

Periodization and Chronology of the Eneolithic in the Upper and Middle Kama Regions

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Abstract

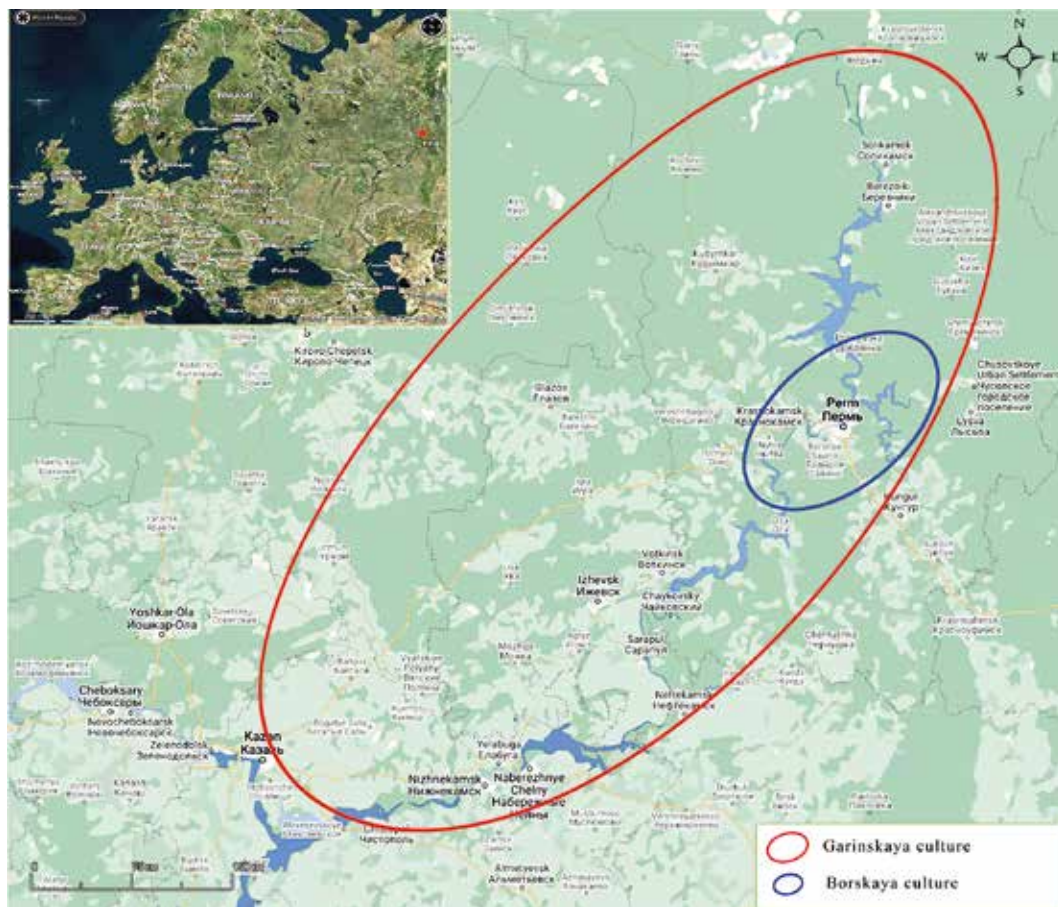
The territory of the Upper and Middle Kama regions is important for study on account of the Turbino sites that have been open there. Artifacts of this type have also been found in Finland. Subsequently, there have been several topics of discussion. Some archaeologists considered the Garino cultural complexes to be from an earlier period, while others supposed that they had appeared simultaneously with the Bor cultural type. The single radiocarbon dates were only obtained for the Garino culture. Therefore, the periodization and chronology of the Eneolithic in the Kama region have not been developed. In recent years, new archaeological sites have been excavated and a series of radiocarbon dates have been obtained for both types of cultures. This allowed us to work out the periodization and chronology of the Eneolithic of the Upper and Middle Kama regions in more detail. The chronological framework of the Garino culture was determined from 4500 BP to 3500 BP (ca. 3500-1600 calBC). The sites of the Bor cultural type were occupied from 4200 BP to 3900 BP (ca. 3000-2200 calBC). Thus, the chronological priority of the Garino culture is established. According to the typological and chronological framework, two stages in the development of the Garino culture were elaborated. The coexistence of the Garino and Bor complexes had a place at the end of the early stage of the Garino culture.

1 Introduction

The study of the Eneolithic sites in the Upper and Middle Kama regions began in the 1930s (Shmidt 1935; Prokoshev 1935). As a result of large-scale excavations in the 1940s and 1950s, O.N. Bader and his students created a considerable source base for this period. On this basis, the researcher identified the Turbino culture. He combined the settlements of the Garino and Bor type with the Turbino burial ground into this culture

(Bader 1963; 1964). O.N. Bader attributed all materials to the Bronze Age back to the 2nd millennium BC (Bader 1961a; 1961b). The researcher identified the early (Garino) and late (Bor) stages as part of the Turbino culture. The chronological framework of the first stage was determined as being between the 20th century BC and the 14th century BC, with the second being in the 14th-12th centuries BC (Bader 1963: 25-30).

In the 1970s and 1980s, as a result of studying the chemical composition of the



metal artifacts from the Turbino burial ground and settlements, some archaeologists made conclusions about their significant differences. In order to make a distinction between the materials of burial grounds of the Turbino type and settlement complexes, the term “Garino-Bor culture” was proposed for the latter (Chernykh 1970). As a consequence, the complexes of the Turbino burial ground were attributed to the Bronze Age, and the materials of the Garino and Bor settlements to the Eneolithic (Chernykh & Kuzminykh 1989). The authors of the article agree with the researchers’ assertion that the Eneolithic is characterized by tools made from copper, whereas the Bronze Age began with the appearance of copper alloys (Ryndina & Degtyareva 2002). Further re-

search allowed scientists to substantiate the independent status of the Garino culture and distinguish the Bor culture as a special type (Melnichuk 1990; Nagovitsyn 1990). However, there remained questions about the genesis and periodization of these cultures, as well as the chronology. This was due to the lack of stratigraphic data and a representative series of radiocarbon dates. This paper aims to advance the resolution of these contentious questions.

