the Eneolithic/EBA transition. On the other hand, group A is characterized by high beakers, in group B the beakers become lower, and there is a trend towards further development of more and more low forms. In group A kurgans appeared, existing along with flat cemeteries in group B, and they disappeared in other groups.[205] All this is rather vague, one can assume a greater similarity of Abashevo's features with group B, but it cannot be ruled out that behind these groups there are not only chronological, but also some social or cultural differences. Therefore, this cannot be the basis for the Abashevo chronology, but it can be assumed that the beginning of the Abashevo is synchronous with the later BBC complexes of Central Europe.

We see a fairly detailed similarity in metal ornaments. There are many types common to Abashevo's and Central European metalworking: "eyeglasses-shaped" pendants, pendants in 1.5 revolution with unforged grooved ends, small shell-shaped plaques, flat plaques, bracelets with round cross-section and pointed ends, spiral rings, rounded and semicircular plaques with a punch ornament and holes, spiral and tube-shaped pendants, combined pendants, a part of which is smooth and another is twisted into a spiral, pendants with a reverse loop, spiral rings with a curl at the end. A similar combination of these objects in the costume is indicative, which included headbands, represented by strips of fabric or leather with small copper ornaments. At the same time, stone wrist-guards typical for the BBC did not appear in Abashevo (Fig. 7).[206]

Basing on ceramics it is rather difficult to determine the area where the Abashevo ceramic tradition could come from, since the Abashevo ceramics have typical features common to the BBC (bell shape, metopes, single-row zigzags and horizontal lines), but in my opinion, the ware in Lesser Poland have little in common, in Northern Poland (due to relatively elongated proportions) too, and the forms from Silesia are closer. In addition, the northern Bell Beaker group is distinguished by the presence of settlements with a small number of burials, which is not typical for the Middle Volga Abashevo. Although chronological differences should probably also be kept in mind, as in Poland there is the evolution from taller and thinner beakers to lower ones too.[207] In this sense, the Abashevo forms are closer precisely to the late BBC or post-Bell-Beaker forms; a connection with the BBC of the northern zone is unlikely.

We may exclude Southern Germany from consideration, where a series of EBA Adlerberg, Neckar, Upper Rhine, Ries, Singen, and Straubing groups are formed on the BBC and CWC basis.[208] They have minor parallels in Babino, but they are united with Abashevo only by some metal objects common to all of Central Europe.

R.A. Mimokhod notes that the Abashevo ritual and ceramics belong to the Eneolithic BB traditions, and metalworking to the Br A1 period, which determines their chronology. This is supported by a comparison of radiocarbon dates (2200–2000 BC for the Middle Volga Abashevo and 2200–2150 BC for the BB/EBA transition in Central Europe), synchronizing it with the cultures of the Unětice circle; and the proto-Unětice phase "Reinecke A0" dated from 2300–2200 BC, preceded the Abashevo culture.[209] In fact, the situation with the Abashevo dates is very complicated (a small number of dates, especially AMS dates, many dates have been obtained many years ago), and a more careful approach allows us to place the beginning of the Middle Volga Abashevo in the interval of 2128–1959 BC, and

[199] BOL'SHOV 2008, 1266.
[200] SOLOV'EV 2000, 68; KUZNETSOV 2003, 86.
[201] MIMOKHOD 2018a; 2022, 123–128, 138.
[202] METZINGER-SCHMITZ 2004, 65, 141–149.
[203] MAKAROWICZ 2003, 143.
[204] MIMOKHOD 2022, 128–130.
[205] METZINGER-SCHMITZ 2004, 157, 160, 236, Abb. 63, Taf. 41b.
[206] MIMOKHOD 2022, 130, 132, 139.
[207] See MAKAROWICZ 2003, 146, 147, fig. 8, 9; CZEBRESZUK/SZMYT 2012, 160, 161, 165, fig. 3, 4, 9, 10.
[208] LIßNER 2004.
[209] MIMOKHOD 2022, 130, 134, 135.

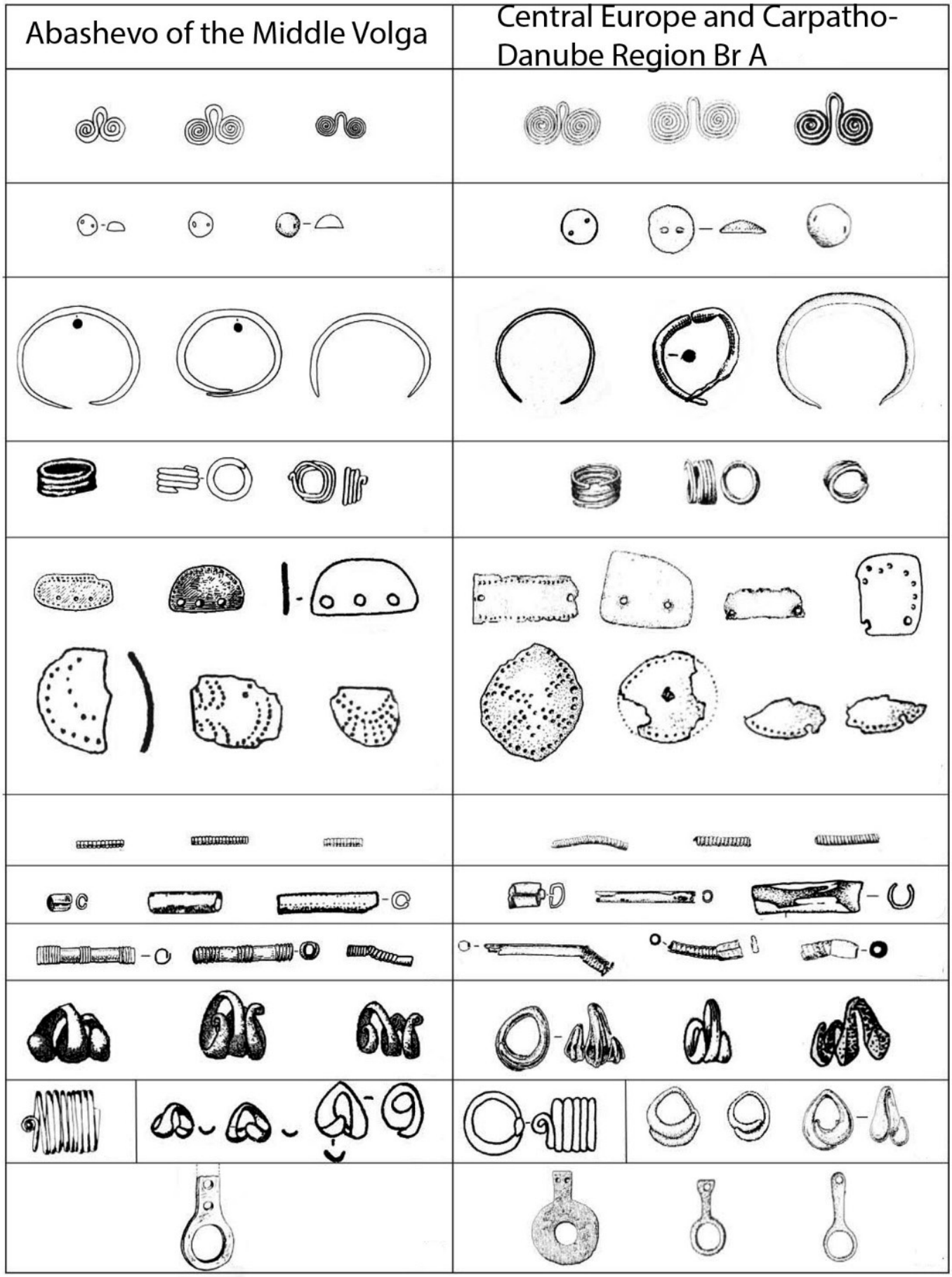

Fig. 7. Copper ornaments of the Middle Volga Abashevo culture and late Bell Beaker culture in Central Europe (after MIMOKHOD 2022, fig. 5).

Tab. 1. Abashevo metal objects having parallels in the metal of different periods of the Central European Bronze Age

Types	Late Eneolithic	A0	A1a	A1b	A1c	A2a	A2b	A2c	B
Absence of ornaments in the form of willow leaf					+	+	+	+	+
Simple rings of wire	+	+	+	+	+	+	+	+	+
Spiral pendants	+	+	+	+	+	+	+	+	+
Tube-shaped pendants	+	+	+	+	+	+	+	+	
Grooved pendants in 1.5 revolutions				+	+	+	+	+	+
Grooved pendants in 1.5 revolutions with a reverse loop					+	+			
Bracelets of wire	+	+	+	+	+	+	+	+	
Spiral finger rings and bracelets	+	+	+	+	+	+	+	+	
Short spiral bracelets	+	+	+	+	+				
Neck rings			+	+	+	+			
"Eyeglasses-shaped" pendants					+	+	+	+	+
Hemispherical platelets with two holes				+	+	+	+	+	
Diadems		+	+	+	+	+	+	+	

its end to ca. 1944–1823 BC.[210] Thus, the beginning of the Abashevo culture should be placed within the A1 phase. It is more difficult to match this with specific sub-phases since the number of types we can compare is very small. Simple rings and bracelets made of wire, tube-shaped pendants, as well as spiral pendants, rings, bracelets do not have a dating potential, since they existed in Europe from the Eneolithic to the end of the Br A phase, sometimes in the next phase B (Table 1). It is indicative that willow-leaf-shaped objects that existed in Central Europe up to subphase A1b inclusive are not characteristic of Abashevo. Double-hole plaques and grooved pendants in 1.5 revolution appeared from subphase A1b, existing until the end of the EBA, but grooved pendants with a reverse loop are known in complexes of subphases A1c and A2a. From subphase A1c, "eyeglasses-shaped" pendants also appeared. Diadems do not allow to specify the dating, since they are dated in Central Europe from subphase A1a to A2a. On these grounds, the migration of the Bell Beaker people and the beginning of Abashevo was dated to the beginning of the A1c subphase, as well as the beginning of Babino culture.[211] But, in the case of Abashevo, the number of compared types is not enough for reliable conclusions. Therefore, although Abashevo is synchronized with Lola, and therefore with Babino,[212] there are no reliable grounds for complete synchronization of the initial phases.

Central European migration to the Middle Volga had to be realized through the territory of Poland. It is noteworthy that in the final phase of the Iwno culture (2050/2000 – 1800 BC) in Northern Poland, there were Unětice influences, which are expressed in the appearance of some metal forms (daggers, adze-axes, rings with ears, bracelets, and pins with loop-shaped head).[213] This is close to the beginning of the Middle Volga Abashevo proposed by A.V. Epimakhov, and it is possible that we may put this into a single process. However, the appearance of Unětice objects in Poland during this period may also be explained by the relations caused by the amber trade.[214] In addition, in Abashevo ceramics there are few features comparable to those of Iwno, except for ornaments common in the BBC: zigzags, metopes, vertical and horizontal lines.[215] At the final stage of the BBC, pottery with "barbed wire" ornamentation appeared in Poland, which survives until the Trzyniec horizon.[216] This ornametation is not typical for Abashevo. Therefore, we may date a possible impulse before the beginning of this final phase. The absence of high beakers in Abashevo indicates the time of the late BBC or post-Bell-Beaker cultures. But this problem requires more detailed study.

Stone wrist-guards and bone V-perforated buttons characteristic of the BBC survive after 2300 BC only in the Unětice area up to 2000 BC.[217] They appeared in Babino, but they absent in Abashevo. Perhaps this is caused not by the later chronology of Abashevo, but by the more northerly original area. However, the question of both the original area and the lower date remains problematic.

No less problematic is the reason for this migration. R.A. Mimokhod explains this by the global climate crisis and aridization ca. 2200 BC.[218] But slow processes of climate deterioration cannot cause unexpected migration. Societies try to adapt to it. Usually migrations are associated with abrupt, even short, changes. On the other hand, under conditions of general aridity, such short-term deterioration could have been more destructive, but it is rather difficult to identify them from archaeological evidence. Therefore, this

[210] EPIMAKHOV 2020.
[211] GRIGORIEV 2019.
[212] MIMOKHOD 2013, 269.
[213] MAKAROWICZ 2003, 137, 138.
[214] CZEBRESZUK/SZMYT 2012, 169.
[215] MAKAROWICZ 2003, 138.
[216] CZEBRESZUK/SZMYT 2012, 166, fig. 11.
[217] HEYD *et alii* 2018, 6.
[218] MIMOKHOD 2018a; 2022, 136, 137.

