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

ABSTRACT

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

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

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

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

Where did the population of the Yamna culture come from?

What was the purpose of their migration?

What were the interrelations between the natives and the newcomers?

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

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

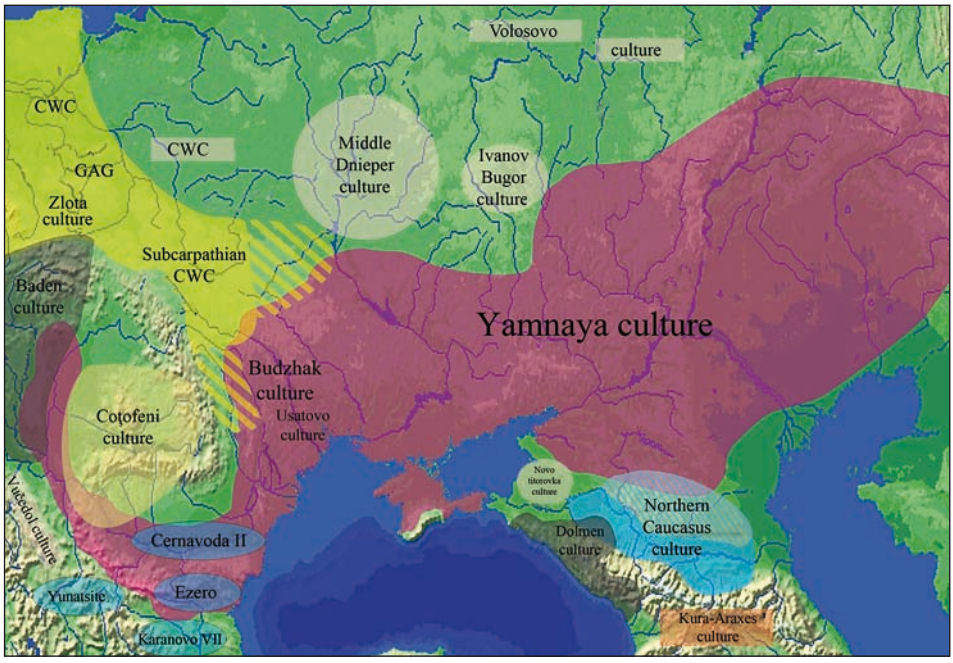

Fig. 1. Yamna cultural-historical area and the surrounding cultural environment. After Bruyako and Samoilova 2013, 346, map 2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. PEOPLE OF THE BUDZHAK CULTURE AS THE LOCAL INHABITANTS