2 Garino culture

The territory of the Garino culture’s distribution covers the entire Kama River basin up to the River Ik in the south. The greatest concentration of sites is in the estuary of

the Chusovaya River near the cities of Perm, Osa, Okhansk, Tchaykovsky and Sarapul. More than 20 out of 100 reference sites were investigated, located on pine-forest terraces over a floodplain with a height of 4-10 m. Temporary seasonal sites (Bor II, Borovoe ozero IV, etc.) were studied. At the same time, permanent settlements with a large number of dwellings were investigated: Krasnoe Plotbishche (30), Bor I (24), Starushka I (12), Nepryakha VII (27), Borovoe ozero II (12), etc. The number of house pits is smaller in the sites of the Northern Kama region (Chashkinskoe ozero II, Vasyukovo II). A characteristic feature of early Garino construction is square pit-houses connected by passages and dug into the ground to a depth of 1 m. Their surface area varies from 40 to 100 m² (6 x 7 m; 8 x 8 m, etc.). Rectangular single dwellings were more typical on the Garino sites of the late stage.

Garino ceramics are characterized by porosity. O.N. Bader suggested that this is the result of the presence of pine bark admixture in the clay, burnt away during firing (Bader 1961a: 28). In the south of the Kama region (Simonikha II, Krasnoe Plotbishche), Garino culture dwellings were found in loamy soils, and the ceramics found have an admixture of the crushed shell. Apparently, it was dissolved in sandy soils (Denisov & Melnichuk 2014: 50). This is confirmed by the recent analysis of the molding mass of the Garino culture's ceramics (Batueva & Lychagina 2018).

The Garino vessels have a cylindrical neck with a restricted or straight mouth and a rounded bottom. In addition to the rounded and straight rims, Г- and T-shaped rims are present. These were decorated with imprints of a toothed stamp, and less often with short oval impressions. Sometimes the pattern is located on the inside of the rim. A characteristic feature is the treatment of the inner surface of the vessels with a toothed instrument, which resulted in the formation of scratches (Fig. 1).

The ornament covers almost the whole surface of the vessel walls in horizontal and

vertical zones. The vast majority of the pottery was decorated with a comb tool, which can be divided into prints of a long stamp and prints of a short oval. The second variety is more characteristic of the southern Garino sites of the Middle Kama region. Ornamental compositions are represented by belts of oblique or horizontal rows of imprints of a long or short stamp, a horizontal or vertical zigzag pattern, and oblique lattice. There is a motif in the form of a "stepping comb" (Fig. 2). Interestingly, "stepping" prints are more common on the pottery of the Upper Kama region than on the sites of the Middle Kama region. Geometric compositions in the form of rhombuses and triangles are present. These motifs resemble patterns of the Ayatskaya type of Trans-Ural origin. Similar ceramics were found in the dwellings of the Bor I settlement and others.

Flakes and spalls served as blanks for making tools. Blades are practically absent. Flint slabs were used for toolmaking. Among the tools are end scrapers and round scrapers, sometimes with a cut blade. The knives are leaf-shaped, rectangular, or curved, and sometimes have a "button-like" shape on the handle. Borers are less common. The arrowhead forms include leaf-shaped, willow-leaf-shaped and triangular ones with truncated or notched bases, including also pentagonal specimens (Fig. 3). Woodworking tools are present in the form of polished axes, adzes, and chisels. There are also grooved hammer stones. Stone sinkers for fishing nets confirm the presence of net fishing. Adornments are represented by oval or round slate pendants, and animals are represented by flint figurines.

Traces of metallurgy were found in many sites (Bor I, Boytsovo VI, Vystelishna, Starushka). A structure used for copper smelting was discovered in the Krasnoe Plotbishche settlement, some fragments of clay casting moulds were found in the settlement of Zaosinovo I, and more than 600 pieces of copper ore were found in a dwelling at the Sauz I settlement (Vybornov et al. 1984). In addition, various copper products were discovered: awls, leaf-shaped knives, and spiral