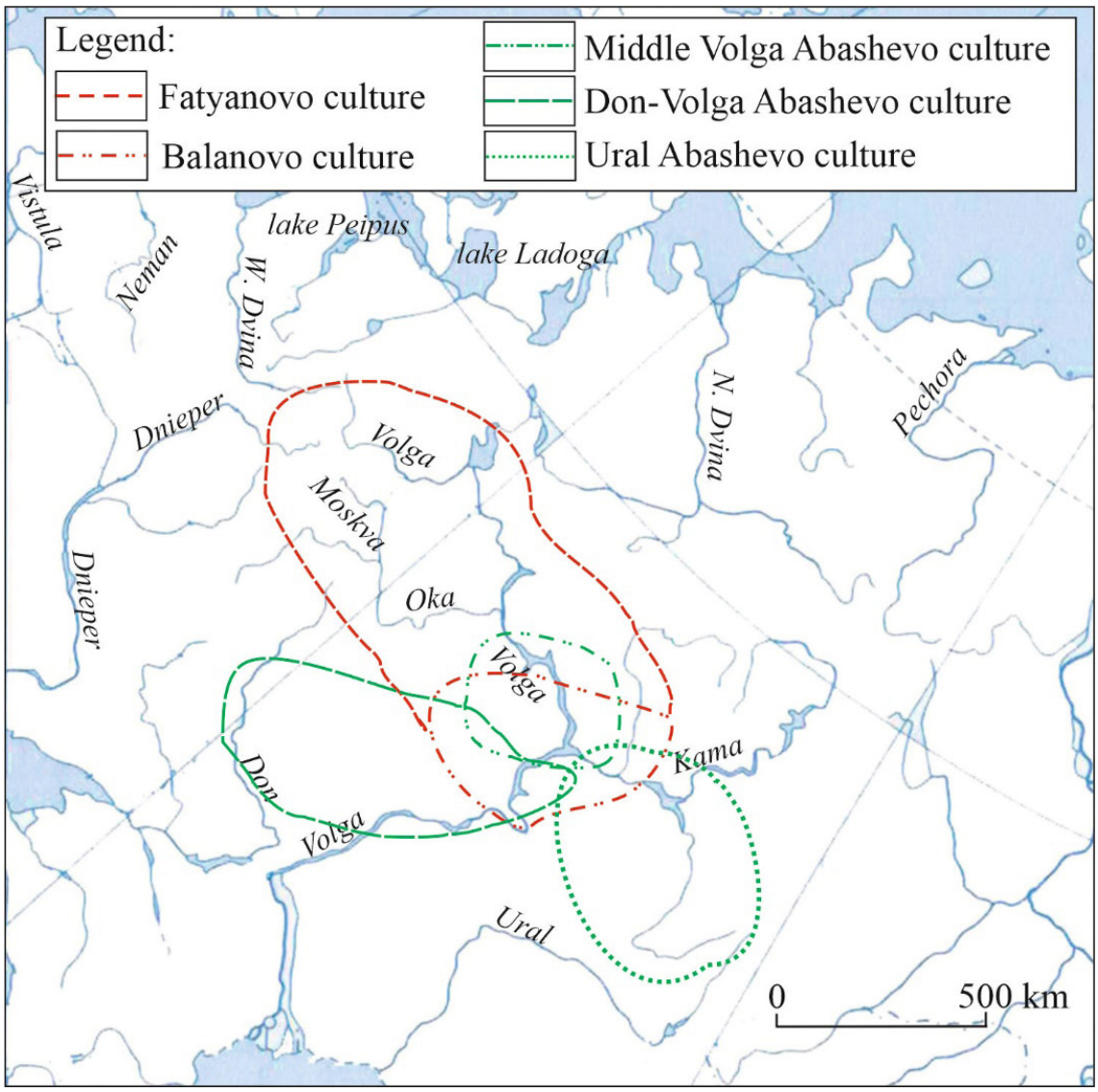

Fig. 8. Areas of Fatyanovo, Balanovo and Abashevo cultures.

crisis could not be the impetus for migrations, but it could create conditions for this.

Some later impulses are also possible with the further development of the Abashevo culture. In particular, burials extended on the back are known in the later Abashevo of the Middle Don, which is usually associated with the very early Eneolithic traditions of the region. However, it is impossible for chronological reasons. It is noteworthy that such burials are known in the Upper Rhine group in southwestern Germany, dated to phase A1 and the beginning of phase A2.[219] Therefore, it is possible that these burials of the Don reflect some later European relations, not necessarily with this group, which is characterized by the standard rite of burial on the side.[220]

I would like to emphasize one more aspect of the problem. Indo-European reconstructions widely use the opinion that the Abashevo culture was formed on the Fatyanovo basis. But the Middle Volga Abashevo was formed, rather, in the Balanovo area (Fig. 8). There is no reliable evidence that the end of Fatyanovo is close to the beginning of Abashevo. There must have been a chronological gap between them. They are quite different cultures, and some similarity in the ornaments on their ware was caused by the common Central European origins.

In the same period, the formation of Babino culture took place. This was the result of direct migration of the post-Corded Ware tribes from Central Europe, which interacted with the local Late Catacomb substrate.[221] The date of this migration is determined by the beginning of the A1c phase.[222] At an early stage of the culture, the binary opposition of the buried is preserved, but the faces are turned to the north, not to the south, as in the case of the CWC. But on the Volga, in the Alekseevsky III cemetery, belonging to the Volsk-Lbishche type, formed under the influence of Epi-Corded cultures of Central Europe, two groups of burials are distinguished, one of which is represented by contracted left-

[219] LUTTEROPP 2009, 344.
[220] LIßNER 2004, 4.
[221] LYTVYNENKO 2013.
[222] GRIGORIEV 2019.

sided sceletons with an eastern orientation of the head, and the second by right-sided ones with a western orientation. In this case, we also see the standard for the CWC facing south.[223]

Sites of the Volsk-Lbishche type have been found in the forest-steppe Volga-Urals. They are represented by settlements and flat cemeteries. Ceramics with thickened rims and combed ornaments have no previous analogues in the region. Other finds include large "eyeglasses-shaped" pendants; spiral pendants with forged willow-leaved or spiral-wrapped ends; platelets with holes; moon-shaped pendants; pendants in 1.5 revolutions; knives, and an adze. Axes of the Fatyanovo-Balanovo type were found. These sites are synchronized with Poltavka and partly with Abashevo, and it is believed that they were formed as a result of the impact of the Corded Ware cultures of Central Europe on the local substrate.[224] However, this problem has been extremely poorly studied, perhaps this cultural group is heterogeneous, and judging by finds of its pottery in other complexes, it belongs to the post-Catacomb period, to the late 3rd – early 2nd millennia BC.[225] Thus, it can fit into the migration wave associated with the spread of Babino culture.

Thus, near the beginning of the A1c phase, new large-scale migrations take place from the post-Corded and post-Bell-Beaker areas of Central Europe, which led to significant transformations in the vast forest-steppe and forest spaces of Eastern Europe.

9. THE PROCESSES OF ETHNOGENESIS IN EUROPE IN THE 3RD MILLENNIUM BC

9.1. "KURGAN THEORY" AND THE PROBLEM OF ITS ADEQUACY

Ideas about the spread of the Indo-Europeans from the steppe and the connection with the kurgan cultures were formulated by M. Gimbutas[226] and quickly became popular. In a more detailed form, this concept was proposed by D. Anthony and subsequently supported by many other scholars. Anthony connects the penetration of the Suvorovo-Novodanilovka complex into the Balkans ca. 4300–3900 BC with the stage of archaic PIE and sees this as a separation of pre-Anatolian languages.[227] There are two contradictions in this: archaeological and linguistic. The first is connected with the fact that this penetration was insignificant, and this complex did not affect the cultural situation in the Balkans. The second contradiction is due to the fact that the Anatolian languages had to be formed in isolation from the rest of the PIE area for a very long time. Their specificity allows them to be taken out of the other IE languages and to be considered as separated from an earlier Proto-Indo-Hittite language.[228] But these Eneolithic populations were in direct contacts with other steppe Eneolithic groups.

Yamnaya people in the east, according to Anthony, became the basis for the separation of Indo-Iranian languages. The Yamnaya's contacts with the Eastern Corded Ware people, who were already Indo-Europeans, lead to the isolation and spread of dialectal ancestors of the Germans, Slavs and Balts, and on the Upper Dniester of the Celts and Italics. The Funnel Beaker substratum also took part in the formation of the Germans, and the Tripolye substratum was also involved in the formation of the Balts and Slavs. The Fatyanovo culture is formed from the Middle Dnieper culture and other CWC and GAC groups, and its movement to the east, to the region of the Baltic river-names, means the separation of Balts. The Yamnaya culture of Hungary marks the separation of pre-Celtic and pre-Italic dialects, and contact with the BBC contributed to the spread of Celtic languages to the west. The emergence of Abashevo is associated with the Yamnaya-Poltavka cultural bloc, and ideas about the formation of Sintashta on the basis of Abashevo and the connection of Sintashta with the Indo-Iranians made it possible to assume that Abashevo people spoke Indo-Iranian.[229]

It is interesting that in this theory, and in others similar to it, the ideas about the genetic series of cultures "Fatyanovo – Abashevo – Sintashta – Andronovo" coexist peacefully with the "Baltic-speaking" Fatyanovo people and the "Indo-Iranian-speaking" Abashevo people.[230] At the same time, as we discussed above, Fatyanovo has no relation with Yamnaya, Abashevo with Fatyanovo, the formation of Sintashta from Abashevo has no basis, and the term "Andronovo culture" is such a complex and contradictory construct that experts who realy study it, either not used this term, or use in a completely different context than it is customary in Western literature or in Indo-European reconstructions.[231] In the latter, as a rule, ideas about cultural genesis in Eurasia are based on ideas that arose in the 60–70s of the last century. Even then, they were not the only or even dominant ones. In real modern studies, most of them are discussed only in the section of historiography, but it is on them that reconstructions of the Indo-European ethnogenesis are built. In Eurasia, the flows of culture and genes were directed from south to north. The penetration of the Andronovo culture into India and Iran is absolutely illusory, and there is no evidence that the steppe population of Eastern Europe penetrated into Anatolia.[232] However, it does not follow from this fact that the steppe kurgan cultures did not speak Indo-European, and that they were not responsible for the Indo-Europeanization of Europe, which, however, does not mean that, at least in this part, the "Kurgan theory" is right: in relation to Europe, we see a series of similarly poorly substantiated ideas.

According to the "Kurgan theory", the penetration of Yamnaya people was the basis for the subsequent dialectal division of the IE languages. But, as we have seen, this penetration left noticeable traces only in Pannonia, it practically did not affect the CWC cultural genesis. It should

[223] LITVINENKO 2006, 218, 221, 228–233.
[224] VASIL'EV 2003.
[225] LOPATIN 2012; MIMOKHOD 2018b.
[226] GIMBUTAS 1994.
[227] ANTHONY 2007, 251, 259–262.
[228] KLOEKHORST 2016, 213, 229, 232.
[229] CARPELAN/PARPOLA 2001, 63–67, 84–88, 93–95; ANTHONY 2007, 306, 344, 348, 360, 367, 380.
[230] See also KRAINOV 1987, 74; NORDQVIST/HEYD 2020, 65, 82, 83; GRUNTHAL *et alii* 2022, 13.
[231] See GRIGORIEV 2021c.
[232] GRIGORIEV 2021a.

be noted that in no case is the connection of any culture with a particular language supported by arguments. This is done exclusively on the basis of spatial relationship of these cultures and much later fixations of languages in certain areas. But it is hard to believe that the formation of the European ethnic landscape took place only in the 3rd millennium BC, and was not associated with later processes. The idea that the Celtic languages moved westward through the contacts between the CWC and BBC in Central Europe is rather dubious. It looks like the Bell Beaker people who spoke some other languages moved east and north, came into contact with the CWC people, adopted their language and spread it back to the Atlantic coast. In real ethnic processes, this is impossible. In any case, such statements require at least minimal evidence.

There are also problems with the chronology of dialectal divison of languages of the European group (very different, and not originated from a single root). In particular, if this process began ca. 3000 BC, the formation of Fatyanovo occurred shortly thereafter. This means that it took no more than 200 years for the separation of Baltic dialects, which is unbelievable. The connection of Abashevo with the Indo-Iranians also seems doubtful for several reasons: 1) Abashevo did not play a significant role in the Sintashta cultural genesis, 2) the idea of the Indo-Iranian belonging of Sintashta, although possibly fair, is based on dubious argumentation, 3) the almost simultaneous separation of Indo-Iranian languages and all other languages, is doubtful and not confirmed by glottochronology, 4) Abashevo's cultural genesis was connected with the BBC; therefore, within the framework of this theory, we must assume either the coming of Celts or some pre-IE groups. Finally, in my opinion, before the division into these branches began, there must have been some intermediate stages, with division into separate dialectal areas. This scheme has many other problems. It is entirely speculative, and is not supported by the evidences both linguistics and archeology. In my opinion, at that time the penetration of the Indo-Europeans into Europe took place, but this must be substantiated; and it was not at all necessary that they were ancestors of the Balts, Slavs or Celts.

9.2. ANCIENT LANGUAGE LAYERS IN EUROPE

Before starting the discussion of ethnic interpretations in the Corded Ware period, it is necessary to try to assess a possible ethnic landscape in Europe before this. According to C. Renfrew, the coming of Anatolian populations at the beginning of the Neolithic resulted in the spread of Indo-European languages.[233] However, in the Near East, the Indo-European homeland is located not in Asia Minor, but to the east, in Upper Mesopotamia.[234] Historically, Asia Minor was inhabited by people who spoke the North Caucasian languages (Hatti and Hurrians), and from there speakers of these languages migrated to the North Caucasus.[235] It is very likely that Etruscan belongs to these languages, which corresponds to the ancient ideas about the Asia Minor origins of the Etruscans.[236] The North Caucasian languages began to separate in the late 6th – early 5th millennia BC;[237] accordingly, the migration to Europe led to the spread of languages of an earlier state.

The North Caucasian languages, the Yenisei languages in Middle Siberia, the Basque in Iberia, and the Na-Dene in North America form the Dene-Caucasian language group.[238] Gamkrelidze and Ivanov suggested that a language closely related to Basque had previously been widespread in Atlantic Europe and was associated with the builders of European megaliths. It is also assumed that the Neolithic population of Europe spoke languages close to North Caucasian or Sumerian.[239] This is indirectly confirmed by the fact that megaliths are known only in areas where it is possible to reconstruct the presence of Dene-Caucasian languages, including in the Urals, and it is possible that the languages of ancient people of Sardinia and that of the Picts belonged to this group too.[240]

These are just assumptions and indirect data. But there are others. In Greece, a pre-Greek Anatolian substratum, probably Luwian, was originally identified. This conclusion was based on toponyms with the endings *-ss-*, *-nth-* and *-nd-*. In addition to Greece and southwestern Anatolia, the area of these toponyms also covers Macedonia, Thrace, and a part of Hungary.[241] Three successive language layers were then identified in Greece: 1) Pre-Indo-European, 2) Luwian, and 3) Greek.[242] The Luwian pre-Greek substratum is associated with the population that came to Greece from the north of the Balkan Peninsula at the beginning of the EBA, simultaneously with the appearance of speakers of other Anatolian dialects in Asia Minor.[243] Accordingly, this is an additional argument in favor of the idea that the Neolithic population of Europe did not speak IE languages, but in the northeast of the Balkans there was an area where Anatolian dialects separated. Their long isolation from other PIE dialects in the Near East determined the specificity of these languages. Their first appearance in the Balkans is also reflected in archaeological sources. If most of the European Neolithic cultures are connected with migrations from Asia Minor, in Bulgaria there were impulses with features of cultures from the more eastern areas of Anatolia and Mesopotamia, where I am inclined to place the IE homeland.[244] The subsequent migration of speakers of these dialects to Anatolia and Greece at the beginning of the EBA/EH was probably provoked by the Yamnaya migration to the Northern Balkans. Thus, the speakers of the Anatolian dialects were isolated from the rest of the PIE massif for at least 2000 years, which ensured their archaism and a special position in relation to other IE languages.