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

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

2.1. The main characteristic of the Budzhak culture

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

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

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

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

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

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

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

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

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

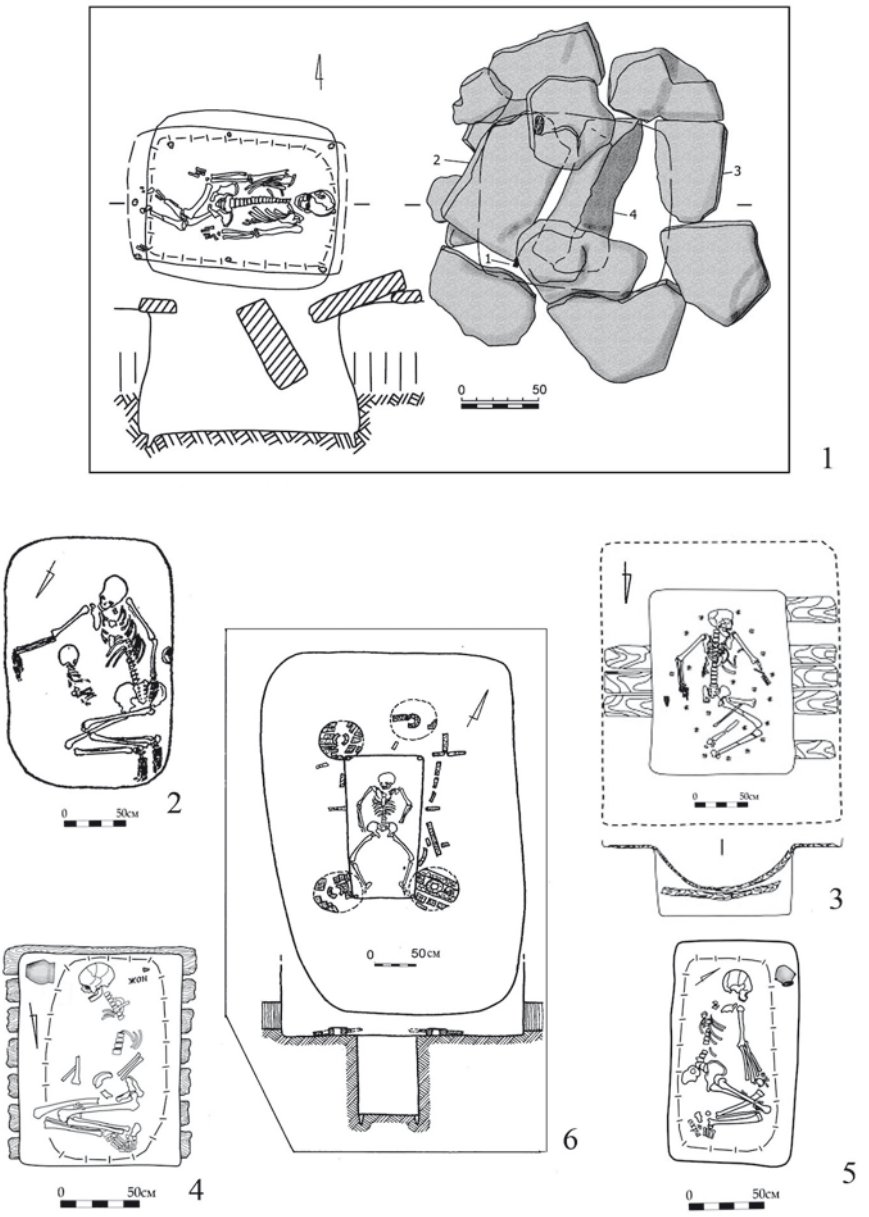

Fig. 2. Positions of the buried individuals inside the grave pits
1 – Tuzly 2/3 (after Razumov *et al.* 2015, 337, fig. 8); 2 – Nerushay 9/9 (after Yarovoy 1985, 71, fig. 14: 4); 3 – Cimișlia 6/9 (after Popovici and Ciobanu 2021, 189, fig. 47: 1); 4 – Semenivka 1/5 (after Subbotin *et al.* 2017, 28,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

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

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

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

Grave goods. There are several categories of funerary inventory.