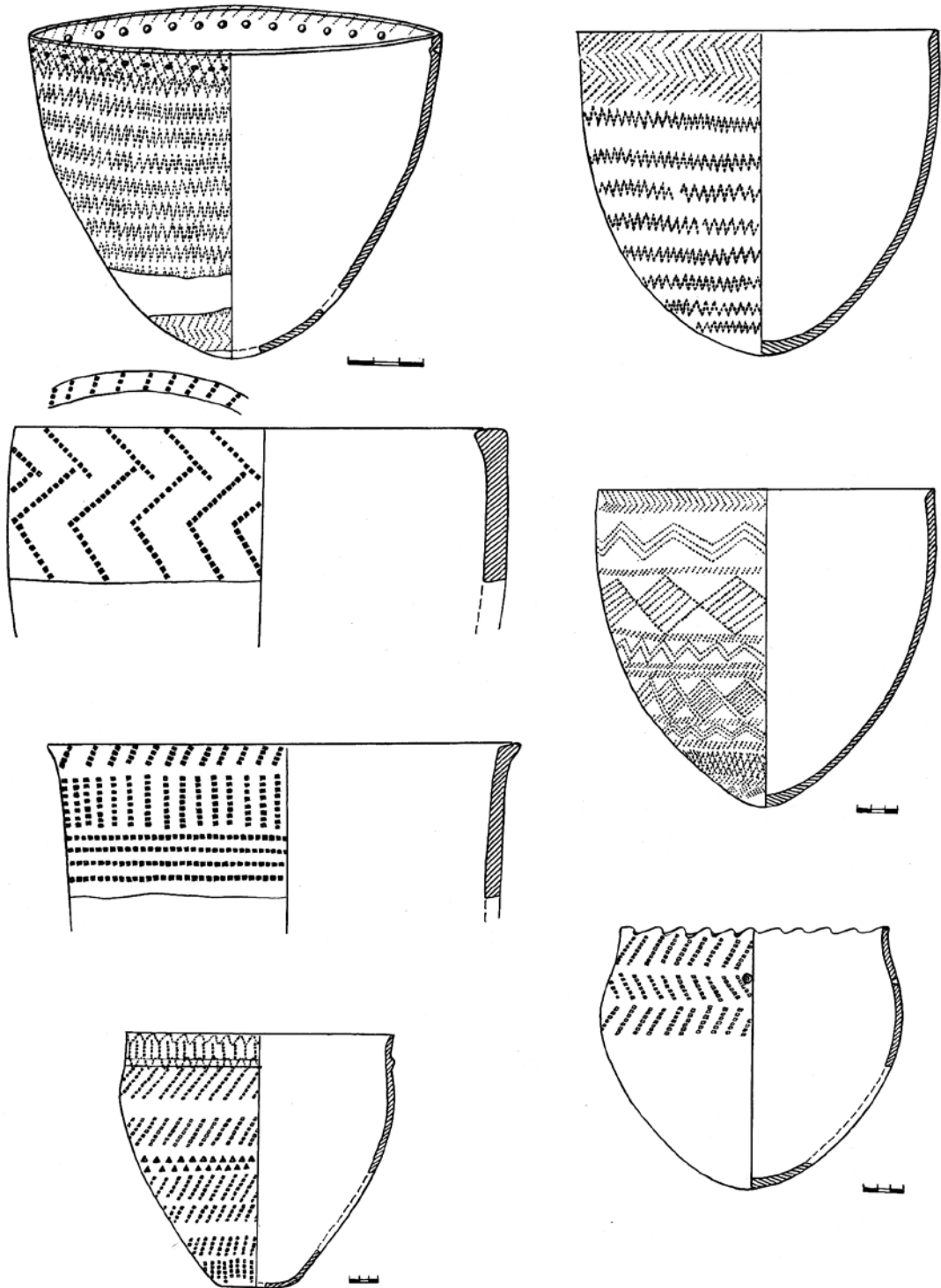


Figure 1. Ceramics of the Garino culture.

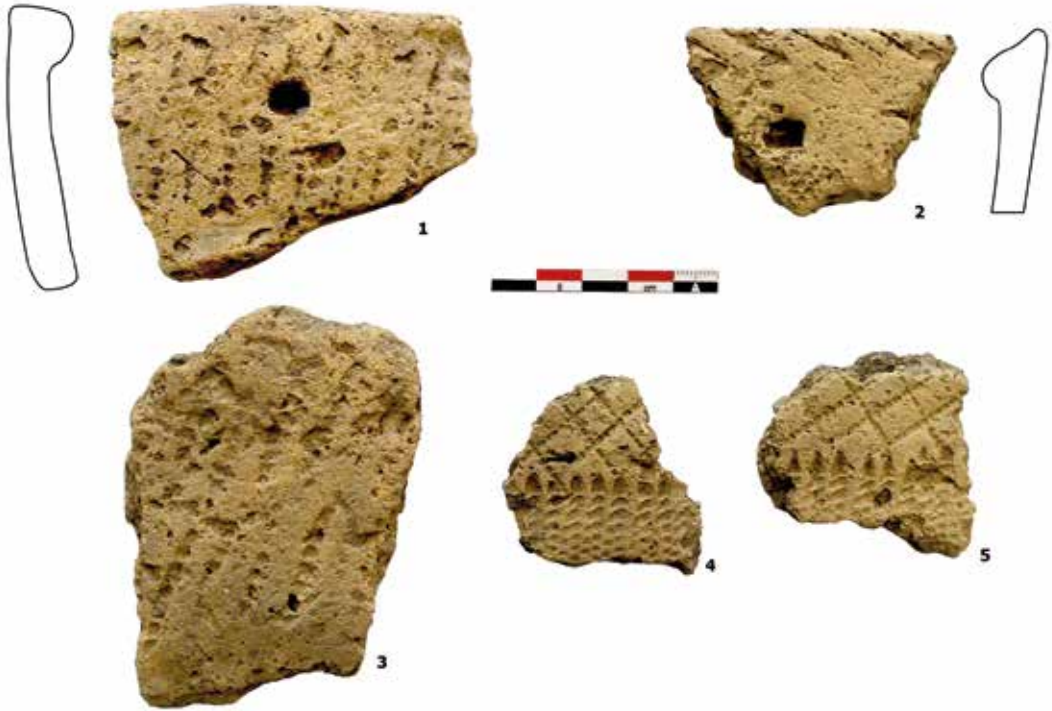


Figure 2. Ceramics of the Garino culture.

and spectacle pendants. The population of the Garino culture had established a kind of centre of non-ferrous metallurgy based on the copper sandstones present in the Kama region (Kuzminykh et al. 2013).

O.N. Bader proved the genesis of the Garino culture based on the local Kama Neolithic culture (Bader 1963). This hypothesis was also supported to a certain extent by other researchers (Melnychuk et al. 2006: 125; Vybornov 2008). Currently, there is a viewpoint that the origins of the Garino culture were influenced by the forest-steppe population of the Tokskoe type of the Ural region. Southern features of ceramics include the inclusion of crushed shells in clay paste, scratching on the inner vessel surface with a toothed stamp, Γ- and T-shaped rims, ornamentation of the rim tops, some decoration motifs, arrowhead forms, etc. (Stavitskiy 2011: 229-232).

3 Sites of the Bor type

O.N. Bader identified the characteristic features of the Bor artifacts, which distinguished them from the rest of the Eneolithic sites of the Urals (Bader 1954; 1961a: 184; Bader & Kokarev 1959).

It is important to note that the sites of the Bor culture occupy a small territory in the estuary of the Chusovaya River (Bor II-V, Borovoe ozero IV, VI, Maloe Borovoe ozero) and near the city of Perm on the left bank floodplain of the Kama River (Zayurchim I, Zverevo), whereas they are very rare in the south. Only two sites, Ust-Ocher I near the city of Okhansk and Boytsovo I near the city of Osa, yielded small Bor ceramic complexes (Bader 1961b: 119-124. Fig. 7-9). The number of sites of the Bor culture is significantly less than those of the Garino type. Large settlements are not characteristic of this culture.