[233] RENFREW 1987.
[234] GAMKRELIDZE/IVANOV 1995; GRIGORIEV 2002, 320–325.
[235] NICHOLS 2019, 153, 154.
[236] IVANOV 1988.
[237] STAROSTIN 1988, 154.
[238] STAROSTIN 1982; BENGTSON 2004.
[239] GAMKRELIDZE/IVANOV 1995, 846; SCHRIJVER 2018, 360, 361.
[240] GRIGORIEV/VASINA 2019, 197–199.
[241] PALMER 1958.
[242] GINDIN 1967, 82, 94, 165–170.
[243] GRIGORIEV 2022, 11, 12.
[244] NIKOLOV 1984, 7, 17–19; 1989, 192, 193; PERNICHEVA 1995, 104; GRIGORIEV 2002, 326–328.

The presence of a pre-IE substrate is confirmed by the hydronymy of Europe. Previously, it was believed that there were no pre-Indo-European river-names in Europe, all names are associated with early IE dialects,[245] which could serve as proof of Renfrew's correctness. However, later it was shown that these names have a typological similarity with the Basque languages, but they were transformed by IE dialects.[246] The connection between the formation of the megalithic complex of the Urals and European megaliths made it possible to reconstruct the migration of speakers of the Proto-Yenisei dialects to the east,[247] which, like Basque, belong to the same Dene-Caucasian language family.

The Balto-Slavic-Germanic languages lacked their own words for the sea, marine coast and life on the marine coast, which means that their speakers had lived for some long time far inland. Many marine terms in the Germanic, Baltic and Finno-Ugrian languages of the Eastern Baltic area can be traced back to a common non-Indo-European and non-Finno-Ugric base. Some of the terms have an Indo-European nature, but they were borrowed from an earlier Indo-European source.[248] In Scandinavia and northern Germany, three consecutive language layers are distinguished on the basis of place-names: non-IE, pre-Germanic IE and proto- or early-Germanic.[249] This suggested that it was the second layer that was associated with the Corded Ware cultures.[250] It is possible that the transformation of the pre-IE river-names by early IE speakers[251] is connected precisely with this. Accordingly, the Neolithic population of Europe did not speak IE languages, and at least some of them belonged to the Dene-Caucasian languages. But more exact data on which Indo-European speakers transformed the Dene-Caucasian hydronymy of Europe are limited. It was suggested by linguists of the first half of the 20th century that this hydronymy has Illyrian features, but it is more accurately to name it "Indo-European".[252]

Based on all that has been said, the most likely hypothesis is that the population of Neolithic Europe spoke the languages of the Dene-Caucasian family, and it is possible that the Bell Beaker people also spoke languages of this group. In the north of the Balkans, in the Neolithic and Eneolithic, there lived tribes who spoke languages of the Anatolian branch of the IE family. The CWC people, and, accordingly, people of the Eneolithic kurgan cultures of the North Pontic region were Indo-Europeans.

9.3. LANGUAGES OF THE CORDED WARE, FATYANOVO AND ABASHEVO PEOPLE

In the case of the Fatyanovo-Balanovo and Abashevo migrations, it is rather difficult to judge what language these tribes eventually spread in Eastern Europe. The connection of the first group with the CWC traditions, and the second with the BBC, suggests that the former spoke some IE dialects, and the latter did some Dene-Caucasian one. The migration of speakers of the Dene-Caucasian languages to the east is proved by the presence of the Yenisei languages in Siberia. We explained this by the penetration of the Eneolithic megalithic complex from Europe into the Transurals, and pointed to the presence of Yenisei hydronyms in the Volga-Kama region, although the megalithic complex is absent there.[253] In fact, similar hydronymy is not necessarily associated with a single process. In addition, hydronymy, which can be compared with Yenisei, is much more widespread in Eastern Europe. It is connected with small rivers and streams, and covers a vast region of the forest zone: occasionally from areas east of Lake Peipus (Chudskoe) to areas southeast of Ladoga, and from the Moskva basin quite densely throughout the Volga-Kama region up to the Bashkir Urals. Single hydronyms are known in the Bityug basin in the Don region.[254] The most part of these river-names between the Moskva and Kama basins falls on areas where it can be explained both by the Fatyanovo-Balanovo and Abashevo presence, but those to the west – only by Fatyanovo, and in Bashkiria and on the Don – only by Abashevo (Fig. 8). It is possible to suggest two explanations, which cannot be verified at this stage: 1) this distribution reflects both processes, including some other processes; for example, in Eastern Europe there are some parallels to the Funnel Beaker ware;[255] 2) the people of both the Fatyanovo-Balanovo and Abashevo cultures spoke dialects close to the Proto-Yenisei languages, since ceramic types are far from always strictly related to the language situation. In addition, as we see in Greece, even in a small area, the process of ethnogenesis takes an extremely long time, despite the spread of similar cultural stereotypes.[256] However, the presence of Proto-Yenisei hydronymy in the Volga-Kama basin and Bashkiria, the connection of Abashevo with BBC, the formation of the BBC tradition primarily on the basis of the old Neolithic traditions in Europe, allows us to assume that the Abashevo people spoke a language of the Dene-Caucasian family. For the Fatyanovo people, this is also possible, since these river-names are also present in the Fatyanovo area, where there are no Abashevo sites. By the time of the Fatyanovo migration to the east, the Indo-Europeans might not have had time to assimilate the former substrate. The spread of cultural traditions was probably much faster than the spread of language, and as we have already discussed, it is unbelievable that the Baltic languages separated in this early period.

Paleogenetic studies allow us to state the closeness of the Balts and the Finno-Ugric peoples. This is explained by the fact that the Balts lived earlier in large areas of Eastern Europe, in contact with the Finno-Ugrians. At the same time, it is possible that the Balts assimilated some Finno-Ugric substratum in the Baltics.[257] The homeland of the Uralic languages, which includes Finno-Ugric, was located east of the Urals.[258] The desintegration of Proto-Uralic,

[245] KRAHE 1964.
[246] VENNEMANN 1994, 263, 264.
[247] GRIGORIEV/VASINA 2019, 197–199.
[248] SAUSVERDE 1996.
[249] WITCZAK 1996; OSTMO 1996, 33.
[250] GRIGORIEV 2002, 272.
[251] VENNEMANN 1994.
[252] KATIČIĆ 1976, 177.
[253] GRIGORIEV/VASINA 2019, 199.
[254] KUKLIN 2001, 10, 13, 14.
[255] See GRIGORIEV/VASINA 2019, 191–193.
[256] GRIGORIEV 2022.
[257] BALANOVSKII 2015, 167, 207.
[258] NAPOL'SKIKH 1997, 162, 163; HÄKKINEN 2012, 95.

according to most linguists, occurred between 4000 and 3000 BC.[259] Recently, a proposal has been made to date the desintegration of the Uralic within the interval of 2200–1900 BC, which is associated with the spread from east to west of the Seima-Turbino (ST) bronzes. These bronzes are considered as a marker of trade network that the speakers of the Uralic dialects owned, and through this network they spread the Uralic languages to the west and to the east.[260] In my opinion, this is a rather strange way of spreading languages, and the dating of language desintegration is made without sufficient grounds. In this case, the Balts, all the more, could not meet the Finno-Ugric substrate in Eastern Europe in the 3rd millennium BC.

We mentioned above that some of the words related to life by the sea were borrowed into the Germanic, Baltic and Finno-Ugric languages of the Baltic region from some non-IE language, and another part of words from an early IE source. The Baltic hydronyms in the forest zone of Eastern Europe are indeed widespread, but the distribution of the Balts could be associated with later events. An extensive literature is devoted to this problem, and its solution, in general, is outlined.

At the end of the 4th and in the 5th centuries AD in the forest zone of Eastern Europe (Upper Dnieper and Western Dvina), provincial Roman objects of Central European origins appeared in large numbers: new types of sickles, millstones, B-shaped fluted buckles, rye and oats, which is explained by powerful migrations from the Middle Vistula basin. It is assumed that before that, the Balts, represented by sites of the Dnieper-Dvina culture, lived here in the Early Iron Age, and these migrations are associated with the Western Balts and Slavs. As a result, local cultures were assimilated, and the Kolochi-Bantserovshchina-Tushemlya cultures formed in this area, as well as Moshchiny culture in the Oka basin, which had the Upper Oka culture as a local basis. Later (in the 11th – 13th centuries AD), some ornaments of these cultures are found among the Slavs-Krivichs, but are also known among the Lithuanians, which is explained by a certain relationship between the Krivichs and Lithuanians. To the northeast, in the area of Lake Ilmen, the Finno-Ugric peoples lived. At the end of the 1st – the beginning of the 2nd millennium AD, in the western part the northern border of the Balts-Latgalians was along the modern border with Estonia, and by this time they already occupied the territories of modern Lithuania and Latvia. The southern border of the Balts were the rivers Pripyat and Seim, where they bordered the Slavs. The infiltration of the Slavs into these territories began in the 6th century. This interpretation is confirmed by the hydronymy of the region.[261]

In these studies, hydronyms with finals *-va*, *-da* are considered as Baltic. But the latter are doubtful, and some of the hydronyms with *-va* are rather Slavic. Therefore, the Baltic hydronyms are localized from the Eastern Baltic to the Upper Dnieper, in the areas of the Brushed Pottery culture, the Dnieper-Dvina, Yukhnov and Late Dyakovo cultures of the early Iron Age. The inclusion of the Moshchiny culture of the Oka basin in the area of Baltic hydronyms is less reliable (Fig. 9).[262] To the east, these hydronyms are unknown, so their area does not correspond to the area of the Fatyanovo-Balanovo sites. Based on all of the above, we may conclude that the Fatyanovo people were not speakers of the Baltic or Balto-Slavic dialects. The latter penetrated into Eastern Europe in the Migration Period of the early Middle Ages.

This is also confirmed when referring to the problem of origins of the Slavs and Veneti. The Eastern Slavs, according to the early Russian Tale of Bygone Years, came from the Danube. On cultural features and on the basis of continuity with subsequent Slavic cultures in the 5th – 7th centuries, three groups of Slavs are distinguished, which, however, do not have a direct relation to their subsequent three language groups: 1) Prague-Korchak (from the Elbe to Pripyat, including the upper and middle reaches of the Vistula and Oder), 2) Prague-Penkovka (forest-steppe between the Dnieper and Danube), 3) northwestern area with pottery of the Sukow and Dziedzice types between the middle Oder and the middle Vistula). The first of these has roots in the Przeworsk culture of the southern half of Poland and Western Ukraine (Fig. 9).[263]

Traditionally, the homeland of the Slavs has been placed north of the Carpathians, from the Vistula (or Oder) to the middle Dnieper, including the Berezina and Desna, and Volhynia with Podolia in the south, although there is much discussion about the clarification of the boundaries and the connection with specific cultures.[264] In Eastern Europe in the first half of the 1st millennium AD, the Slavs occupied the territory between the middle Dnieper, the Dniester and the Bug, where the Zarubinets, Kyiv, and partly Przeworsk cultures were located.[265]

There is another point of view, suggesting the localization of the Slavs and Balts in the first half of the 1st millennium AD in the forest and partly forest-steppe zone of

[259] PARPOLA 2012, 144.

[260] GRUNTHAL *et alii* 2022. This idea is drawn from an earlier work, which suggested that the Seima-Turbino (ST) bronzes were the invention of the Abashevo metallurgists west of the Urals, and their distribution was linked to a trading network (CARPELAN/PARPOLA 2001, 105–109). In this work, the center of this network has been moved to the Transurals, and it is assumed that the Seimo-Turbino people, speakers of the Uralic languages, owned this network, were engaged in mining and metallurgy: "Uralic speakers were the prospectors, miners, boatsmen, trade managers, procurers, and first settlers of trading posts at major river confluences; the Indo-Iranian-speaking Sintashta culture and its successors financed prospecting, trade, and markets" (GRUNTHAL *et alii* 2022, 11). Based on the correlation of chemical compositions and typology of ST bronzes, it is well demonstrated that these objects are connected with the movement of people from Altai to the west (CHERNYKH/KUZ'MINYKH 1989). There are single inclusions of Sintashta metal objects in ST monuments, and *vice versa*, however, there is no typologically Sintashta object made of ST metal. For the ST sites of the Asian zone, Sintashta-Abashevo arsenic bronzes are not typical, but arsenic metal appears on the ST sites of the Volga-Kama region, due to the great distance from the tin sources of Altai. Moreover, in the Urals, there are no tin sources. There is a relationship, driven by technology and chemical processes, between the original ore, types of alloys and types of metal object (GRIGORIEV 2017; GRIGORIEV 2018). Seima-Turbino metallurgy could not have arisen in the Urals. Therefore, when searching for archaeological grounds for the localization of the Uralic and Finno-Ugric homeland, it would be better to turn to the system of cultural genesis of forest cultures in Northern Eurasia in the 4th – 2nd millennia BC, but not to the Seima-Turbino metal.

[261] SEDOV 1982, 29, 34, 39, 43, 44; 1987, 361–375; 2001, 81–85.