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

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

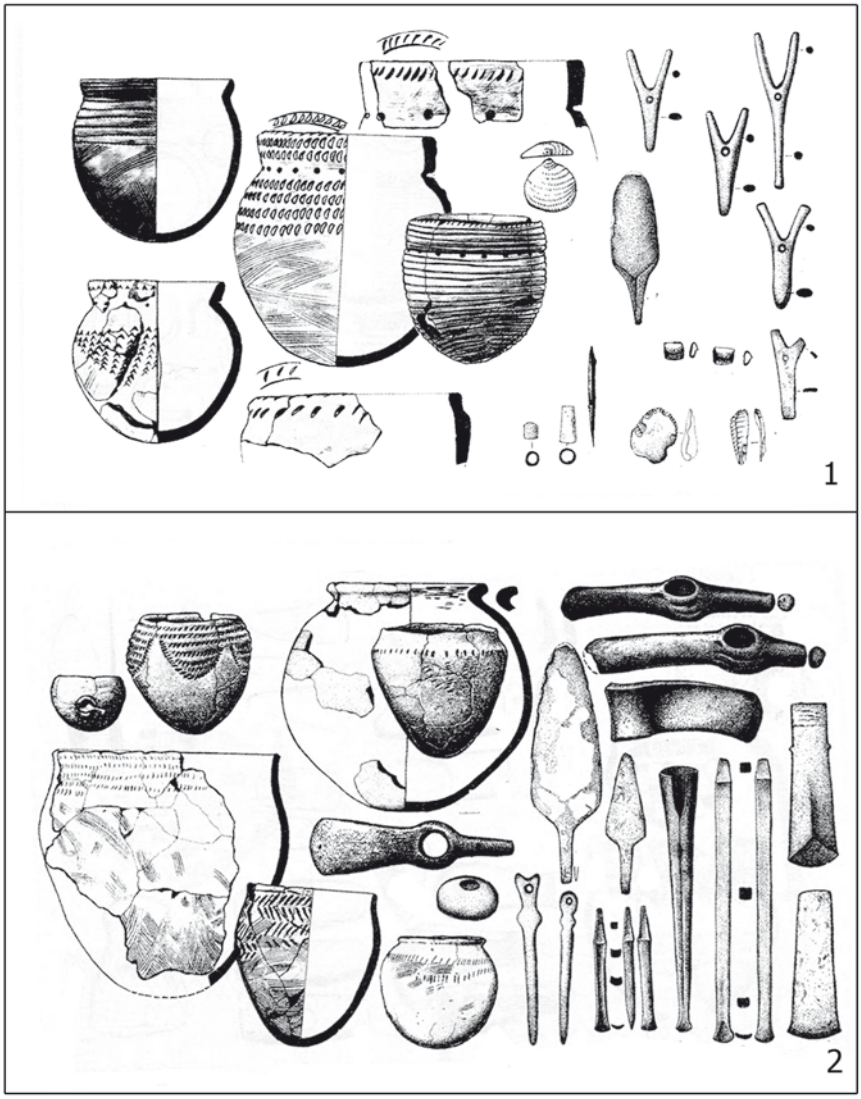

Fig. 3. Main characteristics of the Yamna culture of the steppe Urals: early (1) and late (2) stages. After Bogdanov 2004, 278, fig. 92