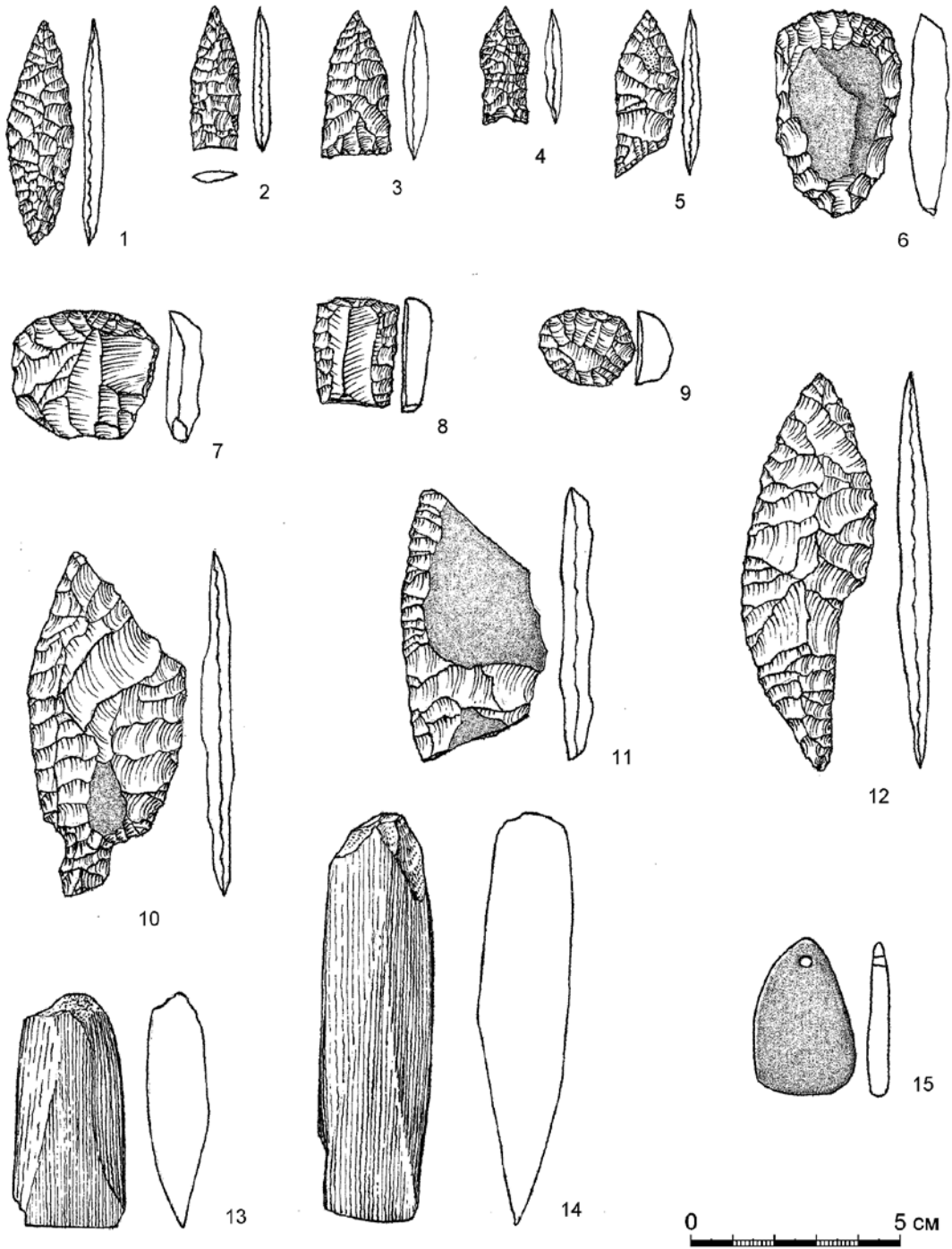


Figure 3. Stone tools of the Garino culture.

Three elongated rectangular structures were studied at the Bor V settlement, three at Bor III and one at Malo Borovoe ozero. The largest of them (36 x 6 m) was excavated at the Borovoe ozero VI settlement.

Borino ceramics are represented by vessels with open pot or bowl shapes, straight walls and a rounded bottom. They are porous because of the dissolution of shell inclusions added to the clay paste. The inner side of the vessels is scraped with a toothed instrument. The rims are slightly bent outward and slanting in cross-section. Ornamentation was sometimes applied to the top and the inside of the rim (Fig. 4), though it does not cover the entire surface of the vessel. The decorations were applied with a comb tool (80-90%). Unlike with the Garino type, impressions of short and medium stamps prevail. Another 10-15% of the vessels are decorated with pit-like impressions and about 10% with a smooth stamp. The ornamental compositions of the Bor vessels are simple: horizontal and oblique belts, and vertical and horizontal zigzags (Fig. 5). A characteristic feature of Bor ceramics is the lack of a "stepping comb" motif.

The stone industry of the Bor complexes is characterized by blade technology. In contrast to the stone industry of the Garino culture, flint slabs were hardly used as raw material. The percentage of tools with long and wide blades is quite high. Knives with straight edges have been made with large blades with an edge retouch on the long sides. End scrapers on massive spalls have a steep retouch on the longitudinal sides. The arrowheads are leaf-shaped, lanceolate, almond-shaped, and tanged, and they come with a truncated base. Axes, adzes, chisels, sinkers, and hammer stones are present, and the adornments include slate pendants (Fig. 6).

Traces of metalworking were only found in dwelling 2 of the Bor V settlement, where an awl and plate, two pouring funnels and three drops were found. A spectral analysis performed by E.N. Chernykh showed that, in terms of metal composition, these products are similar to the copper objects from

the late Garino settlements of Basenkiy Borok and Vystelishna.

The genesis of the Bor culture is an issue of debate. According to O.N. Bader, the formation of the Bor culture was influenced considerably by elements of the Novoilinsk culture that appeared in the Chusovskoye Kama region in the late Garino stage (Bader 1961a: 184). Other researchers emphasise the local originality of the Bor culture in the Chusovskoye Kama region. There is also a school of thought that states that the Bor culture was formed based on the Novoilinsk culture instead of being based on Garino culture sites (Melnichuk 1990; Nagovitsyn 1990).

4 Periodization and chronology of the Garino and Bor complexes

While working on questions of periodization and chronology of the Eneolithic materials, O.N. Bader relied on archaeological data. Based on them, he believed that the sites of the Garino culture were from an early stage. On their basis, later Bor complexes were formed under the influence of the Novoilinskaya culture. The researcher noted the Neolithic appearance of materials of the Novoilinskaya type, but the discovery of copper objects there made him favour the main hypothesis. In the absence of radiocarbon dates, the chronological framework of these cultures was determined rather approximately.