[262] GUSENKOV 2021.

[263] SEDOV 1982, 5, 10, 19, 28.

[264] GODŁOVSKI 1979; RUSANOVA 1993, 6–9.

[265] RUSANOVA 1993, 12.

Fig. 9. Slavic and Baltic cultures of Eastern Europe at the end of the early Iron Age – the beginning of the Middle Ages.

Eastern Europe, between the Western Bug and the Dniester in the west and the upper reaches of the Oka in the east. Their boundary in the north was the upper reaches of the Lovat and the Western Dvina. Such localization is based on the information of Roman authors, Tacitus (AD 23/24–79), Pliny the Elder (ca. AD 55–120), Claudius Ptolemy (d. ca. AD 179) and Jordanes (6th century AD) about the Veneti, by which the Slavs are understood. Some groups of Veneti also lived near the Baltic Sea to the east of the Vistula (Fig. 10). From this area at the end of the 5th – the first third of the 6th century, they spread in the Eastern Carpathian region and along the left bank of the lower Danube, which created the historical memory of their resettlement from there in Russian and Polish chronicles. It is assumed that the Balto-Slavs lived in Eastern Europe as early as the beginning of the 1st millennium BC, and this goes back as far as the CWC period.[266] D.N. Kozak understood the Przeworsk culture of the 2nd century BC – early 5th century AD as the Veneti-Slavs. This culture is located in the southern half of Poland, from where it spread into western Ukraine.[267] However, later, he connected the Veneti of Tacitus with the Zubritsky and Chernyakhov cultures, and the Przeworsk culture with the Germans.[268]

Attention is drawn to the change in the localization of the Veneti: according to Pliny the Elder and Clavidius Ptolemy, they lived east of the Vistula throughout the Venedian Gulf, and according to Jordan, vast areas of the Veneti extended north from the Carpathians and the upper Vistula. Roman road map of the late 3rd – early 4th centuries AD (Tabula Peutingeriana) places the Veneti in two areas: northwest of the Bastarni and next to the Getae and Dacians, i.e. between the Danube and the Dniester, which may reflect the movement of the Slavs to the south. However, in Roman sources, the Veneti and the Slavs are mentioned together as separate peoples, although Jordan suggests their origin from the same root, along with the Antes, and Procopius of Caesarea writes that they spoke the same barbarian language.[269] At the same time, it is assumed that the term "Veneti" was transferred from an older name, possibly, of the Celtic-Illyrian people.[270] In the Merovingian chronicles of the middle of the 7th c. AD, compiled by Fredegarius Scholasticus, the Winidi are repeatedly mentioned, and c. AD 623 there are three mentions of the Slavs, twice explained as "Sclavi cognomento Winidi". But there is never a mention of "Winidi cognomento Sclavi", which indicates a certain difference between them.[271]

Thus, written sources are generally consistent with archaeological ones, and allow us to place the homeland of the Slavs in the Vistula basin, in the Przeworsk culture area, from where they moved south and southeast during the Great Migration Period, i.e. simultaneously with the migration of the Balts to more northern regions. Since this culture was formed in the area and on the basis of the Pomeranian culture (7–3 centuries BC) (Fig. 9), that occupied the entire Vistula basin and reached the middle Oder, which corresponds to the earliest localization of the Veneti, it is possible that ethnogenesis of the Slavs and Balts took place in this area.

But one should pay attention to the fact that the term "Veneti" is "wandering". On the one hand, the Finns, Estonians and Karelians use it for Russia (respectively: *Venäjä*, *Vene* and *Veneä*). In medieval Germany, the term *Winidi* was somehow related to the Slavs. But the Vandals

[266] MACHINSKII 1989.
[267] KOZAK 1993, 53, 63.
[268] KOZAK 2008, 12, 42.
[269] GVOZDANOVIĆ 2012, 38.
[270] RUSANOVA 1993, 13.
[271] GVOZDANOVIĆ 2012, 398.

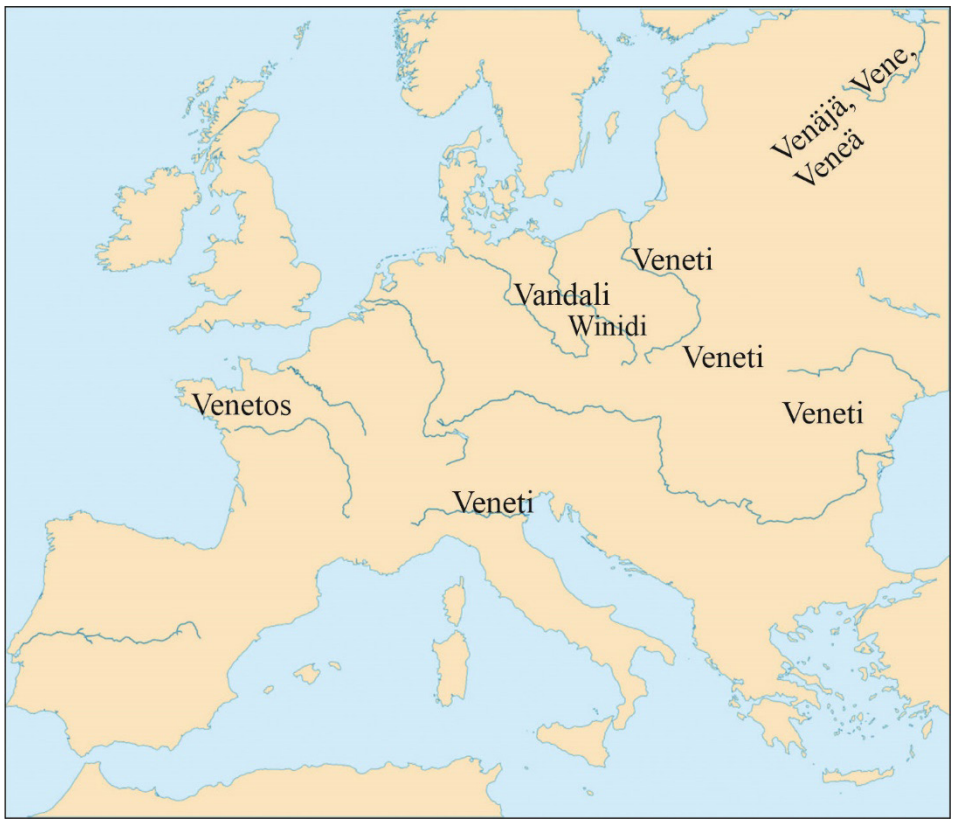

Fig. 10. Distribution areas of the ethnonym "Veneti".

were a Germanic tribe, although they came from the eastern regions adjacent to the Slavic area. And the Romans, starting with Caesar and up to the 5th century AD knew the Gallic tribe *Venetos* in Brittany. Therefore, the term itself is not a marker of any particular people (illustrative situation: Britons, Bretons and British, as well as Franks and French), and could, indeed, go back to some more ancient people who lived in Northern Europe.

The earliest appearance of this term is associated with the Veneti in northeastern Italy, in the area of modern Venice. There, in 200 short inscriptions attributed to 900–182 BC, the Venetic language is fixed. The early inscriptions are written using the North Etruscan alphabet, while the later ones are written in Latin. These data are very scarce, it is obvious that this is an IE language, and its relationship with Illyrian is assumed, although not everyone supports this. Connections with the Celtic and Italic languages are reconstructed, and some limited relations with the Germanic and Slavic ones, but there is no clarity on attributing it to any group.[272]

There is no information on Eastern European and Armorican Venetic, but reconstructions are possible on the basis of some phonological innovations in the Slavic languages and in the Vannetais dialect of Breton, which has a special position among the Celtic languages. These innovations are similar, and they have features of the Venetic of northeastern Italy. These features are more pronounced in the Slovene language, which was formed in a neighboring region in the northwestern Balkans. It is supposed that these innovations in all three areas were transferred to ca. mid-1st millennium BC from one language most comparable to Adriatic Venetic.[273] In my opinion, this indicates two things: 1) the existence of a large related substrate,[274] 2) the survival of its enclaves until the middle of the 1st millennium AD, which indicates an extremely low rate of language assimilations.

In this region of the lower reaches of the Po River, in the period synchronous with the beginning of the EH III in Greece, the Polada culture formed. Its formation was associated with migrations from the Danube region, and subsequently the cultural tradition developed on this basis there. This movement was caused by the coming of the Thracians in the region, and it also caused the displacement of the Illyrians from the same region to the south, up to Western Greece, and migration of the Mesapi to southeastern Italy. The latter is visible in the appearance of materials of the Cetina culture from the northwest of the Balkans.[275] The language of the latter was very close to Illyrian.[276] It was at this time (2300/2200–2200/2100 BC) that the final disappearance of post-Baden cultures took place, and new cultures formed in the Middle Danube: Early Nagyrév, Late Bell Beaker, Nitra, Proto-Aunjetitz, Nyírség, and Maros.[277]

Thus, the Veneti, Illyrians and Mesapi ca. 2200/2150 BC migrated from the Middle Danube, which in the previous time was most actively developed by the steppe groups. In addition, Veneti are present later in the areas of Corded Ware cultures, and some European hydronyms of this region maybe have Illyrian features. In addition, the Veneti and the Illyrians were close neighbors, and, according to some linguists, their languages were related (although the issue has

[272] MALLORY/ADAMS 1997, 620, 621; WALLACE 2004; GVOZDANOVIĆ 2012, 34–37.

[273] GVOZDANOVIĆ 2012, 42–45.

[274] The author of this study believes that Venetic was a special continental Celtic language (GVOZDANOVIĆ 2012, 37, 44, 45). I cannot discuss linguistic arguments; there is no agreement among linguists on this issue. But from the point of view of the historical model, it is difficult to imagine a special Celtic group that existed for such a long time, despite the Celtic migrations, and in different areas contributed to significant innovations in different languages. This picture indicates, rather, some early substrate. Based on the archaeological model discussed here, Venetic is more likely to be related to Illyrian. If this language were Celtic, we should expect similar innovations not only in Slavic but also in South German dialects. However, this problem must be solved by linguists.

[275] MONTANARI *et alii* 1996, 58; MARAN 1998, 315, 325–327; SESTIERI 2010, 21, 47; 2013, 635; GRIGORIEV 2022, 16.

[276] KATIČIĆ 1976, 132–146, 154–157, 163, 166, 175, 184–187; WILKES 1992, 68–80, 87, 183; MALLORY/ADAMS 1997, 288.

[277] HORVÁTH/SVINGOR 2015, 47.

not been finally resolved). Therefore, it can be assumed that in the late 4th – early 3rd millennia BC, the steppe tribes that came to the Danube spoke languages of the Venetic-Illyrian group, and their disintegration into Venetic and Illyrian took place already there. However, this question can only be solved by linguists. Some dialects of this group were also common in the CWC area. At the same time, it is very likely that the process of assimilation of the former population was very slow, and a change of culture does not always mean a change of language. In any case, there is no such data regarding the Fatyanovo and Abashevo people. Moreover, there is reason to suspect that they retained the language of the former Neolithic population.[278] R.A. Mimokhod believes that, since the Abashevo and Fatyanovo migrations started in Central Europe, and the Abashevo people assimilated part of the Fatyanovo-Balanovo population, this migration took place in a related language environment.[279] However, it does not follow from all that has been said that all this may indicate that the language landscape in Central Europe remained unchanged, since the distribution of similar river-names in the Fatyanovo and Abashevo areas discussed above might be resulted from different processes. Fatyanovo migration began shortly after the beginning of the CWC formation, and, despite the change in cultural stereotypes, language assimilation could not occur everywhere. It is possible that some groups that retained the former language were forced out to other regions. But by the Abashevo time, the situation in Central Europe had changed, and IE dialects dominated in most of the CWC area. The Neolithic language component (probably belonging to the Dene-Caucasian group) may have been introduced into Central Europe by a population with the Bell Beaker traditions.

As a result of these processes, the vast spaces of Northern, Central and Southeastern Europe were inhabited by tribes who spoke IE dialects. The spread of these dialects took over 1000 years. In genetic terms, they were ancestors of the later European populations: Balts, Slavs, Germans, Celts and Italics. However, these languages could not be formed from Venetic and Illyrian, and their appearance is associated with later events of the first half of the 2nd millennium BC. After that, probably, the further dialectal division and the formation of European languages known in historical time also took quite a long time. But the presence in Europe of a large previous IE substrate facilitated this process. On the other hand, new migrations from the east contributed to the growth of genetic similarity.[280]

10. CONCLUSIONS

Consideration of cultural processes in Europe within wide spatial and chronological boundaries allows us to reconstruct the ethnogenesis of European peoples in a new way. It began with the penetration of people from Anatolia into Europe at the beginning of the Neolithic. Most of them originated in Asia Minor and were speakers of the Dene-Caucasian languages, only after that, the remaining part of these languages in Asia Minor evolved into the Proto-North Caucasian. In Europe, descendants of these people are the Basques and Etruscans, but if the former are, apparently, the descendants of the first Neolithic wave, then the latter came from Asia Minor much later. At the same time, more eastern groups from Upper Mesopotamia also took part in the process of neolithization of the northeast of the Balkan Peninsula, due to which the isolation of the Anatolian dialects (ancestors of the future Hittite, Luwian and Palaic languages) took place on the territory of modern Bulgaria. Then they spread wider, up to Macedonia and part of Hungary, as indicated by the area of distribution of Anatolian toponyms. It is possible that during the period of the first penetration of the Eneolithic kurgan cultures into the region, this Anatolian substratum was represented by the Ezero and Coțofeni cultures, and possibly some others. The affinity of the language facilitated the formation of the Proto-Venetic and Proto-Illyrian population here. The spread of these peoples to other parts of Europe created the substrate on which later European dialects were superimposed. Thus, despite the difficulties in the spread of languages described in this article, in the case of Europe, this was facilitated by the fact that there were several successive layers of IE languages, which ensured this process.