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

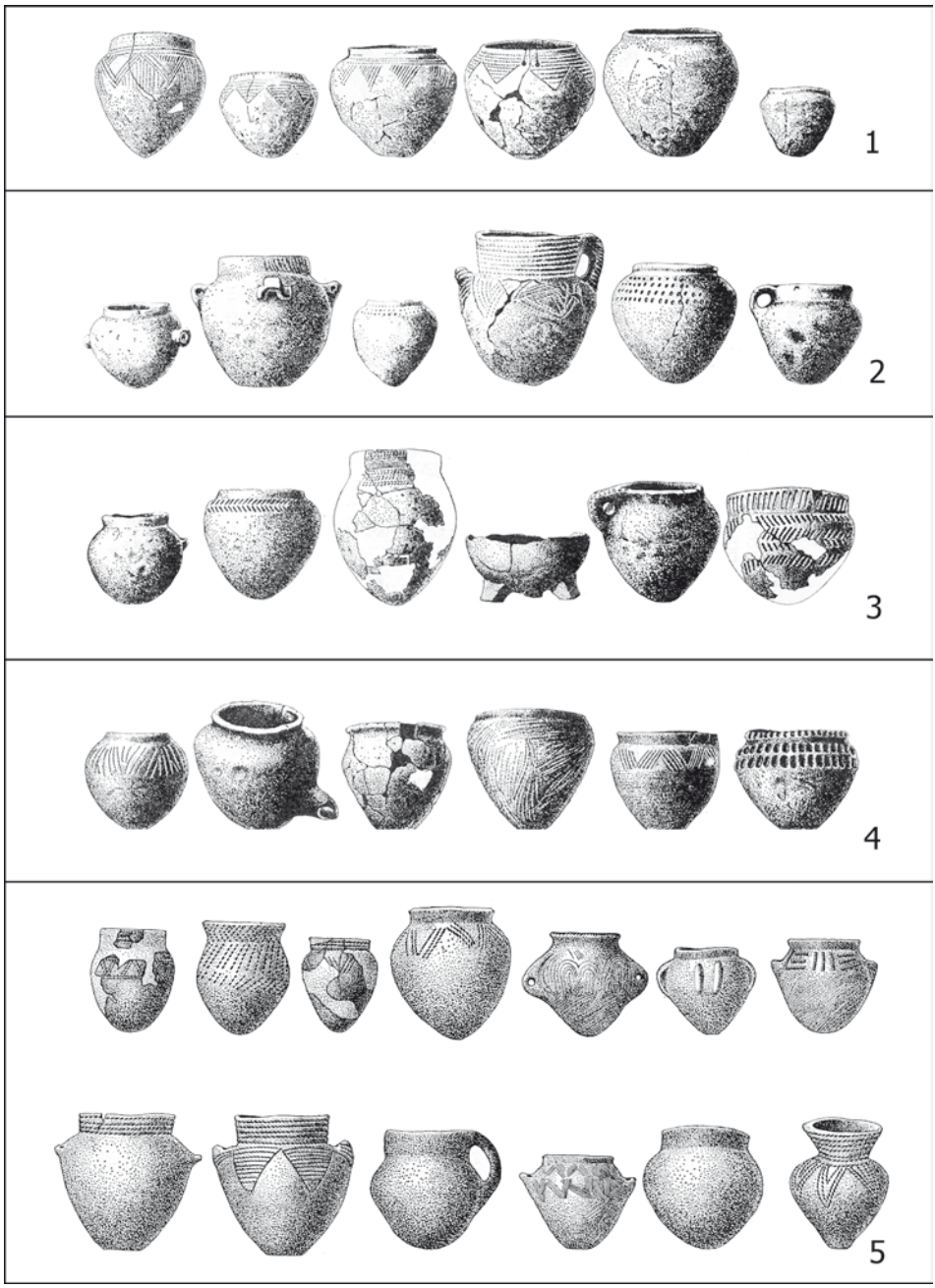

Fig. 4. Main types of pottery of the Azov-Black Sea steppes Yamna culture: 1 – Seversky Donets region; 2 – Azov region; 3 – Steppe Dnipro region; 4 – Middle Dnipro region; 5 – Bug-Ingul region. After Shaposhnikova 1985, 344, fig. 97; 346, 347, fig. 98

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

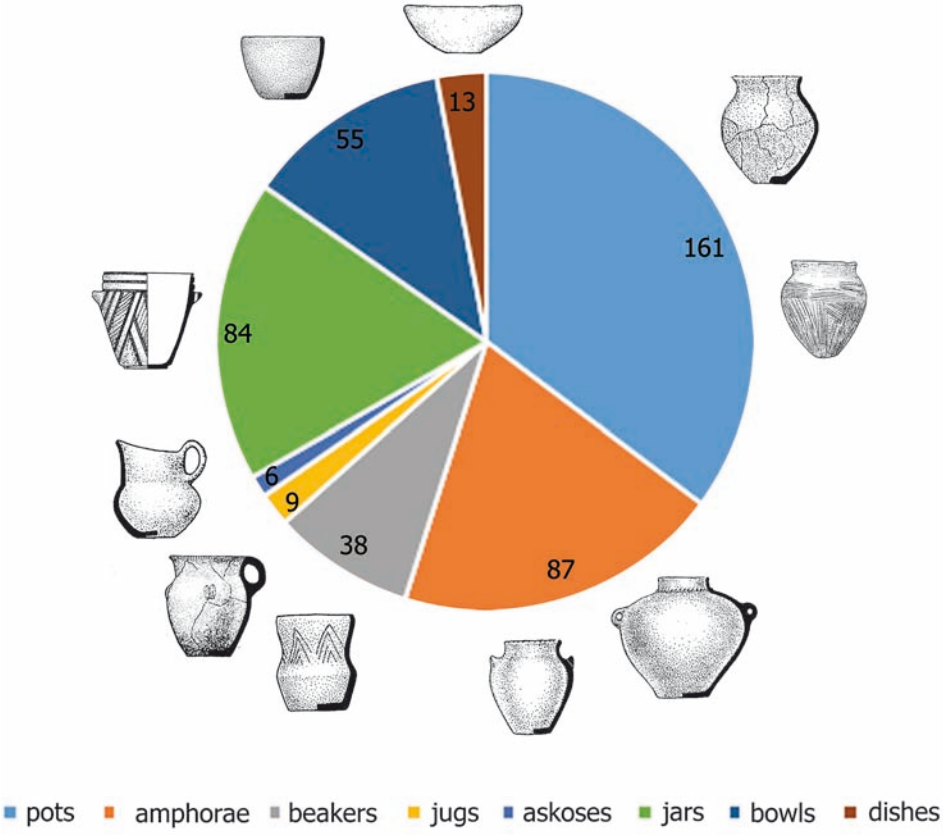

Fig. 6. Ratio of the main types of Budzhak culture pottery

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

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

Weapons:

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

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

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

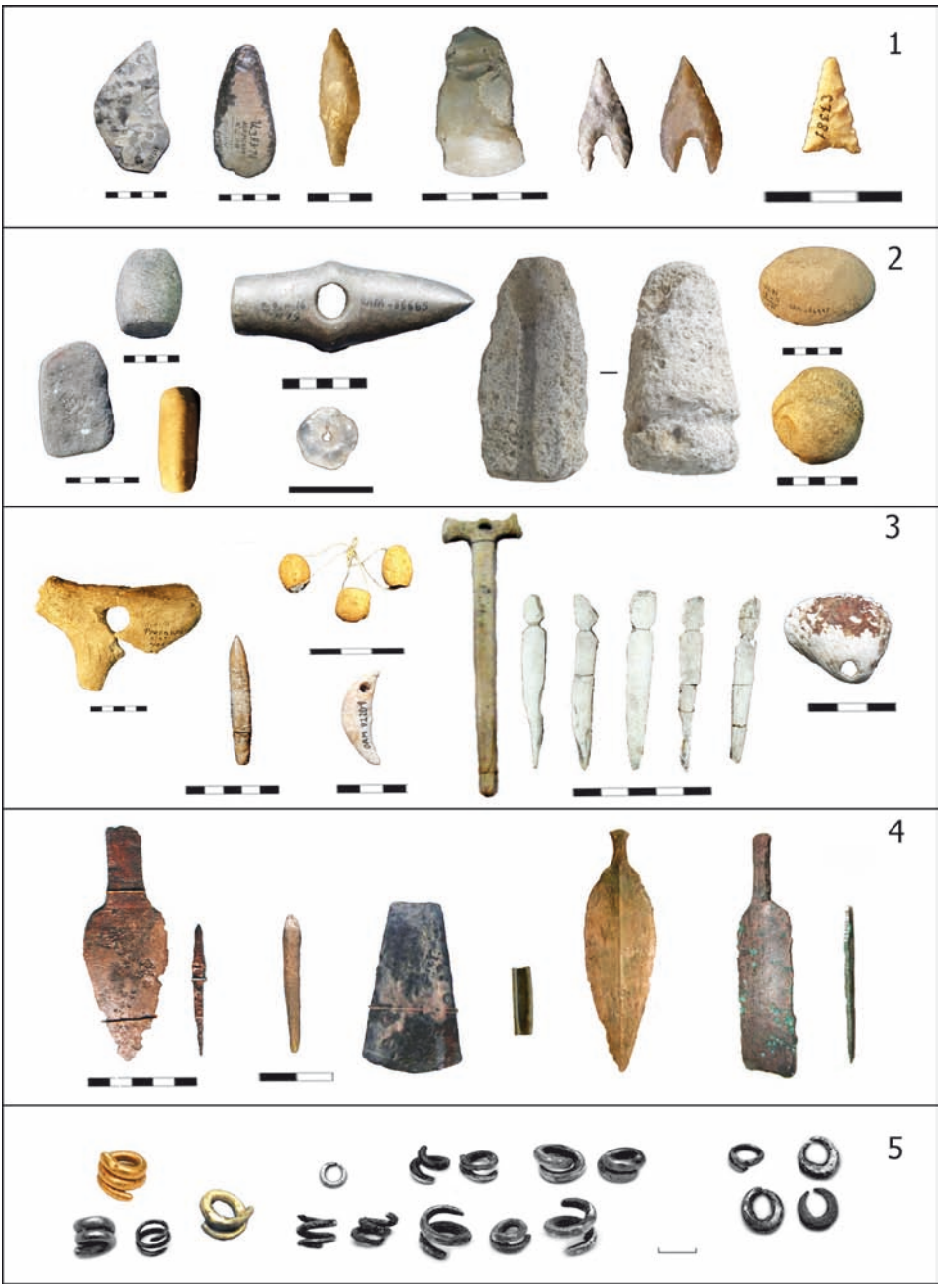

Fig. 7. Tools, weapons, and ornaments of the Budzhak culture:
1 – flint artifacts; 2 – artifacts of different types of stones; 3 – artifacts of bone, teeth and shell; 4 – artifacts of copper; 5 – artifacts of gold and silver. Photo by S. Ivanova, except where noted

Table 2. Comparison of artifacts found in different ritual groups

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

Tools:

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

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

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

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

Ritual artefacts:

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

wood: painted sticks (about 90);

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

Ornaments:

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

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

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

lead: ring (1);

bone: beads (30);

animal teeth: necklaces and bracelets (89);

Unio shells: necklaces (3);

amber: beads (1).