In the 1990s, researchers referred again to these issues. They focused on the fact that features of the Kama Neolithic culture are traced in the Bor materials. These features include pot or bowl-shaped vessels, decoration patterns made with large oval shallow pits, a small percentage of arrowheads, and the shape and size of dwellings. Thus, many of the material culture components of the Bor cultural type of sites seemed to the researchers to be more archaic than the Garino ones. As for chronology, the Garino culture was dated to between the second half of the 3rd and the first half of the 2nd millennium BC

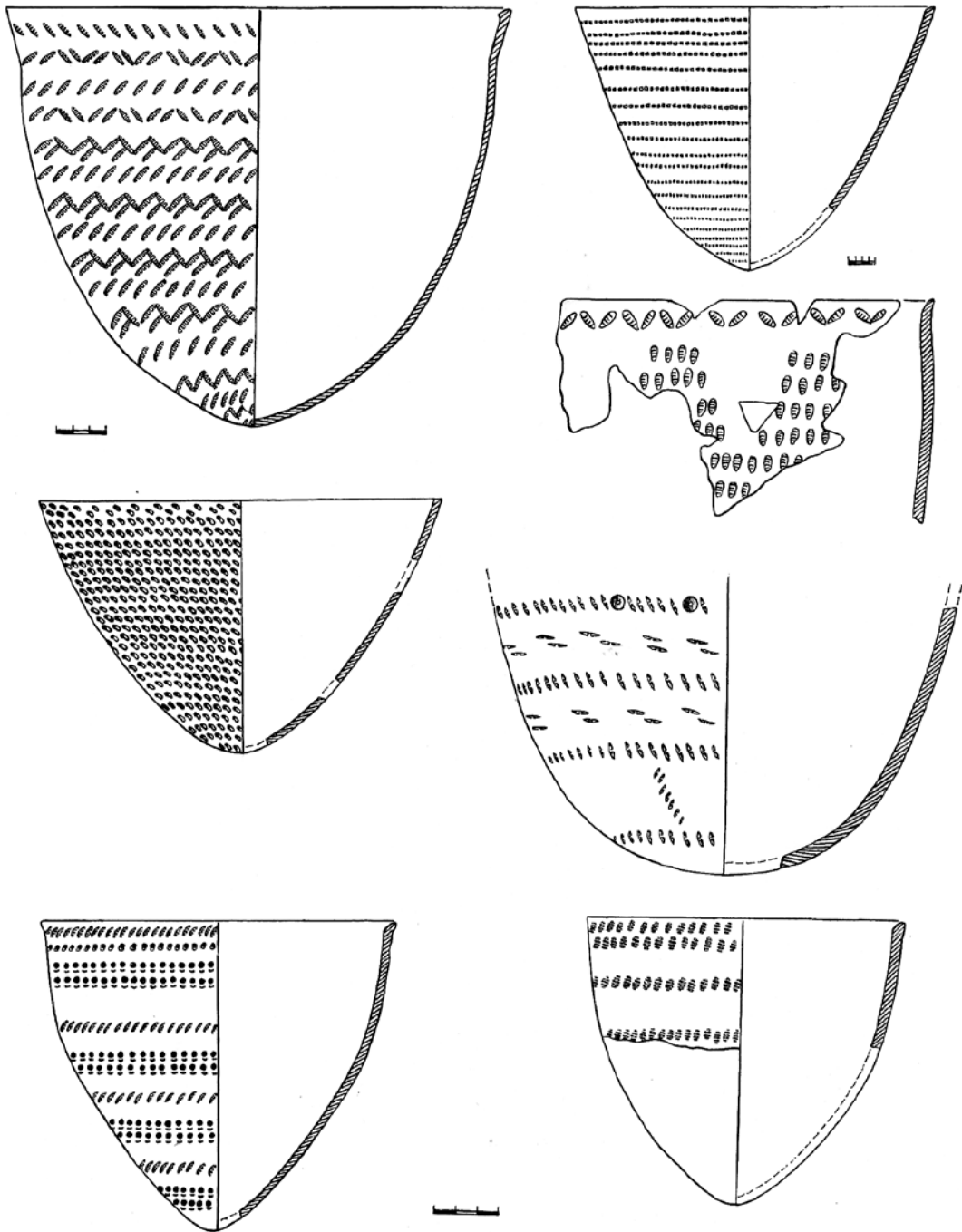


Figure 4. Ceramics of the Bor cultural type.