Within the Eneolithic, especially in its late part, in the North Caucasus and the North Pontic region, waves of newcomers from the south, bearers of Caucasian-Iranian and Anatolian genes, as well as Proto-Venetic/Proto-Illyrian languages, were superimposed on the local substrates. As a result, the Maikop culture formed here (a language of whose speakers is completely unclear, but rather Indo-European), as well as many Late Eneolithic kurgan cultures. In the last quarter of the 4th millennium BC, the bearers of these cultures penetrated the Northern Balkans and the Middle Danube, and a process of cultural transformations began, which probably also reflects language assimilation. The result of this was the formation of a wide zone of permanent interaction from the North Caucasus to Central Europe and the Northern Balkans. Around 3000 BC there was a consolidation of the late Eneolithic groups of the Ponto-Caspian steppes with the formation of the Yamnaya culture. Additional influxes from the south are not excluded in this case, but require not only paleogenetic, but also serious archaeological justification. There was a new, massive penetration of the steppe population into the Balkan-Carpathian region, which caused the displacement of the former population (descendants of local and steppe Eneolithic tribes) to the north and the beginning of the Corded Ware cultures formation in Central and Northern Europe. This led to a significant spatial distribution of these early IE dialects. The process was also intensified by the fact that constant interaction with the original area was established, which ensured the influx of new people. This was a fairly common scheme of ethnogenesis in antiquity, since we see something similar in Greece. However, this process, as in Greece, was extremely slow. In any case, the migration of the Fatyanovo culture from the Corded Ware area probably

[278] I must point to one contradiction: the designation of Russians by terms going back to "Veneti" in the Baltic Finnish and Karelian languages. This may indicate that the Fatyanovo people nevertheless brought the IE language to this area, but it is also very likely that this term was introduced much later.
[279] MIMOKHOD 2022, 138, 139.
[280] GRIGORIEV 2002; GRIGORIEV 2021a, 217, 218.

reflects the coming of people who spoke the old dialects of Neolithic Europe. Therefore, we have no guarantee that the CWC people in all areas spoke IE languages. The second consequence of the steppe penetration to the north of the Balkans was the displacement of the speakers of Anatolian dialects from there to Asia Minor and Greece.

After the middle of the 3rd millennium BC, the Bell Beaker people, who spoke the languages of Neolithic Europe, penetrated into Central Europe. However, in this case, we deal with a somewhat different phenomenon, since no Iberian genes appeared in Central Europe, but there was an increase in earlier Eneolithic genes. These groups coexisted with the main mass of the CWC people, but in some areas they could change the language situation. In any case, the Abashevo people, who migrated after that from Central Europe and inherited mainly the Bell Beaker cultural traditions, probably spoke the former languages of the Dene-Caucasian family, while the Babino people, close to the post-Corded Ware traditions, could be Indo-Europeans, although we have no ground to discuss this problem yet. These last two migrations (as well as migrations of the Veneti, Mesapi and Illirians to the south) were caused by the penetration of the Thracians from Anatolia, who displaced part of the population from the southeast of Central Europe. A completely different situation may have been in the British Isles, where the population changed with the coming of Bell Beaker people, but early IE hydronymy is also known there. Therefore, it is possible that the population came here from the Lower Rhine, subjected to cultural, but not linguistic assimilation. But such conclusions at the level of individual regions are already rather difficult, since the spread of culture does not fully reflect the spread of language, and, as we have seen, it occurs much faster than language assimilation. The latter, as we have seen in all examples, passed extremely slowly, and enclaves of former languages could survive for hundreds and thousands of years. In addition, it is possible that this did not happen everywhere and not in all cases. Therefore, the most general observations given here may not be applied to any region of Europe. Reconstruction of the real situation requires long and complex studies.

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REFERENCES

ALLENTOFT *et alii* 2015

Allentoft, M. *et alii*., Population genomics of Bronze Age Eurasia, *Nature* 522, 167–172.

ALLENTOFT *et alii* 2022

Allentoft, M. *et alii*., Population genomics of Stone Age Eurasia, *BioRxiv preprint*. Doi: https://doi.org/10.1101/2022.05.04.490594.

ALRAM-STERN 2004

Alram-Stern, E., *Die* Ägäische *Frühzeit, 2. Serie, Forschungsbericht 1975-2003, Die Frühbronzezeit in Griechenland mit Ausnahme von Kreta, Veröffentlichungen der Mykenischen Kommission 21* (Wien: Österreichische Akademie der Wissenschaften).

ALRAM-STERN 2014

Alram-Stern, E., Times of Change: Greece and the Aegean during the 4th Millennium BC. In: Horejs, B./Mehofer, M. (eds.), *Western Anatolia before Troy Proto-Urbanisation in the 4th Millennium BC? Oriental and European Archaeology. Vol. 1* (Wien: Österreichische Akademie der Wissenschaften), 305–328.

ANDREEVA 1977

Andreeva, M.V., K voprosu o yuzhnykh svyazyakh maikopskoi kul'tury [To the problem of southern connections of Maikop culture], *Sovetskaya arkheologiya* 1, 39–56.

ANTHONY 2007

Anthony, D.W., *The Horse, the Wheel, and Language: How Bronze Age riders from the Eurasian Steppes shaped the modern world* (Princeton: University Press).

BADER/KHALIKOV 1987

Bader, O.N./Khalikov, A.Kh., Balanovskaya kul'tura [Balanovo culture]. In: Bader, O.N./Krainov, D.A./Kosarev, M.F. (eds.), *Epokha bronzy lesnoi polosy SSSR* [Bronze Age of the forest belt] (Moscow: Nauka), 76–84.

BALANOVSKII 2015

Balanovskii, O.P., *Genofond Evropy* [European gene pool] (Moscow: KMK).

BALANOVSKY 2019

Balanovsky, O., Comments on the Caucasian Substrate Hypothesis, *Journal of Indo-European Studies* 47, 166–174.

BENGTSON 2004

Bengtson, J.D., Some features of Dene-Caucasian phonology (with special reference to Basque), *Cahiers de l'Institut de Linguistique de Louvain (CILL)* 30/4, 33–54.

BOL'SHOV 2003

Bol'shov S.V., Strukturoobrazuyushchie priznaki srednevolzhskoi abashevskoi kul'tury [Structure-forming features of the Middle Volga Abashevo culture]. In: Abashevskaya kul'turno-istoricheskaya obshchnost': istoki, razvitie, nasledie. Materialy mezhdunarodnoi nauchnoi konferencii [Abashevo cultural and historical community: origins, development, heritage. Materials of the international scientific conference], (Cheboksary: Chuvash. Gos. Inst. Gum. Nauk), 9–91.

BOL'SHOV 2008

Bol'shov, S.V., Otnositel'naya khronologiya srednevolzhskoi abashevskoi kul'tury [Relative chronology of the Middle Volga Abashevo culture], *Izvestiya Samarskogo nauchnogo centra Rossiiskoi akademii nauk* 10/4, 1265–1269.

BOL'SHOV 2010

Bol'shov, S.V., K voprosu o fat'yanovsko-balanovskoi kul'turno-istoricheskoi obshchnosti [To the question of the Fatyanovo-Balanovo cultural and historical community], *Izvestiya vysshikh uchebnykh zavedenii. Povolzhskii region. Gumanitarnye nauki* 3, 3–11.

BUCHVALDEK 1986

Buchvaldek, M., Die mitteleuropäische Schnurkeramik und das nördliche Schwarzmeergebiet, *Památky Archeologické* 2, 486–497.

BUDZISZEWSKI/WŁODARCZAK 2011

Budziszewski, J./Włodarczak, P., *Die schnurkeramischen Beile aus den kleinpolnischen Gräbern*. In: Beier, H.-J./Einicke, R./Biermann, E. (eds.), *Varia neolithica VII. Dechsel, Axt, Beil & Co-Werkzeug, Waffe, Kultgegenstand? Aktuellesaus der Neolithforschung* [Beiträge zur Ur- und Frühgeschichte Mitteluropas 63] (Langenweissbach: Beier&Beran), 55–64.

CARPELAN/PARPOLA 2001

Carpelan, Ch./Parpola, A., Emergence, contacts and dispersal of Proto-Indo-European, Proto-Uralic and Proto-Aryan in archaeological perspective. In: Carpelan, Ch./Parpola, A./Koskikallio, P. (eds.), *Early contacts between Uralic and Indo-European: Linguistic and Archaeological Considerations* [Suomalais-Ugrilaisen Seuran Toimituksia/Mémoires de la Société Finno-Ougrienne 242] (Helsinki: Suomalais-Ugrilainen Seura), 55–150.

CHARNYAŬSKI/VAITOVICH 2019

Charnyaŭski, M./Vaitovich, A., Kul'tura sharapadobnykh amfar i yae ŭplyvy na Belaruskim Paazer'i (pavodle materyyalaŭ Kryvinskaga tarfyanika) [Culture of Globular Amphorae and its influences on the Belarusian Lake District (according to materials of the Krivinsky peat bog)]. In: Szmyt, M./Chachlikowski, P./Czebreszuk, J./Ignaczak, M./Makarowicz, P. (eds.), *Vir bimaris: od kujawskiego matecznika do stepów nadczarnomorskich: studia z dziejów międzymorza bałtycko-pontyjskiego ofiarowane Profesorowi Aleksandrowi Kośko* (Poznań: Instytut Archeologii Uniwersytetu im. Adama Mickiewicza w Poznaniu), 609–620.

CHERNYKH 2010

Chernykh, E.N., Med' khvalynskikh mogil'nikov i ee paralleli (po dannym spektroanaliticheskikh issledovanii) [Copper of the Khvalynsk cemeteries and its parallels (according to spectral analyses)]. In: Agapov, S.A. (ed.), *Khvalynskie eneoliticheskie mogil'niki i khvalynskaya eneoliticheskaya kul'tura. Issledovaniya materialov* [Khvalynsk Eneolithic cemeteries and the Khvalyn Eneolithic culture. Materials Research] (Samara: Povolzh'e), 219–233.

CHERNYKH/KUZ'MINYKH 1989

Chernykh, E.N./Kuz'minykh, S.V., *Drevnyaya metallurgiya severnoi Evrazii* [Ancient metallurgy of northern Eurasia] (Moscow: Nauka).

CZEBRESZUK 1991

Czebreszuk, J., Late horizon of the Globular Amphorae Culture versus other cultural structures of the Neolithic-Bronze Age interstage. Problem of system disintegration. In: Cofta-Broniewska, A. (ed.), *New tendencies in studies of Globular Amphorae culture* (Warsaw: Warsaw University), 113–136.

CZEBRESZUK/SZMYT 2008

Czebreszuk, J./Szmyt, M., Bell Beakers and their role in a settlement evolution during the Neolithic-Bronze interstage on the Polish Lowland. In: Baioni, M./Leonini, V./Lo Vetro, D./Martini, F./Poggiani Keller, R./Sarti, L. (eds.), *Bell Beaker in everyday life. Proceedings of the 10th Meeting "Archeologie et Gobelets" (Florence – Siena – Villanuova sul Clisi). May 12-15, 2006* (Firenze: Museo Fiorentino Di Preistoria «Paolo Graziosi»), 221–233.

CZEBRESZUK/SZMYT 2012

Czebreszuk, J./Szmyt, M., Bell Beakers and the cultural milieu of north European plain. In: Fokkens, H./Nicolis, F. (eds.), Background to Beakers. Inquiries into regional cultural backgrounds of the Bell Beaker complex (Leiden: Sidestone Press), 157–176.

CZEBRESZUK *et alii* 2019

Czebreszuk, J./Szmyt, M./Müller, J./Ławniczak, M., Late Neolithic and Early Bronze Age settlement archaeology on the Oder and Vistula Rivers in north-west Poland, *Tagungen des Landesmuseums* für *Vorgeschichte Halle* XX, 1–15.

DANI 2011

Dani, J., Research of Pit–Grave culture kurgans in Hungary in the last three decades. In: Pető, Á./Barczi, A. (eds.), *Kurgan Studies. An environmental and archaeological multiproxy study of burial mounds in the Eurasian steppe zone* (Oxford: British Archaeological Reports Publishing), 25–69.

EBERSCHWEILER 1999

Eberschweiler, B. Die jüngsten endneolithischen Ufersiedlungen am Zürichsee. Mit einem Exkurs von Eduard Gross-Klee: Glockenbecher: ihre Chronologie und ihr zeitliches Verhältnis zur Schnurkeramik aufgrund von C 14-Daten, *Jahrbuch der Schweizerischen Gesellschaft für Ur- und Frühgeschichte* 82, 39–54.

EPIMAKHOV 2020

Epimakhov, A.V., Radiouglerodnye argumenty abashevskogo proiskhozhdeniya sintashtinskikh tradicii bronzovogo veka [Radiocarbon Arguments of the Abashevo Origin of the Bronze Age Sintashta Traditions], *Ural'skij istoricheskii vestnik* 4/69, 51–60.

FRÎNCULEASA/PREDA/HEYD 2015

Frînculeasa, A./Preda, B./Heyd, V., Pit-Graves, Yamnaya and Kurgans along the Lower Danube: Disentangling IVth and IIIrd Millennium BC. Burial Customs, Equipment and Chronology, *Praehistorische Zeitschrift* 90/1-2, 45–113.

FURHOLT 2003

Furholt, M., Die absolutchronologische Datierung der Schnurkeramik in Mitteleuropa und Südskandinavien [Universitätsforschungen zur prähistorischen Archäologie 101] (Bonn: Dr. Rudolf Habelt).

FURHOLT 2008

Furholt, M., Die Złota-Gruppe in Kleinpolen: Ein Beispiel für die Transformation eines Zeichensystems?, *Germania* 86, 1–28.

FURHOLT 2019

Furholt, M., Re-integrating Archaeology: A Contribution to aDNA Studies and the Migration Discourse on the 3rd Millennium BC in Europe, *Proceedings of the Prehistoric Society* 85, 115–129.