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

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

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

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

2.2. Social aspect

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

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

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

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

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

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

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

2.3.1. Features of Budzhak culture social analysis

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

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

2.3.2. Symbolism of the mound and social status

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

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

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

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

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

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

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

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

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

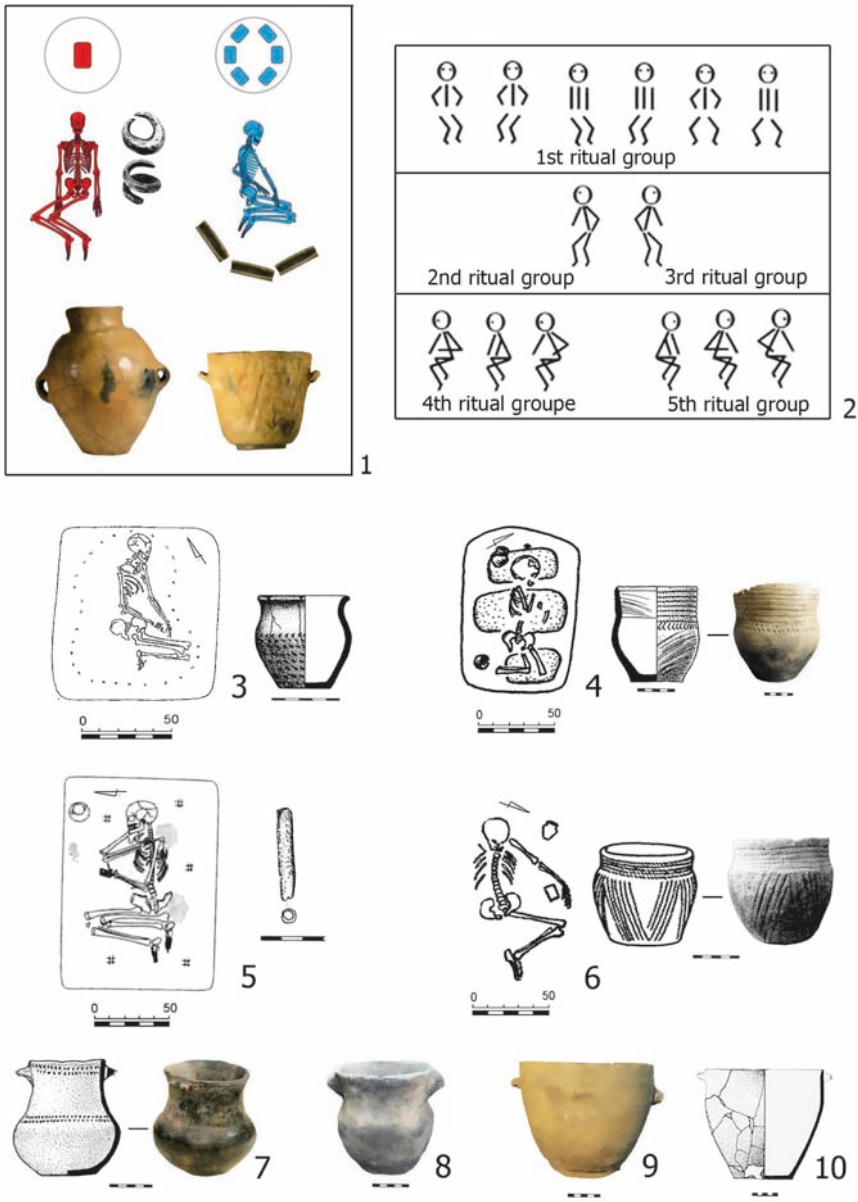

Fig. 8. Positions of the buried individuals inside the grave pits, some burials and pottery:
1 – incorrect classification (after Topal 2022); 2 - correct classification (after Yarovoy 1985, 39, fig. 2, reduced); 3 – Sărăteni, 3/14 (after Levitsky *et al*. 1996, 134 fig. 30: 1,2); 4 – Trapivka 6/20 (after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