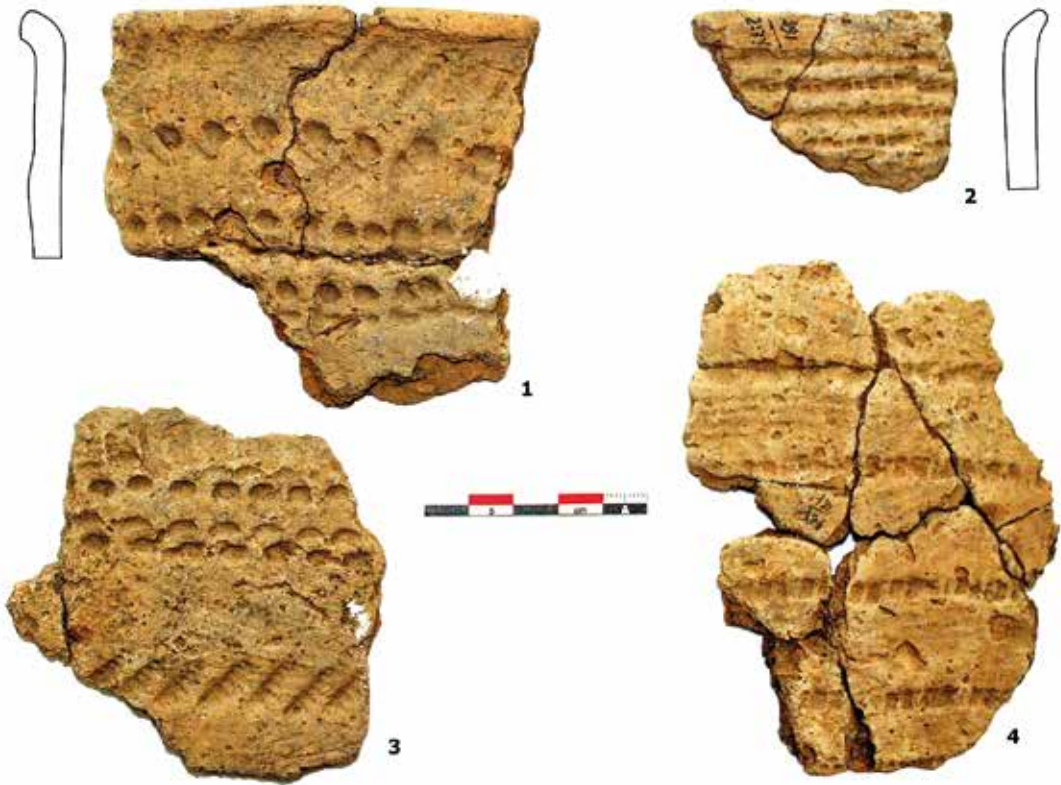
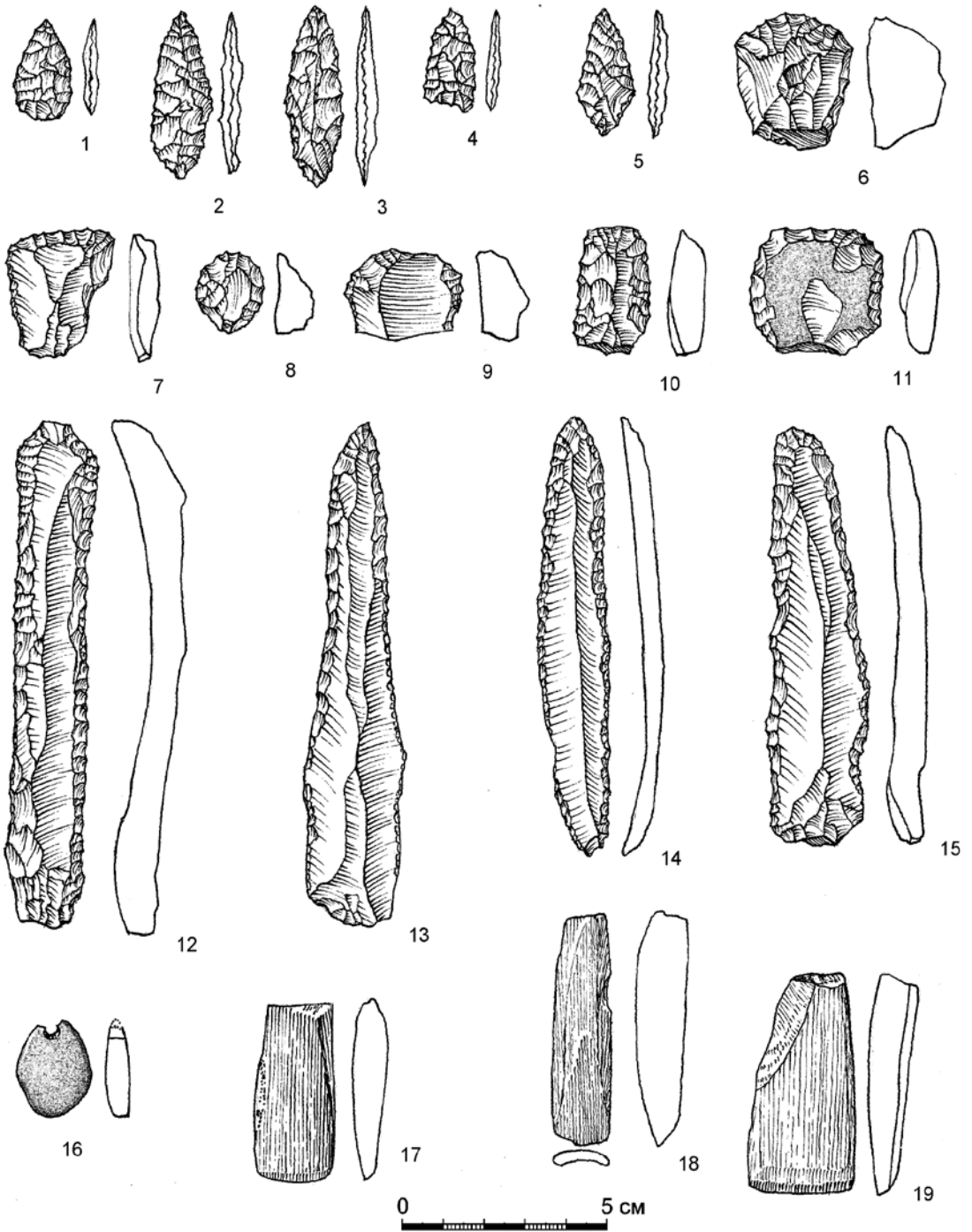