FURHOLT 2020

Furholt, M., Social Worlds and Communities of Practice: a polythetic culture model for 3rd millennium BC Europe in the light of current migration debates, *Préhistoires Méditerranéennes* 8, URL: http://journals.openedition.org/pm/2383.

GAMKRELIDZE/IVANOV 1995

Gamkrelidze, T.V./Ivanov, V.V., *Indo-European and the Indo-Europeans: A Reconstruction and Historical Analysis of a Proto-Language and Proto-Culture* (Berlin: Moutin de Gruyter).

GERLING *et alii* 2012

Gerling, C./Banffy, E./Dani, J./Kohler, K./Kulcsar, G./Pike, A.W.G./Szeverenyi, V./Heyd, V., Immigration and transhumance in the Early Bronze Age Carpathian Basin: the occupants of a kurgan, *Antiquity* 86, 1097–1111.

GIMBUTAS 1956

Gimbutas, M., The prehistory of Eastern Europe. Mesolithic, neolithic and copper age cultures in Russia and the Baltic area [Harvard University Bulletin 20] (Cambridge, Mass.: Peabody Museum).

GIMBUTAS 1994

Gimbutas, M. *Das Ende Alteuropas. Der Einfall von Steppennomaden aus Südrußland und die Indogermanisierung Mitteleuropas* (Budapest: Archaeolingua).

GINDIN 1967

Gindin, L.A., *Yazyk drevnejshego naseleniya yuga Balkanskogo poluostrova* [*Language of the most ancient population of the south of the Balkan Peninsula*] (Moscow: Nauka).

GODŁOVSKI 1979

Godłovski, K. *Z badań nad zagadnieniem* rozprzestrzenienia Słowian w V-VII w. n.e. (Kraków: Wydawnictwo Akademii Górniczo-Hutniczej).

GÓRSKI *et alii* 2013

Górski, J./Jarosz, P./Tunia, K./Wilk, S./Włodarczak, P., New evidence on the absolute chronology of the early Mierzanowice culture in south-eastern Poland. In: Bartelheim, M./Peška, J./Turek, J. (eds.), *From Copper to Bronze Cultural and Social Transformations at the Turn of the 3rd/2nd Millennia B.C. in Central Europe* [Beiträge zur Ur- und Frühgeschichte Mitteleuropas 74] (Langenweissbach: Beier&Beran), 105–118.

GRIGORIEV 2002

Grigoriev, S.A., *Ancient Indo-Europeans* (Chelyabinsk: Rifei).

GRIGORIEV 2017

Grigoriev, S., Social processes in Ancient Eurasia and development of types of alloys in metallurgical production, *Archaeoastronomy and Ancient Technologies* 5/2, 17–44.

GRIGORIEV 2018

Grigoriev, S., Social processes in ancient Europe and changes in the use of ore and alloys in metallurgical production, *Archaeoastronomy and Ancient Technologies* 7/2, 1–30.

GRIGORIEV 2019

Grigoriev, S.A., Central European impulses in Eastern Europe in the early second millennium BC, *Slovenská Archeológia* 2, 225–239.

GRIGORIEV 2021a

Grigoriev, S.A. Archeology, language and genes: the Indo-European perspective, *Journal of Indo-European studies* 1/2.

GRIGORIEV 2021b

Grigoriev, S.A., The evolution of antler and bone cheekpieces from the Balkan-Carpathian region to Central Kazakhstan: chronology of "chariot" cultures and Mycenaean Greece, *Journal of Ancient History and Archaeology* 8/2, 148–189.

GRIGORIEV 2021c

Grigoriev, S., Andronovo Problem: Studies of Cultural Genesis in the Eurasian Bronze Age, *Open Archaeology* 7, 3–36.

GRIGORIEV 2021d

Grigoriev, S., Problema domestikacii loshadi na Blizhnem Vostoke v III tys. do n.e. [The problem of horse domestication in the Near East in the third millennium BC], *Ufimskii arheologicheskii vestnik* 21/2, 14–30.

GRIGORIEV 2022

Grigoriev, S., Origins of the Greeks and Greek dialects, *Journal of ancient history and archaeology* 1, 5–46.

GRIGORIEV/VASINA 2019

Grigoriev, S./Vasina, Yu., *Megaliths of the Vera Island in the Southern Urals* (Oxford: Archaeopress).

GROSS–KLEE 1999

Gross–Klee, E., Glockenbecher: ihre Chronologie und ihr zeitliches Verhältnis zur Schnurkeramik aufgrund von C 14-Daten, *Jahrbuch der Schweizerischen Gesellschaft für Ur- und Frühgeschichte* 82, 55–64.

GRUNTHAL *et alii* 2022

Grunthal, R./Heyd, V./Holopainen, S./Janhunen, J.A./Khanina, O./Miestamo, M./Nichols, J./Saarikivi, J./Sinnemaki, K., Drastic demographic events triggered the Uralic spread, *Diachronica* 39/4, 1–34. Doi: https://doi.org/10.1075/dia.20038.gru.

GUSENKOV 2021

Gusenkov, P.A., Eshche raz o gidronimii «zapadnobaltiiskogo» tipa v srednei polose Rossii [Once again about hydronymy of the "Western Baltic" type in central Russia], *Voprosy onomastiki* 18/2, 67–87.

GVOZDANOVIĆ 2012

Gvozdanović, J., On the linguistic classification of Venetic, *Journal of Language Relationship* 7, 33–46.

HAAK *et alii* 2015

Haak, W. *et alii*, Massive migration from the steppe was a source for Indo-European languages in Europe, *Nature* 522(7555), 207–211.

HÄKKINEN 2012

Häkkinen, J., Early contacts between Uralic and Yukaghir. In: Hyytiäinen, T./ Jalava, L./Saarikivi, J./Sandman, E. (eds.), *Per Urales ad Orientem. Iter polyphonicum multilingue Festskrift tillägnad Juha Janhunen på hans sextioårsdag den 12 februari 2012* [Suomalais-Ugrilaisen Seuran Toimituksia/Mémoires de la Société Finno-Ougrienne 264] (Helsinki: Suomalais-Ugrilaisen Seura), 91–101.

HÄUSLER 2014

Häusler, A., Bemerkungen zu den ostlichen Regionalgruppen der schnurkeramischen Becherkulturen, *Jahresschrift* für *Mitteldeutsche Vorgeschichte* 94, 83–123.

HEGGARTY 2015

Heggarty, P., Prehistory through language and archaeology. In: *Bowern, C./Evans, B. (eds.), The Routledge Handbook of Historical Linguistics* (London: Routledge), 598–626.

HEYD 2016

Heyd, V., Das Zeitalter der Ideologien: Migration, Interaktion und Expansion im prähistorischen Europa des 4. und 3. Jahrtausends v. Chr. Transitional landscapes: the 3rd millennium BC in Europe. In: Furholt, M./Großmann, R./Szmyt, M. (eds.), *Proceedings of the International Workshop "Socio-Environmental Dynamics over the Last 12,000 Years: The Creation of Landscapes III (15th – 18th April*

2013)" in Kiel (Bonn: Dr. Rudolf Habelt), 53–84.

HEYD 2021

Heyd, V., Yamnaya, Corded Wares, and Bell Beakers on the move. In: Heyd, V./Kulcsár, G./Preda-Bălănică, B. (eds.), *Yamnaya interactions. Proceedings of the International Workshop held in Helsinki, 25–26 April 2019* (Budapest: Archaeolingua), 383–414.

HEYD *et alii* 2018

Heyd, V./Fokkens, H./Kristiansen, K./Sjögren, K.-G., SI 1. Archaeological background of the Beaker Complex, *Nature* 555, 190–196.

HORVÁTH/SVINGOR 2015

Horváth, T./Svingor, É., The spatial and chronological distribution of the so-called "Baden culture". In: Nowak, M./Zastawny, A. (eds.), *The Baden culture around the Western Carpathians*, *Via Archaeologica. Źródła z badań wykopaliskowych na trasie autostrady A4 w Małopolsce* (Kraków: Krakowski Zespół do Badań Autostrad, Instytut Archeologii Uniwersytetu Jagiellońskiego, Instytut Archeologii i Etnologii PAN Oddział w Krakowie, Muzeum Archeologiczne w Krakowie), 19–74.

IVANOV 1988

Ivanov, V.V., Drevnevostochnye svyazi etrusskogo yazyka [Near Eastern relations of the Etruscan language]. In: Bongard-Levin, G.M./Ardzinba, V.G. (eds.), *Drevnij Vostok: etnokul'turnye svyazi* [*Ancient East: ethnocultural relations*] (Moscow: Nauka), 215–216.

IVANOVA *et alii* 2014

Ivanova, S./Kos'ko, O./Vlodarchak, P., Komponent traditsiĭ shnurovoĭ keramiki. Amfory u pokhovannyakh yamnoĭ kul'tury pivnichno-zakhidnogo Prichornomor'ya [Component of the Corded Ware traditions. Amphorae in burials of Yamnaya culture in the North-west Pontic]. In: Kosko, A./Potupczyk, M./Razumow, S. (eds.), *Naddniestrzanskie kompleksy cmentarzysk kurhanowych spolecznosci z III i z pierwszejpolowy II tysiąclecia przed Chr. w okolicach Jampola, obwod winnicki. Z badan nadpolnocno-zachodnią rubiezą osadnictwa spolecznosci krggu kultur „wczesnobrązowych" strefypontyjskiej* (Poznan: Nauka i innowacje), 351–386.

IVANOVA 2009

Ivanova, S.V., Istoricheskie processy v yugo-vostochnoi Evrope (eneolit - rannii bronzovyi vek) [Historical processes in southeastern Europe (Eneolithic – Early Bronze Age)]. In: Morgunova, N.L. (ed.), Problemy izucheniya kul'tur rannego bronzovogo veka stepnoi zony Vostochnoi Evropy [Problems of studying the cultures of the early Bronze Age in the steppe zone of Eastern Europe] (Orenburg: OGPU), 49–58.

IVANOVA 2012

Ivanova, S.V., Ob istokakh formirovaniya Budzhakskoi kul'tury [On the origins of the Budjak culture]. In: Tolochko, P.P. *et alii* (eds.), *Starozhitnosti stepovogo Prichornomor'ya i Krimu*, XVI (Zaporizhzhya: University), 18–47.

IVANOVA 2021

Ivanova, S.V., *Istoriya naseleniya Severo-Zapadnogo Prichernomor'ya v kontse IV–III tys. do n.e.* [The history of the population of the North-Western Black Sea region at the end of the IV-III millennium BC] (Zhitomir: Buk-Druk).

IVANOVA/NIKITIN/KIOSAK 2018

Ivanova, S.V./Nikitin, A.G./Kiosak, D.V., Mayatnikovye migracii v Cirkum-pontijskoj stepi i Central'noj Evrope v epohu paleometalla i problema genezisa yamnoj kul'tury [Pendulum migrations in the Circumpontic steppe and Central Europe in the era of paleometal and the problem of the Yamnaya culture genesis], *Arheologiya i davnya istoriya Ukraïni* [*Archeology and old history of Ukraine*] 26/1, 101–146.

JURAS *et alii* 2018

Juras, A./Chyleński, M./Ehler, E./Malmström, H./Żurkiewicz, D./Włodarczak, P./Wilk, S./Peška, J./Fojtík, P./Králík, M./Libera, J./Bagińska, J./Tunia, K./Klochko, V.I./Dabert, M./Jakobsson, M./Kośko, A., Mitochondrial genomes reveal an east to west cline of steppe ancestry in Corded Ware populations, *Nature, Scientific Reports*, 8:11603.

KAISER 2016

Kaiser, E., Migrationen von Ost nach West. Die Archäologie von Wanderungsbewegungen im 3. Jahrtausend v. Chr., *Mitteilungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* 37, 31–44.

KAISER/WINGER 2015

Kaiser, E./Winger, K., Pit graves in Bulgaria and the Yamnaya Culture, *Praehistorische Zeitschrift* 90/1-2, 114–140.

KATIČIĆ 1976

Katičić, R., *Ancient Languages of the Balkans* (The Hague, Paris: De Gruyter Mouton).

KENYON 1971

Kenyon, K.M., Syria and Palestina c. 2160–1780 BC. The Archaeological Sites. In: Edwards, I.E.S./Gadd, C.J./Hammond, N.G.L. (eds.), *The Cambridge Ancient History*, I/2 (Cambridge: University Press), 532–594.

KLEIN 2017

Klein, L.S., Yamnaya, ne yamnaya (obzor sovremennykh rabot o kurgannykh pogrebeniyakh Podunav'ya), *Stratum plus* 2, 361–378.

KLOCHKO/KLOCHKO 2013

Klochko, V./Klochko, L., Complex of Metal Goods between the Vistula and Dnieper Rivers at the turn of the 4th/3rd to the 3rd millennium BC. Concept of the Carpathian – Volhynia "Willow Leaf" Metallurgy Centre, *Baltic-Pontic Studies* 18, 39–71.

KLOCHKO *et alii* 2014

Klochko, V./Kos'ko, O./Razumov, S./Vlodarchak, P., Problema dnistrovs'ko-vislins'kogo shlyakhu u baltiis'kikh intruziyakh yamnoĭ i katakombnoĭ kul'tur. Suchasnii stan doslidzhen'. In: Kosko, A./Potupczyk, M./Razumow, S. (eds.), *Naddniestrzanskie kompleksy cmentarzysk kurhanowych spolecznosci z III i z pierwszejpolowy II tysiąclecia przed Chr. w okolicach Jampola, obwod winnicki. Z badan nadpolnocno-zachodnią rubiezą osadnictwa spolecznosci krggu kultur „wczesnobrązowych" strefypontyjskiej* (Poznan: Nauka i innowacje), 388–398.

KLOEKHORST 2016

Kloekhorst, A., The Anatolian stop system and the Indo-Hittite hypothesis, *Indogermanische Forschungen* 121/1, 213–247.