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

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

Effort devoted to build a grave structure

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

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

Prestigious artefacts

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

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

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

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

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

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

2.5. The chronological aspect

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

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

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

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

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

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

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

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

3. PEOPLE OF THE BUDZHAK CULTURE AS NEWCOMERS

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

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

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

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

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

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

3.1. The routes of migration

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

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

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

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

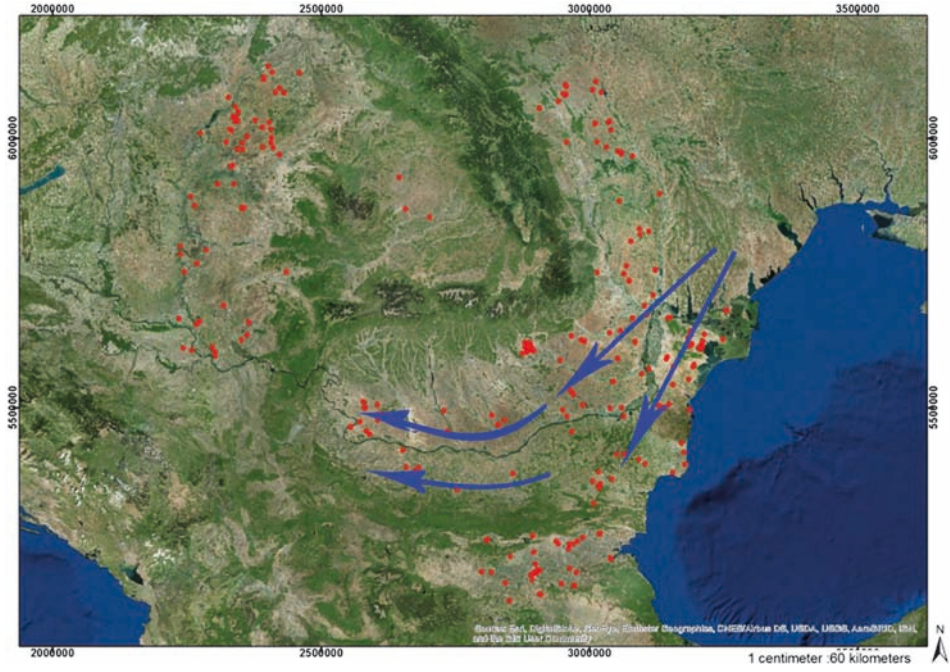

Fig. 9. The Danubian route of people of the Budzhak culture.
After Heyd 2021, path indicated by the author

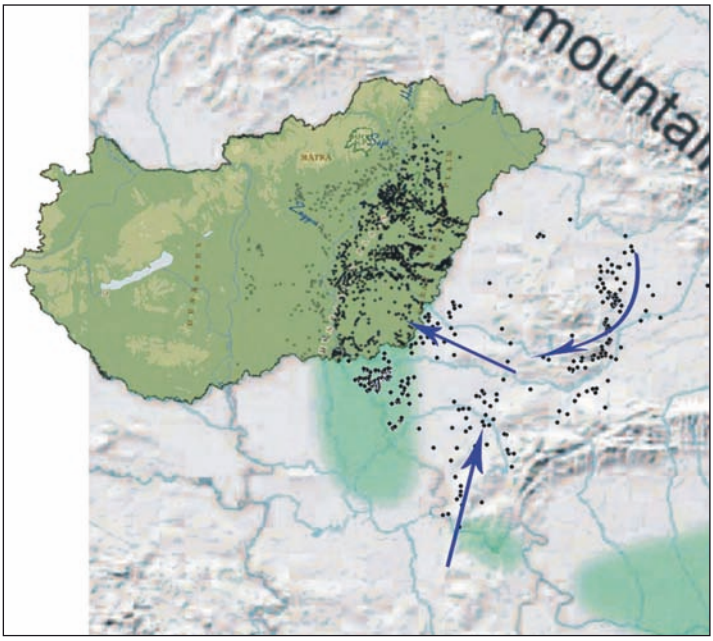

Fig. 10. The Carpathian-and-Transylvanian route of people of the Budzhak culture. After Diaconescu 2020, path indicated by the author