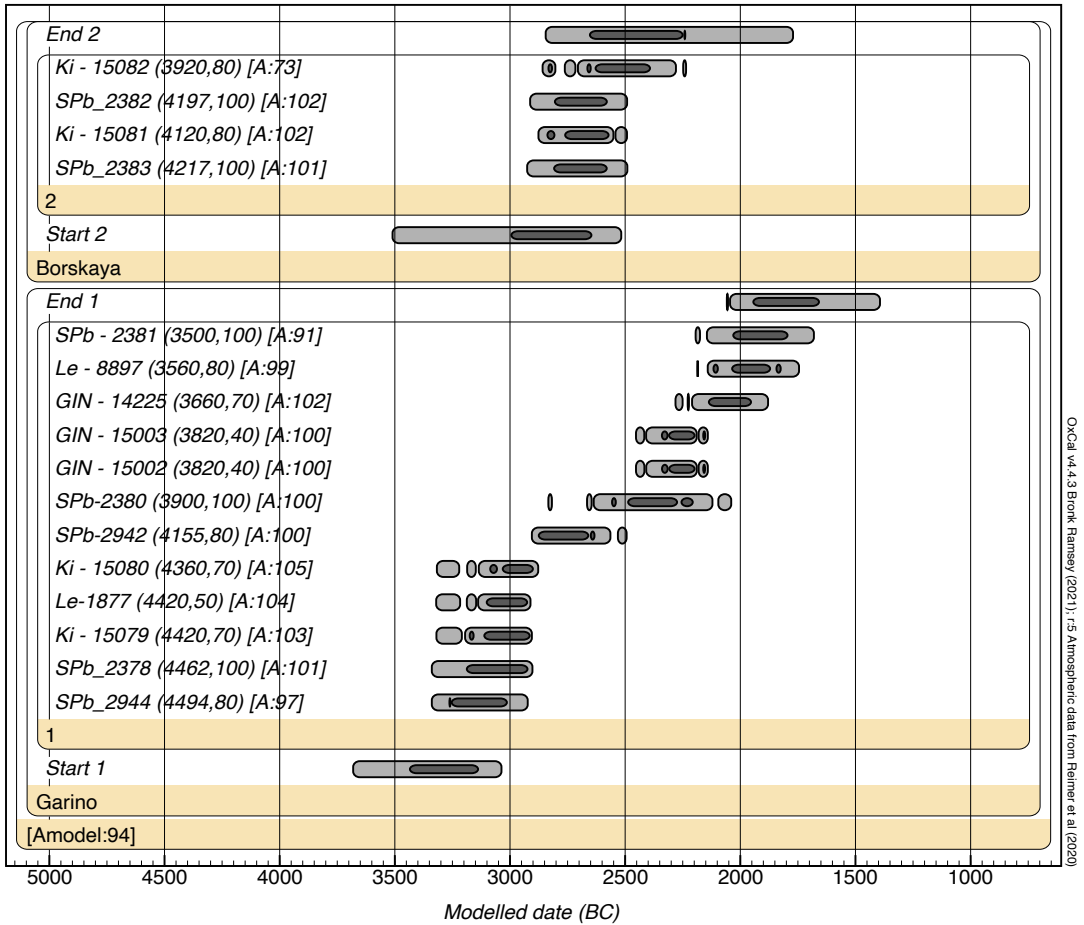
Figure 5. Ceramics of the Bor cultural type.

in the preliminary plan. A radiocarbon date was used to date the lower boundary, and the rest of the interval was dated by analogy. Researchers believed that the sites of the Bor culture existed for a shorter period and correlated with the early Garino ones (Nagovitsyn 1990; Melnichuk 1990).

Since 2007, the research team has carried out targeted work to create a base of radiocarbon dates of the Eneolithic in the Kama region (Melnichuk 2009; 2013; Lychagina & Vybornov 2009; Lychagina 2011; Vybornov et al. 2019). This made it possible to establish a quite reliable chronological framework of the Novoilinsk culture: from the last quarter of the 4th to the middle of the 3rd millennium BC. A comprehensive analysis of all materials of the Novoilinsk type did not confirm its belonging to metallurgical cultures (Denisov & Melnichuk 2014; Vybornov et al. 2019).

The analyses for the Garino and Bor settlements were obtained from charcoal and organics in the pottery matrix. The radiocarbon dates on charcoal were obtained for sites with a single cultural layer for this region. This is well correlated to archaeological periodization. Most of the dates on the organics of ceramics are reliable, and this was supported by other investigations on Neolithic and Eneolithic sites. For example, the dates on the organics of ceramics from the Baybek site in the Northern Cis-Caspian region are 6920 ± 120 BP (SPb-1053) and 6925 ± 120 BP (SPb-1716), coinciding with the dates on charcoal (6986 ± 44 BP (Ua-50260) and 6948 ± 120 BP (SPb-1713)). The date on the organics of ceramics from the Oroshaemoe site in the Lower Volga basin (5890 ± 120 BP (SPb-1729)) is the same as the date on animal bones (5806 ± 26 BP (UGAMS-23059)). Then





there are the dates for the Kalmikovka 1 site located in the forest steppe zone of the Volga basin. The date on the organics of ceramics is 5950 ± 120 BP (SPb-1759). This is the same as the date on the animal bones: 5989 ± 70 BP (SPb-1876). The date on Neolithic ceramics (7010 ± 80 BP (Ki-15915)) from the Koksharovskiy Kholm site in the forest zone of the Ural region coincides with the date on charcoal (7050 ± 180 BP (Le-7883)). The same situation exists on the Zamostye II site in the Upper Volga region. The dates on the ceramics of the Early Neolithic are 6830 ± 80 BP (Ki-15533) and 6680 ± 80 BP (Ki-15434). The dates on the charred crusts are 6834 ± 63 BP (Ua-48463) and 6650 ± 45 BP (Ua-37101). The Khvalynsk culture on

the Kara-Huduk site located in the Northern Cis-Caspian region has two dates on the organics from ceramics: 5950 ± 80 BP (Ki-14912) and 5820 ± 80 BP (Ki-14911), while the dates on the animal bones are 5900 ± 100 BP (SPb-2365) and 5854 ± 60 BP (SPb-2338). For the Kama Neolithic culture of the Upper Kama region the dates on ceramics and charcoal are 5880 ± 100 BP (SPb-897) and 5850 ± 70 BP (GIN-15447), respectively. Specialists note that dating the ceramics with shell inclusions could yield the wrong date in some cases (Meadows, 2020). This type of ceramic composition gives a reservoir effect in dating. The Garino and Bor ceramics were made from clay paste without shell inclusions. The radiocarbon dates on organics of

| N° | Site | Index | Age (BP) | Age, calBC (2 s) | Material |
|----------------|-------------------------|-------------|----------|------------------|----------------|
| GARINO CULTURE | | | | | |
| 1 | Nepryakha IV | Le - 1877 | 4420±50 | 3350-2900 | Charcoal |
| 2 | Bor I | SPb-2378 | 4462±100 | 3490 - 2901 | Pottery carbon |
| 3 | Lake Borovoe II | Ki - 15079 | 4420±70 | 3340-2900 | Pottery carbon |
| 4 | Lake Borovoe III | Ki - 15080 | 4360±70 | 3340-2870 | Pottery carbon |
| 5 | Bor I | SPb-2380 | 3900±100 | 2637-2121 | Pottery carbon |
| 6 | Lake Chashkinskoye IX | SPb-2944 | 4494±80 | 3484-2925 | Pottery carbon |
| 7 | Lake Chashkinskoye IIIa | SPb-2942 | 4155±80 | 2904-2496 | Pottery carbon |
| 8 | Lake Chashkinskoye IIIa | GIN - 15002 | 3820 ±40 | 2370-2190 | Charcoal |
| 9 | Lake Chashkinskoye IIIa | GIN - 15003 | 3820 ±40 | 2370-2190 | Charcoal |
| 10 | Novoil'inskoe III | GIN - 14225 | 3660±70 | 2300-1750 | Charcoal |
| 11 | Novoil'inskoe III | Le - 8897 | 3560±80 | 2140-1690 | Charcoal |
| 12 | Krasnoe plotbicshe | SPb-2381 | 3500±100 | 2061-1608 | Pottery carbon |
| BOR CULTURE | | | | | |
| 13 | Lake Borovoe VI | SPb-2383 | 4217±100 | 3036-2562 | Pottery carbon |
| 14 | Lake Borovoe IV | Ki - 15081 | 4120±80 | 2890-2480 | Pottery carbon |
| 15 | Bor V | SPb-2382 | 4197±100 | 3022-2550 | Pottery carbon |
| 16 | Bor III | Ki - 15082 | 3920±80 | 2620-2190 | Pottery carbon |