KOS'KO/RAZUMOV 2014

Kos'ko, O./Razumov, S., Visnovki. In: Kosko, A./Potupczyk, M./Razumow, S. (eds.), *Naddniestrzanskie kompleksy cmentarzysk kurhanowych spolecznosci z III i z pierwszejpolowy*

II tysiąclecia przed Chr. w okolicach Jampola, obwod winnicki. Z badan nadpolnocno-zachodniq rubiezq osadnictwa spolecznosci krggu kultur „wczesnobrqzowych" strefypontyjskiej (Poznan: Nauka i innowacje), 399–400.

KOZAK 1993

Kozak, D.N., Pshevorskaya kul'tura. In: Rusanova, I.P. Symanovich, E.A. (eds.), *Slavyane i ikh sosedi v kontse I tysyacheletiya do n.e. – pervoi polovine I tysyacheletiya n.e. Arheologiya SSSR* [Slavs and their neighbors at the end of the millennium BC - the first half of the millennium A.D. Archeology of the USSR] (Moscow: Nauka), 53–66.

KOZAK 2008

Kozak, D.N., *Venedi* (Kiev: IA NAN).

KRAHE 1964

Krahe, H., *Unsere ältesten Flussnamen* (Wiesbaden: Harrassowitz).

KRAINOV 1987

Krainov, D.A., 1987, *Fat'yanovskaya kul'tura*, In: Bader, O.N./Krainov, D.A./Kosarev, M.F. (eds.), *Epokha bronzy lesnoi polosy SSSR* [Bronze Age of the forest belt] (Moscow: Nauka), 58–76.

KRAINOV/GADZYATSKAYA 1987

Krainov, D.A./Gadzyatskaya, O.S., *Fat'yanovskaya kul'tura. Yaroslavskoe Povolzh'e, Svod arkheologicheskikh istochnikov* [Fatyanovo culture. Yaroslavl Volga region, Archaeological sources] (Moscow: Nauka).

KRENKE 2019

Krenke, N.A., Radiouglerodnaya khronologiya fat'yanovskoi kul'tury, *Rossiiskaya Arkheologiya* 2, 110–116.

KUKLIN 2001

Kuklin, A.N., Gidronimikon Volgo-Kam'ya na -sa, -za, *Linguistica Uralica* XXXVII/1, 10–22.

KUZNETSOV 2003

Kuznetsov, P.F., *K voprosu o khronologii abashevskoi kul'tury*. In: *Abashevskaya kul'turno-istoricheskaya obshchnost': istoki, razvitie, nasledie. Materialy mezhdunarodnoi nauchnoi konferencii* [Abashevo cultural and historical community: origins, development, heritage. Materials of the international scientific conference] (Cheboksary: Chuvash. Gos. Inst. Gum. Nauk), 86–88.

LIBRADO *et alii* 2021

Librado, P. *et alii,* The origins and spread of domestic horses from the Western Eurasian steppes, *Nature* 598, 1–24.

LINDERHOLM *et alii* 2020

Linderholm, A./Kilinç, G.M./Szczepanek, A./Włodarczak, P./Jarosz, P./Belka, Z./Dopieralska, J./Werens, K./Górski, J./Mazurek, M./Hozer, M./Rybicka, M./Ostrowski, M./Bagińska, J./Koman, W./Rodríguez–Varela, R./Storå, J./Götherström, A./Krzewińska, M., Corded Ware cultural complexity uncovered using genomic and isotopic analysis from southeastern Poland, *Nature, Scientific Reports*, 10:6885, Doi: https://doi.org/10.1038/s41598-020-63138-w.

LISSNER 2004

Lißner, B., Zu den frühbronzezeitlichen Gruppen in Süddeutschland, *Leipziger online-Beiträge zur Ur- und Frühgeschichtlichen Archäologie* 13, 1–20.

LITVINENKO 2006

Litvinenko, R.A., Opyt vyyavleniya prostranstvenno-semanticheskikh struktur v pogreba l'nom obryade kul'tury Babino [Experience in Revealing Spatial-Semantic Structures in the Funeral Rite of the Babino Culture]. In: Evglevskii, A.V. (ed.), *Strukturno-semioticheskie issledovaniya v arkheologii* 3 (Donetsk: DonNU), 215–236.

LOPATIN 2012

Lopatin, V.A., Vol'sko-lbishchenskii vektor kul'turogeneza [Volsk-Lbischche vector of cultural genesis], *Arkheologicheskoe nasledie Saratovskogo kraya*, 10 (Saratov: Poligrafia Povolzhya), 56–78.

LUTTEROPP 2009

Lutteropp, K., *Untersuchungen zu weiblichen und männlichen Bestattungen der Frühen Bronzezeit: Bestattungsgemeinschaften mit bipolar geschlechtsdifferenzierten Bestattungssitten und ihre Sozialstrukturen im Raum Niederösterreich*. Dissertation (Bonn).

LYTVYNENKO 2013

Lytvynenko, R.O., Central European parallels to the Dnieper-Don centre of Babyno Culture, *Baltic-Pontic studies* 18, 121–138.

MACHINSKII 1989

Machinskii, D.A., Territoriya «Slavyanskoi prarodiny» v sisteme geograficheskogo i istoriko-kul'turnogo chleneniya Evrazii v VIII v. do n. e. - XI v. n. e. (kontury kontsepcii) [The territory of the "Slavic homeland" in the system of geographical and historical-cultural division of Eurasia in the VIII century BC – XI century AD]. In: Gerd, A.S./Lebedev, G.S. (eds.), *Slavyane: etnogenez i etnicheskaya istoriya (mezhdisciplinarnye issledovaniya)* (Leningrad: Nauka), 120–130.

MAKAROWICZ 2003

Makarowicz, P., Northern and southern Bell Beakers in Poland. In: Czebreszuk, J./Szmyt, M. (eds.), *The Northeast Frontier of Bell Beakers* (Oxford: British Archaeological Reports), 137–154.

MALLORY 1989

Mallory, J.P., *In Searh of the Indo-Europeans. Language, Archaeology and Myth* (London: Thames & Hudson).

MALLORY/ADAMS 1997

Mallory, J.P./Adams, D.Q. (eds.), *Encyclopedia of Indo-European Culture* (London: Routledge).

MANZURA 2016

Manzura, I.V., North Pontic steppes at the end of the 4th millenium BC: the epoch of broken borders. In: Zanoci, A./Kaiser, E./Kashuba, M./Izbitser, E./Băț, M. (eds.), *Man, Culture and Society from the Copper Age until the Early Iron Age in Northern Eurasia. Contributions in honour of the 60th anniversary of Eugen Sava. Tyragetia International 1* (Chișinău: Bons Offices), 149–171.

MARAN 1998

Maran, J., *Kulturwandel auf dem griechischen Festland und den Kykladen im späten 3. Jahrtausend v. Chr.: Studien zu den kulturellen Verhältnissen in Südosteuropa und dem zentralen sowie östlichen Mittelmeerraum in der späten Kupfer- und frühen Bronzezeit* (Bonn: Dr. Rudolf Habelt).

MATHIESON *et alii* 2015

Mathieson, I., *et alii*, Genome-wide patterns of selection in 230 ancient Eurasians, *Nature* 528, 499–503.

MATHIESON *et alii* 2017

Mathieson, I., *et alii*, *The Genomic History of Southeastern Europe*, "BioRxiv preprint". Doi: http://dx.doi.

org/10.1101/135616.

MELLAART 1971

Mellaart, J., Anatolia c. 4000–2300 BC. In: Edwards, I.E.S./Gadd, C.J./Hammond, N.G.L. (eds.), *The Cambridge Ancient History* I/2 (Cambridge: University Press), 363–416.

METZINGER–SCHMITZ 2004

Metzinger–Schmitz, B., *Die Glockenbecherkultur in Mähren und Niederösterreich*. Dissertation. Saarbrücken.

MIMOKHOD 2013

Mimokhod, R.A., *Lolinskaya kul'tura. Severo-zapadnyi Prikaspii na rubezhe srednego i pozdnego periodov bronzovogo veka* [Lola culture. Northwestern Caspian at the turn of the middle and late periods of the Bronze Age] [Materialy i issledovanya po arkheologii 16] (Moscow: Nauka).

MIMOKHOD 2018a

Mimokhod, R.A., Paleoklimat i kul'turogenez v Vostochnoi Evrope v kontse III tys. do n.e. [Paleoclimate and cultural genesis in Eastern Europe at the end of the 3rd millennium BC], *Rossijskaya Arkheologiya* 2, 33–48.

MIMOKHOD 2018b

Mimokhod, R.A., Vol'sko-lbishchenskaya keramika v pogrebal'nyh kompleksakh: kul'turnye markery ili markery v kul'turakh? [Volsk-Lbischche ceramics in burial complexes: cultural markers or markers in cultures?], *Izvestiya Samarskogo nauchnogo tsentra Rossiiskoi akademii nauk* 20/3, 223–233.

MIMOKHOD 2022

Mimokhod, R.A., Srednevolzhskaya abashevskaya kul'tura i kul'tura kolokolovidnykh kubkov: nabroski k semeinomu portretu [Middle Volga Abashevo culture and the Bell Beaker culture: sketches for a family portrait], *Arkheologiya evraziiskikh stepei* 2, 122–150.

MOCHALOV 2008

Mochalov, O.D., *Keramika pogrebal'nyh pamjatnikov epohi bronzy lesostepi Volgo-Ural'skogo mezhdurech'ja* [Ceramics of burial monuments of the Bronze Age in the forest-steppe of the Volga-Ural interfluve] (Samara: SGPU).

MOLODIN *et alii* 2014

Molodin, V.I./Epimakhov, A.V./Marchenko, Zh.V., Radiouglerodnaya khronologiya kultur epokhi bronzy Urala i yuga Zapadnoy Sibiri: printsipy i podkhody. dostizheniya i problem [Radiocarbon Chronology of the Bronze Age Cultures of the Urals and the South of Western Siberia: Principles and Approaches, achievements and challenges], *Vestnik Novosibirskogo universiteta. Seriya: Istoriya. Filologiya* 13/3, 136–167.

MONTANARI *et alii* 1996

Montanari, G.B./Lucchese, A.L./Frontini, P./Gambari, F.M./Kaufmann, G./Marzatico, F./Kokelj, M.M./Nicolis, F./Odetti, G./Pedrotti, A./Salzani, L., L'Italia settentrionale. L'antica eta del bronzo. In: Cocchi Genick, D. (ed.), *Atti del Congresso di Viareggio, 9-12 Gennaio* (Firenze: Octavo F. Cantini), 57–78.

MORGUNOVA 2014

Morgunova, N.L., O kul'turnom statuse i khronologii pamyatnikov repinskogo tipa v Zavolzh'e i Priural'e, *Izvestiya Samarskogo nauchnogo centra Rossiiskoi akademii nauk* 16, 3(2), 585–591.

MÜLLER 2001

Müller, J., *Soziochronologische Studien zum Spätneolithikum im Mittelelbe-Saale-Gebiet (4100 – 2700 v. Chr.)* (Rahden: Leidorf).

MUNCHAEV 1981

Munchaev, R.M., Kuro-arakskaya kul'tura [Kura-Arax culture]. In: Kushnareva, K.Kh./Markovin, V.I. (eds.), *Epokha bronzy Kavkaza i Srednei Azii. Rannyaya i srednyaya bronza Kavkaza, Archeologiya SSSR* [The Bronze Age of the Caucasus and Central Asia. Early and Middle Bronze Age of the Caucasus, Archeology of the USSR] (Moscow: Nauka), 8–57.

NAPOL'SKIKH 1997

Napol'skikh, V.V. *Vvedenie v istoricheskuyu uralistiku* [Introduction to historical Uralistics] (Izhevsk: Udmurt Institute of History, Language and Literature).

NEDOLUZHKO *et alii*, 2014

Nedoluzhko, A.V./Bulygina, E.S./Sokolov, A.S./Tsygankova, S.V./Gruzdeva, N.M./Rezepkin, A.D./Prokhorchuk, E.B., Секвенирование полного митохондриального генома древнего человека, представителя новосвободненской культуры, указывает на ее возможную связь с культурой воронковидных кубков [Sequencing of the complete mitochondrial genome of ancient man of the Novosvobodnaya culture, indicates its possible connection with the Funnel Beaker culture], *Acta Naturae* 2(21)/6, 34–39.

NICHOLS 2019

Nichols, J., Comments on Allan Bomhard, "The Origins of Proto-Indo-European: The Caucasian Substrate Hypothesis", *Journal of Indo-European Studies* 47/1 & 2, 149–156.

NIGRO *et alii* 2019

Nigro, L./Calcagnile, L./Yasin, J./Gallo, E./Quarta, G., Jericho and the Chronology of Palestine in the Early Bronze Age: A Radiometric re-assessment, *Radiocarbon* 61/1, 211–241.

NIKOLOV 1984

Nikolov, V., Ranneneoliticheskie kul'tury v Zapadnoi Bolgarii, *Sovetskaya arkheologiya* 2, 5–21.

NORDQVIST/HEYD 2020

Nordqvist, K./Heyd, V., The forgotten child of the wider Corded Ware family: Russian Fatyanovo Culture in context, *Proceedings of the Prehistoric Society* 86, 65–93.

OLALDE *et alii* 2018

Olalde, I. *et alii*, The Beaker phenomenon and the genomic transformation of northwest Europe, *Nature* 555, 190–198.

OSTMO 1996

Ostmo, E., The Indo-European Question in a Norwegian perspective: a View from the Wrong End of the Stick? In: Jones-Bley, K./Huld, M. E. (eds.), *The Indo-Europeanization of Northern Europe* (Washington: Institute for the Study of Man), 23–41.

ÖZDOGAN 1991

Özdogan, M. Eastern Thrace before the Beginning of Troy I – an Archaeological Dilemma. In: Lichardus, J. (ed.), *Die Kupferzeit als historische Epoche. Symposium Saarbrücken und Otrenhausen. T. I.* (Bonn: Dr. Rudolf Habelt), 217–225.