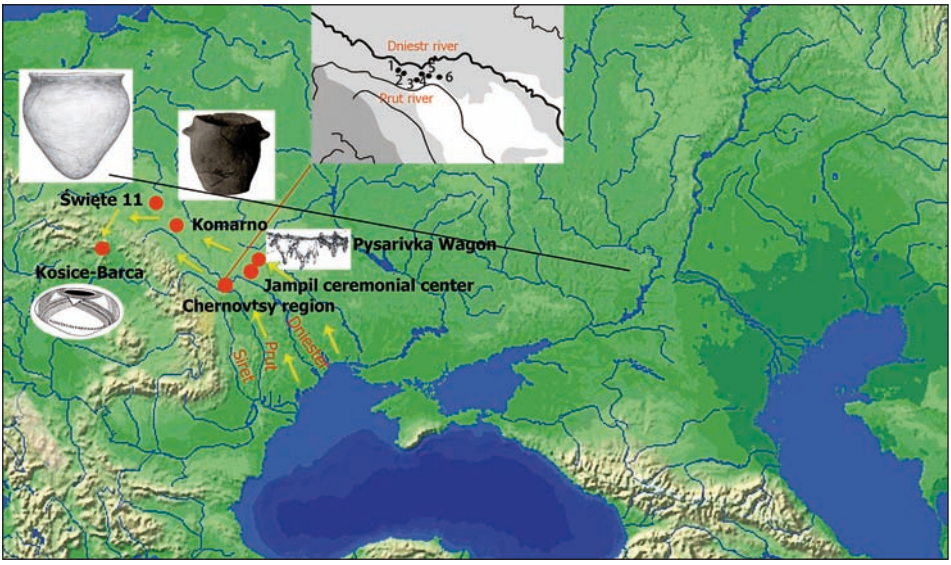

Fig. 11. The Prut-and-Dnister route of people of the Budzhak culture

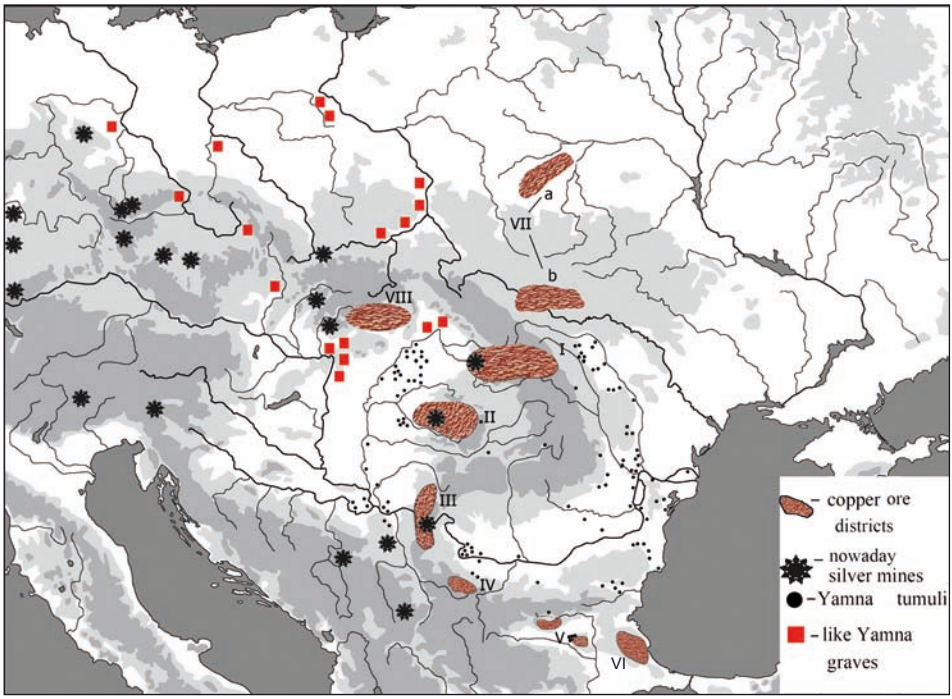

Fig. 12. Budzhak (Yamna) burial mounds and mining regions
(after Chernykh 1976, 18, fig. 2; Klochko 2004, 220, fig. 1; Pernichka *et al.* 2016, 66, fig. 14)
I – Northern part of the Eastern Carpathians (the regions of Baia Mare, Rodna, Southern Bucovina); II – Western Romanian Mountains (Apuseni; Metaliferi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

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

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

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

3.2. The aim of migration

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.3. Trade and change

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

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

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

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

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

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

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

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

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

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

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

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

4. CONCLUSIONS

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

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

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

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