Table 1. Radiocarbon dates of the Garino and Bor cultures.

this type of ceramics have good correlation with archaeological periodization.

To date, four ¹⁴C dates have been received for the Bor sites (Table 1). Three of them have a rather close time interval, which indicates the validity of the obtained data. Thus, new data suggest the existence of the Bor culture in the Chusovskoye Kama region between the last quarter of the 3rd and the beginning of the 2nd millennium BC. The fact that the typologically earliest complex of the Borovoe ozero VI settlement received the earliest date also argues in favour of the validity of the dates. Judging by the dates, the upper boundary of the Novoilinskaya culture and the lower boundary of the Bor culture have a gap of about 400 years. This casts doubt on the chronological sequence of these cultures. To specify the periodization of the Bor sites, an additional comparative analysis of the materials of the earliest (Borovoe ozero VI) and latest (Bor III) sites is required.

As for the chronological frameworks of the Garino culture, its definition was based on the presence of Ayatskaya type of pot-

tery in the Eneolithic Kama region dwellings (Bader 1961a; Melnichuk 2009: 15-16), dating back to the second half of the 3rd millennium BC. (Chairkina 2005: 289). It is permissible to date the beginning of the late Garino period based on the copper lunulas from the sites of Starushka, Vystelishna and Ust-Pal, an analogy of which is presented in the West Siberian dated complexes of the end of the 3rd millennium BC (Koksharov 2012: 32-34).

For the Garino culture, 12 radiocarbon dates from eight sites were obtained (Table 1). They fit into the interval from the middle of the 3rd to the middle of the 2nd millennium BC. Most dates of the first half of the 2nd millennium BC were obtained on charcoal (Table 1, 8-11), while most of the dates of the second half of the 3rd millennium BC were obtained on organics in the ceramic matrix (Table 1, 2-7). There is no inclusion of shells in the clay pastes of the fragments used for the analysis (the shells were probably dissolved due to being in sandy soils). It is noteworthy that the two dates on char-

coal from the Chashkinskoe ozero IIIa site are 300 years younger than the dates for organics from ceramics (Table 1, 7-9). If that is not taken into account, then in the series of dates for the Garino culture two groups are formed: 4460-4360 BP (3500-2870 calBC) and 3900-3500 BP (2637-1600 calBC). It is interesting to note that the dates for the Borino type fit into the interval of 4200-3900 BP (3022-2200 calBC). At the same time, the earliest dates on organic matter in ceramic matrices coincide with the dates on charcoal. In addition, the earliest date corresponds to the earliest typological complex of the Bor I site, which confirms its validity. A similar situation exists with the latest date. It fits well in a series of data on charcoal. The earliest dates match with the latest data for the Novoilinsk culture. The chronological coexistence of the Garino and Bor complexes between the last quarter of the 3rd and the very beginning of the 2nd millennium BC cannot be excluded. Two groups of dates make it possible to confirm the stages in the development of the Garino culture.

At the early stage of the Garino culture, large vessels (up to 70%) with a restricted or straight mouth and a rounded bottom are widespread. There are rims with a bulge on the inside of the vessel. The Γ -shaped rim form appears. The proportion of ornamentation with a toothed stamp reaches 60%. Sometimes the decoration is located on the inside of the rim. There is a horizontal row of round pit-like impressions under the rim on early Garino vessels. The surface of the vessels is densely filled with decoration patterns. The ornamentation is dominated by a long comb stamp. The motif of the “stepping comb” is widely represented. The presence of the Ayatskaya culture of ceramics of Trans-Ural origin is specifically recorded at the early stage.

Closed forms of vessels disappear at the later stage, and new forms of vessels appear: flat-bottomed with an open orifice and a bent rim. Vessels with wavy rims and raised cordons (Zayurchim I, Kamskiy Bor

II, Rychino III) spread towards the end of the Garino era. The appearance of ceramics with raised wavy cordons and homogeneous ornamentation with a fine-toothed stamp in the late Garino complexes is interconnected with the emerging Seima-Turbino culture community of the region. This phenomenon is reflected in the typological proximity of ceramics with raised wavy cordons of the Kama region with the West Siberian Krotovo wares. The appearance of horizon pottery with raised cordons in the area of distribution of Garino pottery should be considered, along with the Chirkovo complexes of the Mari Volga region, in the framework of the formation of the Seima-Turbino phenomenon in the taiga zone of Eastern Europe (Solovyev 2000: 98; Denisov et al. 2012). There is a depletion of ornamentation. The motives of the “stepping comb” and the oblique lattice disappear in the late Garino era. The ornament becomes sparse, while some vessels have no ornamentation at all. It was during this period that the action of its own centre of metallurgy actively manifested. This period is also characterized by findings of metal weapons (spears - Zayurchim I, Sauz I) and ornaments of the Abashevo culture.

Obviously, contacts between the Bor and Garino populations began in the last quarter of the 3rd millennium BC, as evidenced by the materials of the Bor V settlement. It is likely that the Garino population assimilated the members of the Bor culture type at the beginning of the 2nd millennium BC. The end of the Garino culture is chronologically set in the middle of the 2nd millennium BC according to the finds of the Abashevo culture within the dwellings (Starushka, Krasnoe Plotbishche, etc.), supported by radiocarbon dates.

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