PALMER 1958

Palmer, L.R., Luvian and Linear A, *Transactions of the Philological Society* 57, 75–100.

PAPAC *et alii* 2021

Papac, L. *et alii*, Dynamic changes in genomic and social structures in third millennium BCE central Europe, *Science*

Advances, 7: eabi6941.

PARPOLA 2012

Parpola, A., Formation of the Indo-European and Uralic (Finno-Ugric) language families in the light of archaeology: Revised and integrated 'total' correlations. In: Grünthal, R./Kallio, P. (eds.), *A Linguistic Map of Prehistoric Northern Europe* [Suomalais-Ugrilaisen Seuran Toimituksia/ Mémoires de la Société Finno-Ougrienne 266] (Helsinki: Suomalais-Ugrilainen Seura), 119–184.

PARZINGER 1993

Parzinger, H., *Studien zur Chronologie und Kulturgeschichte der Jungstein-, Kupfer- und Frühbronzezeit zwischen Karpaten und Mittleren Taurus* (Mainz am Rhein: Zabern).

PERNICHEVA 1995

Pernicheva, L. Prehistoric cultures in the Middle Struma Valley: Neolithic and Eneolithic. In: Bailey, D.W./Panayotov, I. (eds.), *Prehistoric Bulgaria* [Monographs in World Archaeology 22] (Madison: Prehistory Press).

PREDA–BĂLĂNICĂ *et alii* 2020

Preda–Bălănică, B./Frînculeasa, A./Heyd, V. The Yamnaya Impact North of the Lower Danube: A Tale of Newcomers and Locals, *Bulletin de la Société préhistorique française* 117/1, 85–101.

PRYAKHIN/KHALIKOV 1987

Pryakhin, A.D./Khalikov, A.Kh., Abashevskaya kul'tura [Abashevo culture]. In: Bader, O.N./Krainov, D.A./Kosarev, M.F. (eds.), *Epokha bronzy lesnoi polosy SSSR* [Bronze Age of the forest belt] (Moscow: Nauka), 124–131.

RASSAMAKIN 1994

Rassamakin, Yu., The main directions of the development of early pastoral societies of Northern Pontic zone: 4500-2450 B.C. (Pre-Yamnaya cultures and Yamnaya culture), *Baltic-Pontic Studies* 2, 29–70.

RASSAMAKIN 2012

Rassamakin, Yu., Eneolithic Burial Mounds in the Black Sea Steppe: from the First Burial Symbols to Monumental Ritual Architecture. In: Borgna, E./Müller Celka, S. (eds.), *Ancestral Landscape. Burial mounds in the Copper and Bronze Ages (Central and Eastern Europe – Balkans – Adriatic – Aegean, 4th-2nd millennium B.C.). Proceedings of the International Conference held in Udine, May 15th-18th 2008* [Travaux de la Maison de l'Orient et de la Méditerranée. Série recherches archéologiques, 58] (Lyon: Maison de l'Orient et de la Méditerranée Jean Pouilloux), 293–305.

REGEV *et alii* 2012

Regev, J./de Miroschedji, P./Greenberg, R./Braun, E./ Greenhut, Z./Boaretto, E., Chronology of the Early Bronze Age in the Southern Levant: new analysis for a high chronology, *Radiocarbon* 54/3-4, 525–66.

RENFREW 1987

Renfrew, C.A., *Archaeology and language: The puzzle of Indo-European origins* (London: Penguin Books).

REZEPKIN 2011

Rezepkin, A.D., *Novosvobodnenskaya kul'tura (na osnove materialov mogil'nika Klady), Trudy IIMK RAN* XXXVII (Sankt-Peterburg: IIMK).

RUSANOVA 1993

Rusanova, I.P., Vvedenie [Introduction]. In: Rusanova, I.P./Symanovich, E.A. (eds.), *Slavyane i ikh sosedi v kontse I tysyacheletiya do n.e. – pervoi polovine I tysyacheletiya n.e., Arkheologiya SSSR* [Slavs and their neighbors at the end of the 1st millennium BC – the first half of the 1st millennium AD, Archeology of the USSR] (Moscow: Nauka), 5–18.

RYNDINA 2010

Ryndina, N.V., Mednye nahodki Khvalynskogo I mogil'nika (itogi tekhnologicheskogo issledovaniya [Copper finds of the Khvalynsk cemetery (results of a technological study)]. In: Agapov, S.A. (ed.), *Khvalynskie eneoliticheskie mogil'niki i khvalynskaya eneoliticheskaya kul'tura. Issledovaniya materialov* [Khvalynsk Eneolithic cemeteries and the Khvalyn Eneolithic culture. Materials Research] (Samara: Povolzh'e), 234–256.

SAAG *et alii* 2021

Saag, L. *et alii*, Genetic ancestry changes in Stone to Bronze Age transition in the East European plain, *Science Advances* 7/4. DOI: 0.1126/sciadv.abd6535.

SAFRONOV 1989

Safronov, V.A., *Indoevropeiskie prarodiny* [Indo-European homelands] (Gor'kii: Volga-Vyatka publishing house).

SAUSVERDE 1996

Sausverde, E., Seewörter and Substratum in Germanic, Baltic and Baltic Finno-Ugric Languages. In: Jones-Bley, K./Huld, M. E. (eds.), *The Indo-Europeanization of Northern Europe* (Washington: Institute for the Study of Man), 133–146.

SCHRIJVER 2018

Schrijver, P., Talking Neolithic: The Case for Hatto-Minoan and its Relationship to Sumerian. In: Kroonen, G./Mallory, J.P./Comrie B. (eds.), *Talking Neolithic* (Washington: The Institute for the Study of Man), 336–74.

SCORRANO *et alii* 2021

Scorrano, G./Yediay, F.E./Pinotti, T./Feizabadifarahani, M./Kristiansen, K., The genetic and cultural impact of the Steppe migration into Europe, *Annals of Human Biology* 48/3, 223–233.

SEDOV 1982

Sedov, V.V., *Vostochnye slavyane v VII-XIII vv., Arkheologiya SSSR* [Eastern Slavs in the VIII-XIII centuries, Archeology of the USSR] (Moscow: Nauka).

SEDOV 1987

Sedov, V.V., Balty [Balts]. In: Sedov, V.V. (ed.), *Finno-ugry i balty v epokhu srednevekov'ya, Arkheologiya SSSR* [Finno-Ugrians and Balts in the Middle Ages, Archeology of the USSR] (Moscow: Nauka), 353–419.

SEDOV 2001

Sedov, V.V., Litva i krivichi, *Lietuvos Archeologija* 21, 81–88.

SESTIERI 2010

Sestieri, A.M.B., *L'Italia nell'età del bronzo e del ferro. Dalle palafitte a Romolo (2200-700 a.C.)* (Roma: Carocci editore).

SESTIERI 2013

Sestieri, A.M.B., Peninsular Italy. In: Fokkens, H./ Harding, A. (eds.), *The European Bronze Age* (Oxford: University Press), 632–652.

SOLOV'EV 2000

Solov'ev, B.S., *Bronzovyi vek Mariiskogo Povolzh'ya* [Bronze Age of the Mari Volga Region] (Joshkar-Ola: MarNII).

STAROSTIN 1982

Starostin, S.A., Praeniseiskaya rekonstruktsiya i vneshnie svyazi eniseiskikh yazykov [Pra-Yenisei reconstruction and

external relations of the Yenisei languages]. In: Ivanov, V.V./Toporov, V.N./Uspenskii B.A. (eds.), *Ketskii sbornik* (Leningrad: Nauka), 144-137.

STAROSTIN 1988

Starostin, S.A., Indoevropeisko-severokavkazskie izoglossy [Indo-European-North Caucasian isoglosses]. In: Bongard-Levin, G.M./Ardzinba, V.G. (eds.), *Blizhnii Vostok: etnokul'turnye svyazi* [Near East: ethnocultural relations] (Moscow: Nauka).

SUTER 2008

Suter, P.J., Das endeneolithische Becher-Phänomenon – alternative Vorstellung. In: Dörfler, W./Müller, J. (eds.), *Umwelt – Wirtschaft – Siedlungen im dritten vorchristlichen Jahrtausend Mitteleuropas und Südskandinaviens* (Neumünster: Wachholtz), 335–354.

SZMYT 2003

Szmyt, M., Verbreitung und Kontakte der Kugelamphorenkultur: Ein Blick auf die polykulturellen Peripherien, *Germania* 81, 401–442.

TASSI *et alii* 2017

Tassi, F. *et alii*, Genome diversity in the Neolithic Globular Amphorae culture and the spread of Indo-European languages, *Proceedings of the Royal Society B* 284: 20171540. http://dx.doi.org/10.1098/rspb.2017.1540.

VAITOVICH 2020

Vaitovich, A.U., Kul'tura sharapadobnyh amfar na terytoryi Zakhodnyaga Palessya: gistoryya vyvuchennya i suchasny stan dasledavannyaў [The Globular Amphorae culture in the territory of Western Polesie: the history and the current state of studies], *Chasopis Belaruskaga dzyarzhaўnaga ўniversiteta. Gistoryya* 2, 91–102.

VASIL'EV 2003

Vasil'ev, I.B., Vol'sk-Lbishche – novaya kul'turnaya gruppa epokhi srednei bronzy v Volgo-Ural'e [Volsk-Lbische – a new cultural group of the Middle Bronze Age in the Volga-Urals], In: Abashevskaya kul'turno-istoricheskaya obshchnost': istoki, razvitie, nasledie. Materialy mezhdunarodnoi nauchnoi konferencii [Abashevo cultural and historical community: origins, development, heritage. Materials of the international scientific conference] (Cheboksary: Chuvash. Gos. Inst. Gum. Nauk), 107–115.

VENNEMANN 1994

Vennemann, Th., Linguistic Reconstruction in the Context of European Prehistory, *Transactions of the Philolological Society* 92, 215–284.

WALLACE 2004

Wallace, R.E. Venetic. In: Woodard, R. (ed.), *The Cambridge encyclopedia of the World's Ancient Languages* (Cambridge: University Press), 840–856.

WANG *et alii* 2019

Wang Chuan-Chao *et alii*, Ancient human genome-wide data from a 3000-year interval in the Caucasus corresponds with eco-geographic regions, *Nature communications*. Doi.org/10.1038/s41467-018-08220-8.

WILKES 1992

Wilkes, J., The Illyrians (Cambridge, Ma.: Blackwell Publisher).

WITCZAK 1996

Witczak, K.T., The Pre-Germanic Substrata and Germanic Maritime Vocabulary. In: Jones-Bley, K./Huld, M. *E.* (eds.), *The Indo-Europeanization of Northern Europe* (Washington: Institute for the Study of Man), 166–189.

WŁODARCZAK 2001

Włodarczak, P., The Absolute Chronology of the Corded Ware Culture in South-eastern Poland. In: Czebreszuk, J./Müller, J. (eds.), *Die absolute Chronologie in Mitteleuropa 3000-2000 v. Chr*. (Poznań–Bamberg–Rahden: Leidorf), 103–129.

WŁODARCZAK 2006

Włodarczak, P., *Kultura ceramiki sznurowej na Wyżynie Małopolskiej* (Krakow: Instytut Archeologii i Etnologii Polskiej Akademii Nauk).

WŁODARCZAK 2008

Włodarczak, P., Kultura Złocka i problem genezy kultury ceramiki sznurowej w Małopolsce. In: Bednarczyk, J./Czebreszuk, J./Makarowicz, P./Szmyt, M. (eds.), *Na pograniczu światów. Studia z pradziejów międzymorza bałtycko-pontyjskiego ofiarowane Profesorowi Aleksandrowi Kośko w 60. rocznicę urodzin* (Poznań: Wydawnictwo Poznańskie), 511–532.

WŁODARCZAK 2010

Włodarczak, P., Dunajski szlak kultury grobów jamowych a problem genezy kultury ceramiki sznurowej. In: *Mente et rutro. Studia archeologica Johanni Machnik viro doctissimo octogesimo vitae anno ab amicis, collegis et discipulis oblate* (Rzeszów: Ressoviae), 299–325.

WŁODARCZAK 2012

Włodarczak, P. Die Gliederung der Schnurkeramik im Zürcher Raum und in Mitteleuropa – Probleme der Synchronisation. In: Boschetti-Maradi, A./De Capitani, A./Hochuli, S./Niffeler, U. (eds.), *Form, Zeit und Raum. Grundlagen für eine Geschichte aus dem Boden. Festschrift für Werner E. Stöckli zu seinem 65. Geburtstag* [Antiqua 50] (Basel: Archäologie Schweiz), 127–138.

WŁODARCZAK 2017

Włodarczak, P., Battle-axes and beakers. The Final Eneolithic societies. In: Urbańczyk, P. (ed.), *The past societies. 5500 – 2000 bc. Polish lands from the first evidence of human presence to the early Middle Ages* (Warszawa: Institute of Archaeology and Ethnology of the Polish Academy of Sciences), 275–336.

WŁODARCZAK 2021a

Włodarczak, P., Eneolithic and Early Bronze Age barrows in Vojvodina. In: Jarosz, P./Koledin, J./Włodarczak, P. (eds.), *Danubian route of the Yamnaya culture. The barrows of Vojvodina* (Budapest: Archaeolingua), 215–256.

WŁODARCZAK 2021b

Włodarczak, P., Eastern impulses in cultural and demographic change during the end of the south-eastern Polish Eneolithic. In: Heyd, V./Kulcsár, G./Preda-Bălănică, B. (eds.), *Yamnaya interactions. Proceedings of the International Workshop held in Helsinki, 25–26 April 2019* (Budapest: Archaeolingua), 435–462.

YAKAR 1991

Yakar, J., *Prehistoric Anatolia: The Neolithic Transformation and the Early Chalcolithic Period* (Tel Aviv: University Press).